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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

89980 7590 07/21/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER
SALVUCCI, MATTHEW D

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
07/21/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
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In re Application of	:	
OH, SEUNG WOO, et al.	:	
Application No.: 14/921,269	:	NOTICE
Filed: October 23, 2015	:	
Attorney Docket No.: 304052.0001	:	

This is a notice regarding the request for acceptance of a fee deficiency submission under 37 CFR 1.28(c) filed April 01, 2020.

The Office no longer investigates or rejects original or reissue applications under 37 CFR 1.56. **1098 Off. Gaz. Pat. Office 502 (January 3, 1989)**. Therefore, nothing in this Notice is intended to imply that an investigation was done.

The fee deficiency submission under 37 CFR 1.28(c) is hereby **ACCEPTED**.

This application is no longer entitled to small entity status. Accordingly, all future fees paid in this application must be paid at the undiscounted rate.

Inquiries related to this communication should be directed to Dale Hall, Paralegal Specialist at (571) 272-3586.

/Dale A. Hall/
Paralegal Specialist, OPET



United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :C41722

Sale Accounting Date:07/16/2020

Sale Item Reference Number	Effective Date
14921269	04/01/2020

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20207FD38155289	1461	1.28(C) SUBMISSIONS - APPLIC FILE FEE	$2,990.00	Deposit Account

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	08/04/2020	10733773	304052.0001	6021

89980 7590 07/15/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 250 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Seung Woo OH, Seoul, KOREA, REPUBLIC OF;
CLO VIRTUAL FASHION INC., Seoul, KOREA, REPUBLIC OF;
Kyoung Ae BANG, Seoul, KOREA, REPUBLIC OF;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/921,269	10/23/2015	Seung Woo OH	304052.0001

CONFIRMATION NO. 6021

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

POA ACCEPTANCE LETTER

OC000000118125534

Date Mailed: 07/01/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/26/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/cbowen/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/921,269	10/23/2015	2613	730	304052.0001	17	2

CONFIRMATION NO. 6021

CORRECTED FILING RECEIPT

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

OC000000118125173

Date Mailed: 07/01/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Seung Woo OH, Seoul, KOREA, REPUBLIC OF;
Kyoung Ae BANG, Seoul, KOREA, REPUBLIC OF;

Applicant(s)

CLO VIRTUAL FASHION INC., Seoul, KOREA, REPUBLIC OF;

Assignment For Published Patent Application

CLO VIRTUAL FASHION INC., Seoul, KOREA, REPUBLIC OF

Power of Attorney: The patent practitioners associated with Customer Number 89980

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
REPUBLIC OF KOREA 10-2015-0059086 04/27/2015 No Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 11/03/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/921,269**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

Preliminary Class

345

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PART B – FEE(S) TRANSMITTAL

Complete and send this form, together with the applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By fax, send to: (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

TITLE OF INVENTION:

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0	$0	$1000	06/29/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363)

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. NSIP Law
2.
3.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: CLO VIRTUAL FASHION INC.

(B) RESIDENCE: (CITY and STATE or COUNTRY): Seoul, Republic of Korea

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. Fees Submitted: ☑ Issue Fee ☑ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment (*Please first reapply any previously paid fee shown above*):

☑ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 50-5113

5. Change of Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29. NOTE: Absent a valid Certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27. NOTE: If the application was previously under micro entity status, checking this box will be taken as a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status. NOTE: Checking this box will be taken as a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /S. Mahmood Ahmad/ Date June 29, 2020

Typed or printed name S. Mahmood Ahmad Registration No. 62,101

Electronic Patent Application Fee Transmittal					
Application Number:	14921269				
Filing Date:	23-Oct-2015				
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING				
First Named Inventor/Applicant Name:	Seung Woo OH				
Filer:	Syed Mahmood Ahmad/Mark Gambriel				
Attorney Docket Number:	304052.0001				
Filed as Large Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description		**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:					
Pages:					
Claims:					
Miscellaneous-Filing:					
Petition:					
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
UTILITY APPL ISSUE FEE	1501	1	1000	1000
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1000**

Electronic Acknowledgement Receipt	
EFS ID:	39851992
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Filer Authorized By:	Syed Mahmood Ahmad
Attorney Docket Number:	304052.0001
Receipt Date:	29-JUN-2020
Filing Date:	23-OCT-2015
Time Stamp:	12:13:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1000
RAM confirmation Number	E20206SC13552331
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	NOA20200327_3040520001_IFTransmittalForm.pdf	218452 16219ee7e9a9c1b5a12b2bfbc9cb99191df45d14	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32107 895a84d70c6713ea1ba1ba03376618d9062e9f6e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	250559		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	14/921,269
Filing Date	October 23, 2015
First Named Inventor	Seung Woo OH
Title	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
Art Unit	2613
Examiner Name	SALVUCCI, MATTHEW D
Attorney Docket Number	304052.0001

SIGNATURE of Applicant or Patent Practitioner

Signature	/S. Mahmood Ahmad/	Date (Optional)	June 26, 2020
Name	S. Mahmood Ahmad	Registration Number	62,101
Title (if Applicant is a juristic entity)	Attorney		
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 89980

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

CLO Virtual Fashion Inc.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	6 of March 2020
Name	SeungWoo Oh		
Title	CEO		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Docket No. 304052.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Seung Woo OH et al.

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed:10/23/2015 Examiner: SALVUCCI, MATTHEW D

For: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

STATEMENT UNDER 37 CFR 3.73(c)

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

CLO VIRTUAL FASHION INC., a corporation of the Republic of Korea, states that it is the Assignee of the entire title, right, and interest in Application No. 14/921,269 by virtue of an assignment from the inventors to CLO VIRTUAL FASHION INC. that was recorded against Application No. 14/921,269 in the United States Patent and Trademark Office on April 6, 2020, at Reel 052317, Frame 0389.

The undersigned (whose title is supplied below) is authorized to act on behalf of the Assignee CLO VIRTUAL FASHION INC., to complete this Statement under 37 CFR 3.73(**c**).

Date: June 26, 2020

Respectfully submitted,
/S. Mahmood Ahmad/
S. Mahmood Ahmad, Attorney
Registration No. 62,101

NSIP Law
P.O. Box 65745
Washington, DC 20035
Telephone (202) 429-0020
Facsimile (202) 315-3758
CYP/SMA/mag

Electronic Acknowledgement Receipt	
EFS ID:	39835157
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Filer Authorized By:	Syed Mahmood Ahmad
Attorney Docket Number:	304052.0001
Receipt Date:	26-JUN-2020
Filing Date:	23-OCT-2015
Time Stamp:	09:58:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	NOA20200327_3040520001_CFR.pdf	474158 0c77dce256886ba0640c05ab6b5e26a12e4e671e	no	5

Warnings:

Information:					
2	Application Data Sheet	NOA20200327_3040520001_CorrectedADS.pdf	17878 1c559646641ef61e086bcd2307c4024e49fd36e7	no	2
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Power of Attorney	NOA20200327_3040520001_POA.pdf	1394914 7ad3a57a879e2b293d185cae0875b7251a761a7b	no	3
Warnings:					
Information:					
4	Assignee showing of ownership per 37 CFR 3.73	NOA20200327_3040520001_Stmt37CFR373b.pdf	13039 3a793657b81587144c83aae3c3695f05cb4f8015	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	1899989		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney Docket No. 304052.0001
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS: Seung Woo OH et al. **CONFIRMATION NO.:** 6021

APPLICATION NO.: 14/921,269 **GROUP ART UNIT:** 2613

FILING DATE: October 23, 2015 **EXAMINER:** SALVUCCI, MATTHEW D

TITLE: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

REQUEST UNDER 37 CFR 1.46(c)(1) or (2) TO CHANGE APPLICANT AND REQUEST FOR CORRECTED FILING RECEIPT

Mail Stop: Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Notice of Allowance of March 12, 2014 is acknowledged. The Issue and Publication fees have not yet been paid.

Pursuant to 37 CFR 1.46(c)(1) or (2), it is respectfully requested that the applicant of this application be changed from CLO virtual fashion to the assignee CLO VIRTUAL FASHION INC. As required by 37 CFR 1.46(c)(1) or (2), submitted herewith are a new Corrected Application Data Sheet in compliance with 37 CFR 1.76(b)(7) updating the applicant information section to name CLO VIRTUAL FASHION INC. as the applicant, and a Statement Under 37 CFR 3.73(c) establishing the right of the assignee CLO VIRTUAL FASHION INC., to take action in this application. No fee is required by 37 CFR 1.46(c) or any other rule.

Also submitted herewith is a Power of Attorney by Applicant signed by the assignee CLO VIRTUAL FASHION INC., granting power of attorney to the practitioners associated with Customer Number 89980.

It is respectfully requested that the Office issue a corrected filing receipt listing CLO VIRTUAL FASHION INC., as the applicant and listing that the power of attorney is to the practitioners associated with Customer Number 89980.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number below.

Respectfully submitted,
/ S. Mahmood Ahmad /
S. Mahmood Ahmad
Reg. No.: 62,101

Date: June 26, 2020

CYP/SMA/mag
NSIP Law
P.O. Box 65745
Washington, DC 20035
(202)429-0020

Enclosures: Corrected Application Data Sheet
Statement Under 37 CFR3.73(c)
Power of Attorney Executed by Applicant/Assignee

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/921,269	10/23/2015	2611	730	304053.0001	17	2

CONFIRMATION NO. 6021

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

FILING RECEIPT

OC000000078455587

Date Mailed: 11/06/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Seung Woo OH, Seoul, KOREA, REPUBLIC OF;
Kyoung Ae BANG, Seoul, KOREA, REPUBLIC OF;

Applicant(s)

~~CLO virtual fashion~~, Seoul, KOREA, REPUBLIC OF; CLO VIRTUAL FASHION INC.

Assignment For Published Patent Application

~~CLO virtual fashion~~, Seoul, KOREA, REPUBLIC OF CLO VIRTUAL FASHION INC.

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
REPUBLIC OF KOREA 10-2015-0059086 04/27/2015

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 11/03/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/921,269**

Projected Publication Date: 10/27/2016

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **
Title

METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

Preliminary Class

345

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	304052.0001
	Application Number	14/921,269
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

Applicant Information:

Applicant 1		
(X) Assignee	( ) Legal Representative under 35 U.S.C. 117	( ) Joint Inventor
( ) Person to whom the inventor is obligated to assign.	( ) Person who shows sufficient proprietary interest.	
If the applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor:		
If the Applicant is an Organization check here. ☒		
Organization Name	~~CLO virtual fashion~~ **CLO VIRTUAL FASHION INC.**	
Mailing Address Information For Applicant:		
Address 1	(Nonhyeon-dong) 17-4, Dosan-daero 8-gil	
Address 2	Gangnam-gu	
City	Seoul	State/Province
Country	KR	Postal Code
Phone Number		Fax Number
Email Address		

Assignee Information Including Non-Applicant Assignee Information:

Assignee 1		
If the Assignee or Non-Applicant Assignee is an Organization check here. ☒		
Organization Name	~~CLO virtual fashion~~ **CLO VIRTUAL FASHION INC.**	
Mailing Address Information For Assignee Including Non-Applicant Assignee:		
Address 1	(Nonhyeon-dong) 17-4, Dosan-daero 8-gil	
Address 2	Gangnam-gu	
City	Seoul	State/Province
Country	KR	Postal Code
Phone Number		Fax Number

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	304052.0001
		Application Number	14/921,269
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING		

Email Address	

Signature:

Signature	/S. Mahmood Ahmad/			Date (YYYY-MM-DD)	2020-06-26
First Name	Mahmood	Last Name	Ahmad	Registration Number	62,101

Docket No. 304052.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed: 10-23-2015 Examiner: SALVUCCI, MATTHEW D

For: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

PETITION UNDER 37 CFR 1.28(c) TO ACCEPT PAYMENT OF DEFICIENCY OWED FOR FEES ERRONEOUSLY PAID AS SMALL ENTITY

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to instructions provided by the Office of Petitions, this paper filed via EFS-Web has been coded as "Petition for review by the Office of Petitions."

Small-entity status was claimed in good faith when the application from which this patent issued was filed, and small-entity fees have been paid in good faith up to the date this paper is being filed. However, the applicant has discovered that the entitlement to small-entity status was lost after the application was filed, but the applicant did not recognize this at the time, so the applicant continued paying small-entity fees in good faith after the entitlement to small-entity status was lost. Accordingly, on March 31, 2020, the law firm indicated below changed the entity status of this patent from "small" to "undiscounted" using the entity status update function in Private PAIR. Furthermore, pursuant to 37 CFR 1.28(c)(2)(ii)(D), the applicant owes a total deficiency payment of $2,990 for all of the small-entity fees that were paid after the entitlement to small-entity status was lost.

Pursuant to 37 CFR 1.28(c)(2)(ii)(A)-(C), the table following this paragraph itemizes the total deficiency payment of $2,990 that is owed by listing each particular type of fee that was erroneously paid as a small entity, the current large-entity fee (including the fee code, the fee

amount, the fee quantity, and the total amount), the small-entity fee that was actually paid (including the fee code, the fee amount, the fee quantity, and the total amount), the date the small-entity fee was paid, and the deficiency amount that is owed for each small-entity fee that was erroneously paid.

Fee Type	Current Large-Entity Fee				Small-Entity Fee Actually Paid					Def Amt
	Fee Code	Fee Amt	Fee Qty	Total Amt	Fee Code	Fee Amt	Fee Qty	Total Amt	Mailroom Date	
Utility Examination Fee	1311	760	1	760	2311	360	1	360	10/23/2015	400
Basic Filing Fee - Utility	1011	300	1	300	4011	70	1	70	10/23/2015	230
Utility Search Fee	1111	660	1	660	2111	300	1	300	10/23/2015	360
Extension for Response within First month	1251	200	1	200	2251	100	1	100	7/13/2018	100
Request for Continued Examination (RCE)	1801	1,300	1	1300	2801	650	1	650	7/13/2018	650
Request for Continued Examination (RCE) - 2nd request	1820	1,900	1	1900	2820	950	1	950	7/10/2019	950
Extension for Response within Second month	1252	600	1	600	2252	300	1	300	03/03/2020	300
TOTAL		5,720		**5,720**		2,730		**2,730**		**2,990**

Pursuant to 37 CFR 1.28(c)(2), please charge the total deficiency payment of $2,990 that is owed to Deposit Account No. 50-5113 in the name of North Star Intellectual Property Law, PC. Should the Office decide to refund the small-entity fees and charge the large-entity fees, the refund must also be credited to Deposit Account No. 50-5113, rather than to any other form of payment that may have been used to pay the small-entity fees.

Respectfully submitted,

Date: April 1, 2020

/Charles Y. Park/
Charles Y. Park

NSIP Law
P.O. Box 65745
Washington, DC 20035
Telephone (202) 429-0020
Facsimile (202) 315-3758
CYP/ivo

Electronic Acknowledgement Receipt	
EFS ID:	39029286
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Stephen Thomas Boughner/Isabelle Osborne
Filer Authorized By:	Stephen Thomas Boughner
Attorney Docket Number:	304052.0001
Receipt Date:	01-APR-2020
Filing Date:	23-OCT-2015
Time Stamp:	08:35:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	EntityStatusChange_3040520001_PetitionAcceptPaymentDeficiencyOwed_Patent_LostAfterFiling.pdf	32148 6924a143421ecf2577ed95153011ac50a4c40353	no	3
Warnings:					

Information:	
Total Files Size (in bytes):	32148

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY.DOCKET NO./TITLE	REQUEST ID
14/921,269	10/23/2015	CLO virtual fashion	304052.0001	108734

Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 03/31/2020 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

X Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Stephen T. Boughner/
Name:	Stephen T. Boughner
Registration Number:	45317

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

89980 7590 03/27/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER
SALVUCCI, MATTHEW D

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 03/27/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

TITLE OF INVENTION: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	06/29/2020

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

89980 7590 03/27/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

TITLE OF INVENTION: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	06/29/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
SALVUCCI, MATTHEW D	2613	345-441000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____

2_____

3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

89980 7590 03/27/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER	
SALVUCCI, MATTHEW D	
ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 03/27/2020

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/921,269	Applicant(s) OH et al.	
	Examiner MATTHEW D SALVUCCI	Art Unit 2613	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the reply filed 3 March 2020.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-2,5,7-11,14 and 16-17 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some *c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MATTHEW SALVUCCI/
Primary Examiner, Art Unit 2613

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with S. Mahmood Ahmad on 23 March 2020.

The application has been amended as follows:

CLAIMS:

1. (Currently Amended) A method of creating digital clothing executable by a computing device storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, comprising

inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment,

detecting a current cursor position,

displaying a point on the second segment as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment,

connecting the starting point to a present point on the second selected segment closest in distance to the current cursor position to form a line based on a difference

between the current cursor position and the present point being less than a first reference value,

moving the present point to the candidate ending point, in response to the difference between the present point and the candidate ending point being less than a second reference value,

displaying a difference value between the length of the first selected segment and a length of the line.

selecting the present point as an ending point of the second selected segment, in response to a user input, and

setting, as the second selected segment, a section of the second segment between the starting point and the ending point.

10. (Currently Amended) An apparatus for creating digital clothing comprising a computing device storing patterns and draped digital clothing, the apparatus comprising:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter configured to:

input a starting point of a second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment,

detect a current cursor position,

display a point on the second segment as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment,

connect the starting point to a present point on the second selected segment closest in distance to the current cursor position to form a line based on a difference between the cursor position and the present point being less than a first reference value,

display a difference value between the length of the first selected segment and a length of the line,

move the present point to the candidate ending point, in response to the difference between the present point and the candidate ending point being less than a second reference value,

select the present point as an ending point of the second selected segment, in response to a user input, and

set as the second selected segment, a section of the second segment between the starting point and the ending point.

18. (Cancelled)

19. (Cancelled)

Reasons for Allowance

2. Claims 1, 2, 5, 7-11, 14, 16 and 17 are allowed.

3. The following is an examiner's statement of reasons for allowance:

4. Claims 1 and 10 are allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose or suggest a method of creating digital clothing executable by a computing device storing patterns and draped digital clothing, the method comprising: displaying a difference value between the length of the first selected segment and a length of the line, as presented in the environment of the remaining limitations of claim 1 (and substantially similar limitations in independent claim 10). It is noted that the closest prior art, Gardner et al. (US Pub. 2004/0049309), hereinafter Gardner, shows setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; displaying a point on the second segment as a candidate ending point of the second

selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment, and selecting the present point as an ending point of the second selected segment, in response to a user input. However, Gardner fails to disclose or suggest setting a second selected segment, comprising inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment, detecting a current cursor position, connecting the starting point to a present point on the second selected segment closest in distance to the current cursor position to form a line based on a difference between the current cursor position and the present point being less than a first reference value, moving the present point to the candidate ending point, in response to the difference between the present point and the candidate ending point being less than a second reference value, displaying a difference value between the length of the first selected segment and a length of the line, and setting, as the second selected segment, a section of the second segment between the starting point and the ending point.

5. The remaining claims depend from one of independent claims 1 or 10, either directly or indirectly, and are allowable accordingly.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D SALVUCCI whose telephone number is (571)270-5748. The examiner can normally be reached on M-F: 7:30-4:00PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, XIAO WU can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MATTHEW SALVUCCI/
Primary Examiner, Art Unit 2613

Examiner-Initiated Interview Summary	Application No. 14/921,269	Applicant(s) OH et al.	
	Examiner MATTHEW D SALVUCCI	Art Unit 2613	AIA (FITF) Status Yes

All participants (applicant, applicant's representative, PTO personnel):

(1) MATTHEW D. SALVUCCI. (3) _____.

(2) S. Mahmood Ahmad. (4) _____.

Date of Interview: 23 March 2020.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐ 101 ☐ 112 ☐ 102 ☐ 103 ☑ Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1,10 and 18-19.

Identification of prior art discussed: N/A.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Examiner proposed incorporating the subject matter of dependent claims 18 and 19 into independent claims 1 and 10, respectively. An agreement was reached and these amendments can be seen in the instant Allowability Notice.
.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

CPC - Searched*		
Symbol	**Date**	**Examiner**
G05B2219/2626 + text	10/31/2017	MDS
G05B2219/45195 + text	10/31/2017	MDS

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
EAST search file attached	10/31/2017	MDS
Updated search results in EAST	2/22/2018	MDS
Updated search results in EAST	12/11/2018	MDS
Updated search results in EAST	04/15/2019	MDS
Updated search results in EAST	09/25/2019	MDS
Updated search results in EAST	03/24/2020	MDS
Inventor search	03/24/2020	MDS
Interference search	03/24/2020	MDS

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G05B	2219/2626	03/24/2020	MDS
G05B	2219/45195	03/24/2020	MDS

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	**Art Unit**
	MATTHEW D SALVUCCI	2613

CPC								
Symbol							**Type**	**Version**
G06T	/	11	/	20			F	2013-01-01
A41H	/	3	/	007			I	2013-01-01
G06T	/	11	/	203			I	2013-01-01
G06T	/	2210	/	16			A	2013-01-01
G05B	/	2219	/	45195			A	2013-01-01
G05B	/	2219	/	2626			A	2013-01-01

CPC Combination Sets								
Symbol							**Type**	**Set**	**Ranking**	**Version**
	/		/							

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	11	
/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	24 March 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20200323

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06T11/20	/	11	/	20

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	11	
/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	24 March 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office — Part of Paper No.: 20200323

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	7	10		19										
2	2	8	11												
	3		12												
	4		13												
3	5	9	14												
	6		15												
4	7	10	16												
5	8	11	17												
6	9		18												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	11	
/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	24 March 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

U.S. Patent and Trademark Office Part of Paper No.: 20200323

Bibliographic Data

Application No: 14/921,269

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /MATTHEW SALVUCCI/ Examiner's Signature [ ] Initials

Title: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/23/2015	345	2613	304052.0001
RULE			

APPLICANTS

CLO virtual fashion, Seoul, KOREA, REPUBLIC OF

INVENTORS

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CONTINUING DATA

FOREIGN APPLICATIONS

KOREA, REPUBLIC OF 10-2015-0059086 04/27/2015

IF REQUIRED, FOREIGN LICENSE GRANTED**

11/03/2015

**** SMALL ENTITY ****

STATE OR COUNTRY

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Washington, DC 20035
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FILING FEE RECEIVED

$730

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	32	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L7	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150827"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L8	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150527"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L9	1	("20160314604").PN.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:50
L10	517	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L11	7	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L12	29	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L13	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR	US-PGPUB; USPAT; USOCR;	OR	OFF	2020/03/24 10:50

		fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L14	2	(("20130057544") or ("20160078650")).PN.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:50
L15	92	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L16	105	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L17	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L18	137	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L19	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L20	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L21	67	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L22	73	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR	US-PGPUB; USPAT;	OR	OFF	2020/03/24 10:50

		fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L23	232	(stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L24	76	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L25	45	L24 NOT L22	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L26	251	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L27	76	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L28	137	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L29	198	L26 NOT (L28 L27)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L30	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND	US-PGPUB; USPAT; USOCR;	OR	OFF	2020/03/24 10:50

		(virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L31	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L32	120	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L33	6	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND difference$1 NEAR2 length$1 AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L34	0	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L35	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L36	8	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (siz$3 length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L37	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR2 (messag$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50

L38	59	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L39	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:50
L40	137	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L41	13	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR4 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L42	13	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L43	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR2 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L44	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L45	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:50
L46	7659	(Seung Woo).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2020/03/24 10:50
L47	31	(Seung Woo NEAR3 OH).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	OFF	2020/03/24 10:50

			IBM_TDB			
L48	3	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L49	32	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L50	176	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L51	141	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L52	77	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L53	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L54	8	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L55	15	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50

L56	37	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3 top bottom first second lower upper) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L57	10	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (over$6) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L58	59	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50
L59	31	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/24 10:50

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(G05B2219/2626 G05B2219/45195).CPC. AND (display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1)).CLM.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:37
L2	0	(G05B2219/2626 G05B2219/45195).CPC. AND (display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1)).CLM.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:37
L3	0	(G05B2219/2626 G05B2219/45195).CPC. AND ((stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3)).CLM.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:37
L4	0	(G05B2219/2626 G05B2219/45195).CPC. AND (display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1)).CLM.	US-PGPUB; USPAT	OR	OFF	2020/03/24 10:37
L5	0	(G05B2219/2626 G05B2219/45195).CPC. AND (display NEAR4 (patterns segments OR clothing	US-PGPUB;	OR	OFF	2020/03/24 10:37

		clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1)).CLM.	USPAT			

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

89980 7590 03/24/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER
SALVUCCI, MATTHEW D

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
03/24/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

Applicant-Initiated Interview Summary	**Application No.** 14/921,269	**Applicant(s)** OH et al.	
	Examiner MATTHEW D SALVUCCI	**Art Unit** 2613	**AIA (FITF) Status** Yes

All participants (applicant, applicants representative, PTO personnel):

(1) MATTHEW D. SALVUCCI. (3) _____.

(2) S. Mahmood Ahmad. (4) _____.

Date of Interview: 19 March 2020.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☑103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1,10 and 18-19.

Identification of prior art discussed: N/A.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed the amendments to the claims. Examiner suggested incorporation of claims 18 and 19 into their respective independent claims. No agreement was reached at this time. Applicant will discuss with representatives..

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Docket No. 304052.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh *et al.*	Art Unit: 2613
Application No. 14/921,269	Confirmation No. 6021
Filed: October 23, 2015	Examiner: Matthew D Salvucci

For: **METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING**

AMENDMENT AND RESPONSE TO OFFICE ACTION

Mail Stop Amendments
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Final Office Action mailed October 3, 2019. Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

Amendments to the claims are reflected in the listing of the claims that begins on page 2 of this paper.

Remarks begin on page 7.

In the Claims

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

1. (Currently amended) A method of creating digital clothing executable by a computing device storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, comprising

inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment,

detecting a current cursor position,

displaying a point on the second segment ~~that is closest in distance to the current cursor position~~ as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment,

connecting the starting point to a present point on the second selected segment closest in distance to the current cursor position to form a line based on a difference between the current cursor position and the present point being less than a first reference value,

moving the present point to the candidate ending point, in response to the difference between the present point and the candidate ending point being less than a second reference value,

~~connecting the starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and the point closest in distance to the detected current cursor position being less than a first reference value,~~

~~displaying a difference value between the length of the first selected segment and a length of the line,~~

selecting the ~~candidate ending~~present point as an ending point of the second selected segment, in response to ~~the difference value being less than a second reference value~~a user input, and

setting, as the second selected segment, a section of the second segment between the starting point and the ending point~~, and~~

~~moving the current cursor position to a position of the ending point and displaying the current cursor position~~.

2. (Previously Presented) The method of claim 1, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. (Cancelled)

4. (Cancelled)

5. (Previously Presented) The method of claim 1, wherein the setting of the second selected segment further comprises:

calculating and displaying either one or both of the length of the first selected segment and the length of the line.

6. (Cancelled)

7. (Currently amended) The method of claim 1, ~~wherein the setting of the second selected segment~~ further comprising~~es~~:

displaying a warning sign, in response to the difference value being greater than ~~the~~ a ~~second~~ third reference value.

8. (Currently amended) The method of claim 7, wherein the displaying of the warning sign comprises:

displaying the warning sign by changing at least one of colors of the ~~calculated~~ length of the line ~~and~~ or the difference value.

9. (Previously Presented) A non-transitory computer-readable storage medium storing instructions that, when executed by a processor, cause the processor to perform the method of claim 1.

10. (Currently amended) An apparatus for creating digital clothing comprising a computing device storing patterns and draped digital clothing, the apparatus comprising:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter configured ~~comprising to:~~

~~a starting point input configured to~~ input a starting point of a second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment,

~~a cursor position detector configured to~~ detect a current cursor position,

~~an ending point candidate display configured to~~ display a point on the second segment ~~that is closest in distance to the current cursor position~~ as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment,

~~and to~~ connect the starting point to a present point on the second selected segment closest in distance to the current cursor position ~~the candidate ending point~~ to form a line based on, ~~in response to~~ a difference between ~~the~~the current cursor position and the present point ~~closest in distance to the detected current cursor position~~ being less than a first reference value,

~~a difference value display configured to display a difference value between the length of the first selected segment and a length of the line, and~~move the present point to the candidate ending point, in response to the difference between the present point and the candidate ending point being less than a second reference value,

~~a cursor position mover configured to~~ select the present ~~candidate ending~~ point as an ending point of the second selected segment, in response to a user input, and

~~the difference value being less than a second reference value, to~~ set as the second selected segment, a section of the second segment between the starting point and the ending point~~, to move the cursor position to a position of the ending point and to display the cursor position~~.

11. (Previously Presented) The apparatus of claim 10, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. (Cancelled)

13. (Cancelled)

14. (Previously Presented) The apparatus of claim 10, further comprising:

a length display configured to calculate and display either one or both of the length of the first selected segment and the length of the line.

15. (Cancelled)

16. (Currently amended) The apparatus of claim 10, ~~further comprising~~wherein the second selected segment setter is further configured to:

~~a warning sign display configured to~~ display a warning sign, in response to the difference value being greater than ~~the second~~a third reference value.

17. (Currently amended) The apparatus of claim ~~16~~16, wherein the second selected segment setter~~warning sign display~~ is configured to display the warning sign by changing at least one of colors of the ~~calculated~~ length of the line ~~and~~ or the difference value.

18. (New) The method of claim 1, further comprising:

displaying a difference value between the length of the first selected segment and a length of the line.

19. (New) The apparatus of claim 10, wherein the second selected segment setter is further configured to display a difference value between the length of the first selected segment and a length of the line.

REMARKS

Claims 1-2, 5, 7-11, 14 and 16-17 are pending in the application, of which claims 1 and 10 are independent claims. New claims 18-19 have been added. Claims 1, 7-8, 10, and 16-17 have been amended, without prejudice or disclaimer, to more positively recite the claims features and to put the claims in better condition for allowance. No new matter is submitted by the amendment. No new matter is submitted by the new claims and the claim amendments, and support for the claim amendments can be found in the specification, for example, at paragraph 0070,[1] and in the drawing figures, for example, at FIG. 8.

Applicant has amended the claims to further the prosecution for a disclosed embodiment, and not in response to the outstanding rejections. No new matter has been entered. Applicant reserves the right to later claim other embodiments disclosed, including a broader claim or embodiment. No new matter is submitted by the new claim amendments. Reconsideration and allowance of the pending claims is respectfully requested in view of the amendments and the following remarks.

I. Claims 1-2, 5, 7-11, 14 and 16-17 are Allowable under 35 USC § 103 over Gardner, Sareen, and Park

Claims 1-2, 5, 7-11, 14 and 16-17 are rejected under 35 U.S.C. §103 as being obvious over United States Pat. App. Pub. No. US 2004/0049309 A1 to Gardner *et al.* (Gardner), United States Pat. App. Pub. No. US 2011/0298897 A1 to Sareen *et al.* (Sareen), and United States Pat. App. Pub. No. US 2014/0135971 A1 to Park (Park). See Office Action dated 10/03/2019 at p. 3. These rejections are respectfully traversed. As explained below, the outstanding rejection(s) should be withdrawn because the cited references fail to disclose, at least, the below-mentioned features of the independent claims.

Independent claim 1 recites:

> *A method of creating digital clothing executable by a computing device storing patterns and draped digital clothing, the method comprising:*
>
> *setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and*
>
> *setting a second selected segment, comprising*
>
> *inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment,*
>
> *detecting a current cursor position,*

[1] The citations to the present application refer to the U.S. Patent Application Publication No. US 2016/0314604 A1 to Oh *et al.* ("Specification").

displaying a point on the second segment as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment,

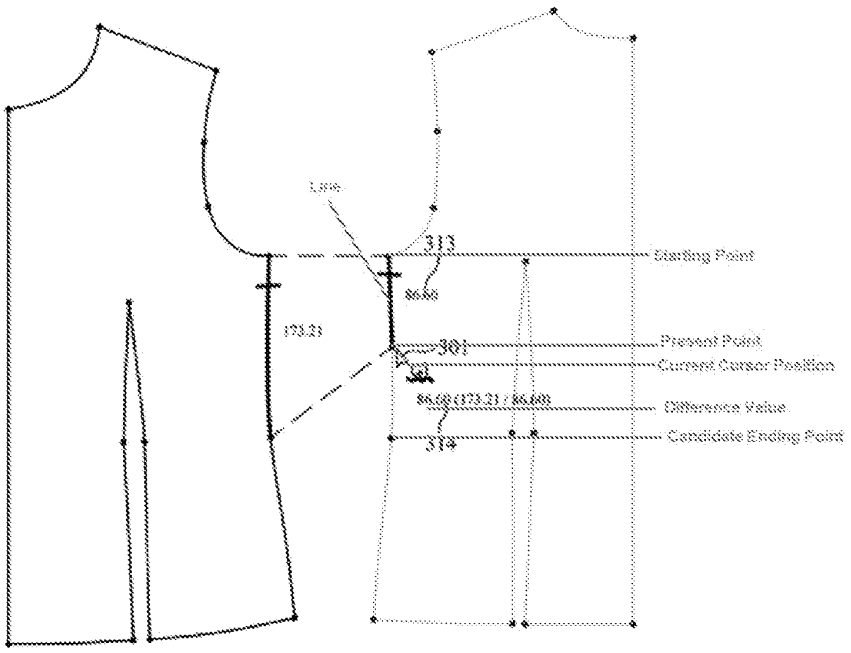
connecting the starting point to a present point on the second selected segment closest in distance to the current cursor position to form a line based on a difference between the current cursor position and the present point being less than a first reference value,

moving the present point to the candidate ending point, in response to the difference between the present point and the candidate ending point being less than a second reference value,

selecting the present point as an ending point of the second selected segment, in response to a user input, and

setting, as the second selected segment, a section of the second segment between the starting point and the ending point.

The independent claims have been amended and support for the claim amendments can be found in the specification, for example, at paragraph 0070, and in the drawing figures, for example, at FIG. 8. An annotated version of FIG. 8 providing some exemplar support for the features added in the amended independent claims is shown below.



See Specification at FIG. 8 (annotations added). The Applicant does not intend to incorporate the elements, which have not been expressly claimed, into the claims. This annotated figure is provided solely for a context for the present amendments and to help the Office better appreciate some of the many benefits of the amended claims.

The Office cites to paragraphs 0113, 0029, 0022, 0120, 0459, 0461, 0500, and 0751-0756 of Gardner to disclose some of the above-recited features of claim 1, but admits that "Gardner does not explicitly disclose setting a second selected segment." *See* Office Action dated 10/03/2019 at pp. 3-5. The Office cites to Sareen to cure the deficiencies of Gardner. *Id.* at p. 6. In particular, the Office admitted that:

> **Gardner does not explicitly disclose setting a second selected segment**, comprising inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is a sewn to the first selected segment, detecting a current cursor position, displaying a point on the second selected segment that is closest in distance to the current cursor position as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment connecting the starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and the point closest in distance to the detected current cursor position being less than a first reference value, and setting, as the second selected segment, a section of the second segment between the starting point and the ending point, and moving the current cursor position to a position of the ending point and displaying the cursor position.

See Office Action dated 10/03/2019 at pp. 5-6 (emphasis added). The Office cites to FIG. 8 and paragraphs 0003, 0040, 0069, 0079, 0082, 0170, 0188-0189, and 0209 of Sareen to cure the deficiencies of Gardner. *Id.* at pp. 6-8. The Office then cites to paragraphs 0052, 0054, and FIGS 9 and 11 of Park for the disclosures related to moving the current cursor position to a position of the determined candidate for the ending point and displaying the cursor position. *Id.* at pp. 8-9. Nevertheless, as established below, these portions and the remainder of Gardner, Sareen, and Park fails to disclose many of the features of amended independent claim 1.

Sareen discloses "an apparatus . . . for 3D virtual try-on of apparel on an avatar." See Sareen at ¶ 0003. Sareen discloses that "a method of fitting a garment on a person's body online comprises receiving specifications of a garment, receiving body specifications of one or more fit models, receiving one or more grade rules, receiving one or more fabric specifications, and receiving specifications of a consumer's body." *Id.* Sareen discloses that "value of one or more fabric constants are determined according to the received one or more fabric specifications." *Id.* Sareen discloses that "[e]ach virtual garment is draped on the related virtual fit model to create a fit-model drape." *Id.* Further, Sareen discloses that "[a]n avatar is received or created to represent a consumer's body shape. A selected one of the virtual garments is determined that represents a closest size for fitting on the avatar. The selected virtual garment is then re-draped on the consumer avatar." *Id.* Finally, Sareen discloses that the "virtual try-on data can be in the form of

visual data or quantitative data that can be interpreted to determine the goodness of a garment's fit." *Id.*

Fig. 8 of Sareen illustrates "steps performed in creating 3D virtual garment object 183." *See* Sareen at ¶ 0039. Paragraph 0040 of Sareen merely discloses that "[i]n step 350 [of FIG. 8], from the digital pattern 57, production sample garment 59, technical pack 54, grading rules 53, fit model scan data or body measurements 58, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114." *See* Sareen at ¶ 0040[2]. Paragraph 0040 of Sareen further discloses the process of drafting the pattern pieces, then laying them over fabric, which is then cut around the perimeter of each piece, and the resulting pieces of fabric are then sewn together to form the finished garment. *Id.* Sareen discloses that "[i]n step 352, generally, the physical fabric of a new garment may be tested and simulated to solve for digital fabric presets to be input into apparel product development software 114 for processing." *See* Sareen at ¶ 0045. Nevertheless, these portions of Sareen fail to cure the deficiencies of Gardner, as admitted by the Office.

Paragraph 0069 of Sareen discloses "stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn." *See* Sareen at ¶ 0069. Paragraph 0079 of Sareen discloses that "E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together." *See* Sareen at ¶ 0079. Paragraph 0082 of Sareen discloses that "layers may be placed, stitched, and draped in a specific order. The culmination of the simulation results in a drape on fit model avatar 173 that may be identical to the drape of a real garment on a real fit model." *See* Sareen at ¶ 0082. Thus, at best Sareen disclose starting and ending point of the

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[2] Specifically, paragraph 0040 of Sareen discloses that:

> In step 350, from the digital pattern 57, production sample garment 59, technical pack 54, **grading rules 53, fit model scan data or body measurements 58**, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114. Generally, a pattern refers to the collection of the individual pieces of the garment 59. In standard practice, the pattern pieces are drafted first, then laid over fabric, which is then cut around the perimeter of each piece. The resulting pieces of fabric are then sewn together to form the finished garment 59. Therefore, the pattern refers to a blueprint of the garment 49 and its individual pieces.

See Sareen at ¶ 0040 (emphasis added).

segments, but absolutely fails to disclose the steps of setting a second selected segment recited in claim 1, which the Office admitted was not disclosed by Gardner.

Paragraph 0170 of Sareen discloses that "a user may run 3D draping software application 900 locally on computing device 24 enabling the user to virtually try on garments." *See* Sareen at ¶ 0170. Sareen also discloses that the "user may click on a link or a button with a mouse, or interact with a touch screen on the display of computer device 131." *Id.* This also fails to disclose the steps of setting a second selected segment as recited in claim 1, which the Office admitted was not disclosed by Gardner.

Paragraph 0188 of Sareen discloses that "stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape." *See* Sareen at ¶ 0188[3]. Sareen discloses that "stretch value may be calculated for many garment measurements, and the stretch value may refer to the total stretch of all garment measurements, or the average stretch value of all garment measurements." *Id.* Paragraph 0189 of Sareen discloses that "[q]uantitative data may also include calculating the change in stretch . . . but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size)." *See* Sareen at ¶ 0189[4]. Paragraph 0189 of Sareen also discloses

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[3] Specifically, paragraph 0188 of Sareen discloses that:

> Stretch can be calculated in many ways. For example, but not by way of limitation, **stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape**. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value. In another embodiment, the **stretch value may be calculated for many garment measurements, and the stretch value may refer to the total stretch of all garment measurements, or the average stretch value of all garment measurements**.

See Sareen at ¶ 0188 (emphasis added).

[4] Specifically, paragraph 0189 of Sareen discloses that:

> **Quantitative data may also include calculating the change in stretch in a similar fashion as described above, but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size).** Furthermore, quantitative data may also include calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape 186. Moreover, quantitative data may also include calculating the total volume of space between the garment and the body and assessing how that total volume may increase or decrease from size to size. All data may be used together, or in pieces in a decision engine to establish a prediction of size. The decision engine may consider the total volume between the garment and the body, from size to size, versus the total stretch value, from size to size, and weight the two data types to arrive at the best fit of the garment to the body. It is well known to those skilled in the art that common procedures are available to determine how a garment is fitting using specific points of measure.

"calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape." *Id.* As another example, Sareen discloses that "quantitative data may also include calculating the total volume of space between the garment and the body and assessing how that total volume may increase or decrease from size to size." *Id.* Finally, Sareen discloses that the "decision engine may consider the total volume between the garment and the body, from size to size, versus the total stretch value, from size to size, and weight the two data types to arrive at the best fit of the garment to the body." *Id.* Paragraph 0209 of Sareen discloses "data collected can be used directly to make custom patterns and therefore custom garments for the consumer." See Sareen at ¶ 0209. Thus, at best Sareen disclose calculating the stretch value and the best fit for the garment, but completely fails to disclose the steps of setting a second selected segment as recited in claim 1, which the Office admitted was not disclosed by Sareen.

The portions of Park cited by the Office fails to cure the deficiencies of Gardner and Sareen. Instead, "FIG. 9 of Park is a diagram illustrating an example of a process information input interface 900." *See* Park at ¶ 0052[5]. Park discloses that the "process information input

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See Sareen at ¶ 0189 (emphasis added).

[5] Specifically, paragraph 0052 of Park discloses that:

> FIG. 9 is a diagram illustrating another example of a process information input interface 900, according to at least one embodiment of the present disclosure. According to an embodiment, the process information input interface 900 may include a full view 902 displaying at least one component in its entirety in association with a corresponding process, and a zoom view 904 enlarging and displaying the full view 902, but the present embodiment is not limited thereto. Some portions of the full view 902 necessary for certain sewing work in a corresponding process may be emphasized and enlarged, and the enlarged portions may be displayed on the zoom view 904, but the present embodiment is not limited thereto. The process information input interface 900 may further include a process information input window 912 that enables the input of information on a corresponding process. The process information input window 912 may receive a product name, a product code, a process number, a process name, a BOM code, a type of a sewing manufacturing device, a stitch shape and materials to be used in each section, a type and color of yarn, a type of a needle, a stitch length, a total number of stitches, an accessory attachment type, and other work guidelines, but the present embodiment is not limited thereto. Also, **the process information input interface 900 enables a user to set start and end positions in each process section. For example, a start position setting button 912-1 and an end position setting button 912-2 may be provided to the process information input window 912 of the process information input interface 900**, but the present embodiment is not limited thereto. In an embodiment, **a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position**. As an example, the set start position and end position are displayed on the zoom view of FIG. 9.

interface 900 may include a full view 902 displaying at least one component in its entirety in association with a corresponding process, and a zoom view 904 enlarging and displaying the full view 902." *Id.* Park discloses that the "process information input window 912 may receive a product name, a product code, a process number, a process name, a BOM code, a type of a sewing manufacturing device, a stitch shape and materials to be used in each section, a type and color of yarn, a type of a needle, a stitch length, a total number of stitches, an accessory attachment type, and other work guidelines." *Id.* Further, Park discloses that "the process information input interface 900 enables a user to set start and end positions in each process section." Id.

In contrast to the ending point and starting point for the second selected segment recited in claim 1, Park discloses that "a start position setting button 912-1 and an end position setting button 912-2 may be provided to the process information input window 912 of the process information input interface 900." *Id.* Park discloses that for **setting a start position**:

> a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section.

Id. Similarly, Park discloses that for **setting an end position**:

> the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position.

Id. Thus, at best, Park disclose setting a start position and setting an end position, but absolutely fails to disclose the steps of setting a second selected segment recited in claim 1. For example, Park fails to disclose the use of any of the "first reference value" and the "second reference value," as recited in claim 1, to determine the starting point and the ending point for setting a second selected segment. In fact, there is no disclosure of any reference values in Park, such as the ones recited in claim 1.

The remaining portions of Park fail to cure the above identified deficiencies. For example, FIG. 11 of Park discloses "a sewing process time and cost prediction interface 1100." *See* Park at ¶ 0054. Park discloses that "the sewing process time and cost prediction interface 1100 may further include a process list button 1108 and a daily required manufacturing amount button 1110. When a user selects the process list button 1108 . . . a process list 1150 for manufacturing the corresponding end product may be displayed." *Id.* Park discloses that "[w]hen When the daily required manufacturing amount button 1110 is selected, the sewing process time and cost

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See Park at ¶ 0052 (emphasis added).

prediction interface 1100 enables a user to input a daily required manufacturing amount for the corresponding end product." *Id.* Park discloses that the process time may be predicted based on a list of factors, such as, "a stitch length, a number of stitches, start and end positions of each process section, a number of yarn cuttings, a number of yarn cuttings set in a sewing manufacturing device, and a number of sewing manufacturing devices involved in each corresponding process; predict process cost on the basis of daily working conditions and the number of workers." Finally, Park discloses displaying of the "predicted process time and the predicted process cost."

Thus, the cited references completely fail to disclose the use of the "first reference value" and the "second reference value," as recited in claim 1, to determine the starting point and the ending point for setting a second selected segment, which is sewn to the first selected segment. Because the cited references, individually or combined, do not disclose, at least, the fore-mentioned elements of claim 1, a *prima facie* rejection for obviousness has not been established with respect to independent claim 1. Accordingly, for at least this reason, the rejection of claim 1 over the Gardner, Sareen, and Park under 35 U.S.C. § 103 should be withdrawn.

To support an obviousness rejection MPEP § 2143.03 requires "all words of a claim to be considered." The Board of Patent Appeal and Interference has affirmed that a proper, post-KSR obviousness determination still requires that the Office make "a searching comparison of the claimed invention — including all its limitations — with the teaching of the prior art." *In re Wada and Murphy*, Appeal 2007-3733, page 7 (BPAI Jan. 14, 2008). To make a *prima facie* finding of "obviousness requires a suggestion of all limitations in a claim." *Id.* (citing *CFMT v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003). Because Gardner, Sareen, and Park do not disclosed, at least, the fore-mentioned elements of claim 1, the applied reference fails to render claim 1 obvious under 35 U.S.C. §103(a). Accordingly, withdrawal of the rejections of the claim 1 is respectfully requested.

Independent claim 10 has its own scope, recite features similar to those recited in independent claim 1. Therefore, it is respectfully submitted that the subject matter of claim 10 distinguish over the combination of references for reasons similar to those discussed above. Moreover, claim 10 is allowable because the additional features recited by claim 10, such as, "display a warning sign, in response to the difference value being greater than a third reference value," are not disclosed by the cited references.

Dependent claims 2, 5, 7-9, 11, 14 and 16-17 depend directly, or through intervening claims, from their respective allowable independent claims 1 and 10. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP §

21432.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ 2d. 1596 (Fed. Cir. 1988)). Thus, dependent claims 2, 5, 7-9, 11, 14 and 16-17 are allowable at least due to their dependence on an allowable independent claim and for the additional features they recite.

In view of the foregoing amendments and remarks, Applicant respectfully submits that *all* claims listed above as presently being under consideration in the application are now in condition for allowance.

CONCLUSION

In view of the foregoing Amendments and comments, Applicants respectfully request reconsideration and timely allowance of all pending claims. Should the Office believe anything further is required to place the application in condition for allowance, the Examiner is requested to contact the Applicant's representative at the telephone number listed below.

In the event this paper is not being filed timely, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees that may be required for this paper, and any other documents filed concurrently with this paper, may be charged to North Star Intellectual Property Law, PC's Deposit Account No. 50-5113.

Respectfully submitted,

Date: March 3, 2020

/S. Mahmood Ahmad/

S. Mahmood Ahmad, Registration No. 62,101
NSIP Law
1120 Connecticut Ave, NW Ste 304
Washington, DC 20036
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Electronic Patent Application Fee Transmittal

Application Number:	14921269
Filing Date:	23-Oct-2015
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Attorney Docket Number:	304052.0001

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 2 months with $0 paid	2252	1	300	300
Miscellaneous:				
		Total in USD ($)		**300**

Electronic Acknowledgement Receipt	
EFS ID:	38755508
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Filer Authorized By:	Syed Mahmood Ahmad
Attorney Docket Number:	304052.0001
Receipt Date:	03-MAR-2020
Filing Date:	23-OCT-2015
Time Stamp:	14:50:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$300
RAM confirmation Number	E202033E50505797
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		OA20191003_3040520001_AsFiled.pdf	161964 7bc7953dfe9cacd56d200b8d9e5d13d2446c2546	yes	15
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	5	
	Applicant Arguments/Remarks Made in an Amendment		6	15	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30773 6214609170599f0175799f7090cfa19ed85a7b33	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	192737		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/03/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 13	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/KIMBERLY N PANNELL/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

89980 7590 01/17/2020

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER	
SALVUCCI, MATTHEW D	

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
01/17/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

Applicant-Initiated Interview Summary	**Application No.** 14/921,269	**Applicant(s)** OH et al.	
	Examiner MATTHEW D SALVUCCI	**Art Unit** 2613	**AIA (FITF) Status** Yes

All participants (applicant, applicants representative, PTO personnel):

(1) MATTHEW D. SALVUCCI. (3) _____.

(2) Mahmood Ahmad. (4) _____.

Date of Interview: 14 January 2020.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☑103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: See Continuation Sheet.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed possible amendments to claim 1 which would incorporate the matter shown in Fig. 7. Examiner noted that the amendments appeared substantial and should further prosecution. No agreement was reached. Formal response will be filed..

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Continuation of Identification of prior art discussed: Gardner et al. (US Pub. 2004/0049309), Sareen et al. (US Pub. 2011/0298897), Park (US Pub. 2014/0135971)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304052.0001	6021

89980 7590 10/03/2019

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER
SALVUCCI, MATTHEW D

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
10/03/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

Office Action Summary	Application No. 14/921,269	Applicant(s) OH et al.	
	Examiner MATTHEW D SALVUCCI	Art Unit 2613	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 10 July 2019.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-2,5,7-11,14 and 16-17 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-2,5,7-11,14 and 16-17 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 July 2019 has been entered.

Status of Claims

3. Applicant's amendments filed on 18 June 2019 have been entered. Claims 1, 7-10, 16, and 17 have been amended. No claims have been canceled. No claims have been added. Claims 1, 2, 5, 7-11, 14, 16, and 17 are still pending in this application, with claims 1 and 10 being independent.

Response to Arguments

4. Applicant's arguments filed 18 June 2019 have been fully considered but they are not persuasive.

5. Applicant argues generally that the cited references do not teach the amended limitations. Examiner finds the aforementioned amended limitations as well as remaining limitations to be taught by the cited references as is outlined in the following Action.

6. Applicant argues for the remaining claims for the reasons above. It follows that all remaining claims are rejected for at least the above reasons.

Claim Rejections - 35 USC § 103

7. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

8. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 5, 7-11, 14, 16, and 17 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner et al. (US Pub. 2004/0049309), hereinafter Gardner, in view of Sareen et al. (US Pub. 2011/0298897), hereinafter Sareen, and further in view of Park (US Pub. 2014/0135971).

10. Regarding claim 1, Gardner discloses a method of creating digital clothing (Paragraph [0113]: *method of capturing the 3D representation of the garment is to provide a digital representation of the 2D pattern pieces, sized to fit The Model, and then to create a virtual r presentation of the garment in 3D by meands of a program such as Stitch from Size8 Software of Jacksonville, Fla. The advantage of the virtual representation is that the rlationship betewen the 2D pattern pieces and the 3D representation is known with precision, which increases the accuracy of the later unwrapping stage, and there is no missing data, which inevitably occurs with a 3D scan*), executable by a computing device storing patterns and draped digital clothing (Paragraph [0029]: *the present invention provides a method of processing information relating to a garment, the method comprising: providing or obtaining information defining the 3D shape of a*

garment designed to fit and as worn by a first body of a person of a first size and shape; providing or obtaining data defining the first body's size and shape in 3D without the garment in question; identifying defined body regions on the first body; identifying one or more design points on the garment, each design point being related in 3D to one or more of the defined body regions of the first body; providing relationship rules that define the said 3D relationships between said design points and said body regions; storing data defining the garment, the design points, the body regions, and the relationship rules), the method comprising: setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern (Paragraph [0022]: *pattern pieces of the base garment are deformed to collide with a 3D human model and with each other, and are then virtually sewn together. This provides a 3D representation of the base garment fitted to a first human model. The first human model is deformed to match the shape/size of a consumer, and the base garment is modified simply by deforming the 3D representation of the base garment in a similar manner to the first human model. The 3D representation of the modified garment can be used for visualisation ("virtual try-on"), and/or as the basis for generating 2D pattern pieces for production of the modified garment. The document describes the 2D pattern pieces being generated by developing the corresponding 3D parts of the 3D representation into 2D shapes. This system relies on colliding base garment pattern pieces with the standard body shape and modifying the resultant 3D representation of the base garment on the basis of a geometrical deformation of the standard body shape to match a consumer body shape. This relatively simple approach provides no guarantee that the modified garment will preserve the design or style of the base garment, or that pattern pieces developed from the modified 3D representation of the garment will be capable of being assembled to produce an acceptable garment*); and displaying a point on the second selected segment that is closest in distance to the current cursor position as a candidate ending point of the second selected segment (Paragraph [0120]: *construction lines (where present), the matching of the Design Points on different pattern pieces and the knowledge base*

of completed garments makes it possibl for an initial rough juxtapositioning of the pattern pieces to be carried out automatically, although the capability to carry out a manual juxtapositioning would be present as a fall-back), displaying a difference value between the length of the first selected segment and a length of the line (Paragraph [0461]: *comparison between the upper arm +12-13 cms and the length of the armhole perimeter therefore provides a cross check on the size of the armhole that is derived as a result of using the 3D process*; Paragraphs [0751]-[0756]: *relative length as compared to the top of the pattern piece (always bigg r than the top, often substantially*), selecting the candidate point as an ending point of the second selected segment, in response to the difference value being less than a second reference valu e (Paragraph [0459]: *3D program also, however, incorporates an iterative evaluation of the many available options to find out which option best accommodates the constraints of the 3D Tailoring rules (within the flexibility provided by body regions as opposed to body points) whilst minimising change. This iterative process compresses what could be weeks and months of trial and err r into a very few seconds*; Paragraph [0500]: *height of the stand provides the first sub set of collars. Each subset is then further divided. The warping program will apply the constraints needed to obtain a good fit (a function f the neckline) the desired looseness and the height and shape of the stand (determined as an end result and achieved in the unwrapped piece by the differences between the inner and outer edges of the collar). The general procedures for maintaining all elements of the garment in as close a form to the base design as possible (whilst meeting the constraints) will allow quite dissimilar styles of collar to be modified in a satisfactory manner*).

Gardner does not explicitly disclose setting a second selected segment, comprising inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is a sewn to the first selected segment, detecting a current cursor position, displaying a point on the second selected segment that is closest in distance to the current cursor position as a candidate ending point of the second selected segment to make a

length of the second selected segment substantially equal to a length of the first selected segment connecting the starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and the point closest in distance to the detected current cursor position being less than a first reference value, and setting, as the second selected segment, a section of the second segment between the starting point and the ending point, and moving the current cursor position to a position of the ending point and displaying the cursor position.

However, Sareen teaches virtual garment creating and storage based on the received garment specifications and fabric constants (Paragraph [0003]), further comprising setting a second selected segment, comprising inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is a sewn to the first selected segment (Fig. 8; Paragraph [0040]: *from the digital pattern 57, production sample garment 59, technical pack 54, grading rules 53, fit model scan data or body measurements 58, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114. Generally, a pattern refers to the collection of the individual pieces of the garment 59. In standard practice, the pattern pieces are drafted first, then laid over fabric, which is then cut around the perimeter of each piece. The resulting pieces of fabric are then sewn together to form the finished garment*), displaying a point on the second selected segment that is closest in distance to the current cursor position as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment connecting the starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and the point closest in distance to the detected current cursor position being less than a first reference value (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and*

ending point of the segments that will be sewn; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*; Paragraph [0170]: *user may click on a link or a button with a mouse, or interact with a touch screen on the display of computer device*; Paragraphs [0188]-[0189]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value. In another embodiment, the stretch value may be calculated for many garment measurements… data may also include calculating the change in stretch in a similar fashion as described above, but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size). Furthermore, quantitative data may also include calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape*), and setting, as the second selected segment, a section of the second segment between the starting point and the ending point (Paragraph [0079]: *step 362, E-FIT assigns sewing instructions. In this step, E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*; Paragraph [0082]: *Sewing and draping may be completed using functions provided by CLOTHFX and native E-FIT according to the sewing instructions assigned above. Often, garments have lining and/or layers of material. In such cases, layers may be placed, stitched, and draped in a specific order*). Sareen teaches that this will allow for user to make custom patterns and therefore custom

garments for the consumer (Paragraph [0209]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner with the features above as taught by Sareen.

Further, Park teaches sewing of digital clothing (Paragraph [0004]), further comprising detecting a current cursor position (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*), and moving the current cursor position to a position of the ending point and displaying the cursor position (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*; Paragraph [0054]: *process list 1150 of FIG. 11 may predict process time on the basis of a stitch length, a number of stitches, start and end positions of each process section, a number of yarn cuttings, a number of yarn cuttings set in a sewing manufacturing device, and a number of sewing manufacturing devices involved in each corresponding process; predict process cost on the basis of daily working conditions and the number of workers; and display the predicted process time and the predicted process cost*). Park teaches that this enables a user to set start and end positions in each process section (Paragraph [0052]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner, in view of Sareen with the features of detecting a current cursor position, and moving the current cursor position to a position of the ending point and displaying the cursor position as taught by Park.

11. Regarding claim 2, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles (Fig. 1; Fig. 11; Paragraph [0461]: *the Pattern Maker working in 3D would be provided with the upper arm measurement and the total size round its perimeter of the armhole*; Paragraph [0477]: *bottom of the yoke can be straight, square, curved or almost any shape imaginable. This profusion of designs makes it inappropriate to attempt to provide any standard set of design points. The design points set out below are therefore used only to indicate the principles of 3D Tailoring of Yokes*).

12. Regarding claim 5, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the setting of the second selected segment further comprises: calculating and displaying either one or both of the length of the first selected segment and the length of the line (Figs. 3-16; Paragraph [1101]: *Constraints between and within pattern pieces In order f r a garment to be constructible it is necessary to impose constraints between pattern pieces. In the case of the pattern piec f FIG. 32 there is a piece to the left, mirroring the one we see and the distance FG is constrained to be equal to the same length on the other piece. Similarly AB and BC are constrained to have lengths matching their companion seams*).

13. Regarding claim 7, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Park discloses wherein the setting of the second selected segment further comprises: displaying a warning sign, in response to the difference value being greater than the second reference value (Paragraph [0015]: *manufacturing management method which includes receiving design information on an end product to be manufactured by sewing; configuring at least one component shape of the end product based on the design information; identifying one or more processes necessary for manufacturing the end product based on analysis of the one or more component shapes; enabling a user to select one process from the one or more*

processes; enabling a user to select one process from the processes; providing one or more process task charts related to the one or more processes; predicting at least one of process time and process cost for the selected process, on the basis of the sewing information and the sewing data; transmitting at least one of the sewing information and the sewing data to at least one sewing manufacturing device through a network; receiving a device status message from the at least one sewing manufacturing device, the device status message including an abnormal status message indicating that a status of the at least one sewing manufacturing device is abnormal; providing at least one of text data and multi-media data to address the abnormal status based on the abnormal status message; and transmitting an A/S request message to a sewing manufacturing device provider based on the abnormal status message; Paragraphs [0022]-[0026]: *the sewing information process module 126 enables the user to easily input sewing information on each process. Sewing information received at the sewing information process module 126 may include a stitch shape, a member to be used in each sewing processing section, a type and color of yarn, a needle, a stitch length, a total number of stitches, a start and end position of each section, an accessory attachment type, and other guidelines/cautions of sewing, but the present embodiment is not limited thereto. The sewing information process module 126 may separately store sewing information, which is received from a user, for each section in each process… sewing data process module 128 enables a user to provide sewing data, which is required for performing a corresponding sewing process, based on the sewing information stored in the sewing information process module 126. The sewing data may include a plurality of parameters for executing a component stitch pattern for each sewing process, and specifically include a stitch width, a number of stitches, an upper yarn tension, a sewing speed, a sewing machine foot pressure, etc., but the sewing data is not limited thereto. The sewing parameters may need to be adjusted according to the sewing manufacturing device that is used in a corresponding sewing process, and thus, the sewing data process module 128 may allow a user to select a sewing manufacturing device to be used.*

When a sewing manufacturing device that a user desires to use is not available, the sewing data process module 128 may transmit an inquiry or a request for a corresponding sewing manufacturing device to a provider…A/S module 138 may receive a device status message from the sewing manufacturing devices 190-1 to 190-n over the second network 152. The device status message may include an abnormal status message indicating that the status of the sewing manufacturing devices 190-1 to 190-n is abnormal, and the abnormal status message may include information to recognize each of the sewing manufacturing devices 190-1 to 190-n and provide details about the abnormal status. The A/S module 138 may provide the sewing manufacturing devices 190-1 to 190-n over the second network 152 with information necessary to address the abnormal status based on the details, for example, in the form of text data or multimedia data. In accordance with the information included in the text data or the multimedia data, the sewing manufacturing devices 190-1 to 190-n may be adjusted or configured by taking appropriate measures).

14. Regarding claim 8, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 7, Sareen discloses wherein the displaying of the warning sign comprises: displaying the warning sign by changing colors of the calculated length and the difference value (Paragraphs [0188]-[0190]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value…an example web page produced by the system illustrates how stretch values may be visually displayed using a color tension map. These color tension maps can be viewed in any image format, on the web, or in any standard image viewing software. The color maps may also be viewable using 3D Viewer Application 82. The color tension map displays high stretch values in red, low stretch values in green, and negative*

stretch values in blue. data may include visual images of consumer drape 1102. Qualitative data may include a visual representation or image of the consumer drape using a color tension map to show the parts of the garment that are fitting tight, loose, or well. The color tension maps may be configured to show stretch values in certain directions with respect to the grain line of the fabric. For instance, a color tension map which display stretch values along the warp direction may be very different than a color tension map which displays stretch values along the weft or bias directions).

15. Regarding claim 9, the limitations of this claim substantially correspond to the limitations of claim 1; thus they are rejected on similar grounds.

16. Regarding claim 10, the limitations of this claim substantially correspond to the limitations of claim 1; thus they are rejected on similar grounds.

17. Regarding claim 11, the limitations of this claim substantially correspond to the limitations of claim 2; thus they are rejected on similar grounds.

18. Regarding claim 14, the limitations of this claim substantially correspond to the limitations of claim 5; thus they are rejected on similar grounds.

19. Regarding claim 16, the limitations of this claim substantially correspond to the limitations of claim 7; thus they are rejected on similar grounds.

20. Regarding claim 17, the limitations of this claim substantially correspond to the limitations of claim 8; thus they are rejected on similar grounds.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D SALVUCCI whose telephone number is (571)270-5748. The examiner can normally be reached on M-F: 7:30-4:00PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is

encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, XIAO WU can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MATTHEW SALVUCCI/
Primary Examiner, Art Unit 2613

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/31/2017	02/22/2018	12/11/2018	04/15/2019	09/25/2019				
	1	✓	✓	✓	✓	✓				
	2	✓	✓	✓	✓	✓				
	3	✓	-	-	-	-				
	4	✓	✓	✓	-	-				
	5	✓	✓	✓	✓	✓				
	6	✓	✓	-	-	-				
	7	✓	✓	✓	✓	✓				
	8	✓	✓	✓	✓	✓				
	9	✓	✓	✓	✓	✓				
	10	✓	✓	✓	✓	✓				
	11	✓	✓	✓	✓	✓				
	12	✓	-	-	-	-				
	13	✓	✓	✓	-	-				
	14	✓	✓	✓	✓	✓				
	15	✓	✓	-	-	-				
	16	✓	✓	✓	✓	✓				
	17	✓	✓	✓	✓	✓				

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

CPC - Searched*		
Symbol	Date	Examiner
G05B2219/2626 + text	10/31/2017	MDS
G05B2219/45195 + text	10/31/2017	MDS

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST search file attached	10/31/2017	MDS
Updated search results in EAST	2/22/2018	MDS
Updated search results in EAST	12/11/2018	MDS
Updated search results in EAST	04/15/2019	MDS
Updated search results in EAST	09/25/2019	MDS

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L5	32	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L6	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150827"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L7	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150527"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L8	1	("20160314604").PN.	US-PGPUB; USPAT	OR	OFF	2019/09/25 15:35
L9	517	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L10	7	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L11	29	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L12	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR	US-PGPUB; USPAT; USOCR;	OR	OFF	2019/09/25 15:35

		fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L13	2	(("20130057544") or ("20160078650")).PN.	US-PGPUB; USPAT	OR	OFF	2019/09/25 15:35
L14	91	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L15	104	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L16	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L17	136	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L18	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L19	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L20	67	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L21	73	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR	US-PGPUB; USPAT;	OR	OFF	2019/09/25 15:35

		fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L22	231	(stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L23	75	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L24	44	L23 NOT L21	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L25	250	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L26	75	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L27	136	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L28	197	L25 NOT (L27 L26)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L29	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND	US-PGPUB; USPAT; USOCR;	OR	OFF	2019/09/25 15:35

		(virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L30	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L31	119	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L32	6	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND difference$1 NEAR2 length$1 AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L33	0	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L34	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L35	8	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (siz$3 length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L36	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR2 (messag$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35

L37	59	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L38	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2019/09/25 15:35
L39	135	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L40	13	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR4 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L41	13	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L42	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR2 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L43	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L44	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2019/09/25 15:35
L45	7447	(Seung Woo).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2019/09/25 15:35
L46	29	(Seung Woo NEAR3 OH).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	OFF	2019/09/25 15:35

			IBM_TDB			
L47	3	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L48	32	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L49	172	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L50	140	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L51	77	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L52	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L53	8	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L54	15	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35

L55	37	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3 top bottom first second lower upper) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L56	10	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (over$6) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L57	58	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35
L58	31	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/09/25 15:35

EAST Search History (Interference)

< This search history is empty>

9/ 25/ 2019 3:42:07 PM
C:\ Users\ msalvucci\ Documents\ EAST\ Workspaces\ 14921269_DigitalFabricSewing.wsp

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	14/921,269	Filing Date	2015-10-23	Docket Number (if applicable)	304053.0001	Art Unit	2613
First Named Inventor	Seung Woo OH			Examiner Name	Matthew D Salvucci		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☒ Other Response to Final Office Action filed on June 18, 2019

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/S. Mahmood Ahmad/	Date (YYYY-MM-DD)	2019-07-10
Name	S. Mahmood Ahmad	Registration Number	62101

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	14921269
Filing Date:	23-Oct-2015
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Attorney Docket Number:	304053.0001
Filed as Small Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	2820	1	950	950
		Total in USD ($)		**950**

Electronic Acknowledgement Receipt	
EFS ID:	36541202
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Filer Authorized By:	Syed Mahmood Ahmad
Attorney Docket Number:	304053.0001
Receipt Date:	10-JUL-2019
Filing Date:	23-OCT-2015
Time Stamp:	12:09:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$950
RAM confirmation Number	071019INTEFSW12101800
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	AA20190627_3040530001_RCE asfiled.pdf	78966 05602c3205df5e145c7a8645aa21f743f0e17f50	no	3
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30780 5fec407110efb6d361e1fd471057477c0b92edc3	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	109746		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304053.0001	6021

89980 7590 06/27/2019

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER	
SALVUCCI, MATTHEW D	

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
06/27/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 14/921,269	**Applicant(s)** OH et al.	
	Examiner MATTHEW D SALVUCCI	**Art Unit** 2613	**AIA (FITF) Status** Yes

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 18 June 2019 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.
   b) ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection.The current period for reply expires ____ months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: The claims have been amended in a way that requires further search and consideration (See 37CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicants reply has overcome the following rejection(s): _____
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☑ For purposes of appeal, the proposed amendment(s):(a) ☑ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☑ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: Applicant argues for the allowance of the amended claims which require further search and consideration.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☑ Other: PTO-2323 attached.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed:_____.
    Claim(s) objected to:_____.
    Claim(s) rejected:1-2,5,7-11,14 and 16-17.
    Claim(s) withdrawn from consideration:_____.

/MATTHEW SALVUCCI/ Primary Examiner, Art Unit 2613	

AFCP 2.0 Decision

Application No.	Applicant(s)	
14/921,269	OH et al.	
Examiner	**Art Unit**	**AIA (FITF) Status**
MATTHEW D SALVUCCI	2613	Yes

This is in response to the After Final Consideration Pilot request filed 18 June 2019.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ A proper AFCP 2.0 request was submitted in response to the most recent final rejection.

   ☐ Other: _____

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☑ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action . See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other: _____

   Examiner Note: Please attach an interview summary when necessary as described above.

DO NOT ENTER: /M.S./ 06/23/2019

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh *et al.*	Art Unit: 2613
Application No. 14/921,269	Confirmation No. 6021
Filed: October 23, 2015	Examiner: Matthew D Salvucci

For: **METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING**

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Final Office Action mailed April 18, 2019. Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

Amendments to the claims are reflected in the listing of the claims that begins on page 2 of this paper.

Remarks begin on page 7.

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh *et al.*	Art Unit: 2613
Application No. 14/921,269	Confirmation No. 6021
Filed: October 23, 2015	Examiner: Matthew D Salvucci

For: **METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING**

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Final Office Action mailed April 18, 2019. Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

Amendments to the claims are reflected in the listing of the claims that begins on page 2 of this paper.

Remarks begin on page 7.

In the Claims

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

Please AMEND claims 1, 7-10, and 16-17, without prejudice or disclaimer, in accordance with the following:

1. (Currently amended) A method of creating digital clothing~~, wherein the method is~~ executable by a computing device ~~comprising a computing element and a storage element~~ storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, comprising

inputting a starting point of the second selected segment ~~onto~~ on a second segment, ~~which is to be~~wherein the second selected segment is sewn to the first selected segment,

detecting a current cursor position,

displaying a point on the second segment that is closest in distance to the current cursor position as a candidate ~~for an~~ ending point of the second selected segment ~~by determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position~~ to make a length of ~~and which makes~~ the second selected segment substantially equal to a ~~same~~ length ~~as of~~ the first selected segment ~~along the second segment, which includes the input starting point~~, ~~wherein~~

~~the second selected segment is made by~~ connecting the ~~input~~ starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and the point closest in distance to the detected current cursor position being less than a first reference value,

displaying a difference value between the length of the first selected segment and a length of the~~a~~ line~~, which is acquired by connecting the starting point, input along the~~

second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position,

selecting the candidate ending point as an inputting the ending point of the second selected segment, in response to the difference value being less than a second reference value which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment, and

setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point, and

wherein the setting of the second selected segment further comprises,

moving the current cursor position to a position of the determined candidate for the ending point and displaying the current cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

2. (Previously Presented) The method of claim 1, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. (Cancelled)

4. (Cancelled)

5. (Previously Presented) The method of claim 1, wherein the setting of the second selected segment further comprises:

calculating and displaying either one or both of the length of the first selected segment and the length of the line.

6. (Cancelled)

7. (Currently amended) The method of claim 1, wherein the setting of the second selected segment further comprises:

displaying a warning sign, in response to the difference value being greater than the second reference value.

8. (Currently amended) The method of claim 7, wherein the displaying of the warning sign comprises:

displaying the warning sign by changing colors of the calculated length and the difference value~~, in response to the difference value being greater than the reference value~~.

9. (Currently amended) A non-transitory computer-readable storage medium storing instructions that, when executed by a processor, cause the processor to perform the ~~The~~ method of claim 1~~, the method is performed by executing a computer program stored in a non-volatile storage media~~.

10. (Currently amended) An apparatus for creating digital clothing~~, wherein the apparatus comprises~~ comprising a computing ~~element and a storage element~~device storing patterns and draped digital clothing, the apparatus comprising:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter comprising

a starting point input configured to input a starting point of a second selected segment ~~onto~~ on a second segment, wherein the second selected segment is ~~which is to be~~ sewn to the first selected segment, ~~and~~

~~an ending point input configured to input the ending point, which, upon starting a point clicking process at the starting point, is closest in distance to a point where the point clicking process occurs on the second segment, wherein the starting point is located on the second segment,~~

a cursor position detector configured to detect a current cursor position~~,~~;

an ending point candidate display configured to display a point on the second segment that is closest in distance to the current cursor position as a candidate ~~for an~~ ending point of the second selected segment ~~by determining, as the candidate for the ending point, a point which is closest in distance to the detected current cursor position and which makes~~to make a length of the second selected segment substantially equal to a ~~same~~ length ~~as~~ of the first selected segment, and to connect ~~along the second segment, which includes~~ the ~~input~~ starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and ~~, wherein the second~~

~~selected segment is made by connecting the input starting point to~~ the point closest in distance to the detected current cursor position being less than a first reference value,

a difference value display configured to display a difference value between the length of the first selected segment and a length of ~~a~~ the line~~, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position~~, and

a cursor position mover configured to select the candidate ending point as an ending point of the second selected segment, in response to the difference value being less than a second reference value, to set as the second selected segment, a section of the second segment between the starting point and the ending point, to move the cursor position to a position of the ~~determined candidate for the~~ ending point and to display the cursor position~~, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value~~.

11. (Previously Presented) The apparatus of claim 10, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. (Cancelled)

13. (Cancelled)

14. (Previously Presented) The apparatus of claim 10, further comprising:

a length display configured to calculate and display either one or both of the length of the first selected segment and the length of the line.

15. (Cancelled)

16. (Currently amended) The apparatus of claim 10, further comprising:

a warning sign display configured to display a warning sign, in response to the difference value being greater than ~~a~~ the second reference value.

17. (Currently amended) The apparatus of claim 16, wherein the warning sign display is configured to display the warning sign by changing colors of the calculated length and the difference value~~, in response to the difference value being greater than the reference value~~.

REMARKS

Claims 1-2, 5, 7-11, 14 and 16-17 are pending in the application, of which claims 1 and 10 are independent claims. Claims 1, 7-10, and 16-17 have been amended, without prejudice or disclaimer, to more positively recite the claims features and to put the claims in better condition for allowance. No new matter is submitted by the amendment, and support for the claim amendments can be found in the specification, for example, at paragraphs 0051-0063 and 0077-0092[1], and in the drawing figures, for example, at FIG. 3.

Applicant has amended the claims to further the prosecution for a disclosed embodiment, and not in response to the outstanding rejections. No new matter has been entered. Applicant reserves the right to later claim other embodiments disclosed, including a broader claim or embodiment. No new matter is submitted by the new claim amendments. Reconsideration and allowance of the pending claims is respectfully requested in view of the amendments and the following remarks.

I. Claims 1-2, 5, 7-11, 14 and 16-17 are Allowable under 35 USC § 103 over Gardner, Sareen, and Park

Claims 1-2, 5, 7-11, 14 and 16-17 are rejected under 35 U.S.C. §103 as being obvious over United States Pat. App. Pub. No. US 2004/0049309 A1 to Gardner *et al.* (Gardner), United States Pat. App. Pub. No. US 2011/0298897 A1 to Sareen *et al.* (Sareen), and United States Pat. App. Pub. No. US 2014/0135971 A1 to Park (Park). See Office Action dated 04/18/2019 at p. 3. These rejections are traversed regarding the claims as previously presented, and are also traversed in so far as the rejections are applicable to the present claims. As explained below, the outstanding rejection(s) should be withdrawn because the cited references fail to disclose, at least, the below-mentioned features of the independent claims.

Draping is a kind of computer simulation, by which 2-dimensional cloth patterns are transformed into a 3-dimensional clothing.[2] Tom achieve this, stitch lines should be specified among lines constituting two 2-dimensional cloth patterns that are to be stitched. In an embodiment, first, the computer model each of the 2-dimensional cloth patterns by a plurality of spring meshes having a mass. Then, it connects the spring meshes on the specified stitch lines, which makes the 2-dimensional patterns into something resembling a folded clothing. The folded

[1] The citations to the present application refer to the U.S. Patent Application Publication No. US 2016/0314604 A1 to Oh *et al.* ("Specification").

[2] The Applicant does not intend to incorporate the elements, which have not been expressly claimed, into the claims. This explanation is provided to provide a context for the present amendments and to help the Office better appreciate some of the many benefits of the amended claims.

clothing is then draped onto an avatar. Usually, operator points out the initial rough positions of some of the meshes constituting the clothing on the surface of the avatar. The computer incrementally calculates the position of the meshes considering its mass and elastic force of the spring. In this process, the surface of the avatar may stop the movement of each of the meshes by so called 'collision.'

Because two patterns may be sewed along a straight line, or sometimes along a circle line, or even along polygon's side lines. Two stitch lines to be sewed may have different length, for example to make a pleat. A line segment may be stitched with two line segments, or even with an arc. For this reason, it is yet not possible, or at least very difficult, to automatically specify all these stitch line cases. Currently, stitch lines to be sewed should be specified by an experienced operator who knows the outcome of the sewing, *i.e.*, the shape of the resulting clothing. Further, specifying two stitch lines to be sewed requires elaborate pointing operation, for example, by the movement of a mouse or a pen.

The present claims define an innovation to assist the operator in handling the stitch lines such that the operator is able to accurately set an end point of the stitch line. The present claims recite features that intelligently interprets the operator's pointing operation, suggests candidate end point of the stitch line, and selects nearest candidate point selected by operator. In addition, the features of the present claims help the operator to correct the pointing operation by visualizing the result of the previous pointing operation, for example, displaying the difference between two stitched lines selected. The user can check the difference if that is his or her intention, or can amend the selection if that is not his or her intention. Without this feature, the operator may have to input the value of the stitch line's length by a keyboard, which would be a cumbersome process involving the use of both hands of the operator. The present claims free the operator's keyboard input by visualizing the difference, which allows the operator to use only one hand, and makes the computer work faster and easier.

The Office cites to paragraphs 0113, 0029, 0022, 0120, 0461, and 0751-0756 of Gardner to disclose some of the features of claim 1, but admits that "Gardner does not explicitly disclose setting a second selected segment." See Office Action dated 04/18/2019 at pp. 3-5. The Office cites to Sareen to cure the deficiencies of Gardner. Id. In particular, the Office cites to FIG. 8 and paragraphs 0003, 0040, 0069, 0079, 0170, 0188-0189, 0082, 0079, and 0209 to cure the deficiencies of Gardner. Id. at pp. 6-8. The Office then cites to paragraphs 0052, 0054, and FIGS 9 and 11 of Park for the disclosures related to moving the current cursor position to a position of the determined candidate for the ending point and displaying the cursor position. Id. at pp. 8-9.

Nevertheless, these portions and the remainder of Gardner, Sareen, and Park fails to disclose many of the features of amended independent claim 1. As amended, independent claim 1 recites:

> *A method of creating digital clothing executable by a computing device storing patterns and draped digital clothing, the method comprising:*
>
> *setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and*
>
> *setting a second selected segment, comprising*
>
> *inputting a starting point of the second selected segment on a second segment, wherein the second selected segment is sewn to the first selected segment,*
>
> *detecting a current cursor position,*
>
> *displaying a point on the second segment that is closest in distance to the current cursor position as a candidate ending point of the second selected segment to make a length of the second selected segment substantially equal to a length of the first selected segment,*
>
> *connecting the starting point to the candidate ending point to form a line, in response to a difference between the current cursor position and the point closest in distance to the detected current cursor position being less than a first reference value,*
>
> *displaying a difference value between the length of the first selected segment and a length of the line,*
>
> *selecting the candidate ending point as an ending point of the second selected segment, in response to the difference value being less than a second reference value,*
>
> *setting, as the second selected segment, a section of the second segment between the starting point and the ending point, and*
>
> *moving the current cursor position to a position of the ending point and displaying the current cursor position.*

Because the cited references, individually or combined, do not disclose, at least, the fore-mentioned elements of claim 1, a *prima facie* rejection for obviousness has not been established with respect to independent claim 1. Accordingly, for at least this reason, the rejection of claim 1 over the Gardner, Sareen, and Park under 35 U.S.C. § 103 should be withdrawn.

To support an obviousness rejection MPEP § 2143.03 requires "all words of a claim to be considered." The Board of Patent Appeal and Interference has affirmed that a proper, post-KSR

obviousness determination still requires that the Office make "a searching comparison of the claimed invention — including all its limitations — with the teaching of the prior art." In re Wada and Murphy, Appeal 2007-3733, page 7 (BPAI Jan. 14, 2008). To make a *prima facie* finding of "obviousness requires a suggestion of all limitations in a claim." Id. (citing CFMT v. Yieldup Intern. Corp., 349 F.3d 1333, 1342 (Fed. Cir. 2003). Because Gardner, Sareen, and Park do not disclosed, at least, the fore-mentioned elements of claim 1, the applied reference fails to render claim 1 obvious under 35 U.S.C. §103(a). Accordingly, withdrawal of the rejections of the claim 1 is respectfully requested.

Independent claim 10 has its own scope, recite features similar to those recited in independent claim 1. Therefore, it is respectfully submitted that the subject matter of claim 10 distinguish over the combination of references for reasons similar to those discussed above.

Dependent claims 2, 5, 7-9, 11, 14 and 16-17 depend directly, or through intervening claims, from their respective allowable independent claims 1 and 10. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 21432.03 (citing In re Fine, 837 F.2d 1071, 5 USPQ 2d. 1596 (Fed. Cir. 1988)). Thus, dependent claims 2, 5, 7-9, 11, 14 and 16-17 are allowable at least due to their dependence on an allowable independent claim and for the additional features they recite.

In view of the foregoing amendments and remarks, Applicant respectfully submits that *all* claims listed above as presently being under consideration in the application are now in condition for allowance.

CONCLUSION

In view of the foregoing Amendments and comments, Applicants respectfully request reconsideration and timely allowance of all pending claims. Should the Office believe anything further is required to place the application in condition for allowance, the Examiner is requested to contact the Applicant's representative at the telephone number listed below.

In the event this paper is not being filed timely, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees that may be required for this paper, and any other documents filed concurrently with this paper, may be charged to North Star Intellectual Property Law, PC's Deposit Account No. 50-5113.

Respectfully submitted,

Date: June 18, 2019

/S. Mahmood Ahmad/

S. Mahmood Ahmad, Registration No. 62,101
NSIP Law
1120 Connecticut Ave, NW Ste 304
Washington, DC 20036
Telephone (202) 429-0020
Facsimile (202) 315-3758

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
304053.0001	14/921,269	October 23, 2015
First Named Inventor:	**Title:**	
Seung Woo Oh	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:

- Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
- The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
  - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
  - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
    - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
    - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/S. Mahmood Ahmad/	June 18, 2019
Name (Print/Typed) S. Mahmood Ahmad	**Practitioner Registration No.** 62,101

***Note**: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

☐ * Total of _____ forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	36335121
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Syed Mahmood Ahmad/Mark Gambriel
Filer Authorized By:	Syed Mahmood Ahmad
Attorney Docket Number:	304053.0001
Receipt Date:	18-JUN-2019
Filing Date:	23-OCT-2015
Time Stamp:	16:04:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		FOA20190418_3040530001_AsFiledResp.pdf	62293 4c07c0b1428ea84befbda1686bde5009efce8e41	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	11

Warnings:					
Information:					
2	After Final Consideration Program Request	FOA20190418_3040530001_AFCPforFiling.pdf	226509 0195fef0352de976a4d9c76e67e97ebcc4ae0efe	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	288802		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	06/18/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/NICOL D SCOTT/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304053.0001	6021

89980 7590 04/18/2019

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER
SALVUCCI, MATTHEW D

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
04/18/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

Office Action Summary	Application No. 14/921,269	Applicant(s) OH et al.	
	Examiner MATTHEW D SALVUCCI	Art Unit 2613	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 15 March 2019.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-2,5,7-11,14 and 16-17 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-2,5,7-11,14 and 16-17 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Status of Claims

2. Applicant's amendments filed on 15 March 2019 have been entered. Claims 1, 10, and 14 have been amended. Claims 4 and 13 have been canceled. No claims have been added. Claims 1, 2, 5, 7-11, 14, 16, and 17 are still pending in this application, with claims 1 and 10 being independent.

Response to Arguments

3. Applicant's arguments filed 15 March 2019 have been fully considered but they are not persuasive. Applicant argues that "*the cited invention Park discloses only clicking a desired position as the start position and a desired position as the end position. So, as to the cited invention Park, if a cursor is located around the desired position for the end position, the cursor isn't moved onto the desired position for the end position. The cited invention Park does not disclose a candidate for the ending point nor discloses a configuration for moving the current cursor position to candidate for the ending point. Therefore, through the cited invention Park, you cannot achieve the advantageous effect of specifying the end point exactly as you clicked the desired end point by clicking near the desired end point position when setting the end point*". Examiner notes that the Park reference explicitly teaches this, reciting in the cited paragraph [0052]: "*the user may click the end position setting button 912-2,* ***move the pointing device to a desired end position*** *in the zoom view 904, and click the desired end position, thereby setting the end position*" (**emphasis added**), clearly reading on the claimed limitation. Thus, Examiner respectfully disagrees with Applicant's allegation that "*the cursor isn't moved onto the*

desired position for the end position" in Park, as clearly this is not the case. Thus, Examiner finds the aforementioned amended limitation as well as remaining limitations to be taught by the cited references as is outlined in the following Action.

4. Applicant argues for the remaining claims for the reasons above. It follows that all remaining claims are rejected for at least the above reasons.

Claim Rejections - 35 USC § 103

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 5, 7-11, 14, 16, and 17 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner et al. (US Pub. 2004/0049309), hereinafter Gardner, in view of Sareen et al. (US Pub. 2011/0298897), hereinafter Sareen, and further in view of Park (US Pub. 2014/0135971).

8. Regarding claim 1, Gardner discloses a method of creating digital clothing (Paragraph [0113]: *method of capturing the 3D representation of the garment is to provide a digital representation of the 2D pattern pieces, sized to fit The Model, and then to create a virtual r presentation of the garment in 3D by meands of a program such as Stitch from Size8 Software of Jacksonville, Fla. The advantage of the virtual representation is that the rlationship betewen*

the 2D pattern pieces and the 3D representation is known with precision, which increases the accuracy of the later unwrapping stage, and there is no missing data, which inevitably occurs with a 3D scan), wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing (Paragraph [0029]: *the present invention provides a method of processing information relating to a garment, the method comprising: providing or obtaining information defining the 3D shape of a garment designed to fit and as worn by a first body of a person of a first size and shape; providing or obtaining data defining the first body's size and shape in 3D without the garment in question; identifying defined body regions on the first body; identifying one or more design points on the garment, each design point being related in 3D to one or more of the defined body regions of the first body; providing relationship rules that define the said 3D relationships between said design points and said body regions; storing data defining the garment, the design points, the body regions, and the relationship rules*), the method comprising: setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern (Paragraph [0022]: *pattern pieces of the base garment are deformed to collide with a 3D human model and with each other, and are then virtually sewn together. This provides a 3D representation of the base garment fitted to a first human model. The first human model is deformed to match the shape/size of a consumer, and the base garment is modified simply by deforming the 3D representation of the base garment in a similar manner to the first human model. The 3D representation of the modified garment can be used for visualisation ("virtual try-on"), and/or as the basis for generating 2D pattern pieces for production of the modified garment. The document describes the 2D pattern pieces being generated by developing the corresponding 3D parts of the 3D representation into 2D shapes. This system relies on colliding base garment pattern pieces with the standard body shape and modifying the resultant 3D representation of the base garment on the basis of a geometrical deformation of the standard body shape to match a consumer body shape. This relatively simple approach provides no*

guarantee that the modified garment will preserve the design or style of the base garment, or that pattern pieces developed from the modified 3D representation of the garment will be capable of being assembled to produce an acceptable garment); and displaying a candidate for an ending point of the second selected segment (Paragraph [0120]: *construction lines (where present), the matching of the Design Points on different pattern pieces and the knowledge base of completed garments makes it possibl for an initial rough juxtapositioning of the pattern pieces to be carried out automatically, although the capability to carry out a manual juxtapositioning would be present as a fall-back*), displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment (Paragraph [0461]: *comparison between the upper arm +12-13 cms and the length of the armhole perimeter therefore provides a cross check on the size of the armhole that is derived as a result of using the 3D process*; Paragraphs [0751]-[0756]: *relative length as compared to the top of the pattern piece (always bigg r than the top, often substantially*).

Gardner does not explicitly disclose setting a second selected segment, comprising inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment, detecting a current cursor position, determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position, a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position, inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located

on the second segment, and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point, wherein the setting of the second selected segment further comprises: moving the current cursor position to a position of the determined candidate for the ending point and displaying the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

However, Sareen teaches virtual garment creating and storage based on the received garment specifications and fabric constants (Paragraph [0003]), further comprising setting a second selected segment, comprising inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment (Fig. 8; Paragraph [0040]: *from the digital pattern 57, production sample garment 59, technical pack 54, grading rules 53, fit model scan data or body measurements 58, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114. Generally, a pattern refers to the collection of the individual pieces of the garment 59. In standard practice, the pattern pieces are drafted first, then laid over fabric, which is then cut around the perimeter of each piece. The resulting pieces of fabric are then sewn together to form the finished garment*), determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in*

accordance with how the garment is supposed to be sewn together; Paragraph [0170]: *user may click on a link or a button with a mouse, or interact with a touch screen on the display of computer device)*, a point on the second segment that is the point closest in distance to the detected current cursor position (Paragraphs [0188]-[0189]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value. In another embodiment, the stretch value may be calculated for many garment measurements… data may also include calculating the change in stretch in a similar fashion as described above, but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size). Furthermore, quantitative data may also include calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape*), inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*), and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point (Paragraph [0079]: *step 362, E-FIT assigns sewing instructions. In this step, E-FIT matches each particular segment of a 3D mesh corresponding to*

a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together; Paragraph [0082]: *Sewing and draping may be completed using functions provided by CLOTHFX and native E-FIT according to the sewing instructions assigned above. Often, garments have lining and/or layers of material. In such cases, layers may be placed, stitched, and draped in a specific order*). Sareen teaches that this will allow for user to make custom patterns and therefore custom garments for the consumer (Paragraph [0209]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner with the features above as taught by Sareen.

Further, Park teaches sewing of digital clothing (Paragraph [0004]), further comprising detecting a current cursor position (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*), wherein the setting of the second selected segment further comprises: moving the current cursor position to a position of the determined candidate for the ending point and displaying the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*; Paragraph [0054]: *process list 1150 of FIG. 11 may predict process time on the basis of a stitch length, a number of stitches, start*

and end positions of each process section, a number of yarn cuttings, a number of yarn cuttings set in a sewing manufacturing device, and a number of sewing manufacturing devices involved in each corresponding process; predict process cost on the basis of daily working conditions and the number of workers; and display the predicted process time and the predicted process cost). Park teaches that this enables a user to set start and end positions in each process section (Paragraph [0052]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner, in view of Sareen with the features of detecting a current cursor position, wherein the setting of the second selected segment further comprises: moving the current cursor position to a position of the determined candidate for the ending point and displaying the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value as taught by Park.

9. Regarding claim 2, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles (Fig. 1; Fig. 11; Paragraph [0461]: *the Pattern Maker working in 3D would be provided with the upper arm measurement and the total size round its perimeter of the armhole*; Paragraph [0477]: *bottom of the yoke can be straight, square, curved or almost any shape imaginable. This profusion of designs makes it inappropriate to attempt to provide any standard set of design points. The design points set out below are therefore used only to indicate the principles of 3D Tailoring of Yokes*).

10. Regarding claim 5, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the setting of the second selected segment further comprises: calculating and displaying either one or both of the length of the first selected segment and the length of the line (Figs. 3-16; Paragraph [1101]: *Constraints between and within pattern pieces In order for a garment to be constructible it is necessary to impose*

constraints between pattern pieces. In the case of the pattern piec f FIG. 32 there is a piece to the left, mirroring the one we see and the distance FG is constrained to be equal to the same length on the other piece. Similarly AB and BC are constrained to have lengths matching their companion seams).

11. Regarding claim 7, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Park discloses wherein the setting of the second selected segment further comprises: displaying a warning sign, in response to the difference value being greater than a reference value (Paragraph [0015]: *manufacturing management method which includes receiving design information on an end product to be manufactured by sewing; configuring at least one component shape of the end product based on the design information; identifying one or more processes necessary for manufacturing the end product based on analysis of the one or more component shapes; enabling a user to select one process from the one or more processes; enabling a user to select one process from the processes; providing one or more process task charts related to the one or more processes; predicting at least one of process time and process cost for the selected process, on the basis of the sewing information and the sewing data; transmitting at least one of the sewing information and the sewing data to at least one sewing manufacturing device through a network; receiving a device status message from the at least one sewing manufacturing device, the device status message including an abnormal status message indicating that a status of the at least one sewing manufacturing device is abnormal; providing at least one of text data and multi-media data to address the abnormal status based on the abnormal status message; and transmitting an A/S request message to a sewing manufacturing device provider based on the abnormal status message*; Paragraphs [0022]-[0026]: *the sewing information process module 126 enables the user to easily input sewing information on each process. Sewing information received at the sewing information process module 126 may include a stitch shape, a member to be used in each sewing processing section, a type and color of yarn, a needle, a stitch length, a total number of stitches,*

a start and end position of each section, an accessory attachment type, and other guidelines/cautions of sewing, but the present embodiment is not limited thereto. The sewing information process module 126 may separately store sewing information, which is received from a user, for each section in each process… sewing data process module 128 enables a user to provide sewing data, which is required for performing a corresponding sewing process, based on the sewing information stored in the sewing information process module 126. The sewing data may include a plurality of parameters for executing a component stitch pattern for each sewing process, and specifically include a stitch width, a number of stitches, an upper yarn tension, a sewing speed, a sewing machine foot pressure, etc., but the sewing data is not limited thereto. The sewing parameters may need to be adjusted according to the sewing manufacturing device that is used in a corresponding sewing process, and thus, the sewing data process module 128 may allow a user to select a sewing manufacturing device to be used. When a sewing manufacturing device that a user desires to use is not available, the sewing data process module 128 may transmit an inquiry or a request for a corresponding sewing manufacturing device to a provider…A/S module 138 may receive a device status message from the sewing manufacturing devices 190-1 to 190-n over the second network 152. The device status message may include an abnormal status message indicating that the status of the sewing manufacturing devices 190-1 to 190-n is abnormal, and the abnormal status message may include information to recognize each of the sewing manufacturing devices 190-1 to 190-n and provide details about the abnormal status. The A/S module 138 may provide the sewing manufacturing devices 190-1 to 190-n over the second network 152 with information necessary to address the abnormal status based on the details, for example, in the form of text data or multimedia data. In accordance with the information included in the text data or the multimedia data, the sewing manufacturing devices 190-1 to 190-n may be adjusted or configured by taking appropriate measures).

12. Regarding claim 8, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 7, Sareen discloses wherein the displaying of the warning sign comprises: displaying the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value (Paragraphs [0188]-[0190]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value…an example web page produced by the system illustrates how stretch values may be visually displayed using a color tension map. These color tension maps can be viewed in any image format, on the web, or in any standard image viewing software. The color maps may also be viewable using 3D Viewer Application 82. The color tension map displays high stretch values in red, low stretch values in green, and negative stretch values in blue. data may include visual images of consumer drape 1102. Qualitative data may include a visual representation or image of the consumer drape using a color tension map to show the parts of the garment that are fitting tight, loose, or well. The color tension maps may be configured to show stretch values in certain directions with respect to the grain line of the fabric. For instance, a color tension map which display stretch values along the warp direction may be very different than a color tension map which displays stretch values along the weft or bias directions*).

13. Regarding claim 9, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the method is performed by executing a computer program stored in non-volatile storage media (Paragraph [1114]: *Such data could be downloaded to the central database 50. However, for reasons of customer privacy and confidentiality, it is preferred that this data is uniquely stored on a data carrier 58 which remains within the custody and control of the customer, with the only data passing to the central*

database 50 being an identification code identifying that customer. The data carrier 58 may be any convenient storage means such as a floppy disc, CD-ROM or smart card).

14. Regarding claim 10, the limitations of this claim substantially correspond to the limitations of claim 1; thus they are rejected on similar grounds.

15. Regarding claim 11, the limitations of this claim substantially correspond to the limitations of claim 2; thus they are rejected on similar grounds.

16. Regarding claim 14, the limitations of this claim substantially correspond to the limitations of claim 5; thus they are rejected on similar grounds.

17. Regarding claim 16, the limitations of this claim substantially correspond to the limitations of claim 7; thus they are rejected on similar grounds.

18. Regarding claim 17, the limitations of this claim substantially correspond to the limitations of claim 8; thus they are rejected on similar grounds.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D SALVUCCI whose telephone number is (571)270-5748. The examiner can normally be reached on M-F: 7:30-4:00PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, XIAO WU can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MATTHEW SALVUCCI/
Primary Examiner, Art Unit 2613

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	**Art Unit**
	MATTHEW D SALVUCCI	2613

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/31/2017	02/22/2018	12/11/2018	04/15/2019					
	1	✓	✓	✓	✓					
	2	✓	✓	✓	✓					
	3	✓	-	-	-					
	4	✓	✓	✓	-					
	5	✓	✓	✓	✓					
	6	✓	✓	-	-					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	-	-	-					
	13	✓	✓	✓	-					
	14	✓	✓	✓	✓					
	15	✓	✓	-	-					
	16	✓	✓	✓	✓					
	17	✓	✓	✓	✓					

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

CPC - Searched*		
Symbol	Date	Examiner
G05B2219/2626 + text	10/31/2017	MDS
G05B2219/45195 + text	10/31/2017	MDS

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST search file attached	10/31/2017	MDS
Updated search results in EAST	2/22/2018	MDS
Updated search results in EAST	12/11/2018	MDS
Updated search results in EAST	04/15/2019	MDS

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MATTHEW SALVUCCI/ Primary Examiner.Art Unit 2613	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	32	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L2	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150827"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L3	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150527"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L4	1	("20160314604").PN.	US-PGPUB; USPAT	OR	OFF	2019/04/15 08:35
L5	516	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L6	7	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L7	29	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L8	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR	US-PGPUB; USPAT; USOCR;	OR	OFF	2019/04/15 08:35

		fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L9	2	(("20130057544") or ("20160078650")).PN.	US-PGPUB; USPAT	OR	OFF	2019/04/15 08:35
L10	91	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L11	104	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L12	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L13	136	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L14	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L15	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L16	67	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L17	73	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR	US-PGPUB; USPAT;	OR	OFF	2019/04/15 08:35

		fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L18	230	(stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L19	75	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L20	44	L19 NOT L17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L21	248	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L22	75	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L23	136	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L24	195	L21 NOT (L23 L22)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L25	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND	US-PGPUB; USPAT; USOCR;	OR	OFF	2019/04/15 08:35

		(virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L26	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L27	119	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L28	6	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND difference$1 NEAR2 length$1 AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L29	0	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L30	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L31	8	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (siz$3 length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L32	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR2 (messag$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35

L33	59	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L34	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2019/04/15 08:35
L35	134	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L36	12	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR4 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L37	12	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L38	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR2 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L39	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L40	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2019/04/15 08:35
L41	7167	(Seung Woo).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2019/04/15 08:35
L42	27	(Seung Woo NEAR3 OH).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	OFF	2019/04/15 08:35

			IBM_TDB			
L43	3	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L44	31	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L45	170	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L46	137	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L47	75	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L48	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L49	7	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L50	15	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35

L51	37	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3 top bottom first second lower upper) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L52	10	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (over$6) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L53	57	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35
L54	31	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/04/15 08:35

EAST Search History (Interference)

< This search history is empty>

4/15/2019 8:55:33 AM
C:\Users\msalvucci\Documents\EAST\Workspaces\14921269_DigitalFabricSewing.wsp

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed: 10/23/2015 Examiner: Matthew D Salvucci

FOR: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

AMENDMENT UNDER 37 C.F.R. § 1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Office Action mailed December 17, 2018. Reconsideration and allowance of the claims is respectfully requested in view of the amendments and the remarks.

Amendments to the Claims are reflected in the listing of the claims that begins on page **2** of this Paper.

Remarks begin on page **9** of this Paper.

IN THE CLAIMS

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

Please **AMEND** claims 1, 10, and 14, and **CANCEL** claims 4 and 13, without prejudice or disclaimer, in accordance with the following:

1. (Currently amended) A method of creating digital clothing, wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, comprising

inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment,

detecting a current cursor position,

displaying a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position,

displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position,

inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment, and

setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point,

wherein the setting of the second selected segment further comprises,

moving the current cursor position to a position of the determined candidate for the ending point and displaying the current cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

2. (Previously Presented) The method of claim 1, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. (Cancelled)

4. (Cancelled)

5. (Previously Presented) The method of claim 1, wherein the setting of the second selected segment further comprises:

calculating and displaying either one or both of the length of the first selected segment and the length of the line.

6. (Cancelled)

7. (Previously Presented) The method of claim 1, wherein the setting of the second selected segment further comprises:

displaying a warning sign, in response to the difference value being greater than a reference value.

8. (Previously Presented) The method of claim 7, wherein the displaying of the warning sign comprises:

displaying the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

9. (Previously Presented) The method of claim 1, the method is performed by executing a computer program stored in a non-volatile storage media.

10. (Currently amended) An apparatus for creating digital clothing, wherein the apparatus comprises a computing element and a storage element storing patterns and draped digital clothing, the apparatus comprising:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter comprising

a starting point input configured to input a starting point of a second selected segment onto a second segment, which is to be sewn to the first selected segment, and

an ending point input configured to input the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment,

a cursor position detector configured to detect a current cursor position;

an ending point candidate display configured to display a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point which is closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position,

a difference value display configured to display a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position, and

a cursor position mover configured to move the cursor position to a position of the determined candidate for the ending point and display the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

~~a cursor position detector configured to detect a current cursor position,~~

~~an ending point candidate display configured to display a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point which is closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position,~~

~~a difference value display configured to display a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position, and~~

~~an ending point input configured to input the ending point, which, upon starting a point clicking process at the starting point, is closest in distance to a point where the point clicking process occurs on the second segment, wherein the starting point is located on the second segment.~~

11. (Previously Presented) The apparatus of claim 10, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. (Cancelled)

13. (Cancelled)

14. (Currently amended) The apparatus of claim ~~13~~10, further comprising:

a length display configured to calculate and display either one or both of the length of the first selected segment and the length of the line.

15. (Cancelled)

16. (Previously Presented) The apparatus of claim 10, further comprising:

a warning sign display configured to display a warning sign, in response to the difference value being greater than a reference value.

17. (Previously Presented) The apparatus of claim 16, wherein the warning sign display is configured to display the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

REMARKS

At the outset, the Office is thanked for the review and consideration of the pending application. The Office Action mailed December 17, 2019 has been received and its contents reviewed. Reconsideration of the pending application is respectfully requested in view of the amendments and the following remarks.

Claims 1-2, 4-5, 7-11, 13-14, and 16-17 are currently under examination, of which claims 1 and 10 are independent claims.

In accordance with the foregoing, claims 1, 10 and 14 have been amended. Claims 4 and 13 have been canceled without prejudice or disclaimer to the underlying subject matter. Applicants have amended the claims solely to further prosecution of the disclosed embodiments, and not in response to the merits of the outstanding rejections. Applicants reserve the right to prosecute broader claims or embodiments, including the original claims, in this application or a continuing application derived therefrom.

I. Claim Rejections under 35 U.S.C. § 103

Claims 1, 2, 4, 5, 7-11, 13, 14, 16, and17 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner (US Pub. 2004/0049309), in view of Sareen (US Pub. 2011/0298897), and further in view of Park (US Pub. 2014/0135971). These rejections are respectfully traversed.

A. Claim 1

Independent claim 1 has been amended by adding the feature "moving the cursor position to a position of the determined candidate for the ending point." This feature was previously recited in claim 4. As shown below, the cited references fail to teach or suggest the above mentioned features of claim 1.

When a user inputs the ending point of the second selected segment, the amended claim 1 recognizes that the determined candidate for the ending point is clicked correctly if the difference between the current cursor position and the determined candidate for the ending point is less than the pre-defined reference value (threshold) and moves the current cursor position to the determined candidate for the ending point. So, if a cursor is located around the candidate for the

ending point, the cursor is moved onto the candidate for the ending point so that the second selected segment may be easily set to be the same as the first selected segment.

The examiner asserts that this feature is disclosed in the cited invention Park (Fig. 9; Paragraph [0052] a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position).

However, the cited invention Park discloses only clicking a desired position as the start position and a desired position as the end position. So, as to the cited invention Park, if a cursor is located around the desired position for the end position, the cursor isn't moved onto the desired position for the end position. The cited invention Park does not disclose a candidate for the ending point nor discloses a configuration for moving the current cursor position to candidate for the ending point. Therefore, through the cited invention Park, you cannot achieve the advantageous effect of specifying the end point exactly as you clicked the desired end point by clicking near the desired end point position when setting the end point.

For at least the reasons stated above, the present rejection of claim 1 should be withdrawn.

The dependent claims 2, 5, and 7-9 depend from independent claim 1. Therefore, the rejections of claims 2, 5, and 7-9 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

B. Claim 10

Independent claim 10 has been amended by adding the feature "a cursor position mover." The feature of "a cursor position mover" was previously recited in claim 13. In addition, claim 10 has been amended to conform to Fig 13.

For at least the reasons stated above, the present rejection of claim 10 should be withdrawn.

The dependent claims 11, 14, and 16-17 depend from independent claims 10. Therefore, the rejections of claims 11, 14, and 16-17 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

In view of the foregoing amendments and remarks, the Applicant respectfully requests withdrawal of the rejections and allowance of all the claims.

II. Response to Examiner's Comments in the Advisory Action

The examiner asserts that the cited invention Sareen has disclosed a configuration that shows the difference in length of the seam to be sewn when seam is selected. We do not agree.

The configuration for displaying the length difference of the two seam lines according to the present disclosure is applied in the step of manufacturing the virtual garment, but the configuration of the cited invention Sareen proposed by the examiner is a configuration applied in step of draping the created virtual garment on an avatar. According to the present disclosure, the user can predict how the virtual garment will be sewn using the length difference of the two seam lines to be sewn. However, it is not possible to predict how sewing will be done through the stretch value of the cited invention Sareen. Sareen's stretch value has nothing to do with sewing virtual garment, it just shows how well virtual garment fit to the avatar's body shape. That is, the stretch value does not provide any clue as to how the virtual garment is sewn. Thus, the cited invention Sareen does not disclose a configuration for the step of displaying the length difference of the two seam lines. Also, Sareen's stretch value cannot be a teaching or suggestion about displaying the length difference of the two seam lines to be sewn. Sareen's stretch value is not related to whether the two seams are sewn to the same length.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Office is requested to telephone the undersigned to attend to these matters.

In the event this paper is not being timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees only associated with the processing of this Amendment and any other documents filed concurrently with this Amendment may be charged to Counsel's Deposit Account 50-5113.

Respectfully submitted,

Date: March 15, 2019

/Wale T. Godo/
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Electronic Acknowledgement Receipt

EFS ID:	35439060
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Wale T. Godo
Filer Authorized By:	
Attorney Docket Number:	304053.0001
Receipt Date:	15-MAR-2019
Filing Date:	23-OCT-2015
Time Stamp:	15:24:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		OA20181217_3040530001_AmendasFiled.pdf	48043 9860e8937f12105aa86bd36bbf4870740e4df60d	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	10
Warnings:			
Information:			
	Total Files Size (in bytes):	48043	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/15/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/CHANTAE S DESSAU/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304053.0001	6021

89980 7590 12/17/2018

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER
SALVUCCI, MATTHEW D

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
12/17/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto.nsip@gmail.com
pto@nsiplaw.com

Office Action Summary	Application No. 14/921,269	Applicant(s) OH et al.	
	Examiner MATTHEW D SALVUCCI	Art Unit 2613	AIA Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 13 July 2018.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-2,4-5,7-11,13-14 and 16-17 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-2,4-5,7-11,13-14 and 16-17 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 July 2018 has been entered.

Status of Claims

3. Applicant's amendments filed on 13 July 2018 have been entered. Claims 1, 5, 7, 10, 14, and 16 have been amended. Claims 6 and 15 have been canceled. No claims have been added. Claims 1, 2, 4, 5, 7-11, 13, 14, 16, and 17 are still pending in this application, with claims 1 and 10 being independent.

Response to Arguments

4. Applicant's arguments filed 13 July 2018 have been fully considered but they are not persuasive. Applicant argues that "*the cited references do not disclose a means for confirming whether the lengths of two seam lines to be sewn are the same. Although Sareen (see paragraphs [0188] - [0189]) discloses a configuration for measuring the stretch value indicating how well the garment fits to the avatar (see paragraph [0187], stretch values maybe used to determine how well or how poor a garment fits an avatar.), a configuration for indicating the difference in length of the two seam lines to be sewn is not disclosed…Sareen describes the*

calculation of the stretch as a percent difference between before and after draping the garment on the avatar (see paragraph [0188], stretch maybe calculated by measuring the percent difference in a specific measurement before and after the drape.). Therefore, it cannot be said that the claim feature of calculating and displaying the length difference of the two seam seams is disclosed in the cited references. The cited references do not disclose such a configuration for indicating the difference in the lengths of the two seam lines before sewing". Examiner notes that the Gardner reference is cited as teaching the difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment (see Paragraph [0461] and Paragraphs [0751]-[0756], as cited in the instant office action). Examiner asserts that in fact, Sareen teaches the limitation, "a point on the second segment that is the point closest in distance to the detected current cursor position", which is clearly disclosed by Sareen, for example in Paragraph [0170] and Paragraphs [0188]-[0189] which clearly teach selection of points on the segments as claimed, as is outlined in the following Action and likewise in the previous Office Action.

5. Applicant argues for the remaining claims for the reasons above. It follows that all remaining claims are rejected for at least the above reasons.

Claim Rejections - 35 USC § 103

6. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

7. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 2, 4, 5, 7-11, 13, 14, 16, and 17 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner et al. (US Pub. 2004/0049309), hereinafter Gardner, in view of Sareen et al. (US Pub. 2011/0298897), hereinafter Sareen, and further in view of Park (US Pub. 2014/0135971).

9. Regarding claim 1, Gardner discloses a method of creating digital clothing (Paragraph [0113]: *method of capturing the 3D representation of the garment is to provide a digital representation of the 2D pattern pieces, sized to fit The Model, and then to create a virtual r presentation of the garment in 3D by meands of a program such as Stitch from Size8 Software of Jacksonville, Fla. The advantage of the virtual representation is that the rlationship betewen the 2D pattern pieces and the 3D representation is known with precision, which increases the accuracy of the later unwrapping stage, and there is no missing data, which inevitably occurs with a 3D scan*), wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing (Paragraph [0029]: *the present invention provides a method of processing information relating to a garment, the method comprising: providing or obtaining information defining the 3D sha pe of a garment designed to fit and as worn by a first body of a person of a first size and shape; providing or obtaining data defining the first body's size and shape in 3D without the garment in question; identifying defined body regions on the first body; identifying one or more design points on the garment, each design point being related in 3D to one or more of the defined body regions of the first body; providing relationship rules that define the said 3D relationships between said design points and said body regions; storing data defining the garment, the design points, the body regions, and the relationship rules*), the method comprising: setting a first

selected segment by inputting the first selected segment to be sewn on a first segment on a pattern (Paragraph [0022]: *pattern pieces of the base garment are deformed to collide with a 3D human model and with each other, and are then virtually sewn together. This provides a 3D representation of the base garment fitted to a first human model. The first human model is deformed to match the shape/size of a consumer, and the base garment is modified simply by deforming the 3D representation of the base garment in a similar manner to the first human model. The 3D representation of the modified garment can be used for visualisation ("virtual try-on"), and/or as the basis for generating 2D pattern pieces for production of the modified garment. The document describes the 2D pattern pieces being generated by developing the corresponding 3D parts of the 3D representation into 2D shapes. This system relies on colliding base garment pattern pieces with the standard body shape and modifying the resultant 3D representation of the base garment on the basis of a geometrical deformation of the standard body shape to match a consumer body shape. This relatively simple approach provides no guarantee that the modified garment will preserve the design or style of the base garment, or that pattern pieces developed from the modified 3D representation of the garment will be capable of being assembled to produce an acceptable garment*); and displaying a candidate for an ending point of the second selected segment (Paragraph [0120]: *construction lines (where present), the matching of the Design Points on different pattern pieces and the knowledge base of completed garments makes it possibl for an initial rough juxtapositioning of the pattern pieces to be carried out automatically, although the capability to carry out a manual juxtapositioning would be present as a fall-back*), displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment (Paragraph [0461]: *comparison between the upper arm +12-13 cms and the length of the armhole perimeter therefore provides a cross check on the size of the armhole that is derived as a result of using the 3D process*;

Paragraphs [0751]-[0756]: *relative length as compared to the top of the pattern piece (always bigg r than the top, often substantially*).

Gardner does not explicitly disclose setting a second selected segment, comprising inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment, detecting a current cursor position, dete rmining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position, a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position, inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment, and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

However, Sareen teaches virtual garment creating and storage based on the received garment specifications and fabric constants (Paragraph [0003]), further comprising setting a second selected segment, comprising inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment (Fig. 8; Paragraph [0040]: *from the digital pattern 57, production sample garment 59, technical pack 54, grading rules 53, fit model scan data or body measurements 58, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114. Generally, a pattern refers to the collection of the individual pieces of the garment 59. In standard practice, the pattern pieces are drafted first, then laid over fabric, which is then cut around the perimeter of each piece. The resulting pieces*

of fabric are then sewn together to form the finished garment), determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*; Paragraph [0170]: *user may click on a link or a button with a mouse, or interact with a touch screen on the display of computer device)*, a point on the second segment that is the point closest in distance to the detected current cursor position (Paragraphs [0188]-[0189]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value. In another embodiment, the stretch value may be calculated for many garment measurements… data may also include calculating the change in stretch in a similar fashion as described above, but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size). Furthermore, quantitative data may also include calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape*), inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in

distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*), and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point (Paragraph [0079]: *step 362, E-FIT assigns sewing instructions. In this step, E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*; Paragraph [0082]: *Sewing and draping may be completed using functions provided by CLOTHFX and native E-FIT according to the sewing instructions assigned above. Often, garments have lining and/or layers of material. In such cases, layers may be placed, stitched, and draped in a specific order*). Sareen teaches that this will allow for user to make custom patterns and therefore custom garments for the consumer (Paragraph [0209]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner with the features above as taught by Sareen.

Further, Park teaches sewing of digital clothing (Paragraph [0004]), further comprising detecting a current cursor position (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*). Park teaches that this enables a user to set start and end positions in each process

section (Paragraph [0052]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner, in view of Sareen with the features of detecting a current cursor position as taught by Park.

10. Regarding claim 2, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles (Fig. 1; Fig. 11; Paragraph [0461]: *the Pattern Maker working in 3D would be provided with the upper arm measurement and the total size round its perimeter of the armhole*; Paragraph [0477]: *bottom of the yoke can be straight, square, curved or almost any shape imaginable. This profusion of designs makes it inappropriate to attempt to provide any standard set of design points. The design points set out below are therefore used only to indicate the principles of 3D Tailoring of Yokes*).

11. Regarding claim 4, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Park discloses wherein the setting of the second selected segment further comprises: moving the cursor position to a position of the determined candidate for the ending point and displaying the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*; Paragraph [0054]: *process list 1150 of FIG. 11 may predict process time on the basis of a stitch length, a number of stitches, start and end positions of each process section, a number of yarn cuttings, a number of yarn cuttings set in a sewing manufacturing device, and a number of sewing*

manufacturing devices involved in each corresponding process; predict process cost on the basis of daily working conditions and the number of workers; and display the predicted process time and the predicted process cost).

12. Regarding claim 5, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the setting of the second selected segment further comprises: calculating and displaying either one or both of the length of the first selected segment and the length of the line (Figs. 3-16; Paragraph [1101]: *Constraints between and within pattern pieces In order f r a garment to be constructible it is necessary to impose constraints between pattern pieces. In the case of the pattern piec f FIG. 32 there is a piece to the left, mirroring the one we see and the distance FG is constrained to be equal to the same length on the other piece. Similarly AB and BC are constrained to have lengths matching their companion seams*).

13. Regarding claim 7, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Park discloses wherein the setting of the second selected segment further comprises: displaying a warning sign, in response to the difference value being greater than a reference value (Paragraph [0015]: *manufacturing management method which includes receiving design information on an end product to be manufactured by sewing; configuring at least one component shape of the end product based on the design information; identifying one or more processes necessary for manufacturing the end product based on analysis of the one or more component shapes; enabling a user to select one process from the one or more processes; enabling a user to select one process from the processes; providing one or more process task charts related to the one or more processes; predicting at least one of process time and process cost for the selected process, on the basis of the sewing information and the sewing data; transmitting at least one of the sewing information and the sewing data to at least one sewing manufacturing device through a network; receiving a device status message from the at least one sewing manufacturing device, the device status message including an abnormal*

status message indicating that a status of the at least one sewing manufacturing device is abnormal; providing at least one of text data and multi-media data to address the abnormal status based on the abnormal status message; and transmitting an A/S request message to a sewing manufacturing device provider based on the abnormal status message; Paragraphs [0022]-[0026]: *the sewing information process module 126 enables the user to easily input sewing information on each process. Sewing information received at the sewing information process module 126 may include a stitch shape, a member to be used in each sewing processing section, a type and color of yarn, a needle, a stitch length, a total number of stitches, a start and end position of each section, an accessory attachment type, and other guidelines/cautions of sewing, but the present embodiment is not limited thereto. The sewing information process module 126 may separately store sewing information, which is received from a user, for each section in each process… sewing data process module 128 enables a user to provide sewing data, which is required for performing a corresponding sewing process, based on the sewing information stored in the sewing information process module 126. The sewing data may include a plurality of parameters for executing a component stitch pattern for each sewing process, and specifically include a stitch width, a number of stitches, an upper yarn tension, a sewing speed, a sewing machine foot pressure, etc., but the sewing data is not limited thereto. The sewing parameters may need to be adjusted according to the sewing manufacturing device that is used in a corresponding sewing process, and thus, the sewing data process module 128 may allow a user to select a sewing manufacturing device to be used. When a sewing manufacturing device that a user desires to use is not available, the sewing data process module 128 may transmit an inquiry or a request for a corresponding sewing manufacturing device to a provider…A/S module 138 may receive a device status message from the sewing manufacturing devices 190-1 to 190-n over the second network 152. The device status message may include an abnormal status message indicating that the status of the sewing manufacturing devices 190-1 to 190-n is abnormal, and the abnormal status*

message may include information to recognize each of the sewing manufacturing devices 190-1 to 190-n and provide details about the abnormal status. The A/S module 138 may provide the sewing manufacturing devices 190-1 to 190-n over the second network 152 with information necessary to address the abnormal status based on the details, for example, in the form of text data or multimedia data. In accordance with the information included in the text data or the multimedia data, the sewing manufacturing devices 190-1 to 190-n may be adjusted or configured by taking appropriate measures).

14. Regarding claim 8, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 7, Sareen discloses wherein the displaying of the warning sign comprises: displaying the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value (Paragraphs [0188]-[0190]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value…an example web page produced by the system illustrates how stretch values may be visually displayed using a color tension map. These color tension maps can be viewed in any image format, on the web, or in any standard image viewing software. The color maps may also be viewable using 3D Viewer Application 82. The color tension map displays high stretch values in red, low stretch values in green, and negative stretch values in blue. data may include visual images of consumer drape 1102. Qualitative data may include a visual representation or image of the consumer drape using a color tension map to show the parts of the garment that are fitting tight, loose, or well. The color tension maps may be configured to show stretch values in certain directions with respect to the grain line of the fabric. For instance, a color tension map*

which display stretch values along the warp direction may be very different than a color tension map which displays stretch values along the weft or bias directions).

15. Regarding claim 9, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the method is performed by executing a computer program stored in non-volatile storage media (Paragraph [1114]: *Such data could be downloaded to the central database 50. However, for reasons of customer privacy and confidentiality, it is preferred that this data is uniquely stored on a data carrier 58 which remains within the custody and control of the customer, with the only data passing to the central database 50 being an identification code identifying that customer. The data carrier 58 may be any convenient storage means such as a floppy disc, CD-ROM or smart card*).

16. Regarding claim 10, the limitations of this claim substantially correspond to the limitations of claim 1; thus they are rejected on similar grounds.

17. Regarding claim 11, the limitations of this claim substantially correspond to the limitations of claim 2; thus they are rejected on similar grounds.

18. Regarding claim 13, the limitations of this claim substantially correspond to the limitations of claim 4; thus they are rejected on similar grounds.

19. Regarding claim 14, the limitations of this claim substantially correspond to the limitations of claim 5; thus they are rejected on similar grounds.

20. Regarding claim 16, the limitations of this claim substantially correspond to the limitations of claim 7; thus they are rejected on similar grounds.

21. Regarding claim 17, the limitations of this claim substantially correspond to the limitations of claim 8; thus they are rejected on similar grounds.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D SALVUCCI whose telephone number is (571)270-5748. The examiner can normally be reached on M-F: 7:30-4:00PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, XIAO WU can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MATTHEW SALVUCCI/
Primary Examiner, Art Unit 2613

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/31/2017	02/22/2018	12/11/2018						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	-	-						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	-						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9	✓	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	-	-						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	✓	✓	-						
	16	✓	✓	✓						
	17	✓	✓	✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/921,269	OH et al.
	Examiner	Art Unit
	MATTHEW D SALVUCCI	2613

CPC - Searched*		
Symbol	Date	Examiner
G05B2219/2626 + text	10/31/2017	MDS
G05B2219/45195 + text	10/31/2017	MDS

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST search file attached	10/31/2017	MDS
Updated search results in EAST	2/22/2018	MDS
Updated search results in EAST	12/11/2018	MDS

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MATTHEW SALVUCCI/ Primary Examiner.Art Unit 2613	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	31	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:21
L3	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150827"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:22
L4	20	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR4 sew$3 AND (length$1 size$1) NEAR3 (compar$ difference$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150527"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:22
L5	1	("20160314604").PN.	US-PGPUB; USPAT	OR	OFF	2018/12/11 13:52
L6	514	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L7	7	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L8	29	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L9	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/12/11 13:52

		fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L10	2	(("20130057544") or ("20160078650")).PN.	US-PGPUB; USPAT	OR	OFF	2018/12/11 13:52
L11	91	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L12	104	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L13	60	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L14	136	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L15	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L16	83	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L17	67	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L18	73	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR	US-PGPUB; USPAT;	OR	OFF	2018/12/11 13:52

		fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L19	230	(stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L20	75	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L21	44	L20 NOT L18	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L22	248	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L23	75	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L24	136	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L25	195	L22 NOT (L24 L23)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L26	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/12/11 13:52

		(virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L27	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L28	119	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L29	6	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND difference$1 NEAR2 length$1 AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L30	0	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L31	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L32	8	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (siz$3 length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L33	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR2 (messag$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52

L34	59	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L35	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2018/12/11 13:52
L36	134	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L37	12	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR4 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L38	12	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L39	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR2 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L40	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L41	1	("20180025539").PN.	US-PGPUB; USPAT	OR	OFF	2018/12/11 13:52
L42	6996	(Seung Woo).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2018/12/11 13:52
L43	27	(Seung Woo NEAR3 OH).IN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	OFF	2018/12/11 13:52

			IBM_TDB			
L44	3	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L45	30	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (layer$3) NEAR2 (order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L46	168	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L47	135	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 fabric$1 OR textile$1 OR garment$1) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L48	72	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L49	0	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L50	6	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (seam$1 stitch$3 sew$3 layer$3) NEAR4 (atop) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L51	15	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52

L52	36	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (layer$3 order$3 top bottom first second lower upper) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L53	9	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND seam$1 NEAR4 (over$6) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L54	57	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (layer$3 order$3) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52
L55	30	display AND (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND sew$3 NEAR4 (front behind bottom top) AND (virtual$2 OR digital$2 CAD) NEAR2 (SEW$3 clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20160721"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/12/11 13:52

EAST Search History (Interference)

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12/ 11/ 2018 2:10:34 PM
C:\ Users\ msalvucci\ Documents\ EAST\ Workspaces\ 14921269_DigitalFabricSewing.wsp

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/13/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 13	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	monique benjamin
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT		(Column 1)		(Column 2)	(Column 3)		
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

AMENDMENT		(Column 1)		(Column 2)	(Column 3)		
	07/13/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 13	Minus	** 20	= 0	X $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**0**

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
Chantae Dessau

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/30 (07-14)
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Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	14/921,269
Filing Date	10/23/2015
First Named Inventor	Seung Woo Oh
Art Unit	2613
Examiner Name	Matthew D Salvucci
Attorney Docket Number	304053.0001

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, to any international application that does not compy with the requirements of 35 U.S.C 371, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO on page 2.)

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☑ Enclosed

      i. ☑ Amendment/Reply

      ii. ☐ Affidavit(s)/ Declaration(s)

      iii. ☐ Information Disclosure Statement (IDS)

      iv. ☐ Other _____

2. Miscellaneous

   a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

   a. ☑ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. 50-5113 .

      i. ☑ RCE fee required under 37 CFR 1.17(e)

      ii. ☑ Extension of time fee (37 CFR 1.136 and 1.17)

      iii. ☐ Other _____

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Joseph Richard Conte III/	Date	July 13, 2018
Name (Print/Type)	Joseph Richard Conte III	Registration No.	74,365

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature			
Name (Print/Type)		Date	

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/30 (07-14)
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Instruction Sheet for RCEs

(not to be submitted to the USPTO)

NOTES:

An RCE is not a new application, and filing an RCE will not result in an application being accorded a new filing date.

Filing Qualifications:

The application must be a utility or plant application filed on or after June 8, 1995. The application cannot be a provisional application, a utility or plant application filed before June 8, 1995, an international application that does not comply with the requirements of 35 U.S.C. 371, a design application, or a patent under reexamination. See 37 CFR 1.114(e). An international application does not comply with the requirements of 35 U.S.C. 371 until the requirements under 35 U.S.C. 371(c), including the requirement for the inventor's oath or declaration under 35 U.S.C. 371(c)(4), have been complied with.

Filing Requirements:

Prosecution in the application must be closed. Prosecution is closed if the application is under appeal, or the last Office action is a final action, a notice of allowance, or an action that otherwise closes prosecution in the application (e.g., an Office action under *Ex parte Quayle*). See 37 CFR 1.114(b).

A submission and a fee are required at the time the RCE is filed. If reply to an Office action under 35 U.S.C. 132 is outstanding (e.g., the application is under final rejection), the submission must meet the reply requirements of 37 CFR 1.111. If there is no outstanding Office action, the submission can be an information disclosure statement, an amendment, new arguments, or new evidence. See 37 CFR 1.114(c). The submission may be a previously filed amendment (e.g., an amendment after final rejection).

WARNINGS:

Request for Suspension of Action:

All RCE filing requirements must be met before suspension of action is granted. A request for a suspension of action under 37 C FR 1.103(c) does not satisfy the submission requirement and does not permit the filing of the required submission to be suspended.

Improper RCE will NOT toll Any Time Period:

Before Appeal - If the RCE is improper (e.g., prosecution in the application is not closed or the submission or fee has not been filed) and the application is not under appeal, the time period set forth in the last Office action will continue to run and the application will be abandoned after the statutory time period has expired if a reply to the Office action is not timely filed. No additional time will be given to correct the improper RCE.

Under Appeal - If the RCE is improper (e.g., the submission or the fee has not been filed) and the application is under appeal, the improper RCE is effective to withdraw the appeal. Withdrawal of the appeal results in the allowance or abandonment of the application depending on the status of the claims. If there are no allowed claims, the application is abandoned. If there is at least one allowed claim, the application will be passed to issue on the allowed claim(s). See MPEP 1215.01.

See MPEP 706.07(h) for further information on the RCE practice.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	14921269
Filing Date:	23-Oct-2015
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Filer:	Joseph Richard Conte III
Attorney Docket Number:	304053.0001
Filed as Small Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	2251	1	100	100
Miscellaneous:				
RCE- 1ST REQUEST	2801	1	650	650
		Total in USD ($)		**750**

Electronic Acknowledgement Receipt	
EFS ID:	33176320
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Joseph Richard Conte III
Filer Authorized By:	
Attorney Docket Number:	304053.0001
Receipt Date:	13-JUL-2018
Filing Date:	23-OCT-2015
Time Stamp:	16:22:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$750
RAM confirmation Number	071618INTEFSW16243300
Deposit Account	505113
Authorized User	Joseph Conte
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AA20180614_3040530001_RespAsFiled.pdf	53368 2b55c4da701cc052a0e5ad46d54d94e1e535416c	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Claims	2	5
	Amendment/Req. Reconsideration-After Non-Final Reject	6	10

Warnings:

Information:

2	Request for Continued Examination (RCE)	AA20180614_3040530001_RCE.pdf	127836 5037e637a4d8fe2c9a137fa1951fb197d80499a7	no	3

Warnings:

This is not a USPTO supplied RCE SB30 form.

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	32448 8a7469354680 8ff9f90482d42c341f7d63d769e0	no	2

Warnings:

Information:

Total Files Size (in bytes):	213652

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed: 10/23/2015 Examiner: Matthew D Salvucci

FOR: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

AMENDMENT
SUBMITTED WITH RCE

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Final Office Action mailed 03/14/2018 and the Advisory Action mailed 06/14/2018. Reconsideration of the claims is respectfully requested.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

IN THE CLAIMS

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

Please amend claims 1, 5, 7, 10, 14, and 16, and cancel claims 6 and 15, without prejudice or disclaimer, in accordance with the following:

1. (Currently amended) A method of creating digital clothing, wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, comprising

inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment,

detecting a current cursor position,

displaying a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position,

displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position,

inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment, and

setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

2. (Previously amended) The method of claim 1, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. (Cancelled)

4. (Previously amended) The method of claim 1, wherein the setting of the second selected segment further comprises:

moving the current cursor position to a position of the determined candidate for the ending point and displaying the current cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

5. (Currently amended) The method of claim 1, wherein the setting of the second selected segment further comprises:

calculating and displaying either one or both of the length of the first selected segment and ~~a~~ the length of ~~a~~ the line~~, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is closest in distance to the current cursor position~~.

6. (Cancelled)

7. (Currently amended) The method of ~~claim 6~~claim 1, wherein the setting of the second selected segment further comprises:

displaying a warning sign, in response to the difference value being greater than a reference value.

8. (Previously amended) The method of claim 7, wherein the displaying of the warning sign comprises:

displaying the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

9. (Previously amended) The method of claim 1, the method is performed by executing a computer program stored in a non-volatile storage media.

10. (Currently amended) An apparatus for creating digital clothing, wherein the apparatus comprises a computing element and a storage element storing patterns and draped digital clothing, the apparatus comprising:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter comprising

a starting point input configured to input a starting point of a second selected segment onto a second segment, which is to be sewn to the first selected segment,

a cursor position detector configured to detect a current cursor position,

an ending point candidate display configured to display a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point which is closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current ~~detected~~ cursor position, ~~and~~

a difference value display configured to display a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position, and

an ending point input configured to input the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment.

11. (Previously amended) The apparatus of claim 10, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. (Cancelled)

13. (Previously amended) The apparatus of claim 10, further comprising:

a cursor position mover configured to move the cursor position to a position of the determined candidate for the ending point and display the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

14. (Currently amended) The apparatus of claim 13, further comprising:

a length display configured to calculate and display either one or both of the length of the first selected segment and ~~a~~ the length of ~~a~~ the line~~, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is closest in distance to the current cursor position~~.

15. (Cancelled)

16. (Currently amended) The apparatus of ~~claim 15~~claim 10, further comprising:

a warning sign display configured to display a warning sign, in response to the difference value being greater than a reference value.

17. (Previously amended) The apparatus of claim 16, wherein the warning sign display is configured to display the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

REMARKS

Upon entry of this amendment, claims 1-2, 4-5, 7-11, 13-14, and 16-17 are pending in the application, of which claims 1 and 10 are independent claims.

Claims 1, 5, 7, 10, 14, and 16 have been amended, to more positively and precisely recite the claim features. Claims 6 and 15 have been canceled, without prejudice or disclaimer. No new matter has been entered, and support for the amendments of the claims can be found in the original specification.

Various amendments have been made commensurate with Applicant's disclosure to more particularly recite some of Applicant's embodiments. Applicant has amended the claims to further the prosecution for some disclosed embodiments, and not in response to the outstanding rejections. Applicant reserves the right to later claim other embodiments disclosed, including a broader claim or embodiment.

Reconsideration and allowance of the pending claims is respectfully requested in view of the amendments and the following remarks.

I. Claim Rejections under 35 U.S.C. § 103

Claims 1, 2, 4-11, and 13-17 were rejected under 35 U.S.C. 103 as being unpatentable over Gardner (US Pub. 2004/0049309), in view of Sareen (US Pub. 2011/0298897), and further in view of Park (US Pub. 2014/0135971). These rejections are respectfully traversed.

A. Claim 1

Independent claim 1 has been amended by adding the feature "displaying a difference value [of] the length." This feature was previously recited in claim 6. As shown below, the cited reference fail to teach or suggest the above mentioned features of claim 1.

The following description in Applicant's specification is relevant to the claimed subject matter. This description is included for purposes of example only, and is not intended to limit the scope of the claims. The claimed method and apparatus relates to a method of creating digital clothing (garment) and allows a user to more easily select two seam lines (segments) to be sewn. As shown in Fig. 7, the lengths of the two segments (seam lines) to be sewn may be the same, but the lengths of the two segments (seam lines) may be intentionally different, as shown in Fig. 8.

In the case where the lengths of the two segments (seam lines) are the same, a method is provided for recommending a candidate for end point so that the second segment (other side seam line) has the same length.

In the case where the lengths of the two segments (seam lines) are different, a method is provided for displaying a difference in length between the first segment (one side seam line) and the second segment (other seam line), which is calculated from the positions of the mouse pointer (Fig. 8). Therefore, the claimed method and apparatus present the advantage of easily achieving the effect (wrinkles, etc.) intended by the user.

In particular, since the length difference between two segments is computed and represented numerically by the movement of the mouse pointer (314 in Figure 8), a user can select two segments (seam lines) to be sewn by adjusting the length difference.

On the other hand, the cited references do not disclose a means for confirming whether the lengths of two seam lines to be sewn are the same. Although Sareen (see paragraphs [0188] – [0189]) discloses a configuration for measuring the stretch value indicating how well the garment fits to the avatar (see paragraph [0187], *stretch values may be used to determine how well or how poor a garment fits an avatar.*), a configuration for indicating the difference in length of the two seam lines to be sewn is not disclosed. This is also not disclosed in other cited references.

Sareen describes the calculation of the stretch as a percent difference between before and after draping the garment on the avatar (see paragraph [0188], *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape.*). Therefore, it cannot be said that the claim feature of calculating and displaying the length difference of the two seam seams is disclosed in the cited references. The cited references do not disclose such a configuration for indicating the difference in the lengths of the two seam lines before sewing.

For at least the reasons stated above, the present rejection of claim 1 should be withdrawn.

The dependent claims 2, 4-5, and 7-9 depend from independent claim 1. Therefore, the rejections of claims 2, 4-5, and 7-9 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

B. Claim 10

Independent claim 10 has been amended by adding "a difference value display." The feature of "a difference value display" was previously recited in claim 15.

The difference between the subject matter of claim 10 and the disclosures of Gardner, Sareen, and Park, and the effect of the difference, are the same as in claim 1.

For at least the reasons stated above, the present rejection of claim 10 should be withdrawn.

The dependent claims 11, 13-14, and 16-17 depend from independent claims 10. Therefore, the rejections of claims 11, 13-14, and 16-17 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

In view of the foregoing amendments and remarks, the Applicant respectfully requests withdrawal of the rejections and allowance of all the claims.

II. Response to Examiner's Comments in the Advisory Action

In the Advisory Action, the Examiner asserted:

> Applicant argues that "the cited references do not disclose a means for confirming whether the lengths of two seam lines to be sewn are the same. Although Sareen (see paragraphs [0188] – [0189]) discloses a configuration for measuring the stretch value indicating how well the garment fits to the avatar (see paragraph [0187], stretch values maybe used to determine how well or how poor a garment fits an avatar), a configuration for indicating the difference in length of the two seam lines to be sewn is not disclosed". Examiner notes that Applicant appears to bring specific portions of the specification into the argument, not necessarily what is claimed. Examiner finds Sareen's teaching of the fit analysis algorithm and output thereof (e.g. paragraph [0186]-[0189]) to read on the limitations as claimed.

In response, Applicant respectfully submits that the method of claim 1 relates to a method of helping to easily set the length of seam lines to be sewn to the user's intention before creating a digital garment. That is, it is a step performed before the pattern pieces are sewn to become a digital garment. However, the Sareen's fit analysis algorithm is applied just before the digital garment is draped to the customer. That is, the Sareen's fit analysis algorithm is an algorithm that cannot be used to select a sewing line to be sewn as in the method of claim 1. This is because Sareen's fit analysis algorithm is performed after sewing the digital garment.

Therefore, Sareen's fit analysis algorithm cannot be properly relied upon to reject the features of claim 1, and cannot be properly relied upon to reject the features of claim 10 for similar reasons. For at least these additional reasons, withdrawal of the rejections under 35 U.S.C. 103 is respectfully requested.

CONCLUSION

In view of the foregoing Amendments and comments, Applicant respectfully requests reconsideration and timely allowance of all pending claims. Should the Office believe anything further is required to place the application in condition for allowance, the Examiner is requested to contact the Applicant's representative at the telephone number listed below.

In the event this paper is not being filed timely, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees that may be required for this paper, and any other documents filed concurrently with this paper, may be charged to North Star Intellectual Property Law, PC's Deposit Account No. 50-5113.

Respectfully submitted,

Date: June 13, 2018

/Joseph Richard Conte III/

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304053.0001	6021

89980 7590 06/14/2018

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER	
SALVUCCI, MATTHEW D	

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
06/14/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto@nsiplaw.com
pto.nsip@gmail.com

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 14/921,269	**Applicant(s)** OH ET AL.	
	Examiner Matthew Salvucci	**Art Unit** 2613	**AIA (First Inventor to File) Status** Yes

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 11 May 2018 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires _____months from the mailing date of the final rejection.
   b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☒ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: .
    Claim(s) objected to: .
    Claim(s) rejected: .
    Claim(s) withdrawn from consideration: .

/Matthew Salvucci/
Primary Examiner, Art Unit 2613

Continuation of 12. does NOT place the application in condition for allowance because: The amendments present new issues which require further search and consideration.

Applicant argues that "the cited references do not disclose a means for confirming whether the lengths of two seam lines to be sewn are the same. Although Sareen (see paragraphs [0188] - [0189]) discloses a configuration for measuring the stretch value indicating how well the garment fits to the avatar (see paragraph [0187], stretch values maybe used to determine how well or how poor a garment fits an avatar.), a configuration for indicating the difference in length of the two seam lines to be sewn is not disclosed". Examiner notes that Applicant appears to bring specific portions of the specification into the argument, not necessarily what is claimed. Examiner finds Sareen's teaching of the fit analysis algorithm and output thereof (e.g. Paragraphs [0186]-[0189]) to read on the limitations as claimed.

DO NOT ENTER: /M.S./ 06/08/2018

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed: 10/23/2015 Examiner: Matthew D Salvucci

FOR: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

AMENDMENT AFTER FINAL REJECTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Final Office Action mailed 03/14/2018. Reconsideration of the claims is respectfully requested.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed: 10/23/2015 Examiner: Matthew D Salvucci

FOR: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

AMENDMENT AFTER FINAL REJECTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
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Sir:

The following amendments and remarks are respectfully submitted in response to the Final Office Action mailed 03/14/2018. Reconsideration of the claims is respectfully requested.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

IN THE CLAIMS

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

Please amend claims 1, 5, 7, 10, 14, and 16, and cancel claims 6 and 15, without prejudice or disclaimer, in accordance with the following:

1. (Currently amended) A method of creating digital clothing, wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, comprising

inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment,

detecting a current cursor position,

displaying a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position,

displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position,

inputting the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment, and

setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

2. (Previously amended) The method of claim 1, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. (Cancelled)

4. (Previously amended) The method of claim 1, wherein the setting of the second selected segment further comprises:

moving the current cursor position to a position of the determined candidate for the ending point and displaying the current cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

5. (Currently amended) The method of claim 1, wherein the setting of the second selected segment further comprises:

calculating and displaying either one or both of the length of the first selected segment and ~~a~~ the length of ~~a~~ the line~~, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is closest in distance to the current cursor position~~.

6. (Cancelled)

7. (Currently amended) The method of ~~claim 6~~claim 1, wherein the setting of the second selected segment further comprises:

displaying a warning sign, in response to the difference value being greater than a reference value.

8. (Previously amended) The method of claim 7, wherein the displaying of the warning sign comprises:

displaying the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

9. (Previously amended) The method of claim 1, the method is performed by executing a computer program stored in a non-volatile storage media.

10. (Currently amended) An apparatus for creating digital clothing, wherein the apparatus comprises a computing element and a storage element storing patterns and draped digital clothing, the apparatus comprising:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter comprising

a starting point input configured to input a starting point of a second selected segment onto a second segment, which is to be sewn to the first selected segment,

a cursor position detector configured to detect a current cursor position,

an ending point candidate display configured to display a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point which is closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current ~~detected~~ cursor position, ~~and~~

a difference value display configured to display a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point on the second segment that is the point closest in distance to the detected current cursor position, and

an ending point input configured to input the ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment.

11. (Previously amended) The apparatus of claim 10, wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. (Cancelled)

13. (Previously amended) The apparatus of claim 10, further comprising:

a cursor position mover configured to move the cursor position to a position of the determined candidate for the ending point and display the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

14. (Currently amended) The apparatus of claim 13, further comprising:

a length display configured to calculate and display either one or both of the length of the first selected segment and ~~a~~ the length of ~~a~~ the line~~, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is closest in distance to the current cursor position~~.

15. (Cancelled)

16. (Currently amended) The apparatus of ~~claim 15~~claim 10, further comprising:

a warning sign display configured to display a warning sign, in response to the difference value being greater than a reference value.

17. (Previously amended) The apparatus of claim 16, wherein the warning sign display is configured to display the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

REMARKS

Upon entry of this amendment, claims 1-2, 4-5, 7-11, 13-14, and 16-17 are pending in the application, of which claims 1 and 10 are independent claims.

Claims 1, 5, 7, 10, 14, and 16 have been amended, to more positively and precisely recite the claim features. Claims 6 and 15 have been canceled, without prejudice or disclaimer. No new matter has been entered, and support for the amendments of the claims can be found in the original specification.

Various amendments have been made commensurate with Applicant's disclosure to more particularly recite some of Applicant's embodiments. Applicant has amended the claims to further the prosecution for some disclosed embodiments, and not in response to the outstanding rejections. Applicant reserves the right to later claim other embodiments disclosed, including a broader claim or embodiment.

Reconsideration and allowance of the pending claims is respectfully requested in view of the amendments and the following remarks.

I. Claim Rejections under 35 U.S.C. § 103

Claims 1, 2, 4-11, and 13-17 were rejected under 35 U.S.C. 103 as being unpatentable over Gardner (US Pub. 2004/0049309), in view of Sareen (US Pub. 2011/0298897), and further in view of Park (US Pub. 2014/0135971). These rejections are respectfully traversed.

A. Claim 1

Independent claim 1 has been amended by adding the feature "displaying a difference value [of] the length." This feature was previously recited in claim 6. As shown below, the cited reference fail to teach or suggest the above mentioned features of claim 1.

The following description in Applicant's specification is relevant to the claimed subject matter. This description is included for purposes of example only, and is not intended to limit the scope of the claims. The claimed method and apparatus relates to a method of creating digital clothing (garment) and allows a user to more easily select two seam lines (segments) to be sewn. As shown in Fig. 7, the lengths of the two segments (seam lines) to be sewn may be the same, but the lengths of the two segments (seam lines) may be intentionally different, as shown in Fig. 8.

In the case where the lengths of the two segments (seam lines) are the same, a method is provided for recommending a candidate for end point so that the second segment (other side seam line) has the same length.

In the case where the lengths of the two segments (seam lines) are different, a method is provided for displaying a difference in length between the first segment (one side seam line) and the second segment (other seam line), which is calculated from the positions of the mouse pointer (Fig. 8). Therefore, the claimed method and apparatus present the advantage of easily achieving the effect (wrinkles, etc.) intended by the user.

In particular, since the length difference between two segments is computed and represented numerically by the movement of the mouse pointer (314 in Figure 8), a user can select two segments (seam lines) to be sewn by adjusting the length difference.

On the other hand, the cited references do not disclose a means for confirming whether the lengths of two seam lines to be sewn are the same. Although Sareen (see paragraphs [0188] – [0189]) discloses a configuration for measuring the stretch value indicating how well the garment fits to the avatar (see paragraph [0187], *stretch values may be used to determine how well or how poor a garment fits an avatar.*), a configuration for indicating the difference in length of the two seam lines to be sewn is not disclosed. This is also not disclosed in other cited references.

Sareen describes the calculation of the stretch as a percent difference between before and after draping the garment on the avatar (see paragraph [0188], *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape.*). Therefore, it cannot be said that the claim feature of calculating and displaying the length difference of the two seam seams is disclosed in the cited references. The cited references do not disclose such a configuration for indicating the difference in the lengths of the two seam lines before sewing.

For at least the reasons stated above, the present rejection of claim 1 should be withdrawn.

The dependent claims 2, 4-5, and 7-9 depend from independent claim 1. Therefore, the rejection of claims 2, 4-5, and 7-9 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

B. Claim 10

Independent claim 10 has been amended by adding “a difference value display.” The feature of “a difference value display” was previously recited in claim 15.

The difference between the subject matter of claim 10 and the disclosures of Gardner, Sareen, and Park, and the effect of the difference, are the same as in claim 1.

For at least the reasons stated above, the present rejection of claim 10 should be withdrawn.

The dependent claims 11, 13-14, and 16-17 depend from independent claims 10. Therefore, the rejections of claims 11, 13-14, and 16-17 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

In view of the foregoing amendments and remarks, the Applicant respectfully requests withdrawal of the rejections and allowance of all the claims.

CONCLUSION

In view of the foregoing Amendments and comments, Applicant respectfully requests reconsideration and timely allowance of all pending claims. Should the Office believe anything further is required to place the application in condition for allowance, the Examiner is requested to contact the Applicant's representative at the telephone number listed below.

In the event this paper is not being filed timely, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees that may be required for this paper, and any other documents filed concurrently with this paper, may be charged to North Star Intellectual Property Law, PC's Deposit Account No. 50-5113.

Respectfully submitted,

Date: May 11, 2018

/Joseph Richard Conte III/

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1120 Connecticut Ave, NW Ste 304
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Electronic Acknowledgement Receipt	
EFS ID:	32606968
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Joseph Richard Conte III
Filer Authorized By:	
Attorney Docket Number:	304053.0001
Receipt Date:	11-MAY-2018
Filing Date:	23-OCT-2015
Time Stamp:	20:23:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		FOA20180314_3040530001_RespAsFiled.pdf	48817 376023597e3a92708c5318703c2fda66d5ab3cb0	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	9
Warnings:			
Information:			
	Total Files Size (in bytes):	48817	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	05/11/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 13	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	KIMBERLY D WILLIAMS
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304053.0001	6021

89980 7590 03/14/2018

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER	
SALVUCCI, MATTHEW D	

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
03/14/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto@nsiplaw.com
pto.nsip@gmail.com

Office Action Summary	Application No. 14/921,269	Applicant(s) OH ET AL.	
	Examiner Matthew Salvucci	Art Unit 2613	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6 February 2018*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1,2,4-11 and 13-17* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1,2,4-11 and 13-17* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Status of Claims

2. Applicant's amendments filed on 6 February 2018 have been entered. Claims 1, 2, 4-11, and 13-17 have been amended. Claims 3 and 12 have been canceled. No claims have been added. Claims 1, 2, 4-11, and 13-17 are still pending in this application, with claims 1 and 10 being independent.

Response to Arguments

3. Applicant's arguments filed 6 February 2018 have been fully considered but they are not persuasive. Applicant argues that "*Gardner discloses marks which are added to the starting and ending points of the seam to be sewn, but does not disclose how to easily select the ending points to equal the length of the seam. Park also teaches how to specify starting and ending points, but it does not teach a way of helping the user to specify the desired ending points (indicating a candidate for the ending point near the cursor position)*". Examiner notes that neither of these references is cited as teaching the respective claim limitation which Applicant attributes to them. Examiner asserts that in fact, Park teaches the first of the two limitations, and Sareen the second of the two, as is outlined in the following Action and likewise in the previous Office Action.

4. Applicant argues for the remaining claims for the reasons above. It follows that all remaining claims are rejected for at least the above reasons.

Claim Rejections - 35 USC § 103

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 4-11, and 13-17 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner et al. (US Pub. 2004/0049309), hereinafter Gardner, in view of Sareen et al. (US Pub. 2011/0298897), hereinafter Sareen, and further in view of Park (US Pub. 2014/0135971).

8. Regarding claim 1, Gardner discloses a method of creating digital clothing (Paragraph [0113]: *method of capturing the 3D representation of the garment is to provide a digital representation of the 2D pattern pieces, sized to fit The Model, and then to create a virtual r presentation of the garment in 3D by meands of a program such as Stitch from Size8 Software of Jacksonville, Fla. The advantage of the virtual*

representation is that the rlationship betewen the 2D pattern pieces and the 3D representation is known with precision, which increases the accuracy of the later unwrapping stage, and there is no missing data, which inevitably occurs with a 3D scan), wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing (Paragraph [0029]: *the present invention provides a method of processing information relating to a garment, the method comprising: providing or obtaining information defining the 3D shape of a garment designed to fit and as worn by a first body of a person of a first size and shape; providing or obtaining data defining the first body's size and shape in 3D without the garment in question; identifying defined body regions on the first body; identifying one or more design points on the garment, each design point being related in 3D to one or more of the defined body regions of the first body; providing relationship rules that define the said 3D relationships between said design points and said body regions; storing data defining the garment, the design points, the body regions, and the relationship rules*), the method comprising: setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern (Paragraph [0022]: *pattern pieces of the base garment are deformed to collide with a 3D human model and with each other, and are then virtually sewn together. This provides a 3D representation of the base garment fitted to a first human model. The first human model is deformed to match the shape/size of a consumer, and the base garment is modified simply by deforming the 3D representation of the base garment in a similar manner to the first human model. The 3D representation of the modified garment can be used for*

visualisation ("virtual try-on"), and/or as the basis for generating 2D pattern pieces for production of the modified garment. The document describes the 2D pattern pieces being generated by developing the corresponding 3D parts of the 3D representation into 2D shapes. This system relies on colliding base garment pattern pieces with the standard body shape and modifying the resultant 3D representation of the base garment on the basis of a geometrical deformation of the standard body shape to match a consumer body shape. This relatively simple approach provides no guarantee that the modified garment will preserve the design or style of the base garment, or that pattern pieces developed from the modified 3D representation of the garment will be capable of being assembled to produce an acceptable garment); and displaying a candidate for an ending point of the second selected segment (Paragraph [0120]: *construction lines (where present), the matching of the Design Points on different pattern pieces and the knowledge base of completed garments makes it possibl for an initial rough juxtapositioning of the pattern pieces to be carried out automatically, although the capability to carry out a manual juxtapositioning would be present as a fall-back*).

Gardner does not explicitly disclose setting a second selected segment, comprising inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment, detecting a current cursor position, determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting

the input starting point to the point closest in distance to the detected current cursor position, inputting ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment, and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

However, Sareen teaches virtual garment creating and storage based on the received garment specifications and fabric constants (Paragraph [0003]), further comprising setting a second selected segment, comprising inputting a starting point of the second selected segment onto a second segment, which is to be sewn to the first selected segment (Fig. 8; Paragraph [0040]: *from the digital pattern 57, production sample garment 59, technical pack 54, grading rules 53, fit model scan data or body measurements 58, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114. Generally, a pattern refers to the collection of the individual pieces of the garment 59. In standard practice, the pattern pieces are drafted first, then laid over fabric, which is then cut around the perimeter of each piece. The resulting pieces of fabric are then sewn together to form the finished garment*), determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting

point to the point closest in distance to the detected current cursor position (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*), inputting ending point, which, upon starting a point-clicking process at the starting point, is closest in distance to a point where the point-clicking process occurs on the second segment, wherein the starting point is located on the second segment (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*), and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point (Paragraph [0079]: *step 362, E-FIT assigns sewing instructions. In this step, E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*; Paragraph [0082]: *Sewing and draping may be completed using functions provided by CLOTHFX and*

native E-FIT according to the sewing instructions assigned above. Often, garments have lining and/or layers of material. In such cases, layers may be placed, stitched, and draped in a specific order). Sareen teaches that this will allow for user to make custom patterns and therefore custom garments for the consumer (Paragraph [0209]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner with the features above as taught by Sareen.

Further, Park teaches sewing of digital clothing (Paragraph [0004]), further comprising detecting a current cursor position (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*). Park teaches that this enables a user to set start and end positions in each process section (Paragraph [0052]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner, in view of Sareen with the features of detecting a current cursor position as taught by Park.

9. Regarding claim 2, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the first and second segments comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles (Fig. 1;

Fig. 11; Paragraph [0461]: *the Pattern Maker working in 3D would be provided with the upper arm measurement and the total size round its perimeter of the armhole*; Paragraph [0477]: *bottom of the yoke can be straight, square, curved or almost any shape imaginable. This profusion of designs makes it inappropriate to attempt to provide any standard set of design points. The design points set out below are therefore used only to indicate the principles of 3D Tailoring of Yokes*).

10. Regarding claim 4, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Park discloses wherein the setting of the second selected segment further comprises: moving the cursor position to a position of the determined candidate for the ending point and displaying the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view*; Paragraph [0054]: *process list 1150 of FIG. 11 may predict process time on the basis of a stitch length, a number of stitches, start and end positions of each process section, a number of yarn cuttings, a number of yarn cuttings set in a sewing manufacturing device, and a number of sewing manufacturing devices involved in each*

corresponding process; predict process cost on the basis of daily working conditions and the number of workers; and display the predicted process time and the predicted process cost).

11. Regarding claim 5, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the setting of the second selected segment further comprises: calculating and displaying either one or both of the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is the closest in distance to the current cursor position (Figs. 3-16; Paragraph [1101]: *Constraints between and within pattern pieces In order f r a garment to be constructible it is necessary to impose constraints between pattern pieces. In the case of the pattern piec f FIG. 32 there is a piece to the left, mirroring the one we see and the distance FG is constrained to be equal to the same length on the other piece. Similarly AB and BC are constrained to have lengths matching their companion seams*).

12. Regarding claim 6, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Sareen discloses wherein the setting of the second selected segment further comprises: displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is closest in distance to the current cursor position (Paragraphs [0188]-[0189]: *stretch may be calculated by measuring the percent difference in a specific*

measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value. In another embodiment, the stretch value may be calculated for many garment measurements… data may also include calculating the change in stretch in a similar fashion as described above, but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size). Furthermore, quantitative data may also include calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape).

13. Regarding claim 7, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 6, Park discloses wherein the setting of the second selected segment further comprises: displaying a warning sign, in response to the difference value being greater than a reference value (Paragraph [0015]: *manufacturing management method which includes receiving design information on an end product to be manufactured by sewing; configuring at least one component shape of the end product based on the design information; identifying one or more processes necessary for manufacturing the end product based on analysis of the one or more component shapes; enabling a user to select one process from the one or more processes; enabling a user to select one process from the processes; providing one or more*

process task charts related to the one or more processes; predicting at least one of process time and process cost for the selected process, on the basis of the sewing information and the sewing data; transmitting at least one of the sewing information and the sewing data to at least one sewing manufacturing device through a network; receiving a device status message from the at least one sewing manufacturing device, the device status message including an abnormal status message indicating that a status of the at least one sewing manufacturing device is abnormal; providing at least one of text data and multi-media data to address the abnormal status based on the abnormal status message; and transmitting an A/S request message to a sewing manufacturing device provider based on the abnormal status message; Paragraphs [0022]-[0026]: *the sewing information process module 126 enables the user to easily input sewing information on each process. Sewing information received at the sewing information process module 126 may include a stitch shape, a member to be used in each sewing processing section, a type and color of yarn, a needle, a stitch length, a total number of stitches, a start and end position of each section, an accessory attachment type, and other guidelines/cautions of sewing, but the present embodiment is not limited thereto. The sewing information process module 126 may separately store sewing information, which is received from a user, for each section in each process… sewing data process module 128 enables a user to provide sewing data, which is required for performing a corresponding sewing process, based on the sewing information stored in the sewing information process module 126. The sewing data may include a plurality of parameters for executing a component stitch pattern for each*

sewing process, and specifically include a stitch width, a number of stitches, an upper yarn tension, a sewing speed, a sewing machine foot pressure, etc., but the sewing data is not limited thereto. The sewing parameters may need to be adjusted according to the sewing manufacturing device that is used in a corresponding sewing process, and thus, the sewing data process module 128 may allow a user to select a sewing manufacturing device to be used. When a sewing manufacturing device that a user desires to use is not available, the sewing data process module 128 may transmit an inquiry or a request for a corresponding sewing manufacturing device to a provider…A/S module 138 may receive a device status message from the sewing manufacturing devices 190-1 to 190-n over the second network 152. The device status message may include an abnormal status message indicating that the status of the sewing manufacturing devices 190-1 to 190-n is abnormal, and the abnormal status message may include information to recognize each of the sewing manufacturing devices 190-1 to 190-n and provide details about the abnormal status. The A/S module 138 may provide the sewing manufacturing devices 190-1 to 190-n over the second network 152 with information necessary to address the abnormal status based on the details, for example, in the form of text data or multimedia data. In accordance with the information included in the text data or the multimedia data, the sewing manufacturing devices 190-1 to 190-n may be adjusted or configured by taking appropriate measures).

14. Regarding claim 8, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 7, Sareen discloses wherein the displaying of the warning sign comprises: displaying the warning sign by changing colors of the calculated length

and the difference value, in response to the difference value being greater than the reference value (Paragraphs [0188]-[0190]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value…an example web page produced by the system illustrates how stretch values may be visually displayed using a color tension map. These color tension maps can be viewed in any image format, on the web, or in any standard image viewing software. The color maps may also be viewable using 3D Viewer Application 82. The color tension map displays high stretch values in red, low stretch values in green, and negative stretch values in blue. data may include visual images of consumer drape 1102. Qualitative data may include a visual representation or image of the consumer drape using a color tension map to show the parts of the garment that are fitting tight, loose, or well. The color tension maps may be configured to show stretch values in certain directions with respect to the grain line of the fabric. For instance, a color tension map which display stretch values along the warp direction may be very different than a color tension map which displays stretch values along the weft or bias directions*).

15. Regarding claim 9, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 1, Gardner discloses wherein the method is performed by executing a computer program stored in non-volatile storage media (Paragraph [1114]:

Such data could be downloaded to the central database 50. However, for reasons of customer privacy and confidentiality, it is preferred that this data is uniquely stored on a data carrier 58 which remains within the custody and control of the customer, with the only data passing to the central database 50 being an identification code identifying that customer. The data carrier 58 may be any convenient storage means such as a floppy disc, CD-ROM or smart card).

16. Regarding claim 10, the limitations of this claim substantially correspond to the limitations of claim 1; thus they are rejected on similar grounds.

17. Regarding claim 11, the limitations of this claim substantially correspond to the limitations of claim 2; thus they are rejected on similar grounds.

18. Regarding claim 13, the limitations of this claim substantially correspond to the limitations of claim 4; thus they are rejected on similar grounds.

19. Regarding claim 14, the limitations of this claim substantially correspond to the limitations of claim 5; thus they are rejected on similar grounds.

20. Regarding claim 15, the limitations of this claim substantially correspond to the limitations of claim 6; thus they are rejected on similar grounds.

21. Regarding claim 16, the limitations of this claim substantially correspond to the limitations of claim 7; thus they are rejected on similar grounds.

22. Regarding claim 17, the limitations of this claim substantially correspond to the limitations of claim 8; thus they are rejected on similar grounds.

Conclusion

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Salvucci whose telephone number is (571)270-5748. The examiner can normally be reached on Monday-Friday.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571)272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew Salvucci/
Primary Examiner, Art Unit 2613

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("20160314604").PN.	US-PGPUB; USPAT	OR	OFF	2018/02/22 18:28
L2	508	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L3	7	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L4	29	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L5	59	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L6	2	(("20130057544") or ("20160078650")).PN.	US-PGPUB; USPAT	OR	OFF	2018/02/22 18:28
L7	89	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L8	102	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L9	59	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/02/22 18:28

		fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L10	133	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L11	82	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L12	82	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L13	67	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L14	73	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L15	227	(stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L16	74	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L17	43	L16 NOT L14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2018/02/22 18:28

			DERWENT; IBM_TDB			
L18	243	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L19	74	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L20	133	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L21	192	L18 NOT (L20 L19)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L22	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L23	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L24	114	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L25	6	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2018/02/22 18:28

		OR garment$1) AND difference$1 NEAR2 length$1 AND @AD<"20150427"	DERWENT; IBM_TDB			
L26	0	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L27	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L28	8	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (siz$3 length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L29	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR2 (messag$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28
L30	59	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/22 18:28

EAST Search History (Interference)

<This search history is empty>

2/22/2018 6:31:51 PM
C:\Users\msalvucci\Documents\EAST\Workspaces\14921269_DigitalFabricSewing.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14921269	OH ET AL.
	Examiner	**Art Unit**
	MATTHEW SALVUCCI	2613

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/31/2017	02/22/2018							
	1	✓	✓							
	2	✓	✓							
	3	✓	-							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	-							
	13	✓	✓							
	14	✓	✓							
	15	✓	✓							
	16	✓	✓							
	17	✓	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14921269	OH ET AL.
	Examiner	Art Unit
	MATTHEW SALVUCCI	2613

CPC- SEARCHED		
Symbol	Date	Examiner
G05B2219/2626 + text	10/31/2017	MDS
G05B2219/45195 + text	10/31/2017	MDS

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search file attached	10/31/2017	MDS
Updated search results in EAST	2/22/2018	MDS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/MATTHEW SALVUCCI/ Primary Examiner.Art Unit 2613

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Seung Woo Oh

Application No. 14/921,269 Art Unit: 2613

Confirmation No. 6021

Filed: 10/23/2015 Examiner: Matthew D Salvucci

FOR: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

AMENDMENT AFTER NON-FINAL REJECTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are respectfully submitted in response to the Office Action mailed 11/06/2017. Reconsideration of the claims is respectfully requested.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 7 of this paper.

IN THE CLAIMS

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

Please amend claims 1-2, 4-11, and 13-17, and cancel claims 3 and 12, without prejudice or disclaimer, in accordance with the following:

1. (Currently amended) A method of creating digital clothing, wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, ~~which comprises:~~comprising

inputting a starting point of ~~a~~ the second selected segment onto ~~at least one~~ a second segment, which is to be sewn to the first selected ~~segment;~~segment,

detecting a current cursor position,

displaying a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the detected current cursor position,

inputting ~~an~~ the ending point, which, upon starting a point-clicking process at the starting point ~~located on a second segment~~, is ~~the~~ closest in distance to a ~~point,~~ point where the point-clicking process ~~occurs,~~ occurs on the second segment, wherein the starting point is located on the second segment, and ~~that includes the input starting point; and~~

setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

2. (Currently amended) The method of claim 1, wherein the first and second segments ~~are at least one~~ comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. (Cancelled)

4. (Currently amended) The method of ~~claim 3~~claim 1, wherein the setting of the second selected segment further comprises:

~~in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value,~~ moving the current cursor position to a position of the determined candidate for the ending point and displaying the current cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

5. (Currently amended) The method of ~~claim 3~~claim 1, wherein the setting of the second selected segment further comprises:

calculating and displaying ~~at least one of:~~ either one or both of the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is ~~the~~ closest in distance to the current cursor position.

6. (Currently amended) The method of ~~claim 3~~claim 1, wherein the setting of the second selected segment further comprises:

displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to ~~the~~ a point that is on the second segment and that is ~~the~~ closest in distance to the current cursor position.

7. (Currently amended) The method of claim 6, wherein the setting of the second selected segment further comprises:

~~in response to the difference value being greater than a reference value,~~ displaying a warning sign, in response to the difference value being greater than a reference value.

8. (Currently amended) The method of claim 7, wherein the displaying of the warning sign comprises:

~~in response to the difference value being greater than the reference value,~~ displaying the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

9. (Currently amended) The method of claim 1, the method is performed by executing a computer program stored ~~executed~~ in a non-volatile storage media ~~storing a computer program to which the method is applied~~.

10. (Currently amended) An apparatus for creating digital clothing, wherein the apparatus comprises a computing element and a storage element storing patterns and draped digital clothing, the apparatus comprising:

~~a user interface, which comprises:~~

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter comprising~~setter, which comprises:~~

a starting point input configured to input a starting point of a second selected segment onto ~~at least one~~ a second segment, which is to be sewn to the first selected ~~segment; and~~segment,

a cursor position detector configured to detect a current cursor position,

an ending point candidate display configured to display a candidate for an ending point of the second selected segment by determining, as the candidate for the ending point, a point which is closest in distance to the detected current cursor position and which makes the second selected segment a same length as the first selected segment along the second segment, which includes the input starting point, wherein the second selected segment is made by connecting the input starting point to the point closest in distance to the current detected cursor position, and

an ending point input configured to input ~~an~~ the ending point, which, upon starting a point-clicking process at the starting point ~~located on a second segment~~, is ~~the~~ closest in distance to a ~~point,~~ point where the point-clicking process ~~occurs,~~ occurs on the second segment ~~that includes the input starting point~~, wherein the starting point is located on the second segment.

11. (Currently amended) The apparatus of claim 10, wherein the first and second segments ~~are at least one~~ comprise any one or any combination of any two or more of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. (Cancelled)

13. (Currently amended) The apparatus of ~~claim 12~~claim 10, further comprising:

a cursor position mover configured to~~, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value,~~ move the cursor position to a position of the determined candidate for the ending point and display the cursor position, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value.

14. (Currently amended) The apparatus of claim 13, further comprising:

a length display configured to calculate and display ~~at least one of:~~ either one or both of the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is ~~the~~ closest in distance to the current cursor position.

15. (Currently amended) The apparatus of claim 13, further comprising:

a difference value display configured to display a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is ~~the~~ closest in distance to the current cursor position.

16. (Currently amended) The apparatus of claim 15, further comprising:

a warning sign display configured to~~, in response to the difference value being greater than a reference value,~~ display a warning sign, in response to the difference value being greater than a reference value.

17. (Currently amended) The apparatus of claim 16, wherein the warning sign display is configured to~~, in response to the difference value being greater than the reference value,~~ display

the warning sign by changing colors of the calculated length and the difference value, in response to the difference value being greater than the reference value.

REMARKS

Upon entry of this amendment, claims 1-2, 4-11, and 13-17 are pending in the application, of which claims 1 and 10 are independent claims.

Claims 1-2, 4-11, and 13-17 have been amended, to more positively and precisely recite the claim features. Claims 3 and 12 have been canceled, without prejudice or disclaimer. No new matter has been entered, and support for the amendments of the claims can be found in the original specification.

Various amendments have been made commensurate with Applicant's disclosure to more particularly recite some of Applicant's embodiments. Applicant has amended the claims to further the prosecution for some disclosed embodiments, and not in response to the outstanding rejections. Applicant reserves the right to later claim other embodiments disclosed, including a broader claim or embodiment.

Reconsideration and allowance of the pending claims is respectfully requested in view of the amendments and the following remarks.

I. Preliminary Remarks

A. Drawings

Applicant acknowledges with appreciation the Office's acknowledgement that the drawings filed on October 23, 2015 have been accepted.

B. Foreign Priority

Applicant acknowledges with appreciation the Office's acknowledgement of the Applicant's claim for foreign priority and that all of the certified copies of the priority documents have been received.

C. Information Disclosure Statements

Applicant acknowledges with appreciation the Office's consideration of the Information Disclosure Statements filed on 10/23/2015, 6/14/2016, and 11/23/2016.

II. Claim Rejections under 35 U.S.C. § 103

Claims 1-2 and 9-11 were rejected under 35 U.S.C. § 103 as being obvious over US 2004/0049309 to Gardner *et al.* ("Gardner") in view of US 2011/0298897 to Sareen *et al.* ("Sareen"). Claims 3-8 and 12-17 were rejected under 35 U.S.C. § 103 as being obvious over

Garner in view of Sareen, and further in view of US 2014/0135971 to Park ("Park"). These rejections are respectfully traversed.

Claim 1 has been amended to add the features of "detecting a current cursor position" and "displaying a candidate for an ending point" into the step of "setting of the second selected segment." Similar features were previously recited in claim 3, now canceled. As shown below, the references cited by the Office fail to teach or suggest the above mentioned features of the amended claim 1.

If one makes digital clothing with different lengths of a first segment on a pattern (one side seam line) and a second segment on a pattern (the other side seam line) to be sewn, wrinkles will occur due to the difference in length of the segment (the seam line). Therefore, when setting a second selected segment (other side seam line), it is necessary to set the starting point and ending point of the second selected segment (other side seam line) so that the length of the first selected segment (one side seam line) and the length of the second selected segment (other side seam line) become the same.

The claimed method presents the advantage of enabling accurate and simple setting of a seam to be sewn.[1] A candidate for the ending point of the second selected segment (other side seam line) is displayed so that the first selected segment (one side seam line) and the second selected segment (other side seam line) to be sewn are set to the same length to prevent creasing after sewing. When a user selects the starting point of the second selected segment (other side seam line) after setting the first selected segment (one side seam line) and moves the cursor along the seam to be sewn, a candidate for the ending point is displayed so that the ending point of the second selected segment (other side seam line) can be easily set in the displaying a candidate for the ending point step. Therefore, the user can easily set the second selected segment (other side seam line) to the same length as the first selected segment (one side seam line) simply by selecting the recommended candidate for the ending point.

Gardner discloses marks which are added to the starting and ending points of the seam to be sewn, but does not disclose how to easily select the ending points to equal the length of the seam. Park also teaches how to specify starting and ending points, but it does not teach a way of

[1] The Applicant does not intend to incorporate the elements, which have not been expressly claimed, into the claims. This explanation is provided to provide a context for the present amendments and to help the Office better appreciate some of the many benefits of the amended claims.

helping the user to specify the desired ending points (indicating a candidate for the ending point near the cursor position).

The claimed features related to the displaying of a candidate for the ending point is not taught or suggested by Gardner, Sareen, and Park. The claimed method offers an advantage in that the length of the first selected segment (one side seam line) and the length of the second selected segment (other side seam line) can be easily designated equally. Garder, Sareen, and Park, on the other hand, do not disclose a configuration to achieve this effect.

Claim 10 has been amended to recite “a cursor position detector” and “an ending point candidate display”. Garner, Sareen, and Park fail to teach or suggest the above mentioned features of claim 10 for similar reasons as discussed above.

For at least the reasons stated above, the present rejections of claims 1 and 10 should be withdrawn.

The dependent claims 2, 4-9, 11, and 13-17 depend from their respective independent claims 1 and 10. Therefore, the rejections of claims 2, 4-9, 11, and 13-17 should be withdrawn, at least, for the reasons discussed above and for the additional features they recite, which are not disclosed in the cited references.

In view of the foregoing amendments and remarks, the Applicant respectfully submits that all claims in the application are now in condition for allowance. Accordingly, withdrawal of the rejections and allowance of all the claims is respectfully requested.

CONCLUSION

In view of the foregoing Amendments and comments, Applicant respectfully requests reconsideration and timely allowance of all pending claims. Should the Office believe anything further is required to place the application in condition for allowance, the Examiner is requested to contact the Applicant's representative at the telephone number listed below.

In the event this paper is not being filed timely, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees that may be required for this paper, and any other documents filed concurrently with this paper, may be charged to North Star Intellectual Property Law, PC's Deposit Account No. 50-5113.

Respectfully submitted,

Date: February 6, 2018

/Joseph Richard Conte III/

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Electronic Acknowledgement Receipt	
EFS ID:	31709911
Application Number:	14921269
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Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		OA20171106_3040530001_RespAsFiled.pdf	52332 c8ac36f675cfb5c7709a95bd8ec659ddbeb3bb99	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	10
Warnings:			
Information:			
	Total Files Size (in bytes):	52332	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/921,269	Filing Date 10/23/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	02/06/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0	X $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
DELEACHES YOUNG

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/921,269	10/23/2015	Seung Woo OH	304053.0001	6021

89980 7590 11/06/2017

NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER	
SALVUCCI, MATTHEW D	

ART UNIT	PAPER NUMBER
2613	

NOTIFICATION DATE	DELIVERY MODE
11/06/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto@nsiplaw.com
pto.nsip@gmail.com

Office Action Summary	Application No. 14/921,269	Applicant(s) OH ET AL.	
	Examiner Matthew Salvucci	Art Unit 2613	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 October 2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-17* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-17* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *23 October 2015* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☒ All b)☐ Some** c)☐ None of the:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 103

2. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

3. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1, 2, and 9-11 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner et al. (US Pub. 2004/0049309), hereinafter Gardner, in view of Sareen et al. (US Pub. 2011/0298897), hereinafter Sareen.**

5. Regarding claim 1, Gardner discloses a method of creating digital clothing (Paragraph [0113]: *method of capturing the 3D representation of the garment is to provide a digital representation of the 2D pattern pieces, sized to fit The Model, and then to create a virtual r presentation of the garment in 3D by meands of a program such as Stitch from Size8 Software of Jacksonville, Fla. The advantage of the virtual*

representation is that the rlationship betewen the 2D pattern pieces and the 3D representation is known with precision, which increases the accuracy of the later unwrapping stage, and there is no missing data, which inevitably occurs with a 3D scan), wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing (Paragraph [0029]: *the present invention provides a method of processing information relating to a garment, the method comprising: providing or obtaining information defining the 3D shape of a garment designed to fit and as worn by a first body of a person of a first size and shape; providing or obtaining data defining the first body's size and shape in 3D without the garment in question; identifying defined body regions on the first body; identifying one or more design points on the garment, each design point being related in 3D to one or more of the defined body regions of the first body; providing relationship rules that define the said 3D relationships between said design points and said body regions; storing data defining the garment, the design points, the body regions, and the relationship rules*), the method comprising: setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern (Paragraph [0022]: *pattern pieces of the base garment are deformed to collide with a 3D human model and with each other, and are then virtually sewn together. This provides a 3D representation of the base garment fitted to a first human model. The first human model is deformed to match the shape/size of a consumer, and the base garment is modified simply by deforming the 3D representation of the base garment in a similar manner to the first human model. The 3D representation of the modified garment can be used for*

visualisation ("virtual try-on"), and/or as the basis for generating 2D pattern pieces for production of the modified garment. The document describes the 2D pattern pieces being generated by developing the corresponding 3D parts of the 3D representation into 2D shapes. This system relies on colliding base garment pattern pieces with the standard body shape and modifying the resultant 3D representation of the base garment on the basis of a geometrical deformation of the standard body shape to match a consumer body shape. This relatively simple approach provides no guarantee that the modified garment will preserve the design or style of the base garment, or that pattern pieces developed from the modified 3D representation of the garment will be capable of being assembled to produce an acceptable garment).

Gardner does not explicitly disclose setting a second selected segment, which comprises: inputting a starting point of a second selected segment onto at least one second segment, which is to be sewn to the first selected segment; inputting an ending point, which, upon starting a point-clicking process at the starting point located on a second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point; and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

However, Sareen teaches virtual garment creating and storage based on the received garment specifications and fabric constants (Paragraph [0003]), further comprising setting a second selected segment, which comprises: inputting a starting point of a second selected segment onto at least one second segment, which is to be

sewn to the first selected segment (Fig. 8; Paragraph [0040]: *from the digital pattern 57, production sample garment 59, technical pack 54, grading rules 53, fit model scan data or body measurements 58, and/or paper pattern 51 received from the retailer 50, digital pattern pieces are created, or converted from digital pattern 57, using the apparel product development software 114. Generally, a pattern refers to the collection of the individual pieces of the garment 59. In standard practice, the pattern pieces are drafted first, then laid over fabric, which is then cut around the perimeter of each piece. The resulting pieces of fabric are then sewn together to form the finished garment*); inputting an ending point, which, upon starting a point-clicking process at the starting point located on a second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point (Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*); and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point (Paragraph [0079]: *step 362, E-FIT assigns sewing instructions. In this step, E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*; Paragraph [0082]: *Sewing and draping may be completed using functions provided by CLOTHFX and native E-FIT according to the sewing instructions assigned above. Often, garments have lining and/or layers of*

material. In such cases, layers may be placed, stitched, and draped in a specific order). Sareen teaches that this will allow for user to make custom patterns and therefore custom garments for the consumer (Paragraph [0209]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner with the features of setting a second selected segment, which comprises: inputting a starting point of a second selected segment onto at least one second segment, which is to be sewn to the first selected segment; inputting an ending point, which, upon starting a point-clicking process at the starting point located on a second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point; and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point as taught by Sareen.

6. Regarding claim 2, Gardner, in view of Sareen teaches the method of claim 1, Gardner discloses wherein the first and second segments are at least one of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles (Fig. 1; Fig. 11; Paragraph [0461]: *the Pattern Maker working in 3D would be provided with the upper arm measurement and the total size round its perimeter of the armhole*; Paragraph [0477]: *bottom of the yoke can be straight, square, curved or almost any shape imaginable. This profusion of designs makes it inappropriate to attempt to provide any standard set of design points. The design points set out below are therefore used only to indicate the principles of 3D Tailoring of Yokes*).

7. Regarding claim 9, Gardner, in view of Sareen teaches the method of claim 1, Gardner discloses wherein the method is executed in non-volatile storage media storing a computer program to which the method is applied (Paragraph [1114]: *Such data could be downloaded to the central database 50. However, for reasons of customer privacy and confidentiality, it is preferred that this data is uniquely stored on a data carrier 58 which remains within the custody and control of the customer, with the only data passing to the central database 50 being an identification code identifying that customer. The data carrier 58 may be any convenient storage means such as a floppy disc, CD-ROM or smart card*).

8. Regarding claim 10, the limitations of this claim substantially correspond to the limitations of claim 1; thus they are rejected on similar grounds.

9. Regarding claim 11, the limitations of this claim substantially correspond to the limitations of claim 2; thus they are rejected on similar grounds.

10. **Claims 3-8 and 12-17 are rejected under 35 U.S.C. 103 as being unpatentable over Gardner, in view of Sareen, and further in view of Park (US Pub. 2014/0135971).**

11. Regarding claim 3, Gardner, in view of Sareen teaches the method of claim 1, wherein the setting of the second selected segment further comprises, between the inputting of the starting point and the inputting of the ending point: displaying a candidate for the ending point by determining, as the candidate for the ending point of the second selected segment (Gardner: Paragraph [0120]: *construction lines (where*

present), the matching of the Design Points on different pattern pieces and the knowledge base of completed garments makes it possibl for an initial rough juxtapositioning of the pattern pieces to be carried out automatically, although the capability to carry out a manual juxtapositioning would be present as a fall-back), a point, which is the closest in distance to the current detected cursor position and which makes the second selected segment a same as a length of the first selected segment along the second segment that includes the input starting point, wherein the second selected segment is made by connecting the input starting point to such a point (Sareen: Paragraph [0069]: *stitch segments may be assigned in the digital pattern 180. Segments may be defined so that they can be sewn in E-FIT. Marks may be added to the digital pattern 180 to define the starting and ending point of the segments that will be sewn*; Paragraph [0079]: *E-FIT matches each particular segment of a 3D mesh corresponding to a particular piece to another segment on the same 3D mesh, or to another 3D piece, in accordance with how the garment is supposed to be sewn together*).

Gardner, in view of Sareen does not explicitly disclose wherein the setting of the second selected segment further comprises, between the inputting of the starting point and the inputting of the ending point: detecting a current cursor position.

However, Park teaches sewing of digital clothing (Paragraph [0004]), further comprising wherein the setting of the second selected segment further comprises, between the inputting of the starting point and the inputting of the ending point: detecting a current cursor position (Fig. 9; Paragraph [0052]: *a user may click the start*

position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As an example, the set start position and end position are displayed on the zoom view). Park teaches that this enables a user to set start and end positions in each process section (Paragraph [0052]). Therefore, it would have been obvious to one of ordinary skill in the art to have modified Gardner, in view of Sareen with the features wherein the setting of the second selected segment further comprises, between the inputting of the starting point and the inputting of the ending point: detecting a current cursor position as taught by Park.

12. Regarding claim 4, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 3, Park discloses wherein the setting of the second selected segment further comprises: in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value, moving the cursor position to a position of the determined candidate for the ending point and displaying the cursor position (Fig. 9; Paragraph [0052]: *a user may click the start position setting button 912-1, move a pointing device to a desired position in the zoom view 904, and click the desired position, thereby setting a start position of a corresponding process section. Similarly, the user may click the end position setting button 912-2, move the pointing device to a desired end position in the zoom view 904, and click the desired end position, thereby setting the end position. As*

an example, the set start position and end position are displayed on the zoom view; Paragraph [0054]: *process list 1150 of FIG. 11 may predict process time on the basis of a stitch length, a number of stitches, start and end positions of each process section, a number of yarn cuttings, a number of yarn cuttings set in a sewing manufacturing device, and a number of sewing manufacturing devices involved in each corresponding process; predict process cost on the basis of daily working conditions and the number of workers; and display the predicted process time and the predicted process cost*).

13. Regarding claim 5, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 3, Gardner discloses wherein the setting of the second selected segment further comprises: calculating and displaying at least one of: the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is the closest in distance to the current cursor position (Figs. 3-16; Paragraph [1101]: *Constraints between and within pattern pieces In order f r a garment to be constructible it is necessary to impose constraints between pattern pieces. In the case of the pattern piec f FIG. 32 there is a piece to the left, mirroring the one we see and the distance FG is constrained to be equal to the same length on the other piece. Similarly AB and BC are constrained to have lengths matching their companion seams*).

14. Regarding claim 6, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 3, Sareen discloses wherein the setting of the second selected segment further comprises: displaying a difference value between the length of

the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position (Paragraphs [0188]-[0189]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value. In another embodiment, the stretch value may be calculated for many garment measurements… data may also include calculating the change in stretch in a similar fashion as described above, but with initial value set to the stretch value of the base size, and the final value being the stretch value of the selected size (if other than the base size). Furthermore, quantitative data may also include calculating the stretch value for specific points of measure, rather than for the entire garment, and then comparing them with the initial 3D virtual garment measurements from fit model drape*).

15. Regarding claim 7, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 6, Park discloses wherein the setting of the second selected segment further comprises: in response to the difference value being greater than a reference value, displaying a warning sign (Paragraph [0015]: *manufacturing management method which includes receiving design information on an end product to be manufactured by sewing; configuring at least one component shape of the end*

product based on the design information; identifying one or more processes necessary for manufacturing the end product based on analysis of the one or more component shapes; enabling a user to select one process from the one or more processes; enabling a user to select one process from the processes; providing one or more process task charts related to the one or more processes; predicting at least one of process time and process cost for the selected process, on the basis of the sewing information and the sewing data; transmitting at least one of the sewing information and the sewing data to at least one sewing manufacturing device through a network; receiving a device status message from the at least one sewing manufacturing device, the device status message including an abnormal status message indicating that a status of the at least one sewing manufacturing device is abnormal; providing at least one of text data and multi-media data to address the abnormal status based on the abnormal status message; and transmitting an A/S request message to a sewing manufacturing device provider based on the abnormal status message; Paragraphs [0022]-[0026]: *the sewing information process module 126 enables the user to easily input sewing information on each process. Sewing information received at the sewing information process module 126 may include a stitch shape, a member to be used in each sewing processing section, a type and color of yarn, a needle, a stitch length, a total number of stitches, a start and end position of each section, an accessory attachment type, and other guidelines/cautions of sewing, but the present embodiment is not limited thereto. The sewing information process module 126 may separately store sewing information, which is received from a user, for each section in each process…*

sewing data process module 128 enables a user to provide sewing data, which is required for performing a corresponding sewing process, based on the sewing information stored in the sewing information process module 126. The sewing data may include a plurality of parameters for executing a component stitch pattern for each sewing process, and specifically include a stitch width, a number of stitches, an upper yarn tension, a sewing speed, a sewing machine foot pressure, etc., but the sewing data is not limited thereto. The sewing parameters may need to be adjusted according to the sewing manufacturing device that is used in a corresponding sewing process, and thus, the sewing data process module 128 may allow a user to select a sewing manufacturing device to be used. When a sewing manufacturing device that a user desires to use is not available, the sewing data process module 128 may transmit an inquiry or a request for a corresponding sewing manufacturing device to a provider…A/S module 138 may receive a device status message from the sewing manufacturing devices 190-1 to 190-n over the second network 152. The device status message may include an abnormal status message indicating that the status of the sewing manufacturing devices 190-1 to 190-n is abnormal, and the abnormal status message may include information to recognize each of the sewing manufacturing devices 190-1 to 190-n and provide details about the abnormal status. The A/S module 138 may provide the sewing manufacturing devices 190-1 to 190-n over the second network 152 with information necessary to address the abnormal status based on the details, for example, in the form of text data or multimedia data. In accordance with the

information included in the text data or the multimedia data, the sewing manufacturing devices 190-1 to 190-n may be adjusted or configured by taking appropriate measures).

16. Regarding claim 8, Gardner, in view of Sareen, and further in view of Park teaches the method of claim 7, Sareen discloses wherein the displaying of the warning sign comprises: in response to the difference value being greater than the reference value, displaying the warning sign by changing colors of the calculated length and the difference value (Paragraphs [0188]-[0190]: *stretch may be calculated by measuring the percent difference in a specific measurement before and after the drape. In other words, an initial garment measurement might yield one length. After draping the garment on an avatar, the draped garment measurement at the same location might have a length that has increased or decreased. In one embodiment, the percent difference in length for that specific measurement may be defined as the stretch value…an example web page produced by the system illustrates how stretch values may be visually displayed using a color tension map. These color tension maps can be viewed in any image format, on the web, or in any standard image viewing software. The color maps may also be viewable using 3D Viewer Application 82. The color tension map displays high stretch values in red, low stretch values in green, and negative stretch values in blue. data may include visual images of consumer drape 1102. Qualitative data may include a visual representation or image of the consumer drape using a color tension map to show the parts of the garment that are fitting tight, loose, or well. The color tension maps may be configured to show stretch values in certain directions with respect to the grain line of the fabric. For instance, a color tension map which display stretch values along the warp*

direction may be very different than a color tension map which displays stretch values along the weft or bias directions).

17. Regarding claim 12, the limitations of this claim substantially correspond to the limitations of claim 3; thus they are rejected on similar grounds.

18. Regarding claim 13, the limitations of this claim substantially correspond to the limitations of claim 4; thus they are rejected on similar grounds.

19. Regarding claim 14, the limitations of this claim substantially correspond to the limitations of claim 5; thus they are rejected on similar grounds.

20. Regarding claim 15, the limitations of this claim substantially correspond to the limitations of claim 6; thus they are rejected on similar grounds.

21. Regarding claim 16, the limitations of this claim substantially correspond to the limitations of claim 7; thus they are rejected on similar grounds.

22. Regarding claim 17, the limitations of this claim substantially correspond to the limitations of claim 8; thus they are rejected on similar grounds.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Salvucci whose telephone number is (571)270-5748. The examiner can normally be reached on Monday-Friday.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571)272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew Salvucci/
Primary Examiner, Art Unit 2613

Notice of References Cited	Application/Control No. 14/921,269	Applicant(s)/Patent Under Reexamination OH ET AL.	
	Examiner Matthew Salvucci	Art Unit 2613	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2004/0049309 A1	03-2004	Gardner, James Holden Patrick	A41H1/00	700/132
*	B	US-2011/0298897 A1	12-2011	Sareen; Raj	G06N3/006	348/47
*	C	US-2014/0135971 A1	05-2014	Park; In Chul	G06Q10/043	700/137
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
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NON-PATENT DOCUMENTS

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BIB DATA SHEET

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APPLICANTS
CLO virtual fashion, Seoul, KOREA, REPUBLIC OF;

INVENTORS
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Kyoung Ae BANG, Seoul, KOREA, REPUBLIC OF;

**** CONTINUING DATA ************************

**** FOREIGN APPLICATIONS ************************
REPUBLIC OF KOREA 10-2015-0059086 04/27/2015

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
11/03/2015

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /MATTHEW D SALVUCCI/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		KOREA, REPUBLIC OF	14	17	2

ADDRESS
NSIP LAW
P.O. Box 65745
Washington, DC 20035
UNITED STATES

TITLE
METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

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Receipt date: 12/23/2016

Substitute for PTO/SB/08a/b

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/921,269
				Filing Date	October 23, 2015
				First Named Inventor	Seung Woo OH
				Art Unit	2613
(Use as many sheets as necessary)				Examiner Name	Matthew D. Salvucci
Sheet	1	of	1	Attorney Docket Number	304053.0001

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number - Kind Code[2] (*If known*)	Patent or Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/M.S./	A	US 2013/0057544 A1	03-07-2013	Oh	Counterpart of KR 10-2011-0119260 A
/M.S./	B	US 2016/0078650 A1	03-17-2016	Kishikawa et al.	Counterpart of JP 2014-182670 A

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Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
/M.S./	a	JP 2014-182670 A	09-29-2014	GEO Technical Laboratory Co., Ltd.	Counterpart of US 2016/0078650 A1	X
/M.S./	b	KR 10-2011-0119260 A	11-02-2011	CLO Virtual Fashion	Counterpart of US 2013/0057544 A1	X
	c					
	d					

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
/M.S./	1	Korean Notice of Allowance issued September 24, 2016, in counterpart Korean Application No. 10-2015-0059086 (2 pages, in Korean).	
	2		
	3		

Examiner Signature	/MATTHEW SALVUCCI/	Date Considered	09/25/2017

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Substitute for PTO/SB/08a/b

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(Use as many sheets as necessary)*				**Complete if Known**	
				Application Number	New Application
				Filing Date	Concurrently Herewith
				First Named Inventor	Seung Woo OH
				Art Unit	Not Yet Assigned
				Examiner Name	Not Yet Assigned
Sheet	1	of	1	Attorney Docket Number	304053.0001

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number - Kind Code[2] (*if known*)	Patent or Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

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Examiner Initials*	Cite No.[1]	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
/M.S./	1	Volino, Pascal, and Nadia Magnenat-Thalmann. "Resolving surface collisions through intersection contour minimization." Vol. 25., No. 3., ACM, 2006. (6 pages)	

Examiner Signature	/MATTHEW SALVUCCI/	Date Considered	09/25/2017

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14921269	OH ET AL.
	Examiner	Art Unit
	MATTHEW SALVUCCI	2613

CPC- SEARCHED		
Symbol	Date	Examiner
G05B2219/2626 + text	10/31/2017	MDS
G05B2219/45195 + text	10/31/2017	MDS

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search file attached	10/31/2017	MDS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/MATTHEW SALVUCCI/ Primary Examiner.Art Unit 2613

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14921269	OH ET AL.
	Examiner	**Art Unit**
	MATTHEW SALVUCCI	2613

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	10/31/2017								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	59	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/31 14:54
S1	1	("20160314604").PN.	US-PGPUB; USPAT	OR	OFF	2017/09/25 11:35
S2	508	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 11:38
S3	7	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 11:42
S4	29	(stitch$3 sew$3) NEAR4 (segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 11:53
S5	59	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 11:55
S6	2	(("20130057544") or ("20160078650")).PN.	US-PGPUB; USPAT	OR	OFF	2017/09/25 14:29
S7	89	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 14:40
S8	102	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	2017/09/25 14:40

		stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	JPO; DERWENT; IBM_TDB			
S9	59	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR fabric$1) AND (virtual$2 OR digital$2) NEAR4 (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 14:48
S11	133	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 14:55
S15	82	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 15:12
S16	82	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 15:18
S17	67	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 15:19
S18	73	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND (start$3 begin$1 OR beginning) NEAR5 (stitch$3 sew$3) AND (clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 15:34
S19	227	(stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 15:40
S20	74	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND	US-PGPUB; USPAT; USOCR;	OR	OFF	2017/09/25 15:41

		(virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S21	43	S20 NOT S18	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/25 15:41
S22	242	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/27 07:23
S23	74	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR4 (sewing OR stitching) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/27 07:26
S26	133	(stitch$3 sew$3) NEAR4 (pattern$1 segment$1 OR clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2) NEAR4 (sewing OR stitching clothing cloth$2 OR fabric$1 OR textile$1 OR garment$1) AND (start$3 begin$1 OR beginning) NEAR5 (point OR select$3 cursor click$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/27 07:27
S27	191	S22 NOT (S26 S23)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/27 07:27
S28	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/27 07:47
S29	2	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) NEAR together AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/27 07:48
S30	113	display NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	2017/09/27 07:49

		clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	JPO; DERWENT; IBM_TDB			
S31	6	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND difference$1 NEAR2 length$1 AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/31 08:04
S32	0	(G05B2219/2626 G05B2219/45195).CPC. AND display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/31 09:45
S33	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/31 13:19
S34	8	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR5 (siz$3 length$1 OR longer OR difference$1 OR match$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/31 13:21
S35	2	display AND (stitch$3 sew$3) NEAR4 (patterns segments OR clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (virtual$2 OR digital$2 CAD) NEAR2 (clothing clothes OR fabric$1 OR textile$1 OR garment$1) AND (error$1 OR warning$1) NEAR2 (messag$3) AND @AD<"20150427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/10/31 13:29

EAST Search History (Interference)

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10/31/2017 2:55:40 PM
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Substitute for PTO/SB/08a/b

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/921,269
				Filing Date	October 23, 2015
				First Named Inventor	Seung Woo OH
				Art Unit	2613
(Use as many sheets as necessary)				Examiner Name	Xiao Min WU
Sheet	1	of	1	Attorney Docket Number	304053.0001

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
/M.S./	a	JP 6-301763 A	10-28-1994	Nippon Steel Corp.		✓

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
/M.S./	1	CLO 3D 2011 Marvelous Designer Manual (2014).	✓
/M.S./	2	Korean Office Action issued March 28, 2016 in counterpart Korean Application No. 10-2015-0059086 (5 pages in Korean).	

Examiner Signature	/MATTHEW SALVUCCI/	Date Considered	09/25/2017

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04(a). [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached (X indicates Abstract only provided).

Substitute for PTO/SB/08a/b

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(Use as many sheets as necessary)*				**Complete if Known**	
				Application Number	14/921,269
				Filing Date	October 23, 2015
				First Named Inventor	Seung Woo OH
				Art Unit	2613
				Examiner Name	Matthew D. Salvucci
Sheet	1	of	1	Attorney Docket Number	304053.0001

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number - Kind Code[2] (*if known*)	Patent or Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A	US 2013/0057544 A1	03-07-2013	Oh	Counterpart of KR 10-2011-0119260 A
	B	US 2016/0078650 A1	03-17-2016	Kishikawa et al.	Counterpart of JP 2014-182670 A

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	a	JP 2014-182670 A	09-29-2014	GEO Technical Laboratory Co., Ltd.	Counterpart of US 2016/0078650 A1	X
	b	KR 10-2011-0119260 A	11-02-2011	CLO Virtual Fashion	Counterpart of US 2013/0057544 A1	X
	c					
	d					

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	1	Korean Notice of Allowance issued September 24, 2016, in counterpart Korean Application No. 10-2015-0059086 (2 pages, in Korean).	
	2		
	3		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04(a). [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached (X indicates Abstract only provided).

Espacenet

Bibliographic data: JP2014182670 (A) — 2014-09-29

DRAWING DATA GENERATING DEVICE AND DRAWING APPARATUS

Inventor(s): KISHIKAWA KIYONARI; TEJIMA EIJI; ARAMAKI MASANORI; UTSUMI KOJI; NAKAGAMI TAKU; AZAGAMI TATSUYA ± (KISHIKAWA KIYONARI, ; TEJIMA EIJI, ; ARAMAKI MASANORI, ; UTSUMI KOJI, ; NAKAGAMI TAKU, ; AZAGAMI TATSUYA)

Applicant(s): GEO TECHNICAL LAB CO LTD ± (GEO TECHNICAL LABORATORY CO LTD)

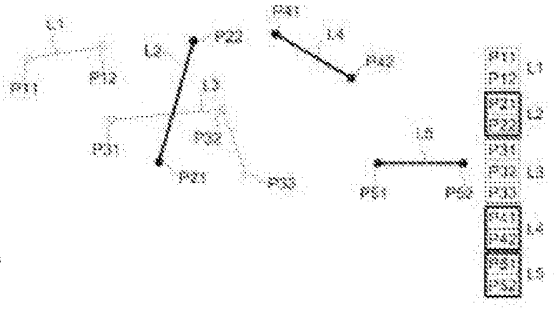
Classification: **- international:** ***G06T11/20; G06T11/60;*** *G09B29/00*
- cooperative: **G01C21/00**; **G06F17/30061**; **G06F17/30321**; **G06T11/203**; **G06T11/60**; **G09B29/106**

Application number: JP20130057496 20130321 Global Dossier

Priority number(s): JP20130057496 20130321

Also published as: JP5883817 (B2) WO2014148039 (A1) US2016078650 (A1) KR20150132177 (A) HK1214876 (A1) more

Abstract of JP2014182670 (A)



PROBLEM TO BE SOLVED: To improve a drawing speed of an image using a graphics library.SOLUTION: Integration processing of line data for drawing a road or the like for map data for displaying a map image is applied. The line data is grouped first on the basis of a line type and a line width, such that lines L1 and L3 are drawn by thin solid lines and lines L2, L4 and L5 are drawn by thick solid lines. The line data is integrated into one line for each group by connecting the lines L1 and L3 by a non-displayed line LA1 and connecting the lines L2, L4 and L5 by non-displayed lines LA2 and LA3. Thus, processing time required for a call can be shortened because a call frequency of a line function for line drawing prepared in a graphics library can be reduced when drawing a map by using the map data in which the line data is integrated.

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2014-182670
(P2014-182670A)
(43)公開日　平成26年9月29日(2014.9.29)

(51)Int.Cl.		F I			テーマコード（参考）
G06T 11/20	***(2006.01)***	G06T	11/20	110A	2C032
G06T 11/60	***(2006.01)***	G06T	11/60	300	5B050
G09B 29/00	*(2006.01)*	G09B	29/00	Z	5B080

審査請求 未請求　請求項の数 10　ＯＬ　（全 18 頁）

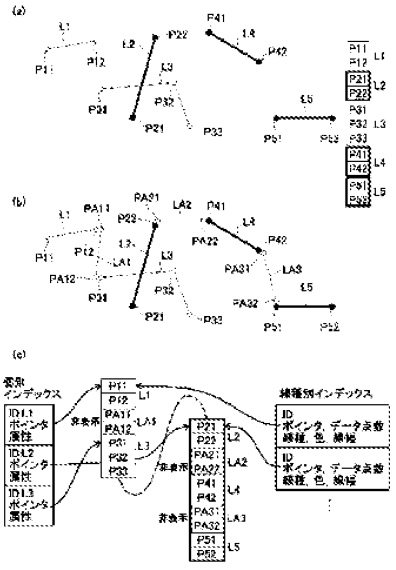
(21)出願番号　特願2013-57496(P2013-57496)
(22)出願日　平成25年3月21日(2013.3.21)

(71)出願人　502002186
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最終頁に続く

(54)【発明の名称】描画データ生成装置および描画装置

(57)【要約】
【課題】　グラフィックスライブラリを利用した画像の描画速度を向上する。
【解決手段】　地図画像を表示するための地図データに対し、道路等を描くためのラインデータの統合化処理を施す。まず、細い実線で描かれるラインＬ１、Ｌ３と、太い実線で描かれるラインＬ２、Ｌ４、Ｌ５というように、線種、線幅に基づいてラインデータをグループ化する。そして、ラインＬ１、Ｌ３の間を非表示のラインＬＡ１で連結し、ラインＬ２、Ｌ４、Ｌ５の間を非表示のラインＬＡ２、ＬＡ３で連結することで、グループごとに、ラインデータを一本のラインに統合する。
　このようにラインデータが統合化された地図データを用いて地図を描画する場合には、グラフィックスライブラリに用意されたライン描画用のライン関数の呼び出し回数を、減らすことができるから、呼び出しに要する処理時間を短縮することができる。
【選択図】　図３



【特許請求の範囲】
【請求項１】
グラフィックスライブラリを用いて画像を描画するための描画データを生成する描画データ生成装置であって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記描画データ生成装置は、
前記描画すべき原データを格納する原データベースと、
前記原データのうち、複数の前記ラインデータを一本のラインデータに統合するラインデータ統合部とを有しており、
前記ラインデータ統合部は、
前記原データに含まれるラインデータのうち、前記ライン関数を共通の設定で用いて描画されるべき複数のラインデータを抽出し、
前記抽出された複数のラインデータを連結して一本のラインデータに統合するように、前記ラインデータの端点のうち空間的に離れている端点間を、非表示のラインで連結するデータを生成する描画データ生成装置。
【請求項２】
請求項１記載の描画データ生成装置であって、
前記ライン関数は、ラインの一方の頂点に指定された第１の表示態様から、他方の頂点に指定された第２の表示態様に、表示態様を順次変化させながら該ラインを描画する機能を有しており、
前記描画データ生成装置は、さらに、
前記統合の際に、前記非表示のラインで連結すべき端点に重ねて、新たに連結で用いるためのダミー点を追加するダミー点追加部を備え、
前記ラインデータ統合部は、前記ダミー点間を非表示のラインで連結する描画データ生成装置。
【請求項３】
請求項１または２記載の描画データ生成装置であって、
前記ラインデータ統合部は、前記空間的に離れている端点のうち、距離が近い端点同士を連結する描画データ生成装置。
【請求項４】
請求項１～３いずれか記載の描画データ生成装置であって、
前記原データベースは、前記各ラインデータの形状、属性を示す固有の原インデックス情報が、それぞれラインデータに関連づけて格納されており、
前記ラインデータ統合部は、前記原インデックス情報とは別に、前記統合されたラインデータの形状、属性を示す固有の統合インデックス情報を生成する描画データ生成装置。
【請求項５】
グラフィックスライブラリを用いて画像を描画する描画装置であって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記描画装置は、
所定サイズのメッシュに区切って生成された前記描画すべき原データを格納する原データベースと、
前記描画の対象となるメッシュが複数あるとき、異なるメッシュに存在する前記ラインデータの端点同士を仮想的に連結して一本のラインデータに統合するライン描画データ設定部と、
前記統合されたラインデータに基づいて前記ライン関数を呼び出すことによって描画を行う描画部とを備える描画装置。
【請求項６】
請求項５記載の描画装置であって、

さらに、前記メッシュごとに、該メッシュ内の複数のラインデータを統合する請求項１～４いずれか記載の描画データ生成装置を備え、
前記ライン描画データ設定部は、前記メッシュごとに統合されたラインデータを対象として前記統合を行う描画装置。
【請求項７】
グラフィックスライブラリを用いて画像を描画するための描画データを、コンピュータによって生成する描画データ生成方法であって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記コンピュータが実行するステップとして、
前記描画すべき原データを格納する原データベースから前記原データを読み出すステップと、
前記原データのうち、複数の前記ラインデータを一本のラインデータに統合するラインデータ統合ステップとを有しており、
前記ラインデータ統合ステップは、
前記原データに含まれるラインデータのうち、前記ライン関数を共通の設定で用いて描画されるべき複数のラインデータを抽出し、
前記抽出された複数のラインデータを連結して一本のラインデータに統合するように、前記ラインデータの端点のうち空間的に離れている端点間を、非表示のラインで連結するデータを生成する描画データ生成方法。
【請求項８】
グラフィックスライブラリを用いて画像を描画するための描画データを生成するためのコンピュータプログラムであって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記コンピュータプログラムは、
前記描画すべき原データを格納する原データベースから前記原データを読み出す機能と、
前記原データのうち、複数の前記ラインデータを一本のラインデータに統合するラインデータ統合機能とをコンピュータに実現させるコンピュータプログラムであり、
前記ラインデータ統合機能は、
前記原データに含まれるラインデータのうち、前記ライン関数を共通の設定で用いて描画されるべき複数のラインデータを抽出し、
前記抽出された複数のラインデータを連結して一本のラインデータに統合するように、前記ラインデータの端点のうち空間的に離れている端点間を、非表示のラインで連結するデータを生成する機能であるコンピュータプログラム。
【請求項９】
グラフィックスライブラリを用いてコンピュータにより画像を描画する描画方法であって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記コンピュータが実行するステップとして、
所定サイズのメッシュに区切って生成された前記描画すべき原データを格納する原データベースから原データを読み出すステップと、
前記描画の対象となるメッシュが複数あるとき、異なるメッシュに存在する前記ラインデータの端点同士を仮想的に連結して一本のラインデータに統合するライン描画データ設定ステップと、
前記統合されたラインデータに基づいて前記ライン関数を呼び出すことによって描画を行う描画ステップとを備える描画方法。
【請求項１０】

グラフィックスライブラリを用いて画像を描画するためのコンピュータプログラムであって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記コンピュータプログラムは、
所定サイズのメッシュに区切って生成された前記描画すべき原データを格納する原データベースから原データを読み出す機能と、
前記描画の対象となるメッシュが複数あるとき、異なるメッシュに存在する前記ラインデータの端点同士を仮想的に連結して一本のラインデータに統合するライン描画データ設定機能と、
前記統合されたラインデータに基づいて前記ライン関数を呼び出すことによって描画を行う描画機能とをコンピュータに実現させるためのコンピュータプログラム。

【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、グラフィックスライブラリを用いて画像を描画する描画装置、および描画のためのデータを生成する描画データ生成装置に関する。
【背景技術】
【０００２】
ナビゲーション装置やコンピュータの画面等に用いられる電子地図などは、ポリゴンデータ等の形式で用意された地図データを参照して、ディスプレイ等に地図を描画する。この描画には、グラフィックスライブラリと呼ばれる描画用の関数が用いられるのが通常である。３次元での描画を行うためのグラフィックスライブラリとしては、ＯｐｅｎＧＬやＤｉｒｅｃｔＸなどが存在する。これらのグラフィックスライブラリを用いることにより、画像の描画を高速で効率的に実行することが可能となる。
一方、グラフィックスライブラリには、それぞれ利用する際の制約があり、必ずしも描画対象となるポリゴンデータが、こうした制約を満足しているとは限らない。かかる場合には、ポリゴンデータを、グラフィックスライブラリの制約に適合するように加工する必要が生じる。特許文献１は、かかる加工の一例として、グラフィックスライブラリが取り扱い可能な頂点数に上限値がある場合、ポリゴンを描画する際に、上限値に基づいてポリゴンを分割して描画する技術を開示している。
また、描画すべきポリゴンデータが、地図データのように多数のポリゴンからなる大容量のデータの場合には、描画速度を速めるため、データ量を削減する処理も行われる。特許文献２は、かかる処理の一例として、ポリゴンを描画する際に、辺間の角度が大きい場合には、頂点数を間引くことによって、ポリゴンの描画速度を速める技術を開示している。
【先行技術文献】
【特許文献】
【０００３】
【特許文献１】特開２００３－１８７２５６号公報
【特許文献２】特開２００４－３４８７０８号公報
【発明の概要】
【発明が解決しようとする課題】
【０００４】
電子地図等においても地物の形状を３次元的に表現した３次元地図が普及し、３次元での描画が要求されるようになると、描画すべきポリゴンデータの容量はますます大きくなる。また、カーナビゲーション装置に３次元地図を適用した場合には、リアルタイムに３次元地図を描画する必要があり、描画に要する時間の短縮化も要求される。このようなデ

ータ容量の増大、描画時間の短縮という要請に十分、応えるためには、描画速度をさらに向上させることが望まれていた。

描画速度の向上は、電子地図に限った課題ではなく、画像の描画に共通の課題である。本発明は、グラフィックスライブラリを用いる場合に、画像の描画速度の向上を図ることを目的とする。

【課題を解決するための手段】

【０００５】

本発明は、

グラフィックスライブラリを用いて画像を描画するための描画データを生成する描画データ生成装置であって、

前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、

前記描画データ生成装置は、

前記描画すべき原データを格納する原データベースと、

前記原データのうち、複数の前記ラインデータを一本のラインデータに統合するラインデータ統合部とを有しており、

前記ラインデータ統合部は、

前記原データに含まれるラインデータのうち、前記ライン関数を共通の設定で用いて描画されるべき複数のラインデータを抽出し、

前記抽出された複数のラインデータを連結して一本のラインデータに統合するように、前記ラインデータの端点のうち空間的に離れている端点間を、非表示のラインで連結するデータを生成する描画データ生成装置として構成することができる。

【０００６】

グラフィックスライブラリを用いて描画を行う場合、ラインを１本ひくごとに、ライン関数を呼び出すことになるが、この呼び出しに少なからず処理時間を要することになる。従って、描画すべきラインデータの本数が増えるほど、ライン関数を呼び出す回数が増大し、全体の処理時間が長くなることになる。

これに対し、本発明によれば、複数のラインデータを非表示のラインで連結することで一本のラインデータに統合することができる。従って、統合化されたラインデータを描画するためには、ライン関数を１回読み出せば足りるため、描画に要する所要時間を短縮することができる。もっとも、ラインを統合する分、1回のライン関数で描画すべきラインデータを構成する頂点数は統合前よりも増大するため、処理時間を増大させる要素とはなり得る。しかし、かかる増大要素よりも、ライン関数の呼び出し回数を減らすことによる所要時間の短縮効果の方が大きいため、全体として処理時間を短縮することが可能となるのである。

グラフィックスライブラリを用いて描画を行う場合、頂点間の区間ごとにラインの表示／非表示は容易に切り換えることができる。従って、ラインデータの間を非表示のラインで連結するのは、ラインデータ間に新たなラインを定義するとともに、当該区間を非表示と設定することにより、容易に実現することができる。

統合の対象となるラインデータは、ライン関数を共通の設定で用いて描画できるものである。例えば、ラインの太さ・線種等が共通のラインなどが対象となり得る。どのようなラインが統合の対象となるかは、利用するグラフィックスライブラリに応じて定まることになる。

【０００７】

本発明において、

前記ライン関数が、ラインの一方の頂点に指定された第１の表示態様から、他方の頂点に指定された第２の表示態様に、表示態様を順次変化させながら該ラインを描画する機能を有している場合、

前記描画データ生成装置は、さらに、

前記統合の際に、前記非表示のラインで連結すべき端点に重ねて、新たに連結で用い

るためのダミー点を追加するダミー点追加部を備え、
前記ラインデータ統合部は、前記ダミー点間を非表示のラインで連結するものとしてもよい。
【０００８】
グラフィックスライブラリのライン関数によっては、ブレンド機能、即ち、第１の頂点から第２の頂点にかけて、徐々に線の色などの表示態様を変化させる機能を備えているものがある。かかる機能を有するライン関数では、例えば、第１の頂点で「赤」、第２の頂点で「青」が指定されていると、その間のラインは、赤から徐々に青に変化しながら描画されることになる。
このようなライン関数の場合、原データに存在する第１のラインの端点（第１の端点と呼ぶ）と、第２のラインの端点（第２の端点と呼ぶ）とを非表示のラインで連結しようとすると、第１のライン、および第２のライン自体が、それぞれ第１の端点、第２の端点に向けて徐々に透明に描かれる自体も生じ得る。
これに対し、本発明によれば、第１の端点、第２の端点にダミー点をそれぞれ追加した上で、これらのダミー点の間を非表示のラインで連結するため、第１のライン、第２のラインは、非表示のラインの影響を受けることなく適正に描画される。
【０００９】
本発明においては、
前記ラインデータ統合部は、前記空間的に離れている端点のうち、距離が近い端点同士を連結するものとしてもよい。
こうすることにより、統合したラインの全体の距離を短くすることができ、ラインの描画時間をより短縮することが可能となる。
【００１０】
本発明においては、
前記原データベースは、前記各ラインデータに固有の原インデックス情報が、それぞれラインデータに関連づけて格納されており、
前記ラインデータ統合部は、前記原インデックス情報とは別に、前記統合されたラインデータの形状、属性を示す固有の統合インデックス情報を生成するものとしてもよい。
ラインを統合した後でも、原データのラインと、統合化のために追加された非表示のラインとは区別可能としておく必要がある。また、原データにおいて、ラインデータごとに、色、線種などの属性が設定されていることがあり、こうした情報は、参照可能な状態で保持しておく必要がある。
上記態様によれば、ラインに関連づけられた原インデックス情報は保持されているため、原データのラインに付されていた形状や属性も参照可能となる。また、これと同時に、統合化されたライン全体のインデックス情報も生成されるため、統合化された後のライン全体としての取り扱いも容易となる利点がある。
【００１１】
本発明は、上述した描画データ生成装置としての態様に限らず、種々の態様で構成することができ、例えば、次に示す描画装置として構成してもよい。
グラフィックスライブラリを用いて画像を描画する描画装置であって、
前記グラフィックスライブラリは、ラインデータによって指定された頂点間を順次結んでラインを描画するライン関数を有しており、
前記描画装置は、
所定サイズのメッシュに区切って生成された前記描画すべき原データを格納する原データベースと、
前記描画の対象となるメッシュが複数あるとき、異なるメッシュに存在する前記ラインデータの端点同士を仮想的に連結して一本のラインデータに統合するライン描画データ設定部と、
前記統合されたラインデータに基づいて前記ライン関数を呼び出すことによって描画を行う描画部とを備える描画装置とする態様である。

上記描画装置によれば、メッシュ間でラインを連結して描画することにより、ライン関数の呼び出し回数を減少させることができ、描画の所要時間短縮を図ることができる。

【００１２】

本発明の描画装置においては、

さらに、前記メッシュごとに、該メッシュ内の複数のラインデータを統合するために、先に説明したいずれかの描画データ生成装置を備え、

前記ライン描画データ設定部は、前記メッシュごとに統合されたラインデータを対象として前記統合を行うものとしてもよい。

こうすることにより、メッシュ内のラインも統合化し、かつ、メッシュ間でも統合化することができるから、より一層、ライン関数の呼び出し回数を減少させることができる。

【００１３】

本発明は、上述した特徴を必ずしも全てを備えている必要はなく、適宜、その一部を省略したり、組み合わせたりしてもよい。

本発明は、さらに、コンピュータによって描画データを生成する生成方法または画像を描画する描画方法として構成してもよい。また、描画データの生成や画像の描画をコンピュータに実行させるためのコンピュータプログラムとして構成してもよい。また、かかるコンピュータプログラムを記録したコンピュータが読み取り可能な記録媒体として構成してもよい。

【図面の簡単な説明】

【００１４】

【図１】経路案内システムの構成を示す説明図である。

【図２】原地図データベースのデータ構造を示す説明図である。

【図３】ラインデータの統合処理の概要を示す説明図である。

【図４】ラインデータ統合処理のフローチャートである。

【図５】経路案内処理のフローチャートである。

【発明を実施するための形態】

【実施例１】

【００１５】

以下、本発明を、地図を描画しつつ、経路探索・経路案内を行う経路案内システムとして構成した場合の実施例を説明する。経路案内システムのうち、グラフィックスライブラリを用いて地図を描画する部分が、本発明における描画装置に相当する。また、そのためのデータを生成する部分が、本発明における描画データ生成装置に相当する。

本発明の描画対象は、地図に限られるものではないから、本発明は、経路案内システムとしての態様に限らず、グラフィックスライブラリを用いて画像を描画する種々の描画装置に適用可能である。

【００１６】

Ａ．システム構成：

図１は、経路案内システムの構成を示す説明図である。経路案内システムは、サーバ２００から提供されるデータに基づいて、端末３００において地図を表示しながら、ユーザが指定した出発地から目的地までの経路を案内するシステムである。サーバ２００と端末３００とはインターネットなどのネットワークＮＥ２で接続されている。本実施例では、端末３００としては、ＣＰＵ、ＲＡＭ、ＲＯＭを備えるスマートフォンを利用したが、携帯電話、パーソナルコンピュータ、タブレット端末など、電子地図を表示可能な種々の装置を利用することができる。

図１には、さらに、地図を効率的に描画するための描画データを生成する描画データ生成装置１００も併せて示した。描画データ生成装置１００は、ＣＰＵ、ＲＡＭ、ＲＯＭを備えるパーソナルコンピュータを利用して構成されており、原地図データベース１０４から、描画用地図データベースを生成する装置である。描画データ生成装置１００は、ネットワークＮＥ１でサーバ２００に接続されており、生成された描画用地図データベースは、サーバ２００に格納される。

描画データ生成装置１００、サーバ２００、端末３００には、それぞれ図示する機能ブロックが備えられている。本実施例では、これらの機能ブロックは、それぞれの機能を実現するためのコンピュータプログラムをインストールすることによってソフトウェア的に構成したが、これらをハードウェア的に構成することも可能である。

また、本実施例で示した描画データ生成装置１００、サーバ２００、端末３００が備える機能は、一例に過ぎず、全ての機能を１台で実現するスタンドアロンの装置として構成することも可能である。また、図示したよりも多数のサーバ等からなる分散システムとして構成してもよい。

以下、各装置ごとに構成を説明する。

【００１７】

描画データ生成装置１００の構成について説明する。

原地図データベース１０４は、地図で描画されるべき地物の形状等を表すポリゴンデータ、ラインデータを格納したデータベースである。本実施例では、３次元の形状を表す３次元地図データを格納するものとした。原地図データベース１０４を、そのまま用いて透視投影等によって３次元地図を描画することも可能なデータである。本実施例では、描画速度を向上させるため、描画データ生成装置１００で、加工し、描画用地図データベース１０３を生成するのである。

コマンド入力部１０１は、原地図データベース１０４に対する加工について、オペレータからの指示等を入力する。

ラインデータ統合部１０２は、上述した加工として、原地図データベース１０４に含まれる複数のラインを表すラインデータを連結し、１本のラインデータにする処理を行う。以下では、この処理を、統合化と呼ぶこともある。

ダミー点追加部１０６は、加工の対象となるラインデータの端点に重ねて、連結用にダミーの点を生成する。ダミーの点を生成する理由については、統合化の処理概要とともに後述する。

描画用地図データベース１０３は、ラインデータ統合部１０２によって加工され、描画の処理速度向上を図った描画用の地図データを格納する。

送受信部１０５は、サーバ２００との間でデータの送受信を行う。本実施例では、描画用地図データベース１０３に格納された地図データは、送受信部１０５により、ネットワークＮＥ１経由でサーバ２００に送信される。

【００１８】

サーバ２００の構成について説明する。

地図データベース２１０には、描画用地図データベース２１１およびネットワークデータ２１３が格納されている。描画用地図データベース２１０は、描画データ生成装置１００で生成された地図データであり、地物の形状を表すポリゴンデータ、ラインデータおよび文字データが格納されている。ネットワークデータ２１３は、道路をリンクおよびノードで表した経路探索用のデータである。

データベース管理部２０２は、地図データベース２１０のデータの入出力を管理する。本実施例では、描画データ生成装置１００で生成された描画用地図データベース２１１のアップデートを行ったり、地図表示時に必要な地図データを地図データベース２１０から読み出したりする。

経路探索部２０３は、ネットワークデータ２１３を利用して、端末３００のユーザから指定された出発地から目的地までの経路を探索する。経路探索は、ダイクストラ法など周知の方法によって行うことができる。

送受信部２０１は、ネットワークＮＥ１、ＮＥ２を介して、描画データ生成装置１００および端末３００との間で、種々のデータやコマンドの送受信を行う。

【００１９】

端末３００の構成について説明する。

主制御部３０４は、端末３００に備えられた各機能ブロックの動作を統合制御する。

送受信部３０１は、ネットワークＮＥ２を介してサーバ２００との間で、データやコマ

ンドの送受信を行う。

コマンド入力部３０２は、ユーザからの経路案内等に関する指示などを入力する。指示としては、例えば、経路案内の出発地、目的地の指定、地図表示時の表示スケールの指定などが挙げられる。

位置・通行情報取得部３０３は、ＧＰＳ（Global Positioning System）等のセンサから端末３００の現在位置を取得したり、ネットワークＮＥ２経由で、交通渋滞や通行規制の情報を取得する。

地図情報記憶部３０５は、地図を表示する際に、サーバ２００から取得した描画用地図データベース２１１を一時的に記憶する。本実施例では、端末３００は、予め全ての地図データを記憶しておくのではなく、地図の表示範囲に応じて必要となる地図データを適宜、サーバ２００から取得する。地図情報記憶部３０５は、こうして取得された地図データを記憶している。また、併せて、経路探索の結果も記憶する。

表示制御部３０６は、地図情報記憶部３０５に記憶されている地図データを用いて、端末３００のディスプレイ３００ｄへの地図表示を行う。表示制御部３０６には、ポリゴンやラインを描画するためのグラフィックスライブラリが備えられており、描画は、適宜、グラフィックスライブラリの関数を呼び出すことで実行される。グラフィックスライブラリとしては、例えば、ＯｐｅｎＧＬやＤｉｒｅｃｔＸを用いることができる。

ライン描画データ設定部３０７は、表示制御部３０６による描画速度を向上させるため、地図データの加工を行う。先に説明した通り、本実施例では、地図データには、描画データ生成装置１００によって、描画速度を向上させるための加工が予め施されている。ただし、地図の表示範囲が定まっていない状態では、加工できる範囲にも制限がある。そこで、ライン描画データ設定部３０７は、地図を表示する時点で改めて実現可能な加工を施すのである。

【００２０】

Ｂ．データ構造：

図２は、原地図データベースのデータ構造を示す説明図である。原地図データベースは、複数のレベル、即ち詳細度に分けて格納されている。図の上側にレベルの概要を示した。レベルｎは、詳細度の高いデータであり、所定サイズの矩形形状からなるメッシュ単位でデータが格納されている。レベルｎ－１は、レベルｎよりも粗いデータであり、主要な道路、建物等のデータを格納する。レベルｎ－１もメッシュ単位でデータが格納されるが、メッシュのサイズは、レベルｎよりも広い。レベルｎ－２は、さらに粗く、広いメッシュ単位で格納された地図データである。

レベルｎのデータを例にとって、地図データの構成を説明する。

【００２１】

ラインデータは、地図中の道路、線路など線状の地物を描画するためのデータである。ラインデータは、地物単位で生成されており、固有のインデックス情報である「ＩＤ」が付されている。ラインデータの形状は、点１（ＸＬ１，ＹＬ１，ＺＬ１）、点２（ＸＬ２，ＹＬ２，ＺＬ２）のようにラインを形成する頂点の位置座標の集合で表される。これらの点の座標値は、各ラインデータ用の領域に格納されるようにしてもよいし、ラインデータとは個別の領域に格納し、ラインデータ用の領域には、その格納先を特定するポインタを記憶しておくようにしてもよい。

「属性」としては、ラインデータが表す地物の「名称」、道路種別など地物の「種別」、ラインを描画する際の「線種」、「線色」、「線幅」、および表示／非表示の指定などが設定されている。

文字データは、地図中に表示される文字を表すデータである。文字データにも、固有のインデックス情報である「ＩＤ」が付されて管理されている。「文字列」は“○○市”のように地図中に記載される文字を表し、「位置」は文字を表示すべき位置の座標値（ＸＣ，ＹＣ，ＺＣ）を表している。また、文字を表示する際のフォント，サイズ、色なども併せて指定されている。

ポリゴンデータは、建物その他の地物の形状を表すデータである。ポリゴンデータも、

地物単位で生成されており、固有のインデックス情報である「ＩＤ」によって管理されている。ポリゴン形状は、頂点１（ＸＰ１，ＹＰ１，ＺＰ１）、点２（ＸＰ２，ＹＰ２，ＺＰ２）のように、ポリゴンを規定する頂点の座標の集合で表される。「属性」としては、ポリゴンが表す地物の「名称」、建物や池などの「種別」等が指定されている。

図２では、原地図データベースのデータ構造を例示したが、描画用地図データベースの構造も同様である。本実施例における描画用地図データベースは、データ構造自体を大きく変更するものではなく、ラインデータに対して、付加的な情報を付すことによって、描画処理速度の向上を図るものである。

【００２２】

Ｃ．描画用データの生成：

図３は、ラインデータの統合処理の概要を示す説明図である。図３（ａ）に、統合化前のラインデータの様子を示した。図の例では、地図中には、街中の細い道路のように細線で描かれるラインＬ１、Ｌ３と、国道などの主要な道路のように太線で描かれるラインＬ２、Ｌ４、Ｌ５がある。図の右側には、これらのラインに対応するラインデータの格納状況を示した。この例では、各ラインを構成する頂点は、ラインデータ（図２）におけるＩＤや属性とは別のメモリ領域にまとめて格納されているものとする。ラインデータには、頂点の座標列として、頂点が格納されたメモリ領域を特定するポインタが格納されることになる。

頂点記憶用のメモリ領域には、ラインＬ１については頂点Ｐ１１、Ｐ１２が記憶される。次に、ラインＬ２を構成する頂点Ｐ２１、Ｐ２２が記憶される。同様に、ラインＬ３、Ｌ４、Ｌ５を構成する頂点Ｐ３１～Ｐ３３、Ｐ４１～Ｐ４２、Ｐ５１～Ｐ５２がそれぞれ記憶される。このように、ラインデータ内では、各ラインＬ１～Ｌ５は個別のものとして扱われているため、頂点もラインごとに格納されている。

【００２３】

図３（ｂ）は、統合化の様子を示している。統合化とは、グラフィックスライブラリを共通の設定で用いることができるライン同士を連結する処理であり、この実施例では、線の太さが同じライン同士を連結する。以下の説明では、ラインを構成する頂点のうち、ラインの端に位置するものを「端点」と呼ぶ。

細線で描かれるラインＬ１、Ｌ３を統合化する場合、ラインＬ１の一方の端点Ｐ１２と、ラインＬ３の一方の端点Ｐ３１を非表示のラインＬＡ１で連結する。非表示のラインＬＡ１の線の太さは、ラインＬ１、Ｌ３と同じである。

非表示のラインＬＡ１は、ラインＬ１の端点Ｐ１１、Ｐ１２、およびラインＬ３の端点Ｐ３１，Ｐ３３のいずれの間を連結してもよいが、本実施例では、連結の距離が最も短くなるよう端点Ｐ１２と端点Ｐ３１という組み合わせを選択した。ラインＬＡ１は、端点Ｐ１２と端点Ｐ３１とを直接、連結するものとしてもよいが、本実施例では、端点Ｐ１２に重ねてダミー点ＰＡ１１、端点Ｐ３１に重ねてダミー点ＰＡ１２を生成し、ダミー点ＰＡ１１、ＰＡ１２を連結して非表示ラインＬＡ１を定義した。

ダミー点ＰＡ１１，ＰＡ１２を設ける理由は、次の通りである。

【００２４】

グラフィックスライブラリのライン関数では、ブレンド機能、即ち、第１の頂点から第２の頂点にかけて、徐々に線の色などの表示態様を変化させる機能が備えられている。従って、頂点Ｐ１２、頂点Ｐ３１を直接にラインＬＡ１で連結しつつ、この区間を非表示に設定すると、ブレンド機能によって、ラインＬ１は頂点Ｐ１１から頂点Ｐ１２に向けて徐々に透明度が高くなるよう描画される現象が請じる。同様に、ラインＬ３は頂点Ｐ３２ら頂点Ｐ３１に向けて徐々に透明度が高くなるよう描画される。

これに対し、ダミー点ＰＡ１１、ＰＡ１２を追加しておけば、ラインＬＡ１を非表示にする場合でも、頂点Ｐ１１、Ｐ１２の間、および頂点Ｐ３１、Ｐ３２の間は、その影響を受けることなく適正に描画される。厳密な意味では、頂点Ｐ１２からダミー点ＰＡ１１に向けてブレンドが行われることになるが、両者は同一の位置にある点なので、ブレンドの結果は、描画されたラインで視認することはできない。

【００２５】
同様に、太線で描かれるラインＬ２、Ｌ４、Ｌ５を統合化する場合、ラインＬ２の一方の端点Ｐ２２と、ラインＬ４の一方の端点Ｐ４１とを非表示のラインＬＡ２で連結し、さらに、ラインＬ４の端点Ｐ４２とラインＬ５の端点Ｐ５１とを非表示のラインＬＡ３で連結する。非表示のラインＬＡ２、ＬＡ３の線の太さは、ラインＬ２，Ｌ４、Ｌ５と同じである。ラインＬ２、Ｌ４、Ｌ５についても、いずれの端点同士を連結してもよい。また、非表示のラインＬＡ２、ＬＡ３は、それぞれ端点Ｐ２２、Ｐ４１、Ｐ４２、Ｐ５１に重ねてダミー点ＰＡ２１、ＰＡ２２、ＰＡ３１、ＰＡ３２を生成した上で、これらのダミー点同士を連結するようにした。
【００２６】
このように統合化処理を行うことにより、細線で描かれるラインＬ１、Ｌ３は、非表示のラインＬＡ１を介して１本のラインに統合化される。また、太線で描かれるラインＬ２、Ｌ４、Ｌ５は、非表示のラインＬＡ２、ＬＡ３を介して１本のラインに統合化される。
この結果、統合化の前は、ラインＬ１～Ｌ５を描くために、ライン関数を５回、呼び出す必要があるのに対し、統合化の後は、細線を描くために１回、太線を描くために１回の合計２回、ライン関数を呼び出せば済むこととなり、ライン関数の呼び出し回数を減少させることができ、処理時間の短縮を図ることができる。
ライン関数においては、区間ごとにラインの表示／非表示を制御できるから、それぞれ非表示ラインＬＡ１、ＬＡ２、ＬＡ３を非表示として描画することにより、ラインＬ１～Ｌ５を個別に描画する場合と同じ描画結果を得ることができるのである。
【００２７】
図３（ｃ）は、ラインの統合化処理をした後のデータの様子を示している。ラインデータは、統合化前は、図３（ａ）に示したように、ラインＬ１～Ｌ５のそれぞれで、まとめて頂点を格納していた。この時点では、細線のラインＬ１、Ｌ３と、太線のラインＬ２、Ｌ４、Ｌ５は、分類されず、両者が混在する形でデータが格納されている。
統合化した後は、図３（ｃ）に示すように、細線のラインについては、これを１つのライン関数で描画するためには、ラインＬ１の頂点、非表示のラインＬＡ３の頂点、ラインＬ３の頂点というようにまとめて格納しておくことが好ましい。また、太線のラインについては、１つのライン関数で描画するため、ラインＬ２の頂点、非表示のラインＬＡ２の頂点、ラインＬ４の頂点、非表示のラインＬＡ３の頂点、ラインＬ５の頂点というようにまとめて格納しておくことが好ましい。
しかし、統合化処理において、このようにデータの格納先を変更していては、処理負荷が多大となる。そこで、本実施例では、図示する通り、頂点の格納先を示すポインタ等を利用するものとした。
【００２８】
図の左側には、各ラインＬ１～Ｌ３の個別インデックスを示した。インデックスとは、図２で示したラインデータの一形式であり、頂点の位置座標を格納するのではなく、頂点を格納するメモリ領域を特定するポインタを格納した形式を言う。例えば、ラインＬ１については、その頂点Ｐ１１のメモリ領域を特定するポインタが格納されることになる。同様に、ラインＬ２については頂点Ｐ２１、ラインＬ３については頂点Ｐ３１のメモリ領域を表すポインタが格納される。
図の右側には、統合化した後のラインの線種別インデックスを示した。実施例では、細線で描画されるライン、太線で描画されるラインをそれぞれ統合化したため、２種類の線種別インデックスが生成されることになる。
【００２９】
線種別インデックスの構造は、個別インデックスと同様である。
まず、統合化されたラインに固有の「ＩＤ」が付される。
その後、統合化されたラインの形状がポインタによって指示される。細線の場合には、まず、端点となる頂点Ｐ１１のポインタが格納される。データ点数は、格納されたポインタから連続して読み出すべき頂点数を表す。例えば、細線を形成するラインＬ１、ＬＡ１

、Ｌ３のデータが連続した領域に格納されている場合には、頂点Ｐ１１から、７つの頂点を読み出せばよいから、データ点数として７が格納されることになる。
一方、非表示のラインＬＡ１、ラインＬ３の頂点が、ラインＬ１の頂点Ｐ１１、Ｐ１２と連続した領域と異なる領域に格納されている場合には、それぞれ非表示のラインＬＡ１の頂点ＰＡ１１を表すポインタ、ラインＬ３の頂点Ｐ３１を表すポインタも格納されることになる。
太線の場合も同様に、「ＩＤ」に対し、太線の端点となる頂点Ｐ２１のポインタおよびデータ点数が格納される。太線を構成するラインＬ２、ＬＡ２、Ｌ４、Ｌ５の頂点が連続していない領域に格納されている場合には、それぞれの頂点を表すポインタも併せて格納されることになる。

【００３０】
このように個別インデックスと、線種別インデックスの双方を用意することには、次の利点がある。個別インデックスを参照することによって、それぞれの頂点およびラインを、統合化される前の分離された個別のライン等として把握することができる。また、線種別インデックスを参照することによって、各頂点およびラインを、統合化された一本のラインとして把握することができる。このように個別インデックスと線種別インデックスの双方を用意しておくことにより、頂点およびラインを、個別のラインおよび統合化されたラインという２通りの方法で活用することが可能となる。

【００３１】
図３で示した統合化を行うための処理内容について説明する。
図４は、ラインデータ統合処理のフローチャートである。描画データ生成装置１００のラインデータ統合部１０２、およびダミー点追加部１０６が実行する処理であり、ハードウェア的には、描画データ生成装置１００のＣＰＵが実行する処理である。
図４（ａ）にはフローチャートを示し，図４（ｂ）には処理の例を示した。ここでは、統合化前の原データに存在するラインを実線で表し、統合化する過程で生成される非表示のラインを破線で表している。

【００３２】
処理を開始すると、ＣＰＵは、処理対象メッシュからラインデータを読み込む（ステップＳ１０）。図２で説明した通り、実施例の原地図データベース１０４は、メッシュ単位で地図データを格納しているため、統合化処理もメッシュ単位で行うからである。処理対象メッシュは、オペレータが手動で指示してもよいし、予め設定したシーケンスに従うなどの方法で自動的に設定するものとしてもよい。

【００３３】
ＣＰＵは、読み込んだラインデータを、線種、線幅ごとにグループ化する（ステップＳ１１）。線種、線幅が同じライン同士が統合化の対象となるからである。グループ化の対象は、グラフィックスライブラリのライン関数における描画上の制約に応じて定まる。本実施例では、ライン関数は、線種および線幅の一方または双方が異なるラインは、一度に描くことができないという制約があるため、線種、線幅に基づいてグループ化を行うものとした。例えば、線種が同一であるラインならば線幅が異なっていても一度に描くことができるライン関数を用いる場合には、線種が同じラインをグループ化すればよい。

【００３４】
ＣＰＵは、生成されたグループのいずれかを処理対象として選択し、処理対象のグループからスタートポイントを選択する（ステップＳ１２）。スタートポイントとは、統合化後のラインの端点となる頂点である。スタートポイントは、処理対象のグループに含まれるラインの端点から任意に選択することができる。本実施例では、メッシュの境界上にある端点を優先的に選択するものとした。メッシュの境界にあるラインから順に連結することにより、統合化したライン全体の長さを抑えやすくなるからである。また、統合化したラインの端点がメッシュの境界にあることにより、後述するメッシュ間の統合化を行いやすくなるという利点もある。
図４（ｂ）の例では、メッシュ境界上の頂点Ｐ１がスタートポイントとして選択されて

いる。

【００３５】

ＣＰＵは、選択したスタートポイントからラインデータをたどり、端点を特定する。そして、こうして特定されたラインデータの端点から最短距離にある端点を検索する（ステップＳ１３）。

図４（ｂ）の例では、スタートポイントＰ１からラインデータをたどり、端点Ｐ２が特定される。端点Ｐ２の近傍にある他の端点としては、端点Ｐ３，Ｐ５、Ｐ６が存在する。ＣＰＵは、端点Ｐ２と端点Ｐ３、Ｐ５、Ｐ６との距離をそれぞれ計算し、端点Ｐ２から最短の距離にある端点Ｐ３を選択する。この端点Ｐ３が非表示のラインで結合すべき端点となる。

【００３６】

こうして結合すべき端点が見いだされると、ＣＰＵは、結合すべき双方の端点にダミー点を追加し、これらを非表示ラインで結合する（ステップＳ１４）。

図４（ｂ）の例では、端点Ｐ２にダミー点ＰＡ１、端点Ｐ３にダミー点ＰＡ２を追加し、両者間を破線で示した非表示ラインで連結している。

【００３７】

ＣＰＵは、以上のステップＳ１３，Ｓ１４の処理を全ラインが結合されるまで（ステップＳ１５）、繰り返し実行する。

図４（ｂ）の例では、ＣＰＵは、端点Ｐ３からラインデータをたどり端点Ｐ５にたどり着くと、端点Ｐ５から最短距離にある端点Ｐ６を選択する（ステップＳ１３）。そして、端点Ｐ５にダミー点ＰＡ３、端点Ｐ６にダミー点Ｐ４を追加し、両者間を非表示のラインで結合する。

さらに、ＣＰＵは、端点Ｐ６からラインデータをたどり端点Ｐ７にたどり着くと、端点Ｐ７から最短距離にある端点Ｐ８を選択する（ステップＳ１３）。そして、端点Ｐ７にダミー点ＰＡ５、端点Ｐ８にダミー点ＰＡ６を追加し、両者間を非表示のラインで結合する。この結果、全ラインが１つに結合されたことになるから、ステップＳ１５までの処理が完了することになる。

【００３８】

ＣＰＵは、グループごとに、以上の処理を繰り返し実行し（ステップＳ１６）、得られた結果を、描画用地図データベース１０３に格納するとともに、インデックスを生成する（ステップＳ１７）。インデックスの内容は、図３で説明した通りである。

こうして、ラインデータについては、メッシュ内で、線種、線幅ごとに、一本のラインに統合化されており、ライン関数を線種、線幅ごとに１回読み出すだけで描画できる状態となっている。

【００３９】

Ｄ．経路案内処理：

次に、描画用地図データを活用して地図表示を行う例として、経路案内処理について示す。経路案内処理は，経路探索によって得られた経路を地図表示しながら案内する処理である。経路探索は、経路案内に先立ってサーバ２００においてなされている。

図５は、経路案内処理のフローチャートである。これは、主として端末３００の表示制御部３０６、ライン描画データ設定部３０７によって行われる処理であり、ハードウェア的には端末３００のＣＰＵによって行われる処理である。

処理を開始すると、端末３００は、経路探索結果、現在位置、渋滞情報、地図表示サイズを入力する（ステップＳ２０）。経路探索結果は、サーバ２００から取得することができる。現在位置は、ＧＰＳなどのセンサを利用して検出することができる。渋滞情報は、インターネット等を介して取得できる。地図表示サイズは、ユーザからの指定を受け付ける。

そして、端末３００は、地図表示に必要となる地図データを読み込む（ステップＳ２１）。本実施例では、端末３００は、まず地図情報記憶部３０５に格納されているデータを読み込む、そして地図を表示するために地図データが不足している場合には、不足分をサ

ーバ２００から取得する。

【００４０】

次に、端末３００は、経路探索結果、現在位置、渋滞情報に基づき、ダミー点の追加および表示色の設定を行う（ステップＳ２２）。探索された経路や渋滞している道路を、通常の道路とは異なる色で表示するための処理である。

図中に処理の概要を示した。頂点Ｐ１、Ｐ２、Ｐ３を通る道路において、頂点Ｐ１、Ｐ２の間が、探索された経路または渋滞している道路に該当し、色を変更する必要があるものとする。

中段には、ダミー点を追加せずに色の設定を行った場合を例示した。ライン関数のブレンド機能により、頂点Ｐ１、Ｐ２に表示色を設定すると、頂点Ｐ２、Ｐ３の間でグラデーションがかかった表示となってしまうのである。例えば、本来、頂点Ｐ１、Ｐ２、Ｐ３を通る道路が赤で表示されるべき道路である場合において、探索された経路であることを表すために、頂点Ｐ１、Ｐ２間を青に設定したとする。この場合、頂点Ｐ１、Ｐ２間が青で表示されるのに伴い、頂点Ｐ２、Ｐ３間では、頂点Ｐ２から頂点Ｐ３に向けて青から徐々に赤になるように表示されてしまう。

下段には、ダミー点を追加した状態を例示した。原データの頂点Ｐ２と同じ位置にダミー点ＰＡを追加し、色の設定を行う。例えば、頂点Ｐ１、Ｐ２間は青で、頂点ＰＡ，Ｐ３間は赤で表示するように設定する。こうすることにより、頂点Ｐ１、Ｐ２間の表示色の影響を受けることなく、頂点ＰＡ、Ｐ３間を表示することができる。厳密に言えば、頂点Ｐ２、ＰＡ間でブレンドが行われることになるが、両者は同一の位置にある点であるため、このブレンドは視認されないのである。

【００４１】

こうして色の設定を終えると、端末３００は、メッシュ間でラインデータを結合する（ステップＳ２３）。

図中に処理の概要を示した。ラインデータ統合処理（図４）によって、各メッシュ内では、線種、線幅が同じラインは、一本に統合化されている。メッシュ１、２内の各ラインは、それぞれメッシュ内で統合化された結果を表している。統合化されたラインには、線種別インデックス１，２が用意され、ラインを構成する頂点は、ポインタによって特定されている。

地図を表示する際には、メッシュをまたがって地図データを利用する場合がある。本実施例では、このような場合に、さらに描画の高速化を図るため、メッシュ間で線種、線幅が共通のライン同士を結合するのである。この処理は、メッシュ内の統合化と同様の方法によって行うことができる。即ち、異なるメッシュに存在する統合化されたラインを線種、線幅に基づいてグループ化し、これらの端点のうち、最短距離にあるもの同士を非表示のラインで結合するのである。

連結する端点同士の位置座標が異なる場合には、ブレンド機能による影響を回避するため、各端点にダミー点を追加した上で結合する。端点同士の位置座標が同一の場合には、ブレンド機能による影響は視認できないから、ダミー点の追加を省略してもよい。

【００４２】

以上の前処理を終えると，端末３００はディスプレイ３００ｄに地図を表示する（ステップＳ２４）。地図の表示には、グラフィックスライブラリが用いられる。ラインデータを表示する際には、ライン関数を呼び出すことになる。本実施例によれば、メッシュ内のラインが統合化されているだけでなく、さらに、メッシュ間のラインを結合するため、より一層、ライン関数の呼び出し回数を減少させることができ、描画の高速化を図ることができる。

【００４３】

Ｅ、効果および変形例：

以上で説明した実施例によれば、地図を表示する際に、線種、線幅が共通のラインを統合化することによって、グラフィックスライブラリに備えられたライン関数の呼び出し回数を減らすことができ、表示処理に要する時間を短縮することができる。グラフィックス

ライブラリを用いて描画を行う場合、ライン関数の呼び出しに少なからず処理時間を要するため、呼び出し回数の減少による処理時間の短縮効果は大きいからである。

本実施例では、統合化の処理を静的処理／動的処理の２段階で行っている。静的処理とは、予めメッシュ単位で統合化処理を行って描画用地図データベースを生成する処理（図４）を意味する。こうすることにより、メッシュ単位の描画速度を速めることができる。動的処理とは、端末３００で地図表示時に行う、メッシュ間でのラインデータの結合処理である（図５）。こうすることにより、複数のメッシュにまたがって地図を表示する場合、さらなる描画速度の高速化を図ることができる。

【００４４】

以上、本発明の実施例について説明した。本発明は、必ずしも上述した実施例の全ての機能を備えている必要はなく、一部のみを実現するようにしてもよい。また、上述した内容に追加の機能を設けてもよい。

実施例では、経路案内システムを例示したが、本発明は、経路案内と無関係に地図を表示するシステムとして構成することも可能である。また、本発明は、地図に限らず、グラフィックスライブラリを利用して画像を描画する描画装置一般に利用可能である。

本発明は上述の実施例に限定されず、その趣旨を逸脱しない範囲で種々の構成を採ることができることはいうまでもない。例えば、実施例においてハードウェア的に構成されている部分は、ソフトウェア的に構成することもでき、その逆も可能である。

【産業上の利用可能性】

【００４５】

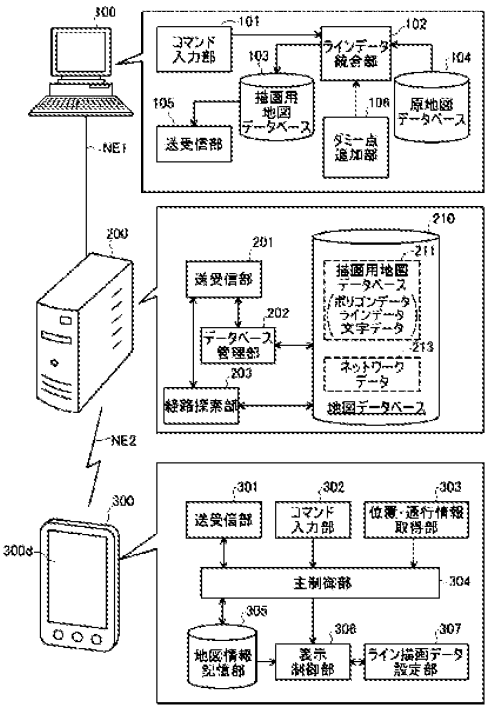
本発明は、グラフィックスライブラリを用いた画像の描画速度を向上させるために利用可能である。

【符号の説明】

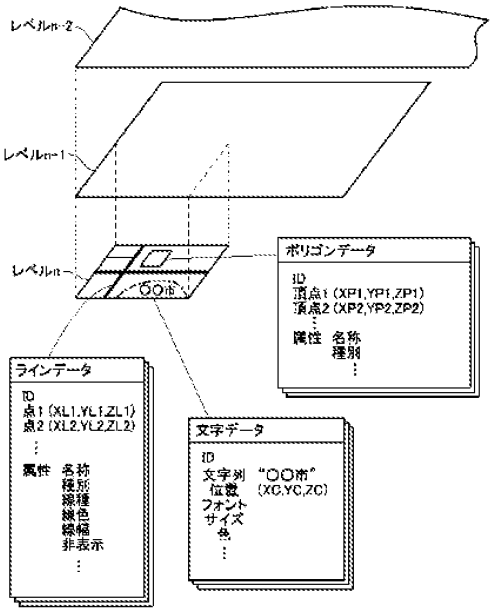
【００４６】

１００…描画データ生成装置
１０１…コマンド入力部
１０２…ラインデータ統合部
１０３…描画用地図データベース
１０４…原地図データベース
１０５…送受信部
１０６…ダミー点追加部
２００…サーバ
２０１…送受信部
２０２…データベース管理部
２０３…経路探索部
２１０…地図データベース
２１１…描画用地図データベース
２１３…ネットワークデータ
３００…端末
３００ｄ…ディスプレイ
３０１…送受信部
３０２…コマンド入力部
３０３…位置・通行情報取得部
３０４…主制御部
３０５…地図情報記憶部
３０６…表示制御部
３０７…ライン描画データ設定部

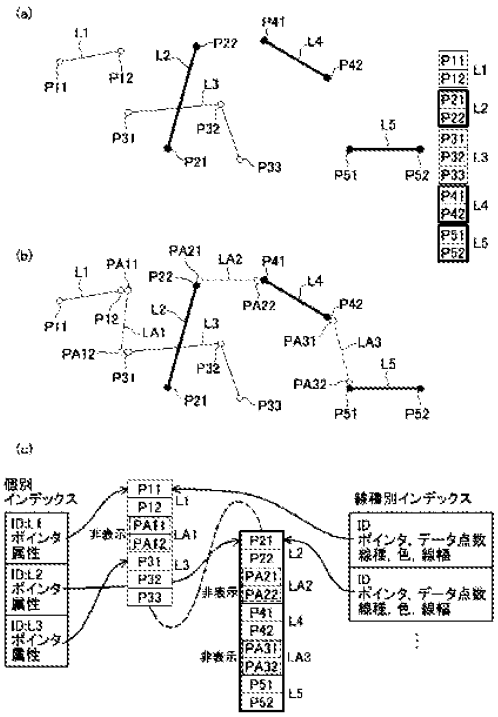
【図１】


300
101
コマンド入力部
102
ラインデータ統合部
103
描画用地図データベース
104
原地図データベース
105
送受信部
106
ダミー点追加部
NE1
200
201
送受信部
210
211
描画用地図データベース
ポリゴンデータ
ラインデータ
文字データ
202
データベース管理部
213
ネットワークデータ
203
経路探索部
地図データベース
NE2
300
300a
301
送受信部
302
コマンド入力部
303
位置・通行情報取得部
主制御部
304
305
地図情報記憶部
306
表示制御部
307
ライン描画データ設定部

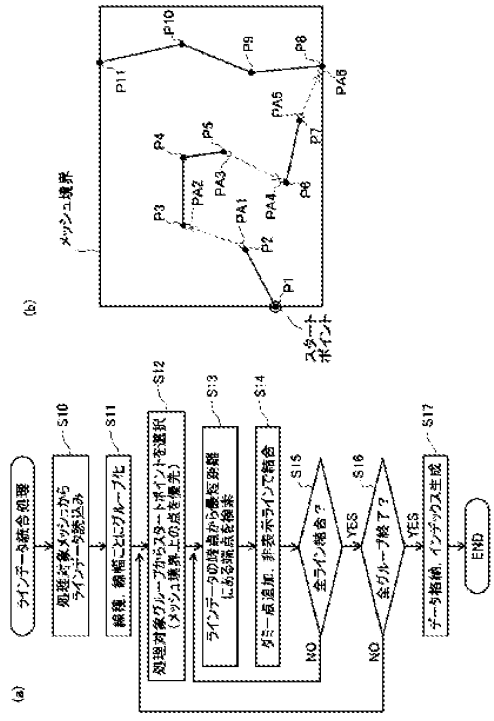
【図２】


レベルn-2
レベルn-1
レベルn
○○市
ポリゴンデータ
ID
頂点1 (XP1,YP1,ZP1)
頂点2 (XP2,YP2,ZP2)
……
属性 名称
種別
……
ラインデータ
ID
点1 (XL1,YL1,ZL1)
点2 (XL2,YL2,ZL2)
……
属性 名称
種別
線種
線幅
線色
非表示
……
文字データ
ID
文字列 “○○市”
位置 (XC,YC,ZC)
フォントサイズ
色
……

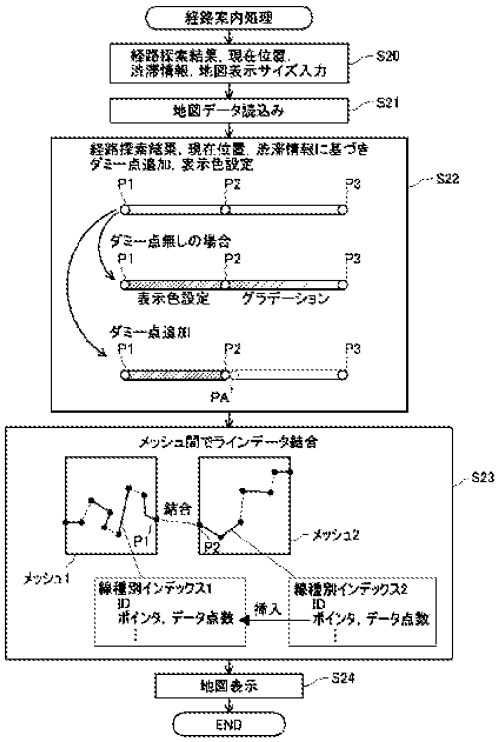
【図３】


(a)
(b)
(c)
仮想インデックス
ID:L1 ポインタ 属性
ID:L2 ポインタ 属性
ID:L3 ポインタ 属性
非表示
線種別インデックス
ID
ポインタ、データ点数
線種、色、線幅
ID
ポインタ、データ点数
線種、色、線幅

【図４】


メッシュ境界
スタートポイント
ラインデータ統合処理
処理対象メッシュからラインデータ読込み
線種、線幅ごとにグループ化
処理対象グループからスタートポイントを選択（メッシュ境界上の点を優先）
ラインデータの始終点から最短距離にある端点を探索
ダミー点追加、非表示ラインで結合
全ライン結合？
全グループ終了？
データ格納、インデックス生成
END
YES
NO
S10
S11
S12
S13
S14
S15
S16
S17

【図５】


経路案内処理
経路探索結果，現在位置，
渋滞情報，地図表示サイズ入力
S20
地図データ読込み
S21
経路探索結果，現在位置，渋滞情報に基づき
ダミー点追加，表示色設定
S22
P1
P2
P3
ダミー点無しの場合
表示色設定
グラデーション
ダミー点追加
PA
メッシュ間でラインデータ結合
S23
結合
メッシュ1
メッシュ2
線種別インデックス1
ID
ポインタ，データ点数
挿入
線種別インデックス2
ID
ポインタ，データ点数
地図表示
S24
END

フロントページの続き

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METHOD AND APPARATUS FOR AUTOMATICALLY TRANSFERRING 3 DIMENSIONAL CLOTHES, AND A COMPUTER READABLE MEDIUM STORING A PROGRAM EXCUTING THE METHOD

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Applicant(s): CLO VIRTUAL FASHION [KR] ± (CLO VIRTUAL FASHION)

Classification: **- international:** ***G06T17/00***
- cooperative: **G06Q30/06**; **G06Q30/0643**; **G06T13/20**; **G06T19/00**; G06T2210/16

Application number: KR20100038870 20100427 Global Dossier

Priority number (s): KR20100038870 20100427

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Abstract of KR20110119260 (A)

PURPOSE: A method and apparatus for automatically transferring 3D clothes and a computer readable medium storing a program executing the method are provided to share the costumes among avatars. CONSTITUTION: An apparatus receives inputs of a first avatar and a second avatar(S100). The apparatus applies a costume to the first avatar in order to change the costume shape according to the movement of the avatar (S110). The apparatus fits the first avatar by the shape of a second avatar(S120). The apparatus changes the skinned costume corresponding to the fitted first avatar(S130). The apparatus separates the transformed costume from the first avatar(S140). The apparatus applies the separated costume to the second avatar.

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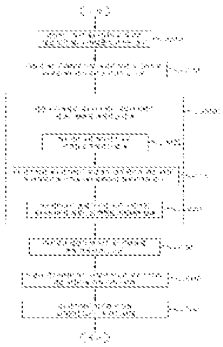
전체 청구항 수 : 총 9 항

(54) 3차원 의상 자동 전이 착장 방법 및 그 장치와, 그 방법을 실행시키기 위한 프로그램을 기록한 컴퓨터 판독가능 기록매체

(57) 요 약

본 발명은 컴퓨터에서 수행되는 아바타 의상 착경 방법에 있어서, (a) 의상이 입혀진 제1 아바타와 상기 제1 아바타에 입혀진 의상을 새로 입힐 제2 아바타를 입력받는 단계; (b) 상기 의상이 상기 제1 아바타의 모양 변화에 따라 움직이도록 상기 의상을 상기 제1 아바타에 스키닝하는 단계; (c) 상기 의상이 스키닝된 제1 아바타를 상기 제2 아바타의 형상에 맞도록 피팅하는 단계; (d) 상기 스키닝된 의상을 상기 피팅된 제1 아바타에 맞게 상기 (b) 단계에서 스키닝된 것의 기반하여 변형시키는 단계; (e) 상기 피팅된 제1 아바타에서 상기 변형된 의상을 분리시키고, 상기 분리된 의상을 제2 아바타에 입히는 단계; 및 (f) 상기 분리된 의상이 입혀진 제2 아바타에서 상기 의상을 교차없이 드레이핑하는 단계;를 포함하는 3차원 의상 자동 전이 착장 방법에 관한 것이다. 본 발명에 따르면, 개인 사용자가 게임이나 영화, TV, 웹사이트에서 본 의상을 자신이 가지고 있는 3차원 아바타(게임 캐릭터나 자기 몸을 스캐닝한 아바타, 자기가 좋아하는 캐릭터 등)에 바로 입혀볼 수 있고, 또 3차원 의상을 구매하거나 해당 실제의상을 구매할 수도 있는 통합 의상 거래 플랫폼의 구축이 가능하도록, 각각의 서비스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공할 수 있다.

대 표 도 - 도1



특허청구의 범위

청구항 1

컴퓨터에서 수행되는 아바타 의상 착장 방법에 있어서,

(a) 의상이 입혀진 제1 아바타와 상기 제1 아바타에 입혀진 의상을 새로 입힐 제2 아바타를 입력받는 단계;

(b) 상기 의상이 상기 제1 아바타의 모양 변화에 따라 움직이도록 상기 의상을 상기 제1 아바타에 스키닝하는 단계;

(c) 상기 의상이 스키닝된 제1 아바타를 상기 제2 아바타의 형상에 맞도록 피팅하는 단계;

(d) 상기 스키닝된 의상을 상기 피팅된 제1 아바타에 맞게 상기 (b) 단계에서 스키닝된 것에 기반하여 변형시키는 단계;

(e) 상기 피팅된 제1 아바타에서 상기 변형된 의상을 분리시키고, 상기 분리된 의상을 제2 아바타에 입히는 단계; 및

(f) 상기 분리된 의상이 입혀진 제2 아바타에서 상기 의상을 교차없이 드레이핑하는 단계;를 포함하는 3차원 의상 자동 전이 착장 방법.

청구항 2

제1항에 있어서, 상기 (b)단계는,

상기 의상의 메쉬들의 모든 점들로부터 상기 제1 아바타의 표면상까지 가장 가까운 지점을 구하고, 상기 의상의 메쉬들의 모든 점들과 상기 제1 아바타의 표면상까지 가장 가까운 지점을 연결하는 것을 특징으로 하는 3차원 의상 자동 전이 착장 방법.

청구항 3

제1항에 있어서, 상기 (c)단계는,

(c1) 상기 제1 아바타와 제2 아바타의 특징점을 추출하는 단계;

(c2) 상기 추출된 상기 제1 아바타와 제2 아바타의 특징점이 일치되도록 상기 제1 아바타의 전체 크기와 포즈를 상기 제2 아바타에 일치시키는 단계; 및

(c3) 상기 제2 아바타에 전체 크기와 포즈가 일치된 상기 제1 아바타의 세부적인 체형을 피팅하는 단계;를 포함하는 3차원 의상 자동 전이 착장 방법.

청구항 4

제1항에 있어서, 상기 (f)단계는,

(f1) 상기 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 메쉬 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간의 교차가 발생한 메쉬를 찾아 교차 여부를 판단하고, 교차가 발생한 메쉬가 있는 경우에는 (f2) 및 (f3) 단계를 수행하고, 교차가 발생한 메쉬가 없는 경우에는 (f2)와 (f3) 단계를 수행하지 않고 종료하는 단계;

(f2) 상기 (f1)단계에서 상기 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 것으로 판단한 경우에는, 상기 제2 아바타의 입혀진 의상의 교차가 발생한 메쉬를 제2 아바타의 피부 바깥 방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하고, 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 것으로 판단하는 경우에는, 3차원 공간에서 상기 제2 아바타의 바깥 방향인지 안쪽 방향인지를 판단할

수 있는 디스턴스 필드를 계산하고, 겉옷의 교차가 발생한 메쉬는 겉옷과 속옷의 교차가 발생한 메쉬의 교차선분의 중점에서 구한 디스턴스 필드의 그래디언트 방향으로 밀어내고, 속옷의 교차가 발생한 메쉬는 상기 디스턴스 필드의 그래디언트 방향의 반대방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하는 단계; 및

(f3) 상기 생성된 미리 설정된 크기의 교차 제거 힘을 해당 메쉬에 가하여 드레이핑 시뮬레이션 과정을 수행하고, 상기 드레이핑 시뮬레이션 과정이 종료되면 (f1) 단계를 수행하는 단계;를 포함하는 3차원 의상 자동 전이 착장 방법.

청구항 5

제1항 내지 제4항의 방법 중 어느 하나의 방법을 실행시키기 위한 프로그램이 기록되어 있는 것을 특징으로 하는 컴퓨터에서 판독 가능한 기록매체.

청구항 6

의상이 입혀진 제1 아바타와 상기 제1 아바타에 입히진 의상을 벗겨 입힐 제2 아바타를 입력받는 입력부;

상기 입력받은 의상의 상기 제1 아바타의 모양 변화에 따라 움직이도록 상기 의상을 상기 제1 아바타에 스키닝하는 스키닝부;

상기 의상이 스키닝된 제1 아바타를 상기 제2 아바타의 형상에 맞도록 피팅하는 피팅부;

상기 스키닝된 의상을 상기 피팅된 제1 아바타에 맞게 상기 스키닝부에서 스키닝된 것에 기반하여 변형시키는 의상변형부;

상기 피팅된 제1 아바타에서 상기 의상변형부에서 변형된 의상을 분리시키고, 상기 분리된 의상을 제2 아바타에 입히는 의상전이부; 및

상기 분리된 의상이 입혀진 제2 아바타에서 상기 의상을 교차없이 드레이핑하는 드레이핑부;를 포함하는 3차원 의상 자동 전이 착장 장치.

청구항 7

제6항에 있어서, 상기 스키닝부는,

상기 의상의 메쉬들의 모든 점들로부터 상기 제1 아바타의 표면상까지 가장 가까운 지점을 구하고, 상기 의상의 메쉬들의 모든 점들과 상기 제1 아바타의 표면상까지 가장 가까운 지점을 연결하는 것을 특징으로 하는 3차원 의상 자동 전이 착장 장치.

청구항 8

제6항에 있어서, 상기 피팅부는,

상기 제1 아바타와 제2 아바타의 특징점을 추출하고, 상기 추출된 상기 제1 아바타와 제2 아바타의 특징점이 일치되도록 상기 제1 아바타의 전체 크기와 포즈를 상기 제2 아바타에 일치시킨 후, 상기 제2 아바타에 전체 크기와 포즈가 일치된 상기 제1 아바타의 세부적인 체형을 피팅하는 것을 특징으로 하는 3차원 의상 자동 전이 착장 장치.

청구항 9

제6항에 있어서, 상기 드레이핑부는,

제2 아바타에 입혀진 의상과 상기 제2 아바타간에 교차가 발생한 메쉬 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 메쉬를 찾아 교차 여부를 판단하고, 교차가 발생한 메쉬가 있는 경우에 교차 제거 힘 생성부에 교차 제거 힘을 생성하도록 요청하는 교차 여부 판단부;

상기 교차 여부 판단부로부터 교차 제거 힘을 생성하도록 요청받으면, 상기 교차 여부 판단부가 제2 아바타에

입혀진 의상과 상기 제2 아바타간에 교차가 발생한 것으로 판단하는 경우에는, 상기 제2 아바타에 입혀진 의상의 교차가 발생한 메쉬를 상기 제2 아바타의 피부 바깥 방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하고, 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 것으로 판단하는 경우에는, 3차원 공간에서 상기 제2 아바타의 바깥 방향인지 안쪽 방향인지를 판단할 수 있는 디스턴스 필드를 제산하고, 겉옷의 교차가 발생한 메쉬는 겉옷과 속옷의 교차가 발생한 메쉬의 교차점들의 중점에서 구한 디스턴스 필드의 그레디언트 방향으로 밀어내고, 속옷의 교차가 발생한 메쉬는 상기 디스턴스 필드의 그레디언트 방향의 반대방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하고, 드레이핑 시뮬레이션부에 드레이핑 시뮬레이션 과정을 수행하도록 요청하는 교차 제거 힘 생성부; 및

상기 교차 제거 힘 생성부로부터 드레이핑 시뮬레이션 과정을 수행하도록 요청받으면, 상기 생성된 미리 설정된 크기의 교차 제거 힘을 해당 메쉬에 가하여 드레이핑 시뮬레이션 과정을 수행하고, 드레이핑 시뮬레이션 과정이 종료되면 상기 교차 여부 판단부에 교차가 제거되었는지를 판단하도록 요청하는 드레이핑 시뮬레이션부;를 포함하는 3차원 의상 자동 전이 확장 장치.

명 세 서

기 술 분 야

[0001] 본 발명은 3차원 의상 자동 전이 확장 방법 및 그 장치와, 그 방법을 실행시키기 위한 프로그램을 기록한 컴퓨터 판독가능 기록매체에 관한 것으로, 보다 상세하게는 3차원 의상과 아바타의 메쉬 구조나 크기에 상관없이 원하는 의상을 아바타에 자동으로 입힐 수 있는 기술에 관한 것이다.

배 경 기 술

[0002] 본 발명은 3차원 의상 자동 전이 확장 방법 및 그 장치와, 그 방법을 실행시키기 위한 프로그램을 기록한 컴퓨터 판독가능 기록매체에 관한 것이다.

[0003] 최근 온라인 게임에서의 의상 아이템 판매량은 전체 매출의 대부분을 차지할 정도록 엄청날 규모로, 세계 시장의 규모는 수조원에 달한다. 또한, 게임뿐만 아니라 세컨라이프나 퍼퍼랜드, IMVU 같은 가상세계에서도 의상 아이템 판매는 서비스의 주 수익원이 되고 있다. 앞으로 3차원 의상 시장이 실제 의류 시장과 결합된다면, 즉 실제 의류를 판매하는 서비스에 3차원 의상이 활용된다면 그 시장 규모는 더욱 커질 것이다. 그러나 기존의 의상 거래 서비스들은 해당 서비스 내에만 의상과 아바타가 호환되는 절정적인 한계를 가지고 있다.

[0004] 또한, 기존의 의상 전이 기술은 메쉬 구조가 같은 아바타간에서만 호환이 가능하였으며, 아바타를 피팅하는 기술 또한 아바타들의 특정점들을 사용자가 직접 입력해 주어야 하는 문제점이 있고, 3차원 스캐닝 소프트웨어에서도 이런 특정점들을 자동으로 분석해 주기는 하지만 정확성 문제로 아바타 피팅에 사용되지는 않는 현실이다.

[0005] 또한, 기존의 의상 드레이핑 기술은 아바타와 의상, 의상과 의상간에 교차가 발생하지 않도록 드레이핑 전에 의상을 잘 배치한 다음 시뮬레이션을 수행해야 하는 문제점이 있었다.

발명의 내용

해결하려는 과제

[0006] 상술한 문제점을 해결하기 위해 안출된 본 발명의 목적은 개인 사용자가 게임이나 영화, TV, 웹사이트에서 본 의상을 자신이 가지고 있는 3차원 아바타(게임 캐릭터나 자기 몸을 스캐닝한 아바타, 자기가 좋아하는 캐릭터 등)에 바로 입혀볼 수 있고, 또 3차원 의상을 구매하거나 해당 실제의상을 구매할 수도 있는 통합 의상 거래 플랫폼의 구축이 가능하도록, 각각의 서비스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자동 전이 확장 방법 및 그 장치를 제공하기 위한 것이다.

[0007] 또한, 본 발명의 다른 목적은 게임이나 영화 제작자, TV나 웹의 의상 콘텐츠 제공자들이 자기 서비스 사용자뿐만 아니라 플랫폼에 연결된 모든 사용자에게 3차원 의상을 판매할 수 있는 통합 의상 거래 플랫폼의 구축이 가능하도록, 각각의 서비스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자

동 전이 착장 방법 및 그 장치를 제공하기 위한 것이다.

[0008] 또한, 본 발명의 또 다른 목적은 실제 의류를 판매하는 패션회사에서 자체적으로 제공하는 온라인쇼핑몰이나 TV 홈쇼핑 등에 3차원 의상 콘텐츠를 제공하고 실의상 매출과 연계시킬 수 있는 통합 의상 거래 플랫폼의 구축이 가능하도록, 각각의 서버스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공하기 위한 것이다.

[0009] 또한, 본 발명의 또 다른 목적은 자동으로 아바타의 특징점을 추출하여 자동으로 아바타를 피팅하고, 또한, 고속으로 아바타를 피팅하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공하기 위함이다.

[0010] 또한, 본 발명의 또 다른 목적은 아바타와 의상, 의상과 의상 사이의 어떠 교차가 발생한 상태에서 교차를 제거해가면서 의상을 드레이핑 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공하기 위함이다.

[0011] 또한, 본 발명의 또 다른 목적은 3차원 의상 자동 전이 착장 방법을 실행시키기 위한 프로그램을 기록한 컴퓨터 판독가능 기록매체를 제공하기 위함이다.

과제의 해결 수단

[0012] 상기한 바와 같은 목적을 달성하기 위한 본 발명의 특징에 따르면, 본 발명의 3차원 의상 자동 전이 착장 방법은, 컴퓨터에서 수행되는 아바타 의상 착장 방법에 있어서, (a) 의상이 입혀진 제1 아바타와 상기 제1 아바타에 입혀진 의상을 새로 입힐 제2 아바타를 입력받는 단계; (b) 상기 의상이 상기 제1 아바타의 모양 변화에 따라 움직이도록 상기 의상을 상기 제1 아바타에 스키닝하는 단계; (c) 상기 의상이 스키닝된 제1 아바타를 상기 제2 아바타의 형상에 맞도록 피팅하는 단계; (d) 상기 스키닝된 의상을 상기 피팅된 제1 아바타에 맞게 상기 (b) 단계에서 스키닝된 것에 기반하여 변형시키는 단계; (e) 상기 피팅된 제1 아바타에서 상기 변형된 의상을 분리시키고, 상기 분리된 의상을 제2 아바타에 입히는 단계; 및 (f) 상기 분리된 의상이 입혀진 제2 아바타에서 상기 의상을 교차없이 드레이핑하는 단계;를 포함한다.

[0013] 한편, 상기 (b)단계는, 상기 의상의 메쉬들의 모든 점들로부터 상기 제1 아바타의 표면상까지 가장 가까운 지점을 구하고, 상기 의상의 메쉬들의 모든 점들과 상기 제1 아바타의 표면상까지 가장 가까운 지점을 연결하는 것을 특징으로 한다.

[0014] 또한, 상기 (c)단계는, (c1) 상기 제1 아바타와 제2 아바타의 특징점을 추출하는 단계; (c2) 상기 추출된 상기 제1 아바타와 제2 아바타의 특징점이 일치되도록 상기 제1 아바타의 전체 크기와 포즈를 상기 제2 아바타에 일치시키는 단계; 및 (c3) 상기 제2 아바타에 전체 크기와 포즈가 일치된 상기 제1 아바타의 세부적인 체형을 피팅하는 단계;를 포함한다.

[0015] 또한, 상기 (f)단계는, (f1) 상기 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 메쉬 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 메쉬를 찾아 교차 여부를 판단하고, 교차가 발생한 메쉬가 있는 경우에는 (f2) 및 (f3) 단계를 수행하고, 교차가 발생한 메쉬가 없는 경우에는 (f2)와 (f3) 단계를 수행하지 않고 종료하는 단계; (f2) 상기 (f1)단계에서 상기 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 것으로 판단한 경우에는, 상기 제2 아바타에 입혀진 의상의 교차가 발생한 메쉬를 제2 아바타의 피부 바깥 방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하고, 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 것으로 판단하는 경우에는, 3차원 공간에서 상기 제2 아바타의 바깥 방향인지 안쪽 방향인지를 판단할 수 있는 디스턴스 필드를 계산하고, 겉옷의 교차가 발생한 메쉬는 겉옷과 속옷의 교차가 발생한 메쉬의 교차점분의 중점에서 구한 디스턴스 필드의 그래디언트 방향으로 밀어내고, 속옷의 교차가 발생한 메쉬는 상기 디스턴스 필드의 그래디언트 방향의 반대방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하는 단계; 및 (f3) 상기 생성된 미리 설정된 크기의 교차 제거 힘을 해당 메쉬에 가하여 드레이핑 시뮬레이션 과정을 수행하고, 상기 드레이핑 시뮬레이션 과정이 종료되면 (f1) 단계를 수행하는 단계;를 포함한다.

[0016] 상기한 바와 같은 목적을 달성하기 위한 본 발명의 다른 특징에 따르면, 본 발명의 컴퓨터에서 판독 가능한 기록매체는 본 발명의 3차원 의상 자동 전이 착장 방법을 실행시키기 위한 프로그램이 기록되어 있는 것을 특징으로 한다.

[0017] 상기한 바와 같은 목적을 달성하기 위한 본 발명의 또 다른 특징에 따르면, 본 발명의 3차원 의상 자동 전이 착장 장치는 의상이 입혀진 제1 아바타와 상기 제1 아바타에 입혀진 의상을 새로 입힐 제2 아바타를 입력받는 입력부; 상기 입력받은 의상이 상기 제1 아바타의 모양 변화에 따라 움직이도록 상기 의상을 상기 제1 아바타에

스캐닝하는 스캐닝부; 상기 의상이 스캐닝된 제1 아바타를 상기 제2 아바타의 형상에 맞도록 피팅하는 피팅부; 상기 스캐닝된 의상을 상기 피팅된 제1 아바타에 맞게 상기 스캐닝부에서 스캐닝된 것에 기반하여 변형시키는 의상변형부; 상기 피팅된 제1 아바타에서 상기 의상변형부에서 변형된 의상을 분리시키고, 상기 분리된 의상을 제2 아바타에 입히는 의상전이부; 및 상기 분리된 의상이 입혀진 제2 아바타에서 상기 의상을 교차없이 드레이핑하는 드레이핑부;를 포함한다.

[0018] 한편, 상기 스캐닝부는 상기 의상의 메쉬들의 모든 점들로부터 상기 제1 아바타의 표면상까지 가장 가까운 지점을 구하고, 상기 의상의 메쉬들의 모든 점들과 상기 제1 아바타의 표면상까지 가장 가까운 지점을 연결하는 것을 특징으로 한다.

[0019] 또한, 상기 피팅부는, 상기 제1 아바타와 제2 아바타의 특징점을 추출하고, 상기 추출된 상기 제1 아바타와 제2 아바타의 특징점이 일치되도록 상기 제1 아바타의 전체 크기와 포즈를 상기 제2 아바타에 일치시킨 후, 상기 제2 아바타의 전체 크기와 포즈가 일치된 상기 제1 아바타의 세부적인 체형을 피팅하는 것을 특징으로 한다.

[0020] 또한, 상기 드레이핑부는, 제2 아바타에 입혀진 의상과 상기 제2 아바타간에 교차가 발생한 메쉬 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 메쉬를 찾아 교차 여부를 판단하고, 교차가 발생한 메쉬가 있는 경우에 교차 제거 힘 생성부에 교차 제거 힘을 생성하도록 요청하는 교차 여부 판단부;

[0021] 상기 교차 여부 판단부로부터 교차 제거 힘을 생성하도록 요청받으면, 상기 교차 여부 판단부가 제2 아바타에 입혀진 의상과 상기 제2 아바타간에 교차가 발생한 것으로 판단하는 경우에는, 상기 제2 아바타에 입혀진 의상의 교차가 발생한 메쉬를 상기 제2 아바타의 피부 바깥 방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하고, 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 것으로 판단하는 경우에는, 3차원 공간에서 상기 제2 아바타의 바깥 방향인지 안쪽 방향인지를 판단할 수 있는 디스턴스 필드를 계산하고, 겉옷의 교차가 발생한 메쉬는 겉옷과 속옷의 교차가 발생한 메쉬의 교차선분의 중점에서 구한 디스턴스 필드의 그래디언트 방향으로 밀어내고, 속옷의 교차가 발생한 메쉬는 상기 디스턴스 필드의 그래디언트 방향의 반대방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘을 생성하고, 드레이핑 시뮬레이션부에 드레이핑 시뮬레이션 과정을 수행하도록 요청하는 교차 제거 힘 생성부; 및

[0022] 상기 교차 제거 힘 생성부로부터 드레이핑 시뮬레이션 과정을 수행하도록 요청받으면, 상기 생성된 미리 설정된 크기의 교차 제거 힘을 해당 메쉬에 가하여 드레이핑 시뮬레이션 과정을 수행하고, 드레이핑 시뮬레이션 과정이 종료되면 상기 교차 여부 판단부에 교차가 제거되었는 지를 판단하도록 요청하는 드레이핑 시뮬레이션부;를 포함한다.

발명의 효과

[0023] 이상 살펴본 바와 같은 본 발명에 따르면, 게임 사용자가 게임이나 영화, TV, 웹사이트에서 본 의상을 자신이 가지고 있는 3차원 아바타(게임 캐릭터나 자기 몸을 스캐닝한 아바타, 자기가 좋아하는 캐릭터 등)에 바로 입혀 볼 수 있고, 또 3차원 의상을 구매하거나 해당 설계의상을 구매할 수도 있는 통합 의상 거래 플랫폼의 구축이 가능하도록, 각각의 서버스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공할 수 있다.

[0024] 또한, 본 발명에 따르면, 게임이나 영화 제작자, TV나 웹의 의상 콘텐츠 제공자들이 겨기 서버스 사용자뿐 만 아니라 플랫폼에 연결된 모든 사용자에게 3차원 의상을 판매할 수 있는 통합 의상 거래 플랫폼의 구축이 가능하도록,각각의 서버스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공할 수 있다.

[0025] 또한, 본 발명에 따르면, 실제의류를 판매하는 패션회사에서 자체적으로 제공하는 온라인쇼핑몰이나 TV 홈쇼핑 등에 3차원 의상 콘텐츠를 제공하고 실의상 배송과 연계시킬 수 있는 통합 의상 거래 플랫폼의 구축이 가능하도록, 각각의 서버스 사이에서 메쉬 구조가 다른 아바타 간에도 의상이 호환 가능하게 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공할 수 있다.

[0026] 또한, 본 발명에 따르면, 자동으로 아바타의 특징점을 추출하여 자동으로 아바타를 피팅하고, 또한, 고속으로 아바타를 피팅하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공할 수 있다.

[0027] 또한, 본 발명에 따르면, 아바타와 의상, 의상과 의상 사이에 이미 교차가 발생한 상태에서 교차를 제거해가면

서 의상을 드레이핑 하는 3차원 의상 자동 전이 착장 방법 및 그 장치를 제공할 수 있다.

[0028] 또한, 본 발명에 따르면, 3차원 의상 자동 전이 착장 방법을 실행시키기 위한 프로그램을 기록한 컴퓨터 판독가능 기록매체를 제공할 수 있다.

도면의 간단한 설명

[0029] 도 1은 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 방법을 나타낸 흐름도이다.

도 2는 본 발명의 바람직한 실시예에 따른 도 1의 드레이핑 시뮬레이션 과정을 수행하는 단계의 세부 절차를 나타낸 흐름도이다.

도 3은 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 장치를 나타낸 도면이다.

도 4는 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 기술적용 개요를 나타낸 도면이다.

도 5는 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 플랫폼의 적용 전의 가상의상의 적용 범위를 나타낸 도면이다.

도 6은 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 플랫폼의 적용 후의 가상의상의 공유 범위의 변화를 나타낸 도면이다.

발명을 실시하기 위한 구체적인 내용

[0030] 기타 실시예들의 구체적인 사항들은 상세한 설명 및 도면들에 포함되어 있다.

[0031] 본 발명의 이점 및 특징, 그리고 그것들을 달성하는 방법은 첨부되는 도면과 함께 상세하게 후술되어 있는 실시예들을 참조하면 명확해질 것이다. 그러나 본 발명은 이하에서 개시되는 실시예들에 한정되는 것이 아니라 서로 다른 다양한 형태로 구현될 수 있으며, 단지 본 실시예들은 본 발명의 개시가 완전하도록 하고, 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자에게 발명의 범주를 완전하게 알려주기 위해 제공되는 것이며, 본 발명은 청구항의 범주에 의해 정의될 뿐이다. 명세서 전체에 걸쳐 동일 참조 부호는 동일 구성 요소를 지칭한다.

[0032] 이하, 본 발명의 실시예들에 의하여 3차원 의상 자동 전이 착장 방법 및 그 장치와, 그 방법을 실행시키기 위한 프로그램을 기록한 컴퓨터 판독가능 기록매체를 설명하기 위한 도면들을 참고하여 본 발명에 대해 설명하도록 한다.

[0033] 도 1은 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 방법을 나타낸 흐름도이다.

[0034] 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 방법은 컴퓨터에서 수행되는 아바타 의상 착장 방법에 있어서, 먼저 의상이 입혀진 제1 아바타와 제1 아바타에 입혀진 의상을 새로 입힐 제2 아바타를 입력받는다(단계 S100).

[0035] 그 다음, 의상이 제1 아바타의 모양 변화에 따라 움직이도록 그 의상을 제1 아바타에 스키닝한다(단계 S110).

[0036] 한편, 단계 S110은 의상의 메쉬들의 모든 점들로부터 제1 아바타의 표면상까지 가장 가까운 지점을 구하고, 의상의 메쉬들의 모든 점들과 제1 아바타의 표면상까지 가장 가까운 지점을 연결하여 스키닝하는 것이 바람직하다.

[0037] 좀 더 구체적으로, 단계 S110은 아바타의 포즈나 체형 변화에 따라 의상을 변형하기 위해서 의상을 아바타의 스킨처럼 만드는 스키닝 데이터 생성 작업을 수행하게 되는데, 이 작업은 의상의 메쉬들의 모든 점들로부터 아바타 표면상에서 가장 가까운 위치를 계산함으로써 가능하다.

[0038] 한편, 의상과 아바타 사이의 연결 관계를 계산하는 과정은 geometry 사이의 최소 거리를 계산하는 알고리즘으로 최소 거리를 계산하는 일반적인 방법을 사용하여 구현할 수 있다.

[0039] 여기서, 최소 거리를 계산하는 일반적인 방법은 논문 [Seungwoo Oh, Hyungseok Kim, Nadia Magnenat-Thalmann, "Generating unified model for dressed virtual humans", The Visual Computer, 21(8-10): 522-531, (Proc. Pacific Graphics 2005), 2005]을 참조하여 알 수 있다.

[0040] 결국, 이 과정을 통해 의상의 메쉬들의 모든 점과 아바타 사이의 연결 관계가 형성되므로 아바타의 모양이 바뀌어도 의상의 메쉬들의 각 점이 연결된 아바타 부위를 따라가게 만들 수 있어 아바타 포즈나 체형의 몇 개 의상을

변형시킬 수 있게 된다.

[0041] 그 다음, 의상이 스키닝된 제1 아바타를 제2 아바타의 형상에 맞도록 피팅한다(단계 S120).

[0042] 또한, 단계 S120은, 제1 아바타와 제2 아바타의 특징점을 추출하는 단계(단계 S122), 추출된 제1 아바타와 제2 아바타의 특징점이 일치되도록 제1 아바타의 전체 크기와 포즈를 제2 아바타에 일치시키는 단계(단계 S124) 및 제2 아바타에 전체 크기와 포즈가 일치된 제1 아바타의 세부적인 체형을 피팅하는 단계(단계 S126)를 포함하는 것이 바람직하다.

[0043] 좀 더 구체적으로, 단계 S122는 제1 아바타와 제2 아바타의 특징점을 자동으로 추출하는 데[참조 : Iat-Fai Leong, Fang JJ and Tsai MJ., "Automatic body feature extraction from a marker-less scanned human body", Computer-Aided Design, 2007], 여기서 특징점이란 아바타의 피팅 후에 반드시 일치해야 하는 신체의 주요 부위를 말한다.

[0044] 한편, 아바타의 피팅시에 사용할 특징점은 피팅 방법에 따라 다양하게 선택할 수 있는 데, 엄지 발가락끝, 발뒤꿈치, 복숭아뼈, 무릎, 배꼽, 유두점, 어깨위점, 팔꿈치, 손목, 손가락끝, 턱끝, 머리끝 등이 될 수 있다.

[0045] 또한, 단계 S124는 추출된 제1 아바타와 제2 아바타의 특징점이 일치되도록 제1 아바타의 체형을 피팅하는 데, 피팅 과정은 제1 아바타의 체형을 유지하면서 제1 아바타의 특징점이 제2 아바타의 특징점과 일치되도록 하기 위해 특징점을 constraint로 주고 일반적인 최적화 과정을 수행하게 된다.

[0046] 여기서 일반적인 최적화 과정에 대해서는 [ALLEN, B., CURLESS, B., and POPOVIC Z. 2003. The space of all body shapes: reconstruction and parameterization from range scans. ACM Transactions on Graphics (ACM SIGGRAPH 2003), 22, 3, 587-594.]에 게시되어 있다.

[0047] 다만, 상기 논문은 템플릿 아바타 모델을 바디스캔한 데이터에 피팅하는 내용으로 메쉬 구조가 다른 아바타 간에 특징점을 자동으로 추출하고 피팅하는 본 발명과는 차이가 있다.

[0048] 또한, 단계 S126은 세부적인 체형을 피팅하는 과정으로, 세부 피팅과정 역시 일반적인 최적화 솔루션을 이용하여 구현할 수 있는 데 최적화 과정에는 보통 많은 계산 시간이 요구되는 문제가 있다.

[0049] 따라서, 단계 S126에서는 멀티 그리드 기법을 이용하여 최적화 과정을 가속화하는 것이 바람직하다. 멀티 그리드 기법이 성공적으로 적용되면 수분에서 수십분이 걸리는 계산 시간을 1분 안에 원하는 결과를 얻을 수 있다.

[0050] 즉, 임의의 메쉬 구조를 변형하는데 적용할 수 있는 Algebraic Multigrid 라 불리는 표준 멀티그리드 방법[참조 : Lin Shi, Yizhou Yu, Nathan Bell and Wei-Wen Feng SIGGRAPH 2006 (ACM Transactions on Graphics, Vol. 24, No. 3, 2006)]을 선형시스템 풀이 과정인 최적화 과정에 적용하여 세부 체형을 피팅하기 위한 최적화 과정을 가속화할 수 있게 된다.

[0051] 한편, 아바타의 피팅 방법 자체에 대해서는 위에 게시된 논문들을 참조하여 볼 때 통상의 지식을 가진 자에게 명확하다고 할 수 있으므로 더 이상 자세한 설명은 생략하도록 한다.

[0052] 그 다음, 스키닝된 의상을 피팅된 제1 아바타에 맞게 단계 S110에서 스키닝된 것에 기반하여 변형시킨다(단계 S130).

[0053] 즉, 제1 아바타에 입혀져 있는 의상은 이미 단계 S110에서 제1 아바타의 크기나 체형이 변하게 되더라도 따라갈 수 있도록 의상의 메쉬들의 모든 점들과 제1 아바타의 표면상까지 가장 가까운 지점이 연결되도록 스키닝되어 있으므로 제2 아바타의 체형에 맞도록 피팅된 제1 아바타에 맞게 의상을 쉽게 변형시킬 수 있게 된다.

[0054] 그 다음, 피팅된 제1 아바타에서 변형된 의상을 분리시키고, 분리된 의상을 제2 아바타에 입힌다(단계 S140).

[0055] 마지막으로, 분리된 의상이 입혀진 제2 아바타에서 그 의상을 교차없이 드레이핑한다(단계 S150).

[0056] 도 2는 본 발명의 바람직한 실시예에 따른 도 1의 드레이핑 시뮬레이션 과정을 수행하는 단계의 세부 절차를 나타낸 흐름도이다.

[0057] 본 발명의 바람직한 실시예에 따른 도 1의 드레이핑 시뮬레이션 과정을 수행하는 단계(단계 S150)는, 교차 여부를 판단하는 단계(단계 S152)와, 교차 제거 힘(force)을 생성하는 단계(단계 S154) 및 드레이핑 시뮬레이션

과정을 수행하는 단계(단계 S156)를 포함한다.

[0058] 여기서, 드레이핑 시뮬레이션 과정은 기본적으로 [Pascal Volino, Nadia Magnenat-Thalmann: Resolving surface collisions through intersection contour minimization, ACM Trans. Graph. 25(3): 1154-1159 (2006)]에 제시된 방법을 사용하게 된다.

[0059] 다만, 위 방법은 교차가 발생한 옷이 여러 겹인 경우 겉옷과 속옷의 교차가 발생한 메쉬를 교차가 없어지도록 밀어낼 방향을 결정하기 곤란하므로 본 발명이 제시하는 드레이핑 시뮬레이션 과정은 아래에서 설명하는 디스턴스 필드(distance field)를 이용하여 보완한다.

[0060] 교차 여부를 판단하는 단계(단계 S152)는 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 메쉬 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 메쉬를 찾아 교차 여부를 판단하고, 교차가 발생한 메쉬가 있는 경우에는 단계 S154와 단계 S156을 수행하고, 교차가 발생한 메쉬가 없는 경우에는 단계 S154와 단계 S156을 수행하지 않고 종료한다.

[0061] 좀 더 구체적으로, 위의 Pascal Volino 논문에 제시된 교차 검사 방법을 이용하여 제2 아바타에 입혀진 의상과 아바타간의 교차 여부 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간의 교차 여부를 판단할 수 있다.

[0062] 또한, 교차 제거 힘(force)을 생성하는 단계(단계 S154)는 단계 S152에서 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 것으로 판단한 경우에는, 제2 아바타에 입혀진 의상의 교차가 발생한 메쉬를 제2 아바타의 피부 바깥 방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘(force)을 생성하고,

[0063] 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 것으로 판단하는 경우에는, 3차원 공간에서 상기 제2 아바타의 바깥 방향인지 안쪽 방향인지를 판단할 수 있는 디스턴스 필드(distance field)를 계산하고, 겉옷의 교차가 발생한 메쉬는 겉옷과 속옷의 교차가 발생한 메쉬의 교차선분의 중점에서 구한 디스턴스 필드(distance field)의 그레디언트(gradient) 방향으로 밀어내고, 속옷의 교차가 발생한 메쉬는 상기 디스턴스 필드(distance field)의 그레디언트(gradient) 방향의 반대방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘(force)을 생성한다.

[0064] 좀 더 구체적으로, 제2 아바타에 입혀진 의상과 제2 아바타가 교차할 때는 제2 아바타의 입혀진 의상의 교차가 발생한 메쉬를 제2 아바타의 피부 바깥 방향으로 밀어내면 되기 때문에, 상기 Pascal Volino 논문에 제시된 방법을 바로 적용할 수 있다.

[0065] 이에 반해, 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 경우에는 어떤 방향이 아바타 바깥 방향인지를 모르기 때문에 모든 3차원 공간에서 아바타 바깥 방향인지 안쪽 방향인지를 판단할 수 있는 디스턴스 필드(distance field)를 계산하여 옷과 옷을 밀어낼 힘(force)의 방향을 결정해야 한다.

[0066] 여기서 아바타에 대한 디스턴스 필드(distance field)는 [Mark W. Jones and J. Andreas Bærentzen and Milos Sramek. 3D distance fields: A survey of techniques and applications, IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS, 2006]과 [Avneesh Sud, Miguel A. Otaduy, Dinesh Manocha, DiFi: Fast 3D Distance Field Computation Using Graphics Hardware, *Eurographics*, 2004]를 참조하여 구할 수 있다.

[0067] 한편, 디스턴스 필드(distance field)는 특정 위치에서 가장 가까운 아바타 표면까지의 거리를 3차원 공간상의 모든 위치에 대해 계산하여 저장해 놓는 데이타구조를 말하는 데, 이를 위해 보통 공간을 격자로 조개고 이때 생긴 각각의 복셀(voxel)마다 그 중심에서 가장 가까운 아바타 표면까지의 거리를 계산해서 복셀(voxel)에 저장해 놓게 된다. 여기서 복셀이란 3D 공간의 한 점을 정의한 일단의그래픽 정보를 말한다.

[0068] 이 디스턴스 필드(distance field)는 수학적으로 말하면 스칼라 필드(scalar field)에 해당하고 이 필드(field)에 대한 그레디언트(gradient)를 구할 수 있다.

[0069] 이때, 이 스칼라 필드(scalar field)의 그레디언트(gradient)는 벡터 필드(vector field)가 되는데 여기서 벡터(vector)는 결국 스칼라(scalar)값이 가장 급격하게 적지는 방향의 벡터(vector), 즉 아바타 표면으로부터 가장 멀어지는 방향 벡터(vector)가 된다. 결국 이 방향이 "아바타 바깥방향"이라고 할 수 있다.

[0070] 즉, 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷의 삼각형 메쉬가 교차되면 교차된 부분은 하나의 선분으로 나타나게 되는 데, 그 선분을 교차선분이라고 했을 때 겉옷의 삼각형 메쉬에 가하는 힘(force)의 방향

은 교차선분의 중점에서 구한 디스턴스 필드(distance field)의 그래디언트(gradient), 즉 "아바타 바깥방향"이 되고, 속옷의 삼각형 메쉬에 가해지는 힘(force)의 방향은 "아바타 바깥방향"의 반대방향이 된다.

[0071] 또한, 드레이핑 시뮬레이션 과정을 수행하는 단계(단계 S156)는 생성된 미리 설정된 크기의 교차 제거 힘(force)을 해당 메쉬에 가하여 드레이핑 시뮬레이션 과정을 수행하고, 드레이핑 시뮬레이션 과정이 종료되면 단계 S152를 다시 수행한다.

[0072] 좀 더 구체적으로, 단계 S154에서 힘(force)의 크기를 적절히 설정한 후, 그 힘(force)을 드레이핑 시뮬레이션 과정에 반영하여 드레이핑 시뮬레이션을 수행하면 교차가 발생한 두 삼각형 메쉬 사이의 교차선분이 줄어들거나 없어지게 된다.

[0073] 즉, 이렇게 교차 검사 - 교차제거 힘(force) 생성 - 드레이핑 시뮬레이션 과정을 교차가 완전히 없어질 때까지 반복 수행함으로써 이미 교차가 발생한 상태에서 드레이핑 시뮬레이션을 시작하더라도 교차를 없애면서 의상을 완벽하게 드레이핑할 수 있게 된다.

[0074] 따라서, 이미 교차가 발생한 상태에서 드레이핑 시뮬레이션을 시작하더라도 의상을 완벽하게 드레이핑할 수 있으므로 의류 전자상거래나 의상 디자인 소프트웨어 등에 핵심 기술로 활용될 수 있을 것이다.

[0075] 도 3은 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 장치를 나타낸 도면이다.

[0076] 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 착장 장치(200)는 입력부(210), 스키닝부(220), 피팅부(230), 의상변형부(240), 의상전이부(250)와 드레이핑부(260)를 포함한다.

[0077] 입력부(210)는 의상이 입혀진 제1 아바타와 제1 아바타에 입혀진 의상을 새로 입힐 제2 아바타를 입력받는다.

[0078] 또한, 스키닝부(220)는 입력받은 의상이 제1 아바타의 포잉 변화에 따라 움직이도록 의상을 제1 아바타에 스키닝한다.

[0079] 한편, 스키닝부(220)는 의상의 메쉬들의 모든 점들로부터 제1 아바타의 표면상까지 가장 가까운 지점을 구하고, 의상의 메쉬들의 모든 점들과 제1 아바타의 표면상까지 가장 가까운 지점을 연결하는 것을 특징으로 한다.

[0080] 또한, 피팅부(230)는 의상이 스키닝된 제1 아바타를 제2 아바타의 형상에 맞도록 피팅한다.

[0081] 한편, 피팅부(230)는 제1 아바타와 제2 아바타의 특징점을 추출하고, 추출된 제1 아바타와 제2 아바타의 특징점이 일치되도록 제1 아바타의 전체 크기와 포즈를 제2 아바타에 일치시킨 후, 제2 아바타에 전체 크기와 포즈가 일치된 제1 아바타의 세부적인 체형을 피팅하는 것을 특징으로 한다.

[0082] 또한, 의상변형부(240)는 스키닝된 의상을 피팅된 제1 아바타에 맞게 스키닝부(220)에서 스키닝된 것에 기반하여 변형시킨다.

[0083] 또한, 의상전이부(250)는 피팅된 제1 아바타에서 의상변형부(240)에서 변형된 의상을 분리시키고, 분리된 의상을 제2 아바타에 입힌다.

[0084] 또한, 드레이핑부(260)는 분리된 의상이 입혀진 제2 아바타에서 의상을 교차없이 드레이핑한다.

[0085] 한편, 드레이핑부(260)는 교차 여부 판단부(262), 교차 제거 힘(force) 생성부(264) 및 드레이핑 시뮬레이션부(266)를 포함한다.

[0086] 교차 여부 판단부(262)는 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 메쉬 또는 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 메쉬를 찾아 교차 여부를 판단하고, 교차가 발생한 메쉬가 있는 경우에 교차 제거 힘 생성부(264)에 교차 제거 힘을 생성하도록 요청한다.

[0087] 또한, 교차 제거 힘 생성부(264)는 교차 여부 판단부(262)로부터 교차 제거 힘을 생성하도록 요청받으면, 교차 여부 판단부(262)가 제2 아바타에 입혀진 의상과 제2 아바타간에 교차가 발생한 것으로 판단하는 경우에는, 제2 아바타에 입혀진 의상의 교차가 발생한 메쉬를 제2 아바타의 피부 바깥 방향으로 밀어내는 미리 설정된 크기의 교차 제거 힘(force)을 생성하고,

[0088] 제2 아바타에 입혀진 의상이 여러 겹인 경우 겉옷과 속옷간에 교차가 발생한 것으로 판단하는 경우에는, 3차원 공간에서 제2 아바타의 바깥 방향인지 안쪽 방향인지를 판단할 수 있는 디스턴스 필드(distance field)를 계산하고, 겉옷의 교차가 발생한 메쉬는 겉옷과 속옷의 교차가 발생한 메쉬의 교차선분의 중점에서 구한 디스턴스

필드(distance field)의 그래디언트(gradient) 방향으로 밀어내고, 속옷의 교차가 발생한 때에는 디스턴스 필드의 그래디언트 방향의 반대방향으로 밀어내는 머리 설정된 크기의 교차 제거 힘을 생성하고, 드레이핑 시뮬레이션부(266)에 드레이핑 시뮬레이션 과정을 수행하도록 요청한다.

[0089] 또한, 드레이핑 시뮬레이션부(266)는 교차 제거 힘 생성부(264)로부터 드레이핑 시뮬레이션 과정을 수행하도록 요청받으면, 생성된 머리 설정된 크기의 교차 제거 힘(force)을 해당 메쉬에 가하여 드레이핑 시뮬레이션 과정을 수행하고, 드레이핑 시뮬레이션 과정이 종료되면 교차 여부 판단부(262)에 교차가 제거되었는 지를 판단하도록 요청한다.

[0090] 도 4는 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 확장 기술 적용 개요를 나타낸 도면이다.

[0091] 도 4를 참조하여 바람직한 실시예를 보면, 도 4는 3차원 의상 자동 전이 확장 기술의 적용 개요를 나타낸 도면으로, 본 발명이 제공하는 3차원 의상 자동 전이 확장 기술은 인체 스캐닝 분야, 3차원 의상 디자인 및 전자상거래 분야에서 활용될 수 있을 것이다.

[0092] 현재 인체 스캐닝 시스템에서 출력해주는 결과물은 폴리곤수가 많고 군데군데 구멍이 뚫려 있는 등 영화나 게임에 바로 사용할 수 없는 형태인데 반해, 자동 아바타 피팅 기술을 이용하면 잘 제작해 놓은 아바타 모델을 인체 스캐닝 데이터에 피팅할 수 있으므로 마우스 클릭 한번으로 영화나 게임에서 쓸 수 있는 포맷으로 만들 수 있다.

[0093] 또한, 3차원 의상 디자인 및 전자상거래 분야에서 교차가 발생한 상태에서 의상을 자연스럽게 드레이핑할 수 있는 기술을 사용하면 여러벌의 의상 코디를 손쉽게 할 수 있다.

[0094] 즉, 현재의 의상 디자인 소프트웨어로 여러벌 의상을 코디하기 위해서는 의상이 제대로 드레이핑 되도록 일일이 결과 옷을 구분하여 배치해 줘야 하는 수작업이 필요한데 반해, 본 발명이 제공하는 3차원 의상 자동 전이 확장 기술은 의류 전자상거래에서 의상을 바로 코디해 보는 데에도 사용될 수 있다.

[0095] 도 5는 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 확장 플랫폼의 적용 전의 가상의상의 적용 범위를 나타낸 도면이다. 도 6은 본 발명의 바람직한 실시예에 따른 3차원 의상 자동 전이 확장 플랫폼의 적용 후의 가상의상의 공유 범위의 변화를 나타낸 도면이다.

[0096] 도 5와 도 6을 참조하여 바람직한 실시예를 보면, 본 발명의 3차원 의상 자동 전이 확장 방법과 그 장치를 이용하여 가상의상을 거래하는 플랫폼을 구축하게 되면, 서로 다른 게임, 가상세계 어플리케이션, 온라인 쇼핑 사이트 간의 아바타와 의상을 완벽하게 호환할 수 있다.

[0097] 본 발명이 속하는 기술분야의 통상의 지식을 가진 자는 본 발명이 그 기술적 사상이나 필수적인 특징을 변경하지 않고서 다른 구체적인 형태로 실시될 수 있다는 것을 이해할 수 있을 것이다. 그러므로 이상에서 기술한 실시예들은 모든 면에서 예시적인 것이며 한정적이 아닌 것으로 이해해야만 한다. 본 발명의 범위는 상기 상세한 설명보다는 후술하는 특허청구의 범위에 의하여 나타내어지며, 특허청구의 범위의 의미 및 범위 그리고 그 균등 개념으로부터 도출되는 모든 변경 또는 변형된 형태가 본 발명의 범위에 포함되는 것으로 해석되어야 한다.

부호의 설명

[0098] 200 : 3차원 의상 자동 전이 확장 장치 210 : 입력부

220 : 스캐닝부 230 : 피팅부

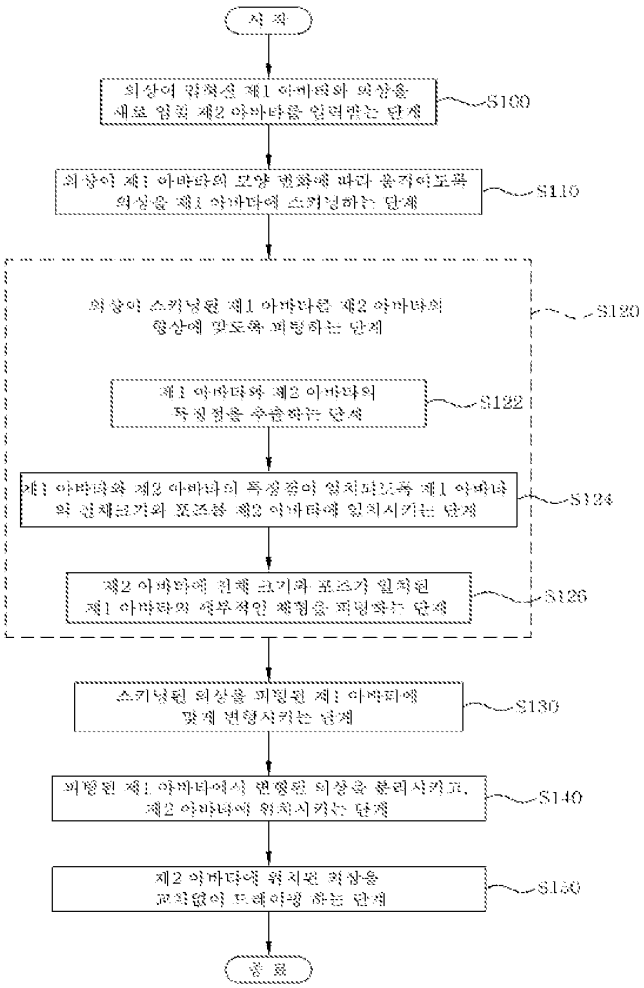
240 : 의상변형부 250 : 의상전이부

260 : 드레이핑부 262 : 교차여부판단부

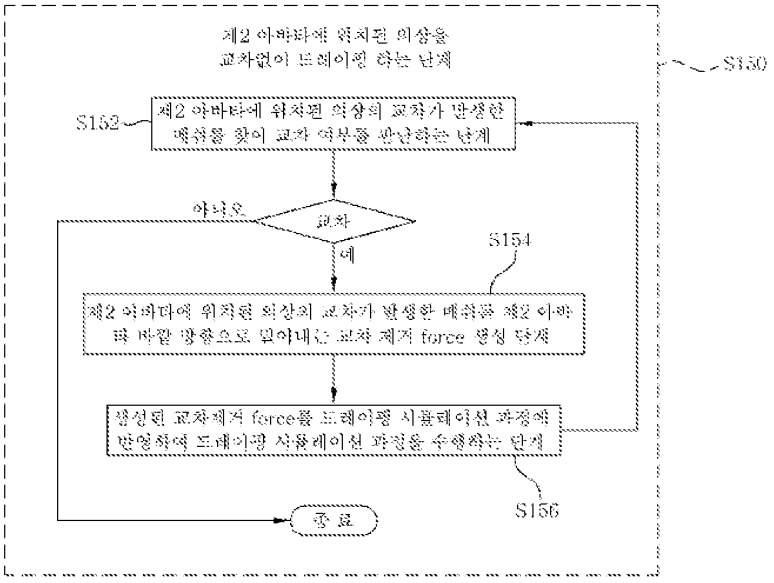
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도면

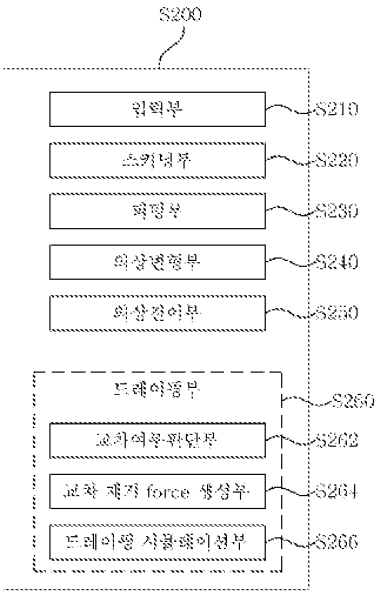
도면1


시작
의상이 입혀진 제1 아바타와 의상을 새로 입힐 제2 아바타를 입력받는 단계
S100
의상이 제1 아바타의 모양 변화에 따라 움직이도록 의상을 제1 아바타에 스키닝하는 단계
S110
의상이 스키닝된 제1 아바타를 제2 아바타의 형상에 맞도록 피팅하는 단계
S120
제1 아바타와 제2 아바타의 특징점을 추출하는 단계
S122
제1 아바타와 제2 아바타의 특징점이 일치되도록 제1 아바타의 전체크기와 포즈를 제2 아바타에 일치시키는 단계
S124
제2 아바타에 전체 크기와 포즈가 일치된 제1 아바타의 세부적인 체형을 피팅하는 단계
S126
스키닝된 의상을 피팅된 제1 아바타에 맞게 변형시키는 단계
S130
변형된 제1 아바타에서 변형된 의상을 분리시키고, 제2 아바타에 위치시키는 단계
S140
제2 아바타에 위치된 의상을 교차없이 드레이핑 하는 단계
S150
종료

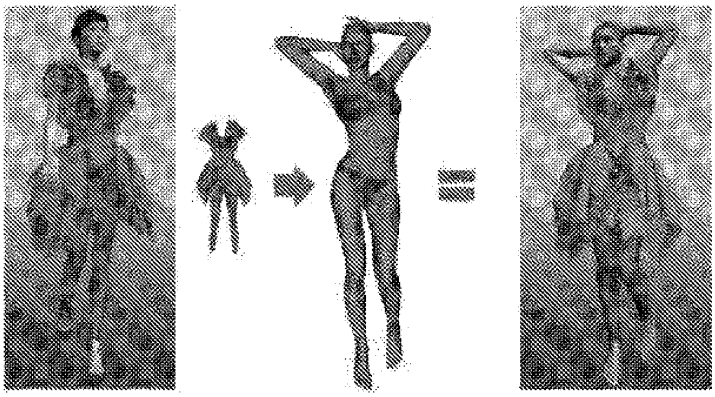
도면2


제2 아바타에 위치된 의상을
교차없이 드레이핑 하는 단계
S150
S152
제2 아바타에 위치된 의상의 교차가 발생한
메쉬를 찾아 교차 여부를 판단하는 단계
교차
아니오
예
S154
제2 아바타에 위치된 의상의 교차가 발생한 메쉬를 제2 아바
타 바깥 방향으로 밀어내는 교차 제거 force 생성 단계
생성된 교차제거 force를 드레이핑 시뮬레이션 과정에
반영하여 드레이핑 시뮬레이션 과정을 수행하는 단계
S156
종료

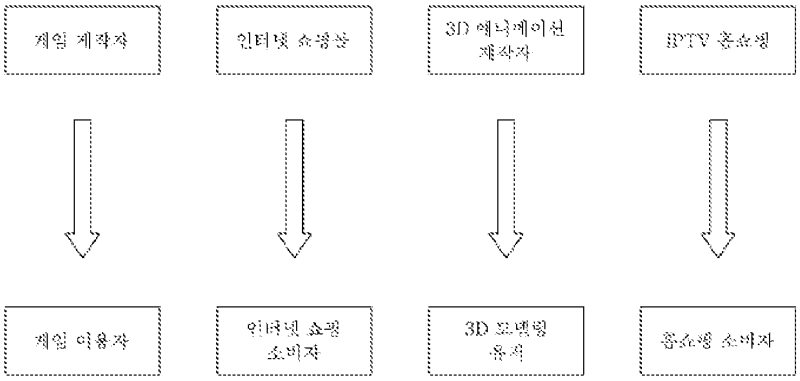
도면3


S200
입력부
S210
스캐닝부
S220
피팅부
S230
의상변형부
S240
의상전어부
S250
드레이핑부
S260
교차여부판단부
S262
교차 제거 force 생성부
S264
드레이핑 시뮬레이션부
S266

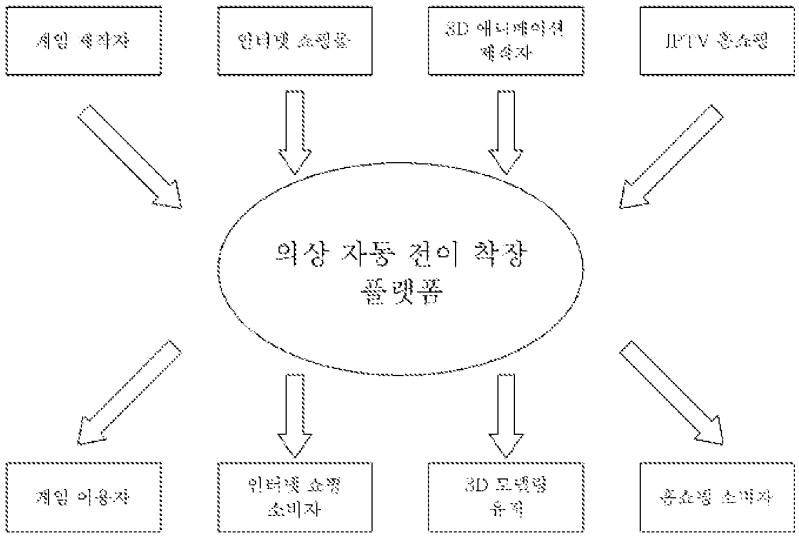
도면4



도면5


게임 제작자
인터넷 쇼핑몰
3D 애니메이션 제작자
IPTV 홈쇼핑
게임 이용자
인터넷 쇼핑 소비자
3D 모델링 유저
홈쇼핑 소비자

도면6


게임 제작자
인터넷 쇼핑몰
3D 애니메이션 제작자
IPTV 홈쇼핑
의상 자동 견이 착장 플랫폼
게임 이용자
인터넷 쇼핑 소비자
3D 모델링 유저
홈쇼핑 소비자

Electronic Acknowledgement Receipt

EFS ID:	27893909
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Franklin Robert Bryan/Jessica LaBossiere
Filer Authorized By:	Franklin Robert Bryan
Attorney Docket Number:	304053.0001
Receipt Date:	23-DEC-2016
Filing Date:	23-OCT-2015
Time Stamp:	13:56:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	IDS20161215_3040530001_Statement.pdf	22283 7c48215d105c38d3ba8b1f634a6acd6e0ceca652	no	2

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	IDS20161215_3040530001_IDS.pdf	45327 c14bcb457bab22629391a3fb4bc632a2ad19bca3	no	1
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Information:					
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Information:					
5	Non Patent Literature	IDS20161215_3040530001_NPL_KR-NOA-2016-09-24.pdf	411730 3d0ef443016665 8eaed8a4a86cfd38310b81535a	no	2
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS: Seung Woo OH, et al. **CONFIRMATION NO.:** 6021

APPLICATION NO.: 14/921,269 **GROUP ART UNIT:** 2613

FILING DATE: October 23, 2015 **EXAMINER:** Matthew D. Salvucci

TITLE: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicant hereby submits an Information Disclosure Statement for consideration by the Examiner.

The patents, publications and other information submitted for consideration by the Office (except unpublished U.S. patent applications) are listed on Form PTO/SB/08 attached hereto.

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

It is respectfully requested that this Information Disclosure Statement be considered.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number below.

Respectfully submitted,

/Franklin R. Bryan/

Dated: December 23, 2016 By_____

Franklin R. Bryan, Reg. No. 68,313
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CYP/FRB/jgl

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/921,269	10/23/2015	Seung Woo OH	304053.0001

CONFIRMATION NO. 6021

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

PUBLICATION NOTICE

OC000000086799125

Title:METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

Publication No.US-2016-0314604-A1
Publication Date:10/27/2016

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute for PTO/SB/08a/b

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(Use as many sheets as necessary)*				**Complete if Known**	
				Application Number	14/921,269
				Filing Date	October 23, 2015
				First Named Inventor	Seung Woo OH
				Art Unit	2613
				Examiner Name	Xiao Min WU
Sheet	1	of	1	Attorney Docket Number	304053.0001

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	a	JP 6-301763 A	10-28-1994	Nippon Steel Corp.		✓

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	1	CLO 3D 2011 Marvelous Designer Manual (2014).	✓
	2	Korean Office Action issued March 28, 2016 in counterpart Korean Application No. 10-2015-0059086 (5 pages in Korean).	

Examiner Signature		Date Considered	

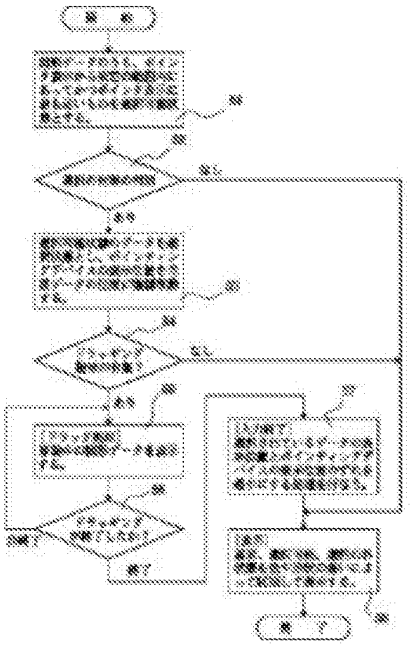
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04(a). [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached (X indicates Abstract only provided).

Selected Gazette

JP,06-301763,A

Publication number	06-301763
(43)Date of publication of application	28.10.1994
(51)Int.Cl.	G06F 15/62 G06F 3/03 G06F 3/14 G06F 15/60
(21)Application number	05-086104
(22)Date of filing	13.04.1993
(71)Applicant	NIPPON STEEL CORP
(72)Inventor	SHIBUSAWA TETSUO HIRONO SO

(54)SELECTION METHOD FOR GRAPHIC DATA AND DEVICE THEREFOR



(57)Abstract

PURPOSE: To accurately perform selection in the case of indicating and selecting graphic data on a screen by using a pointing device such as a mouse or the like. CONSTITUTION: As the state of the graphic data, a selectable state is provided other than a normal state which is an unselected state and a selection state which is a selected state. A distance between the pointer display of the pointing device, and the display

position of the graphic data on the screen is calculated and the graphic data present in a prescribed range from the pointer display and closest to the pointer display are turned to the selectable state (step 51). Display on the screen is performed by changing the colors and shapes of the graphic data so as to discriminate whether the graphic data are in the normal state, the selectable state or the selection state (step 58).

CLAIMS

[Claim(s)]

[Claim 1]In a selection method which chooses graphic data on a screen using a pointing device,

A selection method of graphic data characterized by comprising the following.

The aforementioned graphic data are what can take one state of a normal state, a selectable state, and a selective state, respectively, A process of display styles of graphic data differing in the aforementioned normal state and said selectable state at least, and existing within the limits of predetermined from a position on the aforementioned screen of a pointer display corresponding to the aforementioned pointing device, and looking for graphic data nearest to the aforementioned position as the maximum contiguity figure.

A transition process which makes the maximum contiguity figure concerned change in the selectable state when the aforementioned maximum contiguity figure is in the aforementioned normal state.

[Claim 2]A selection method of the graphic data according to claim 1 which further has a selection process which makes graphic data of a selectable state change to a selective state when selection of graphic data is instructed.

[Claim 3]A selection method of the graphic data according to claim 2 which further have a compulsive transfer process which moves a position of a pointer display to a display position of graphic data made to change according to a selection process by selective state forcibly.

[Claim 4]A selection method of the graphic data according to claim 1 whose display

style is a foreground color.
[Claim 5]A selection method of the graphic data according to claim 1 whose graphic data are at least one or more things in a line, a point, and a surface.
[Claim 6]A selection method of the graphic data according to claim 2 which further have a transfer process to which a figure in a selective state is moved on a screen according to operation to a pointing device.
[Claim 7]A selection method of the graphic data according to claim 1 which are what is used in order that graphic data may create object data of the aforementioned three-dimensional object from one perspective diagram describing a projection image of a three-dimensional object.
[Claim 8]In a selecting arrangement of graphic data which a pointing device and a display device are connected, display graphic data and a pointer display of the aforementioned pointing device on a screen of the aforementioned display device, and choose graphic data,
A selecting arrangement of graphic data characterized by comprising the following.
A storing means which the aforementioned graphic data can take one state of a normal state, a selectable state, and a selective state, respectively, and stores the aforementioned graphic data.
A distance calculation means which computes distance of a position of the aforementioned pointer display and the aforementioned graphic data on a screen.
An output control means which makes the maximum contiguity figure concerned change in the selectable state, and changes a display style, and displays the aforementioned maximum contiguity figure on the aforementioned display device when it is within the limits of predetermined from the aforementioned position, and the nearest graphic data are searched as the maximum contiguity figure from the aforementioned position and the aforementioned maximum contiguity figure is in a normal state.

[Claim 9]A selecting arrangement of the graphic data according to claim 8 which make graphic data which are in a selectable state when it has an instruction input part into which selection instructing of graphic data is input and the aforementioned selection instructing is input change to a selective state.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]The present invention relates to the selection method of the graphic data which instruct and choose graphic data displayed on the screen of a display device, such as a line segment and a point, with pointing devices, such as a mouse, and its equipment.

[0002]

[Description of the Prior Art]Within the CAD system or the graphics processing system, generally, the figure of a processing object is treated as vector data, such as a point, a line segment and a surface, and is stored. And in order to choose the figure displayed on the screen of display devices, such as CRT, and to process to the selected figure, pointing devices, such as a mouse and a trackball, are used.

[0003]When using a pointing device, the pointer display (for example, arrow display) corresponding to this pointing device is performed on a screen, and a pointer display moves on a screen according to operation amount by operating a pointing device. And in choosing the specific figure on a screen, operate a pointing device, move a pointer display on the figure, and click the button with which the pointing device was equipped. If a pointing device is operated choosing the figure of a moved object as mentioned above, and pressing down a button and a pointer display is moved when moving a specific figure by a CAD system etc. (dragging operation), the figure of a moved object will also accompany and it will move it. When a figure is positioned in a movement destination, movement of a figure is completed by detaching a button. JP,H4-310186,A and JP,H4-342072,A has disclosed autotrace technology [in / as an example of the selection method of the graphic data based on a pointing device / CAD/CAM].

[0004]

[Problem to be solved by the invention]In the selection method of the conventional graphic data which were mentioned above, when a plurality of figures approach on a screen, or a part laps and is arranged, there is a problem that the figure which is not what it was going to choose will be chosen. Since processing is performed simultaneously with selection of a figure when choosing the figure of a processing object, after specifying the contents of processing, such as reversal and deletion, previously especially, the problem that processing which an operator does not expect

will be performed arises.
[0005]There is the object of this invention in providing the selection method which can choose graphic data correctly, and its equipment.
[0006]
[Means for solving problem]It is characterized by a selection method of graphic data of the present invention comprising the following.
In the selection method which chooses the graphic data on a screen using a pointing device, the aforementioned graphic data, It is what can take one state of a normal state, a selectable state, and a selective state, respectively, A process of display styles of graphic data differing in the aforementioned normal state and the above-mentioned selectable state at least, and existing within the limits of predetermined from a position on the aforementioned screen of a pointer display corresponding to the aforementioned pointing device, and looking for graphic data nearest to the aforementioned position as the maximum contiguity figure.
A transition process which makes the maximum contiguity figure concerned change in the selectable state when the aforementioned maximum contiguity figure is in the aforementioned normal state.

[0007]The present invention the selecting arrangement of the graphic data of the present invention, A pointing device and a display device are connected, graphic data and a pointer display of the aforementioned pointing device are displayed on a screen of the aforementioned display device, and a selecting arrangement of graphic data which choose graphic data is characterized by comprising the following:
A storing means which the aforementioned graphic data can take one state of a normal state, a selectable state, and a selective state, respectively, and stores the aforementioned graphic data.
A distance calculation means which computes distance of a position of the aforementioned pointer display and the aforementioned graphic data on a screen.
An output control means which makes the maximum contiguity figure concerned change in the selectable state, and changes a display style, and displays the aforementioned maximum contiguity figure on the aforementioned display device when it is within the limits of predetermined from the aforementioned position, and the nearest graphic data are searched as the maximum contiguity figure from the

aforementioned position and the aforementioned maximum contiguity figure is in a normal state.

[0008]
[Function]In the present invention, there is a selectable state other than a normal state and a selective state as a state which each graphic data can take. A normal state is in the state which is not chosen by a pointing device etc., and a selective state is in the state instructed and chosen. And although the selectable state is not necessarily chosen, it is in the state which shows that he is a candidate chosen. If it carries out as [change / set the display style of graphic data differently in a normal state and the selectable state here and / are within the limits of predetermined from the pointer display of a pointing device, and / in the selectable state / only the nearest graphic data], Before actually performing selection operation, it becomes possible to recognize visually which figure is chosen. That is, since the display style of the graphic data by the side of these days [the] changes when a pointer display is positioned in a certain position, when selection operation of clicking is performed, the figure actually chosen can be checked. As a result, when the display style of the graphic data which are not meant changes. Since it is the time when selection operation must not be then performed, a pointing device will be operated, a pointer display will be moved so that the display style of the graphic data which it is going to choose may change, and then selection operation will be performed. if it is made for the position of a pointer display to be forcibly moved to the display position of graphic data in connection with this selection operation, the actually selected graphic data will be checked more clearly -- things can be carried out.
[0009]Of course, dragging operation may be made to be performed so that the figure in a selective state may be moved on a screen according to the operation to a pointing device. Although the graphic data in particular treated by the present invention are not limited, there are a point, a line, a surface, etc., for example.
[0010]Since it changes into a selectable state when the predetermined range is defined and graphic data exist within the limits of this, When the pointer display is separated from all the graphic data more than fixed, neither of the graphic data is selectable, and graphic data are not selectable regardless of operation of positioning a pointer display. Therefore, it will not be in a selectable state, without meaning, and operability further improves.

[0011]In the present invention, although the display style of graphic data is changed according to the state (a normal state, a selectable state, and a selective state) of graphic data, according to a state, the foreground color of a figure can change in this case. A foreground color is changed and also it may be made for the thickness of a line type or a line to differ.

[0012]

[Working example]Next, with reference to Drawings, it describes about the working example of the present invention. Fig.1 is a block diagram showing the composition of the selecting arrangement of one working example of the present invention, and Fig.2 is a flow chart which shows operation of this equipment. The selecting arrangement shown in Fig.1 operates in accordance with the selection method of the graphic data of the present invention.

[0013]The pointing devices 11, such as a mouse, and the display devices 12, such as CRT, are connected to the selecting arrangement 10. The interface part 21 to which direct continuation of the pointing device 11 is carried out as for the selecting arrangement 10, The vector data storage 22 which stores graphic data as vector data, the distance calculating part 23, and the output control part 24 for displaying the pointer display of graphic data and a pointing device on the display device 12 are provided. Graphic data consist of point data, line data, plane data, etc., and take one state of a normal state, a selectable state, and a selective state, respectively. The exception of each of these states is performed by changing a foreground color or a line type of graphic data, etc. For example, red and the selective state of white and a selectable state are green, and the graphic data of a normal state are expressed.

[0014]The information on the moving operation to the pointing device 11 and the information on whether selection instructing input via the pointing device 11 input into the interface part 21. The information on moving operation is the movement magnitude of the mouse here, if the pointing device 11 is a mouse. To the vector data storage 22, graphic data are supplied from outside. The distance calculating part 23 is for calculating the distance of the position of the pointer display on a screen, and the position of graphic data. The output control part 24 controls dragging operation while controlling a display and selection, It exists within the limits of predetermined from the position of the pointer display on a screen, and looks for the nearest graphic data as the maximum contiguity figure, and a selectable state will be made to change if it is the

graphic data which have this maximum contiguity figure in a normal state. Therefore, the output control part 24 also changes the foreground color at the same time it makes the maximum contiguity figure change in the selectable state. Inside the output control part 24, the position correction part 25 for minimizing the gap of a display position with the pointer display at the time of performing dragging operation and graphic data is provided.

[0015]Next, it attaches in operation of this example and describes using the flow chart of Fig.2. Graphic data are preliminarily stored in the vector data storage 22. In the flow chart of Fig.2, although a start and end of a control flow are shown, in order to respond to movement of the pointing device 11 in real time actually, operation shown here is repeatedly performed by the very short time interval.

[0016]In the distance calculating part 23, the distance of the pointer display and graphic data on the screen of the display device 12 is computed first, Control moves to the output control part 24, and it is within the limits of predetermined from a pointer display, and it is the graphic data (the maximum contiguity figure) nearest to a pointer display, and the graphic data in a normal state are searched. And these searched graphic data are made to change by the selectable state (Step 51). In this case, a state as it is is maintained, without making the state of other graphic data newly change, if the maximum contiguity figure is already in a selectable state. And distinction of whether the existence of selection, i.e., the instruction of selection, is performed is performed (Step 52). The instruction of selection here is performed by the left button of a mouse being clicked, for example, when the pointing device 11 is a mouse. When selection is not instructed here, it shifts to Step 58 and display processing is performed. In display processing, according to each state of a normal state, a selectable state, and selection, it is distinguished with a color or form, and each graphic data are displayed on a screen.

[0017]On the other hand, when the instruction of selection is detected at Step 52, the graphic data of a selectable state are made into a selective state, and forcible movement of the pointer display is carried out in the display position of these graphic data (Step 53). And the check of whether the instruction of dragging is performed is performed (Step 54). The instruction of dragging is performed [whether the left button of a mouse is continue being pushed, and] by detecting, for example, when the pointing device 11 is a mouse. Since it is mere selection operation when the instruction

of dragging is not performed, it shifts to the above-mentioned step 58, and the display according to the state of graphic data is performed. When the instruction of the dragging is performed at Step 54, drug processing 55 is performed. According to the moving operation to the pointing device 11, on a screen, the selected position of graphic data and position of a pointer display move, and are updated in this drug processing (Step 55). And the judgment of whether dragging was completed is made (Step 56). It can be judged by detecting whether the push down of the left button of a mouse is completed that dragging was completed, if it is a case of a mouse. When the dragging is not completed, it returns to Step 55 and repeats dragging processing.
[0018]When the end of a dragging is detected at Step 56, input end processing is performed by the position correction part 25 (Step 57). This input end processing is processing which minimizes the gap with the display position of the graphic data on a screen chosen, and the position of a pointer display. When the vector data which becomes origin is multiplied by a proper magnifying power or reduction percentage and the figure is being displayed on a screen, performing such processing, While having repeated drug processing of Step 55, in spite of the error's having accumulated and having coincided both display position at Step 53, it is because a pointer display and graphic data may deviate. Since it is thought that the direction of the position of the pointer display corresponding to the pointing device 11 is often reflecting an operator's intention, the vector data which becomes origin is corrected and it is made for the above-mentioned gap to become the minimum in input end processing. Then, it shifts to Step 58 mentioned above, and display processing is performed.
[0019]Next, it is based on an individual case and this example is described. Here, the example used for the object data creation from a perspective diagram is described.
[0020]The object data creation from a perspective diagram is gaining the three-dimensional data of the object (projected) drawn on the figure from one perspective diagram, such as a photograph and sketch drawing, as it is in Japanese Patent Application No. 4-296775 ("an object data listing device and a method from a perspective diagram") by these people. This technique asks for the equation which expresses that plane from the profile line showing a cut end when an object is cut at a plane, the position of the vanishing point corresponding to that plane, and the position of the viewpoint of a perspective diagram, By calculating the projection image of the profile line to the plane top which the called-for equation expresses, the three-

dimensional data of the target object is made profitably like. In this case, a profile line may correspond to a projection image, may be drawn on a perspective diagram from the beginning, and may be added to a perspective diagram afterwards using a graphics processing system etc. Anyway, as for a profile line, it is desirable to be held as segment data or vector data inside a processing system on account of calculation. The position of a profile line or a vanishing point is changed referring to the created three-dimensional object data one by one, and operating it so that desired data may be obtained is also performed. This example is a thing about the case where these positions are corrected, choosing a profile line and a disappearance line using the selecting arrangement of this example.

[0021]Fig.3 shows the state where the profile line (solid line) extracted from the perspective diagram describing the seat for vehicles is displayed on the display screen 60. This profile line is used in order to obtain the three-dimensional data of the seat for vehicles, and it is expressed as a meeting of a plurality of line data. A dash-dotted line shows the disappearance line corresponding to each vanishing point, and the point for O seal to operate a corner point and for a cross operate a disappearance line in a shunt and ** seal is shown. The profile line is divided into each line element for every corner point or shunt. Here, paying attention to the corner point 61, the case where dragging operation is performed to this corner point 61 is considered.

[0022]First, a pointing device is operated and the graphic display arrow-like pointer display 62 is made to approach the corner point 61. Then, the corner point 61 changes in the selectable state from a normal state, and the display style of the corner point 61, for example, a foreground color, changes. And if selection operation is performed, the corner point 61 will be in a selective state, and it will perform dragging as it is. The state after performing dragging is shown in Fig.4.

[0023]Although the three line elements 64 which are components of a profile line exist near the corner point 61, it can choose exactly by using the selection method of this example, the graphic data, i.e., corner point 61, which are made into the object. The result of having performed dragging operation to the disappearance line 63 similarly is shown in Fig.5.

[0024]

[Effect of the Invention]As described above, the present invention provides a selectable state other than a normal state and a selective state as a state which graphic data can

take, By being within the limits of predetermined from the pointer display corresponding to a pointing device, and changing the nearest graphic data into a selectable state from this pointer display, and changing a display style, The graphic data which will be chosen before performing actual selection operation can be recognized visually, and it is effective in the accuracy and efficiency of selection operation improving.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a block diagram showing the composition of the selecting arrangement of one working example of the present invention.

[Drawing 2]It is a flow chart which describes operation of the equipment of Fig.1.

[Drawing 3]It is the figure which describes the specific example of application.

[Drawing 4]It is the figure which describes the state after performing dragging in Fig.3.

[Drawing 5]It is the figure which describes the state after performing dragging in Fig.3.

[Explanations of letters or numerals]

10 Selecting arrangement

11 Pointing device

12 Display device

21 Interface part

22 Vector data storage

23 Distance calculating part

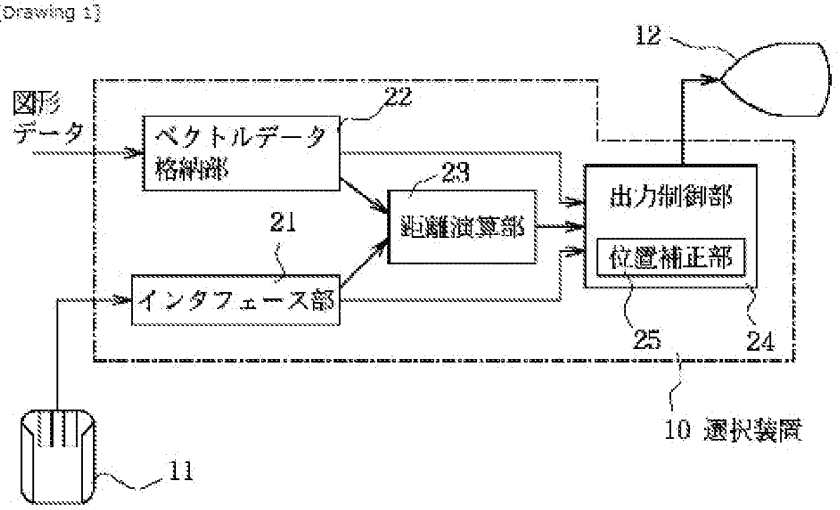
24 Output control part

25 Position correction part

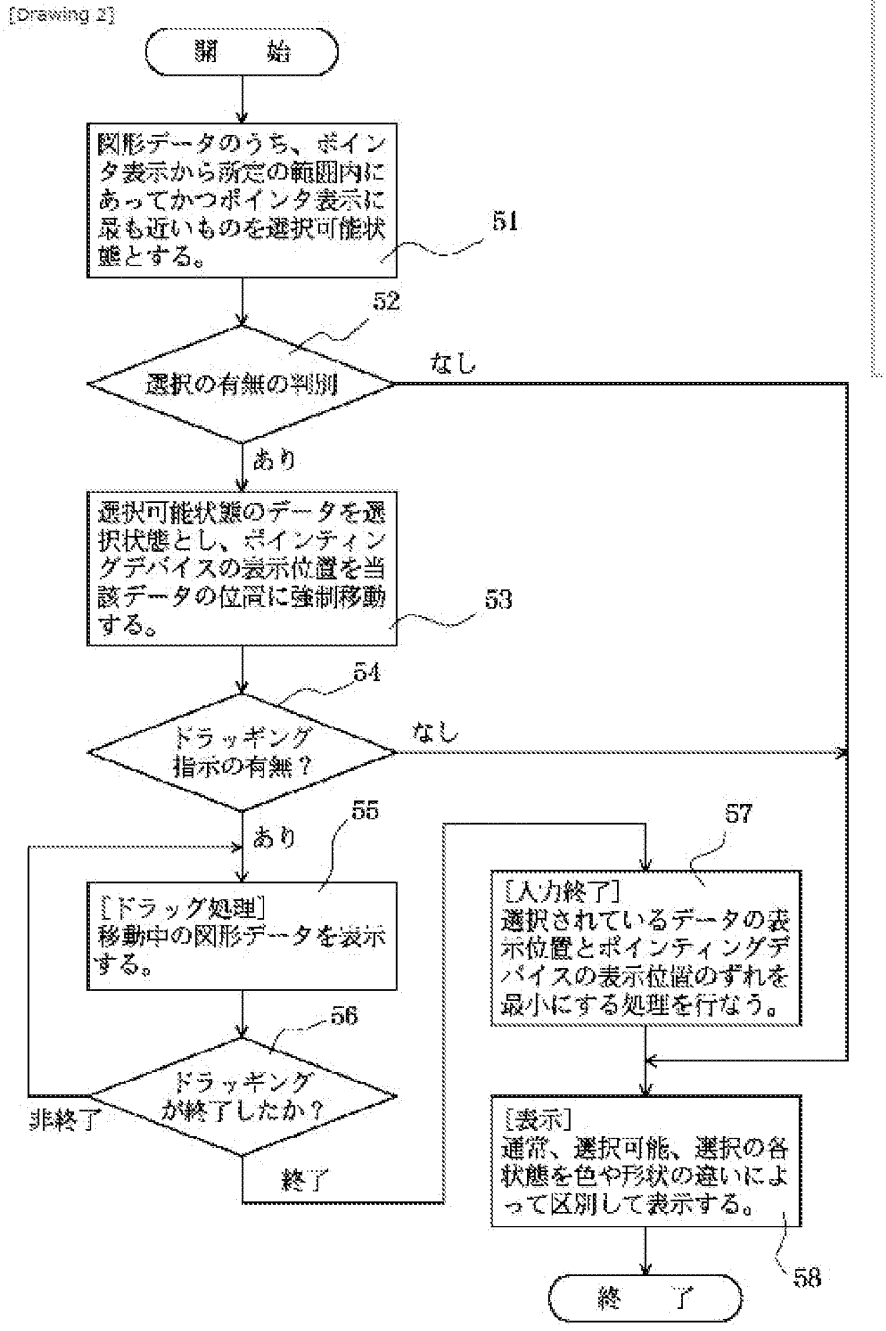
51-58 Step

DRAWINGS

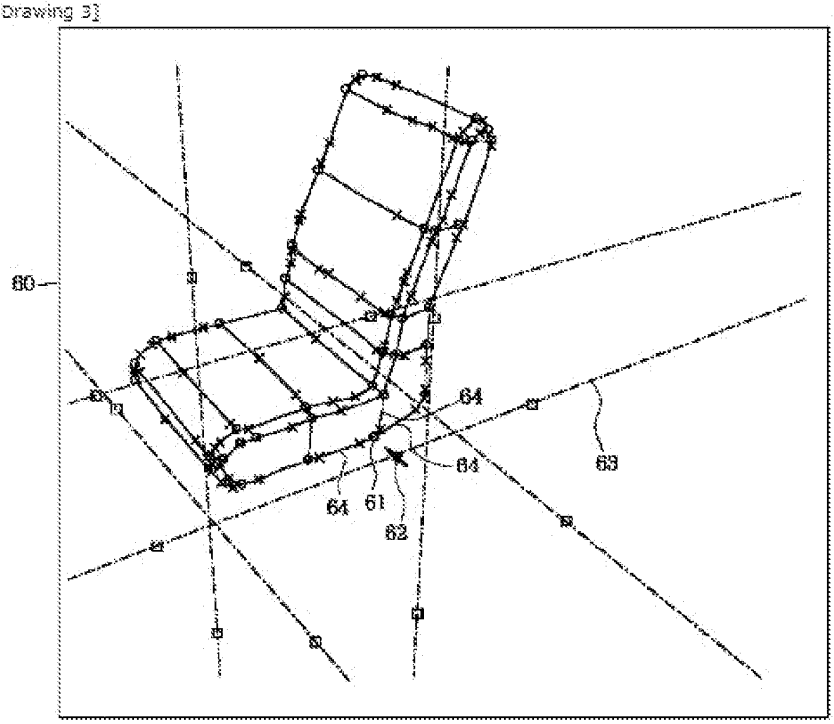
[Drawing 1]



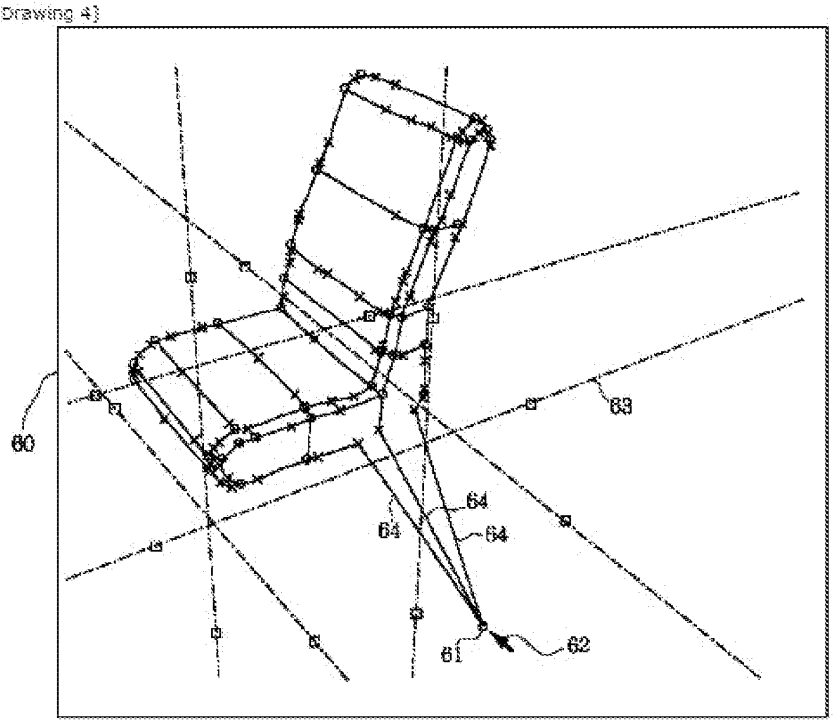
[Drawing 2]


開　始
図形データのうち、ポインタ表示から所定の範囲内にあってかつポインタ表示に最も近いものを選択可能状態とする。
51
52
選択の有無の判別
なし
あり
選択可能状態のデータを選択状態とし、ポインティングデバイスの表示位置を当該データの位置に強制移動する。
53
54
ドラッギング指示の有無？
なし
あり
55
[ドラッグ処理]
移動中の図形データを表示する。
56
ドラッギングが終了したか？
非終了
終了
57
[入力終了]
選択されているデータの表示位置とポインティングデバイスの表示位置のずれを最小にする処理を行なう。
[表示]
通常、選択可能、選択の各状態を色や形状の違いによって区別して表示する。
58
終　了

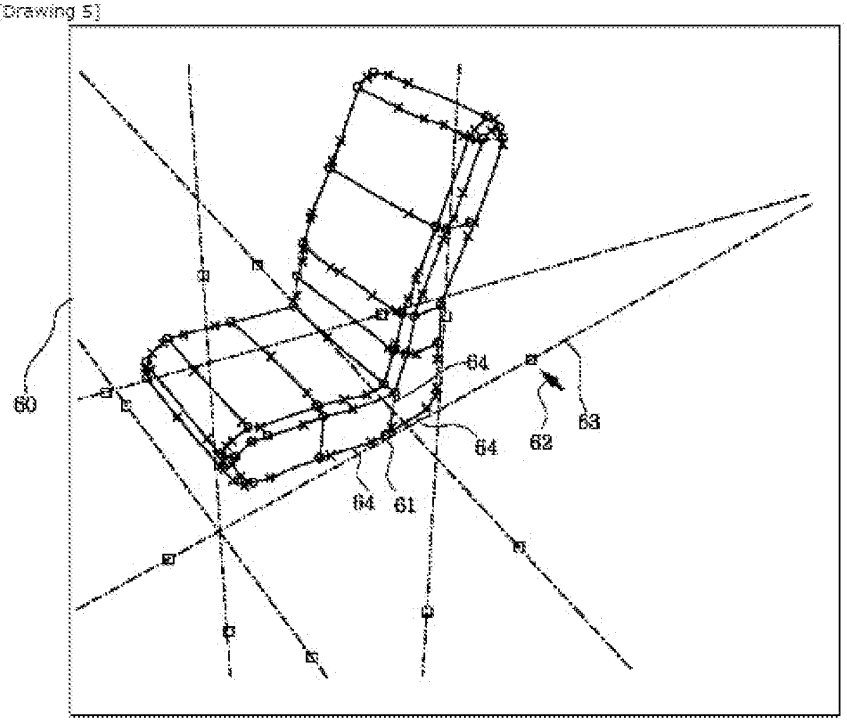
[Drawing 3]



[Drawing 4]



[Drawing 5]



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	3/14	３６０　Ａ	7165－5B		
	15/60	３１０	7623－5L		

審査請求　未請求　請求項の数９　ＯＬ　（全　８　頁）

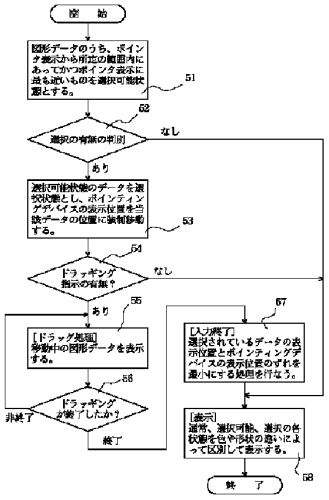
(21)出願番号　特願平5－86104

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(54)【発明の名称】　図形データの選択方法およびその装置

(57)【要約】
【目的】　マウスなどのポインティングデバイスを用いて画面上の図形データの指示・選択を行なう場合に、選択を正確に行なえるようにする。
【構成】　図形データの状態として、選択されていない状態である通常状態と選択された状態である選択状態とのほかに、選択可能状態を設ける。画面上におけるポインティングデバイスのポインタ表示と図形データの表示位置との距離を算出し、ポインタ表示から所定の範囲内にあってかつポインタ表示に最も近い図形データを選択可能状態とする（ステップ５１）。画面上での表示は、通常状態、選択可能状態、選択状態のいずれかにあるかが区別できるように、図形データの色や形状を変化させて行なう（ステップ５８）。



【特許請求の範囲】
【請求項１】　ポインティングデバイスを使用して画面上の図形データを選択する選択方法において、
前記図形データはそれぞれ通常状態、選択可能状態、選択状態のいずれかの状態をとり得るものであり、少なくとも前記通常状態と前記選択可能状態とでは図形データの表示形態が異なり、
前記ポインティングデバイスに対応するポインタ表示の前記画面上での位置から所定の範囲内に存在しかつ前記位置に最も近い図形データを最近接図形として探索する工程と、
前記最近接図形が前記通常状態にある場合に当該最近接図形を選択可能状態に遷移させる遷移工程とを有することを特徴とする図形データの選択方法。
【請求項２】　図形データの選択が指示された場合に選択可能状態の図形データを選択状態に遷移させる選択工程をさらに有する、請求項１に記載の図形データの選択方法。
【請求項３】　選択工程によって選択状態に遷移させられた図形データの表示位置にポインタ表示の位置を強制的に移動させる強制移動工程をさらに有する請求項２に記載の図形データの選択方法。
【請求項４】　表示形態が表示色である請求項１に記載の図形データの選択方法。
【請求項５】　図形データが、線、点、面のうちの少なくとも１つ以上のものである請求項１に記載の図形データの選択方法。
【請求項６】　選択状態にある図形をポインティングデバイスへの操作に応じて画面上で移動させる移動工程をさらに有する請求項２に記載の図形データの選択方法。
【請求項７】　図形データが３次元物体の投影像を描いた１枚の透視図から前記３次元物体の物体データを作成するために使用されるものである請求項１に記載の図形データの選択方法。
【請求項８】　ポインティングデバイスと表示装置とが接続され、前記表示装置の画面上に図形データと前記ポインティングデバイスのポインタ表示とを表示し、図形データの選択を行なう図形データの選択装置において、
前記図形データはそれぞれ通常状態、選択可能状態、選択状態のいずれかの状態をとり得るものであり、
前記図形データを格納する格納手段と、
画面上における前記ポインタ表示の位置と前記図形データとの距離を算出する距離算出手段と、
前記位置から所定の範囲内にあってかつ前記位置から最も近い図形データを最近接図形として検索し、前記最近接図形が通常状態にある場合には当該最近接図形を選択可能状態に遷移させかつ表示形態を変えて前記最近接図形を前記表示装置に表示させる出力制御手段とを有することを特徴とする図形データの選択装置。
【請求項９】　図形データの選択指示が入力される指示入力部を有し、前記選択指示が入力された場合には選択可能状態にある図形データを選択状態に遷移させる請求項８に記載の図形データの選択装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、表示装置の画面上に表示された線分や点などの図形データをマウスなどのポインティングデバイスによって指示・選択する図形データの選択方法およびその装置に関する。
【０００２】
【従来の技術】ＣＡＤシステムあるいは図形処理システム内では、一般に、処理対象の図形は点や線分、面などのベクトルデータとして取り扱われ格納されている。そして、ＣＲＴなどの表示装置の画面上に表示された図形を選択し、選択した図形に対して処理を行なうために、マウスやトラックボールなどのポインティングデバイスが使用されている。
【０００３】ポインティングデバイスを使用する場合、このポインティングデバイスに対応するポインタ表示（例えば矢印表示）が画面上に行なわれ、ポインティングデバイスを操作することにより操作量に応じてポインタ表示が画面上で移動する。そして、画面上の特定の図形を選択する場合には、ポインティングデバイスを操作してポインタ表示をその図形上に移動させ、ポインティングデバイスに備えられたボタンをクリックすればよい。また、ＣＡＤシステムなどで特定の図形を移動させる場合、移動対象の図形を上述のように選択しボタンを押えたままポインティングデバイスを操作してポインタ表示を移動させると（ドラッギング操作）、移動対象の図形も付随して移動する。移動先に図形が位置付けられた時点でボタンを離すことによって図形の移動が完了するようになっている。特開平４－３１０１８６号公報や特開平４－３４２０７２号公報には、ポインティングデバイスによる図形データの選択方法の一例として、ＣＡＤ／ＣＡＭにおけるオートトレース技術が開示されている。
【０００４】
【発明が解決しようとする課題】上述したような従来の図形データの選択方法では、画面上で複数の図形が近接しあるいは一部が重なって配置されている場合、選択しようとしたものではない図形が選択されてしまうという問題点がある。特に、反転や削除といった処理内容を先に指定してから処理対象の図形を選択する場合、図形の選択と同時に処理が行なわれるので、操作者の予期しない処理が行なわれてしまうという問題が生じる。
【０００５】本発明の目的は、図形データの選択を正確に行なうことのできる選択方法およびその装置を提供することにある。
【０００６】
【課題を解決するための手段】本発明の図形データの選

8-2

択方法は、ポインティングデバイスを使用して画面上の図形データを選択する選択方法において、前記図形データは、それぞれ通常状態、選択可能状態、選択状態のいずれかの状態をとり得るものであり、少なくとも前記通常状態と前記選択可能状態とでは図形データの表示形態が異なり、前記ポインティングデバイスに対応するポインタ表示の前記画面上での位置から所定の範囲内に存在しかつ前記位置に最も近い図形データを最近接図形として探索する工程と、前記最近接図形が前記通常状態にある場合に当該最近接図形を選択可能状態に遷移させる遷移工程とを有する。

【０００７】本発明の図形データの選択装置は、ポインティングデバイスと表示装置とが接続され、前記表示装置の画面上に図形データと前記ポインティングデバイスのポインタ表示とを表示し、図形データの選択を行なう図形データの選択装置において、前記図形データはそれぞれ通常状態、選択可能状態、選択状態のいずれかの状態をとり得るものであり、前記図形データを格納する格納手段と、画面上における前記ポインタ表示の位置と前記図形データとの距離を算出する距離算出手段と、前記位置から所定の範囲内にあってかつ前記位置から最も近い図形データを最近接図形として検索し、前記最近接図形が通常状態にある場合には当該最近接図形を選択可能状態に遷移させかつ表示形態を変えて前記最近接図形を前記表示装置に表示させる出力制御手段とを有することを特徴とする。

【０００８】

【作用】本発明では、各図形データのとり得る状態として、通常状態、選択状態のほかに選択可能状態がある。通常状態はポインティングデバイスなどによって選択されていない状態であり、選択状態は指示、選択されている状態である。そして選択可能状態は、選択されているわけではないが、選択される候補であることを示す状態である。ここで通常状態と選択可能状態とで図形データの表示形態を異ならせておき、ポインティングデバイスのポインタ表示から所定の範囲内にあってかつ最も近い図形データのみが選択可能状態に遷移するようすると、実際に選択動作を行なう前にどの図形が選択されるであろうかを視認することが可能となる。すなわち、ある位置にポインタ表示を位置付けたとき、その最近傍の図形データの表示形態が変わるので、クリックするなどの選択動作を行なったときに実際に選択される図形を確認することができる。その結果、意図しない図形データの表示形態が変わったときには、そのまま選択動作を行なってはいけないときであるから、選択しようとする図形データの表示形態が変わるようにポインティングデバイスを操作してポインタ表示を移動させ、そののち選択動作を行なえばよいことになる。この選択動作に伴って、図形データの表示位置にポインタ表示の位置が強制的に移動させられるようにすれば、実際に選択した図形データをより明確に確認することできる。

【０００９】もちろん、ポインティングデバイスへの操作に応じて、選択状態にある図形を画面上で移動させるように、すなわちドラッギング動作が行なわれるようにしてもよい。また、本発明で扱われる図形データは、特に限定されるものではないが、例えば、点、線、面などがある。

【００１０】なお、所定の範囲を定め、この範囲内に図形データが存在する場合に選択可能状態とするので、ポインタ表示が全ての図形データから一定以上離れている場合にはいずれの図形データも選択可能状態となることはなく、ポインタ表示を位置付けるという動作と無関係に図形データが選択可能状態となることはない。したがって、意図せずに選択可能状態となることがなく、操作性がさらに向上する。

【００１１】本発明では、図形データの状態（通常状態、選択可能状態および選択状態）に応じて図形データの表示形態を異ならせるが、この場合、状態に応じて図形の表示色が変化するようにすることができる。表示色を異ならせるほか、線種や線の太さが異なるようにしてもよい。

【００１２】

【実施例】次に、本発明の実施例について図面を参照して説明する。図１は本発明の一実施例の選択装置の構成を示すブロック図であり、図２はこの装置の動作を示すフローチャートである。図１に示した選択装置は、本発明の図形データの選択方法にしたがって動作するものである。

【００１３】選択装置１０には、マウスなどのポインティングデバイス１１と、ＣＲＴなどの表示装置１２が接続されている。選択装置１０は、ポインティングデバイス１１が直接接続されるインタフェース部２１と、図形データをベクトルデータとして格納するベクトルデータ格納部２２と、距離演算部２３と、表示装置１２に図形データおよびポインティングデバイスのポインタ表示の表示を行なわせるための出力制御部２４とが設けられている。図形データは、点データ、線データ、面データなどからなり、それぞれ、通常状態、選択可能状態、選択状態のいずれかの状態をとるようになっている。これら各状態の別は、図形データの表示色あるいは線種などを異ならせることによって行なわれている。例えば、通常状態の図形データは白、選択可能状態は赤、選択状態は緑で表わされるようになっている。

【００１４】インタフェース部２１には、ポインティングデバイス１１への移動操作の情報と、ポインティングデバイス１１を介して選択指示が入力したかの情報が入力するようになっている。ここで移動操作の情報とは、ポインティングデバイス１１がマウスであればそのマウスの移動量である。ベクトルデータ格納部２２は、外部から図形データが供給されるようになっている。距離演

算部２３は、画面上でのポインタ表示の位置と図形データの位置との距離を演算するためのものである。出力制御部２４は、表示・選択の制御を行なうとともに、ドラッギング操作の制御を行ない、さらに、画面上におけるポインタ表示の位置から所定の範囲内に存在しかつ最も近い図形データを最近接図形として探索し、この最近接図形が通常状態にある図形データであれば選択可能状態に遷移させるものである。したがって、出力制御部２４は、最近接図形を選択可能状態に遷移させると同時に、その表示色も変化させる。出力制御部２４の内部には、ドラッキング動作を行なった場合のポインタ表示と図形データとの表示位置のずれを最小にするための位置補正部２５が設けられている。

【００１５】次に、本実施例の動作にてついて図２のフローチャートを用いて説明する。予め図形データをベクトルデータ格納部２２に格納しておく。また、図２のフローチャートでは、制御の流れの開始と終了が示されているが、実際にはポインティングデバイス１１の移動にリアルタイムで応答するため、ごく短い時間間隔でここに示された動作が繰り返して行なわれる。

【００１６】まず距離演算部２３において表示装置１２の画面上におけるポインタ表示と図形データとの距離が算出され、出力制御部２４に制御が移り、ポインタ表示から所定の範囲内にあってポインタ表示に最も近い図形データ（最近接図形）であり、かつ通常状態にある図形データが検索される。そして、この検索された図形データが選択可能状態に遷移させられる（ステップ５１）。この場合、最近接図形がすでに選択可能状態にあれば、新たに他の図形データの状態を遷移させることなく、そのままの状態が維持される。そして、選択の有無、すなわち選択の指示が行なわれているかの判別が行なわれる（ステップ５２）。ここで選択の指示は、ポインティングデバイス１１がマウスの場合、例えばマウスの左ボタンがクリックされることで行なわれる。ここで選択が指示されていない場合には、ステップ５８に移行し、表示処理が行なわれる。表示処理では、通常状態、選択可能状態、選択の各状態に応じて色や形状によって区別され、各図形データが画面上に表示される。

【００１７】一方、ステップ５２で選択の指示が検出された場合には、選択可能状態の図形データを選択状態とし、ポインタ表示をこの図形データの表示位置に強制移動する（ステップ５３）。そして、ドラッギングの指示が行なわれているかの確認が行なわれる（ステップ５４）。ドラッギングの指示は、ポインティングデバイス１１がマウスの場合には、例えば、マウスの左ボタンが押され続けているかどうかを検出して行なわれる。ドラッギングの指示が行なわれていないときは、単なる選択動作なので、上述のステップ５８に移行し、図形データの状態に応じた表示が行なわれる。ステップ５４でドラッキングの指示が行なわれている場合には、ドラッグ処理５５が行なわれる。このドラッグ処理では、ポインティングデバイス１１への移動操作に応じて、選択された図形データの位置とポインタ表示の位置とが画面上で移動し更新される（ステップ５５）。そして、ドラッギングが終了したかの判定がなされる（ステップ５６）。ドラッギングが終了したことは、マウスの場合であれば、マウスの左ボタンの押下げが終了しているかどうかを検出することによって判定できる。ドラッキングが終了していない場合には、ステップ５５に戻ってドラッキング処理を繰り返す。

【００１８】ステップ５６でドラッキングの終了が検出された場合、位置補正部２５によって入力終了処理が行なわれる（ステップ５７）。この入力終了処理は、画面上での選択されている図形データの表示位置とポインタ表示の位置とのずれを最小にする処理である。このような処理を行なうのは、元になるベクトルデータに適宜の拡大率あるいは縮小率を乗じて画面上に図形を表示している場合などに、ステップ５５のドラッグ処理を繰り返しているうちに誤差が累積し、ステップ５３で両者の表示位置を一致させたにも関わらず、ポインタ表示と図形データとがずれてしまうことがあるからである。ポインティングデバイス１１に対応するポインタ表示の位置の方が操作者の意図をよく反映していると考えられるので、入力終了処理では、元になるベクトルデータの補正を行ない、上記のずれが最小になるようにする。そののち、上述したステップ５８に移行して、表示処理が行なわれる。

【００１９】次に、本実施例を具体的事例に即して説明する。ここでは、透視図からの物体データ作成に用いた例を説明する。

【００２０】透視図からの物体データ作成とは、本出願人による特願平４－２９６７７５（「透視図からの物体データ作成装置および方法」）にあるように、写真やスケッチなどの１枚の透視図からその図に描かれた（投影された）物体の３次元データを獲得することである。この手法は、平面で物体を切ったときの切口を表わす断面線とその平面に対応する消失点の位置と透視図の視点の位置とからその平面を表現する方程式を求め、求められた方程式の表わす平面上への断面線の投影像を計算することによって、対象とする物体の３次元データを得ようとするものである。この場合、断面線は投影像に対応するものであって、透視図に最初から描いておいてもよいし、図形処理システムなどを用いて後から透視図に書き足してもよい。いずれにせよ、計算の都合上、断面線は処理システム内部で線分データあるいはベクトルデータとして保持されていることが望ましい。また、作成された３次元物体データを逐次参照しながら断面線や消失点の位置を変化させ、所望のデータが得られるように操作することも行なわれる。この具体例は、本実施例の選択装置を用い、断面線や消失線を選択しつつこれらの位置

を補正する場合についてのものである。

【００２１】図３は、乗物用座席を描いた透視図から抽出された断面線（実線）が表示画面６０上に表示されている状態を示している。この断面線は乗物用座席の３次元データを得るために使用されるものであり、複数の線データの集まりとして表わされている。また、一点鎖線は、各消失点に対応する消失線を示し、○印は端点、×印は通過点、□印は消失線を操作するためのポイントを示している。断面線は端点あるいは通過点ごとに個々の線要素に分割されている。ここで、端点６１に注目し、この端点６１に対してドラッギング操作を施す場合を考える。

【００２２】まず、ポインティングデバイスを操作し、図示矢印状のポインタ表示６２を端点６１に近接させる。すると、端点６１が通常状態から選択可能状態に遷移し、端点６１の表示形態、例えば表示色が変化する。そして、選択動作を行なうと端点６１が選択状態となり、そのままドラッギングを行なう。ドラッギングを行なったのちの状態が図４に示されている。

【００２３】端点６１の近傍には、断面線の構成要素である３本の線要素６４が存在するが、本実施例の選択方法を用いることにより、目的とする図形データすなわち端点６１を的確に選択することができる。同様に消失線６３に対してドラッギング操作を行なった結果が図５に示されている。

【００２４】

【発明の効果】以上説明したように本発明は、図形データの取り得る状態として通常状態と選択状態とのほかに選択可能状態を設け、ポインティングデバイスに対応するポインタ表示から所定の範囲内にあってかつこのポインタ表示から最も近い図形データを選択可能状態とし表示形態を異ならせることにより、実際の選択動作を行なう前に選択されるであろう図形データを視認することができることとなって、選択動作の正確さや効率が向上するという効果がある。

【図面の簡単な説明】

【図１】本発明の一実施例の選択装置の構成を示すブロック図である。

【図２】図１の装置の動作を説明するフローチャートである。

【図３】具体的な適用例を説明する図である。

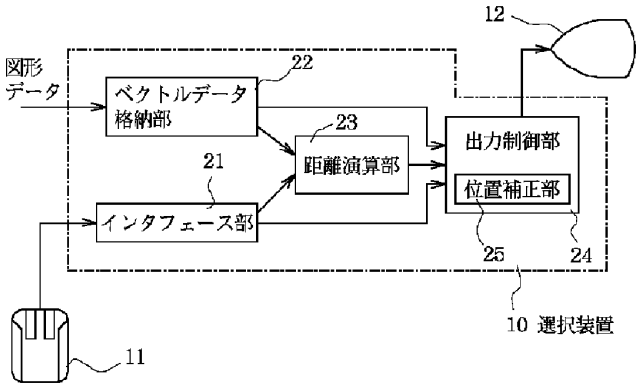
【図４】図３においてドラッギングを行なった後の状態を説明する図である。

【図５】図３においてドラッギングを行なった後の状態を説明する図である。

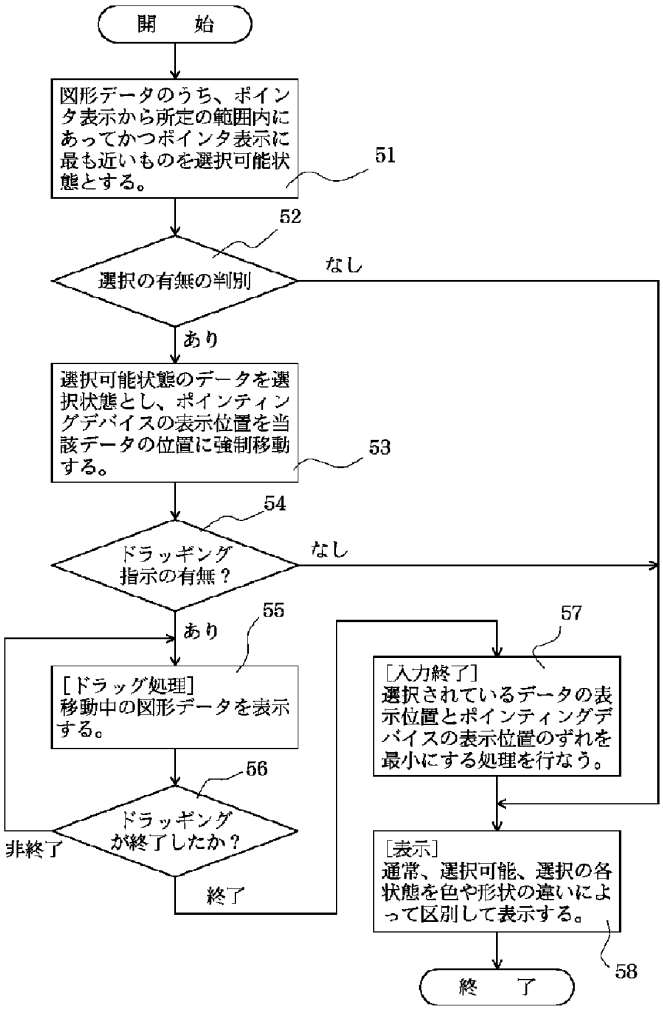
【符号の説明】

１０　選択装置
１１　ポインティングデバイス
１２　表示装置
２１　インタフェース部
２２　ベクトルデータ格納部
２３　距離演算部
２４　出力制御部
２５　位置補正部
５１～５８　ステップ

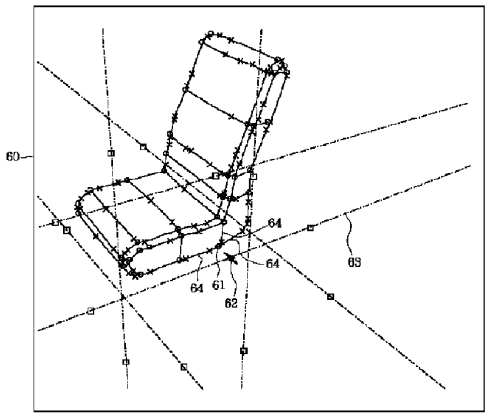
【図１】



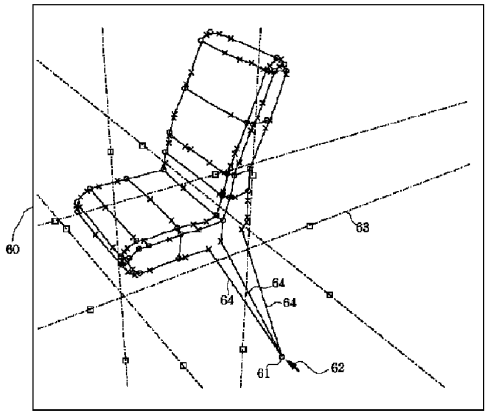
【図２】


開　始
図形データのうち、ポインタ表示から所定の範囲内にあってかつポインタ表示に最も近いものを選択可能状態とする。
51
52
選択の有無の判別
なし
あり
選択可能状態のデータを選択状態とし、ポインティングデバイスの表示位置を当該データの位置に強制移動する。
53
54
ドラッギング指示の有無？
なし
あり
55
[ドラッグ処理]
移動中の図形データを表示する。
56
ドラッギングが終了したか？
非終了
終了
57
[入力終了]
選択されているデータの表示位置とポインティングデバイスの表示位置のずれを最小にする処理を行なう。
[表示]
通常、選択可能、選択の各状態を色や形状の違いによって区別して表示する。
58
終　了

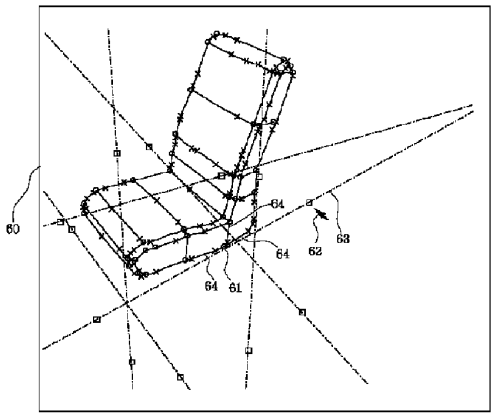
【図３】



【図４】



【図５】



Electronic Acknowledgement Receipt

EFS ID:	26057400
Application Number:	14921269
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Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Form (SB08)	IDS20160614_3040530001_IDS.pdf	32806 8357a40ba83bb1c7062d0159dd4abb6f004d808f	no	1
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4	Non Patent Literature	IDS20160614_3040530001_NPL_1_CLO3D2011MarvelousDesigner.pdf	16719581 95884b2dac2417bac615be1e1c426af1265db94e	no	369
Warnings:					
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5	Non Patent Literature	IDS20160614_3040530001_NPL_2_KR-OA.pdf	1439949 75d64a73c58a4fe71550adc6e87cfcd1cb8deadf	no	5
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney Docket No. 304053.0001
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS: Seung Woo OH, et al. **CONFIRMATION NO.:** 6021

APPLICATION NO.: 14/921,269 **GROUP ART UNIT:** 2613

FILING DATE: October 23, 2015 **EXAMINER:** Xiao Min WU

TITLE: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicant hereby submits an Information Disclosure Statement for consideration by the Examiner.

The patents, publications and other information submitted for consideration by the Office (except unpublished U.S. patent applications) are listed on Form PTO/SB/08 attached hereto.

This Information Disclosure Statement is being filed pursuant to 37 CFR 1.97(b)(3) because it is being filed before the mailing of a first Office Action on the merits, such that neither a statement under 37 CFR 1.97(e) nor the fee of $180.00 set forth in 37 CFR 1.17(p) is required.

Attached hereto is a sheet entitled "Information Disclosure Statement by Applicant" listing one foreign patent document and two non-patent literature documents, and copies of these three documents, including an English abstract of the foreign patent document and a complete English translation of the substantive portion of one of the non-patent literature documents.

The references cited on the PTO/SB/08 were cited in a Korean Office Action issued on March 28, 2015 in counterpart Korean Application No. 10-2015-0059086. A copy of the Korean Office Action is enclosed.

The concise statement of the relevance of JP 6-301763 A and non-patent literature document *CLO 3D 2011 Marvelous Designer Manual* pursuant to 37 CFR 1.98(a)(3)(1) is provided by the English translations of these references.

No fee is believed to be due in light of the above-noted status or above-provided certification.

It is respectfully requested that this Information Disclosure Statement be considered.

Respectfully submitted,

/Brian H. Buck/

Dated: June 14, 2016 By_____

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Enclosures: Form PTO/SB/08 (1 sheet)
Documents



별첨 사본은 아래 출원의 원본과 동일함을 증명함.

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office

출 원 번 호 : 10-2015-0059086
Application Number

출 원 년 월 일 : 2015년 04월 27일
Filing Date APR. 27, 2015

출 원 인 : (주)클로버추얼패션
Applicant(s) CLO virtual fashion

2016년 04월 25일

특 허 청
COMMISSIONER

제출 일자 : 2015-04-27

【서지사항】

【서류명】 특허출원서

【출원구분】 특허출원

【출원인】

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【출원인코드】 1-2009-003174-4

【대리인】

【명칭】 특허법인 신지

【대리인코드】 9-2010-100061-8

【지정된변리사】 이헌수, 유경열, 문호지, 박진석, 김병주

【포괄위임등록번호】 2014-050805-4

【발명의 국문명칭】 디지털 의상 객체 생성 방법 및 장치

【발명의 영문명칭】 method and apparatus for generating digital cloth object

【발명자】

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【성명의 영문표기】 OH SEUNG WOO

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제출 일자 : 2015-04-27

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대리인 특허법인 신지 (서명 또는 인)

【수수료】

【출원료】	0	면	46,000 원
【가산출원료】	55	면	0 원
【우선권주장료】	0	건	0 원
【심사청구료】	17	항	891,000 원
【합계】	937,000 원		
【감면사유】	중기업(70%감면)[1]		
【감면후 수수료】	281,100 원		

【수수료 자동납부번호】 05409725904017

제출 일자 : 2015-04-27

【명세서】

【발명의 명칭】

디지털 의상 객체 생성 방법 및 장치{method and apparatus for generating digital cloth object}

【기술분야】

<1> 컴퓨터 시뮬레이션 기술에 관련된 것으로, 보다 상세하게는 2D 의상 패턴들을 재봉 처리하여 디지털 의상 객체를 생성하는 시뮬레이션 기술에 관한 것이다.

【배경기술】

<2> 현재 의상 시뮬레이션 기술은, 패션 산업뿐만 아니라 게임, 애니메이션, 영화 특수 효과에 이르기까지 다양한 분야에서 사용되고 있다. 또한 가상 세계에서의 의상 아이템 판매의 시장 규모도 수 조원에 달한다. 이 기술은 옷감을 질량을 가진 메쉬(mesh)로 모델링하여 옷을 입은 아바타의 움직임이나 바람, 조명 등의 외부 움직임에 따라 옷감의 움직임을 시뮬레이션할 수 있는 기술이다.

<3> 패턴으로부터 디지털 의상 객체를 생성하기 위한 재봉 시뮬레이션 방법에서 서로 다른 2개의 패턴을 재봉하는 방식에는 선분 재봉 및 자유 재봉이 있다.

<4> 선분 재봉은 점으로 구분되어 있는 선분들 중 선택된 두 선분을 재봉하는 것이고 자유 재봉은 재봉할 두 선분의 길이를 각각 자유롭게 조절하여 사용자가 원하는 조절된 길이를 가지는 두 선분을 재봉하는 것이다.

<5> 자유 재봉의 경우, 자세하게 사용자가 재봉할 두 선분의 길이를 같도록 조절하여 재봉하려는 경우, 먼저 선택된 하나의 선분의 길이와 같은 나머지 하나의 선분의 길이를 마우스와 같은 입력 장치를 통해 조절하는 것은 정밀함이 요구된다.

<6> 자유 재봉에서 재봉하려는 선분의 길이를 다르게 제도하여 재봉하게 되면, 잘 늘어나는 원단의 경우 디지털 의상도 마치 같은 길이로 재봉한 것처럼 보일 수 있다. 그러나 잘 늘어나지 않는 원단의 경우에는 디지털 의상에 주름이 생길 수 있다.

<7> 나아가, 자유 재봉으로 재봉될 두 선분의 길이를 다르게 설정하려는 경우, 나중에 선택된 선분이 처음 선택된 선분에 비해 얼마나 짧은지 또는 얼마나 긴지를 나중에 선택된 선분의 길이를 조절하는 과정에서 인지할 필요가 있다.

<8> 또한, 재봉될 두 선분의 길이 차이가 재봉이 불가능 해질 정도의 차이 이상일 때 경고 표시를 표시하여, 나중에 선택된 선분의 길이를 조절하는 과정에서 사용자가 인식하도록 할 필요가 있다.

【발명의 내용】

【해결하려는 과제】

<9> 본 발명은 자유 재봉시, 패턴상에서 선택된 선분의 길이와 같은 길이를 가지도록 재봉될 다른 선분의 길이를 쉽게 조절하게 함을 목적으로 한다.

<10> 본 발명은 자유 재봉시, 패턴상에서 선택된 선분과 선택된 선분과 재봉될 선

분의 길이 차이를 산출하여 표시함으로써 정밀한 재봉이 이루어지게 함을 다른 목적으로 한다.

<11> 본 발명은 자유 재봉시, 패턴상에서 선택된 선분과 선택된 선분과 재봉될 선분의 길이 차이가 재봉이 불가능할 정도로 큰 경우 경고 표시를 사용자가 인지하게 함을 또 다른 목적으로 한다.

【과제의 해결 수단】

<12> 일 양상에 따른, 컴퓨팅 요소와, 패턴 및 드레이핑(draping)된 디지털 의상 객체를 저장하는 저장 요소를 포함하는 컴퓨팅 장치에 의해 실행 가능한 디지털 의상 객체 생성 방법에 있어서, 디지털 의상 객체 생성 방법은 패턴 상의 일측 재봉 가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정하는 일측 재봉선택선 설정 단계와 일측 재봉선택선과 재봉될 적어도 하나의 타측 재봉가능선에서 타측 재봉선택선의 시작점을 입력 받는 시작점 입력 단계, 포인팅 선택 이벤트 발생시, 상기 시작점이 입력된 타측 재봉가능선에서 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는 끝점 입력 단계, 상기 입력된 시작점으로부터 입력된 끝점까지의 타측 재봉가능선 구간을 타측 재봉선택선으로 설정하는 설정 단계를 포함하는 타측 재봉선택선 설정 단계 및 재봉 명령에 따라 상기 일측 재봉선택선과 타측 재봉선택선을 재봉 처리하여 3D의상 객체를 생성하는 드레이핑 단계를 포함할 수 있다.

<13> 다른 양상에 있어서, 일측 재봉가능선 또는 타측 재봉가능선은 직선, 곡선, 다중 분기선, 다각형 및 원 중 적어도 하나일 수 있다.

<14> 또 다른 양상에 있어서, 디지털 의상 객체 생성 방법은 상기 타측 재봉선택선 설정 단계가 시작점 입력 단계와 끝점 입력 단계 사이에 현재 커서 위치를 검출하는 커서 위치 검출 단계, 입력된 시작점으로부터 상기 검출된 현재 커서 위치와 최단 거리이면서 타측 재봉가능선을 따라 일측 재봉선택선의 길이와 같게 되는 점을 타측 재봉선택선의 끝점 후보로 산출하고 이를 표시하는 끝점 후보 표시 단계를 더 포함할 수 있다.

<15> 또 다른 양상에 있어서, 타측 재봉선택선 설정 단계는 현재 커서 위치와 산출된 끝점 후보 위치 간의 차이가 기준치 이하이면 커서가 산출된 끝점 후보 위치로 이동하여 표시되는 커서 위치 이동 단계를 더 포함할 수 있다.

<16> 또 다른 양상에 있어서, 타측 재봉선택선 설정 단계는 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이 중 적어도 하나를 산출하여 표시하는 길이 표시 단계를 더 포함할 수 있다.

<17> 또 다른 양상에 있어서, 타측 재봉선택선 설정 단계는 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 표시하는 차이값 표시 단계를 더 포함할 수 있다.

<18> 또 다른 양상에 있어서, 타측 재봉선택선 설정 단계는 차이값이 기준치 이상이면 경고 표시를 하는 경고 표시 단계를 더 포함할 수 있다.

<19> 또 다른 양상에 있어서, 경고 표시 단계는 차이값이 기준치 이상이면 산출된 길이 및 차이값의 색깔을 바꾸어 경고 표시를 할 수 있다.

【발명의 효과】

<20> 본 발명은 패턴상에서 선택된 선분과 선택된 선분과 재봉할 선분의 길이를 같도록 설정할 수 있다.

<21> 본 발명은 패턴상에서 선택된 선분과 선택된 선분과 재봉할 선분의 길이가 상이할 때 그 차이값을 확인할 수 있다.

【도면의 간단한 설명】

<22> 도 1은 일 실시예에 따른 디지털 의상 객체 생성 방법의 흐름을 도시한다.

도 2는 일 실시예에 따른 타측 재봉선택선 설정 단계의 세부적인 흐름을 도시한다.

도 3은 일측 재봉선택선 설정 단계를 설명하기 위한 일 예를 도시한다.

도 4는 일측 재봉선택선 설정 단계를 설명하기 위한 다른 예를 도시한다.

도 5는 타측 재봉선택선 설정 단계를 설명하기 위한 일 예를 도시한다.

도 6은 끝점 후보 표시 단계를 설명하기 위한 일 예를 도시한다.

도 7은 커서 위치 이동 단계, 길이 표시 단계, 차이값 표시 단계를 설명하기 위한 일 예를 도시한다.

도 8은 차이값 표시 단계 및 경고 표시 단계를 설명하기 위한 일 예를 도시한다.

도 9는 차이값 표시 단계 및 경고 표시 단계를 설명하기 위한 다른 예를 도시한다.

도 10은 2D 패턴 및 드레이핑 전의 3D 패턴을 도시한다.

도 11은 2D 패턴 및 드레이핑 후의 3D 패턴을 도시한다.

도 12는 일측 재봉가능선 및 타측 재봉가능선의 다양한 형태를 도시한다.

도 13은 일 실시예에 따른 디지털 의상 객체 생성 장치의 구성을 도시한다.

【발명을 실시하기 위한 구체적인 내용】

<23> 전술한, 그리고 추가적인 양상들은 첨부된 도면을 참조하여 설명하는 실시예들을 통해 구체화된다. 각 실시예들의 구성 요소들은 다른 언급이나 상호간에 모순이 없는 한 실시예 내에서 다양한 조합이 가능한 것으로 이해된다. 나아가 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다.

<24> 도면에서 본 발명을 명확하게 설명하기 위해서 설명과 관계없는 부분은 생략하였으며, 명세서 전체를 통하여 유사한 부분에 대해서는 유사한 도면 부호를 붙였다. 그리고, 어떤 부분이 어떤 구성 요소를 "포함"한다고 할 때, 이는 특별히 반대

되는 기재가 없는 한 다른 구성 요소를 제외하는 것이 아니라 다른 구성 요소를 더 포함할 수 있는 것을 의미한다. 명세서에서 기술한 부란, "하드웨어 또는 소프트웨어의 시스템을 변경이나 플러그인 가능하도록 구성한 블록"을 의미하는 것으로서, 즉 하드웨어나 소프트웨어에 있어 기능을 수행하는 하나의 단위 또는 블록을 의미한다.

<25> 제안된 디지털 의상 객체 생성 방법 및 그 장치와 그 방법을 실행시키기 위한 컴퓨터 프로그램을 기록한 기록 매체는 3D 시뮬레이션 기술 분야에 적용될 수 있다.

<26> 디지털 의상은 실제 의상 제작 과정을 모티브로 하여 그 과정을 반영한 컴퓨터 시뮬레이션 저작 프로그램을 통하여 생성 된다. 예를 들어 제작자가 의상의 2D 패턴을 그린 후, 옷을 입게 될 아바타 모델에 2D 패턴을 드레이핑 시뮬레이션 한다. 드레이핑 결과를 렌더링 하여 표시함으로써 3D의상이 화면으로 출력된다. 아바타 모델과 2D 의상 패턴은 사용자가 직접 컴퓨터 프로그램을 통하여 그리거나, 저장된 것을 사용할 수 있다. 사용자가 직접 그리는 경우 다양한 그래픽 소프트웨어나 CAD 프로그램을 사용하여 입력할 수 있으며, 제공되는 2D 패턴 제작 툴을 사용할 수도 있다.

<27> 일 실시예에 따른 디지털 의상 착장 시뮬레이션 방법에서 드레이핑 시뮬레이션 방법은, 패턴의 메쉬화 단계, 아바타 주변에 패턴의 배치, 패턴과 아바타의 충돌 여부를 판단하는 단계와, 충돌 제거 힘(force)을 생성하는 단계 및 드레이핑 시뮬레이션 과정을 수행하는 단계를 포함한다. 패턴의 메쉬화 단계는 딜러니 삼각화

(Delaunay Triangulation) 기법을 적용하여 이루어 질 수 있으며, 드레이핑 시뮬레이션 과정은 일 실시 예로 [Pascal Volino, Nadia MagnenatThalmann: Resolving surface collisions through intersection contour minimization.ACM Trans. Graph. 25(3): 1154-1159 (2006)]에 게시된 방법을 사용할 수 있다.

<28> 도 1은 일 실시에에 따른 디지털 의상 객체 생성 방법의 흐름을 도시한다.

<29> 일 양상에 있어서, 컴퓨팅 요소와, 패턴 및 드레이핑(draping)된 디지털 의상 객체를 저장하는 저장 요소를 포함하는 컴퓨팅 장치에 의해 실행 가능한 디지털 의상 객체 생성 방법은 일측 재봉선택선 설정 단계(S10), 타측 재봉선택선 설정 단계(S20) 및 드레이핑 단계(S30)를 포함할 수 있다.

<30> 일 실시예에 있어서, 일측 재봉선택선 설정 단계(S10)는 패턴 상의 일측 재봉가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정한다. 일측 재봉선택선 설정 단계(S10)는 재봉될 두 개의 선 중 하나의 선인 일측 재봉선택선을 입력할 수 있다. 일측 재봉선택선을 입력 하는 방법은 마우스, 터치 펜, 키보드 등의 입력 장치를 통해 직접 재봉하려는 부분을 선택하거나, 컴퓨터 프로그램을 통하여 어느 하나의 패턴 상에 선택 가능한 외곽선을 제시하여 사용자가 선택하게 할 수도 있다.

<31> 입력 장치를 통해 직접 재봉하려는 일측 재봉선택선을을 선택할 경우, 일측

재봉선택선의 시작점과 끝점을 입력하여 선택할 수 있다. 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력하는 위치인 커서가 어느 하나의 패턴 상에 존재하는 재봉 가능선에 존재 하지 않는데, 현재 커서 위치를 시작점 또는 끝점으로 선택한 경우 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 시작점 또는 끝점으로 할 수 있다. 일측 재봉선택선 설정 단계(S10)에 대한 추가적인 설명은 도 3 및 도 4에 대한 설명과 함께 후술한다.

<32> 패턴은 3D 의상을 구성하기 위해 재단되는 옷 본을 컴퓨터에서 2차원 객체로 시뮬레이션 한 2D 패턴 및 3차원 객체로 시뮬레이션 한 3D 패턴 중 적어도 하나를 포함할 수 있다. 2D 패턴은 디지털 의상을 구성하기 위해 재단되는 옷 본을 컴퓨터에서 2차원 객체로 시뮬레이션 한 것을 말한다. 2D 패턴은 옷감의 외형과 물리적인 특성의 설정으로 생성된다. 2D 패턴의 외형을 나타내기 위해서는 2D 패턴의 외곽선 정보 입력이 필요하다. CAD 툴이나 다양한 그래픽 프로그램 툴을 이용하여 패턴의 외곽선과 꼭지점을 생성할 수 있고, 또는 의상 유형에 따른 2D 패턴 모델로 구성된 저장 장치로부터 선택하여 사용할 수 있다. 외곽선에 의해 외형이 결정된 2D 패턴의 내부는 삼각형 또는 사각형의 메쉬로 구성될 수 있다. 메쉬는 질량을 갖는 격자 점과 격자 점을 연결하는 스프링으로 구성될 수 있다. 격자 점과 스프링을 통해 2D 패턴 소재의 성질, 옷감의 접힘, 늘어뜨림 등의 모양을 나타낼 수 있다.

<33> 일 양상에 있어서, 타측 재봉선택선 설정 단계(S20)는 시작점 입력 단계

(S21), 끝점 입력 단계(S30) 및 설정 단계(S31)를 포함할 수 있다. 타측 재봉선택선은 일측 재봉선택선과 재봉될 선으로 이에 대한 구체적인 설명은 후술한다.

<34> 일 실시예에 있어서, 드레이핑 단계(S30)는 재봉 명령에 따라 상기 일측 재봉선택선과 타측 재봉선택선을 재봉 처리하여 디지털 의상 객체를 생성한다. 드레이핑 단계(S30)에서는 2D 패턴이 아바타 모델 주위로 배치되면서 사용자가 설정한 재봉선택선에 따라 재봉된다.

<35> 일반적으로 착장(draping)은 바디(body)에 직접 천을 대면서 디자인을 창작하거나, 예정된 디자인의 다트나 이음을 재단하면서 입체적으로 완성하는 기법을 의미한다. 본 명세서에서 '착장'은 컴퓨터 프로그램에 의해 2D 패턴 정보로부터 3D의상 객체를 생성하는 과정을 의미한다. 2D 패턴상에 재봉될 재봉선택선이 입력되면 2D 패턴이 결합되면서 디지털 의상이 3D 객체 상에 생성 즉 착장 된다. 드레이핑 단계(S30)에 대한 구체적인 설명은 도 10 및 도 11의 설명과 함께 후술한다.

<36> 도 2는 일 실시예에 따른 타측 재봉선택선 설정 단계(S20)의 세부적인 흐름을 도시한다.

<37> 전술한 것처럼 타측 재봉선택선 설정 단계(S20)는 시작점 입력 단계(S21), 끝점 입력 단계(S30) 및 설정 단계(S31)를 포함한다.

<38> 일 실시예에 있어서, 시작점 입력 단계(S21)는 일측 재봉선택선과 재봉될 적

어도 하나의 타측 재봉가능선에서 타측 재봉선택선의 시작점을 입력 받는다. 타측 재봉선택선의 시작점은 마우스, 터치 팬, 키보드 등의 입력 장치를 통해 직접 선택될 수 있다. 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력하는 위치인 커서가 어느 하나의 2D 패턴 상에 존재하는 재봉가능선에 존재 하지 않는데, 현재 커서 위치를 시작점으로 선택한 경우, 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 시작점으로 할 수 있다. 시작점 입력 단계(S21)에 대한 추가적인 설명은 도 5 에 대한 설명과 함께 후술한다.

<39> 일 실시예에 있어서, 끝점 입력 단계(S30)는 포인팅 선택 이벤트 발생시, 상기 시작점이 입력된 타측 재봉가능선에서 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는다. 현재 커서의 위치가 복수의 타측 재봉가능선 중 시작점이 입력된 타측 재봉가능선과 가장 가까운 경우, 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는다. 현재 커서의 위치가 시작점이 입력된 타측 재봉가능선이 아닌 다른 타측 재봉가능선과 더 가까이 있는데 포인팅 선택 이벤트가 발생한 경우, 끝점 입력이 이루어 지지 않을 수 있다. 일측 재봉선택선의 길이와 동일한 길이를 같도록 타측 재봉선택선의 끝점을 선택할 수 있지만, 이에 한정되는 것은 아니고 일측 재봉선택선의 길이와 다른 길이를 가지도록 타측 재봉선택선의 끝점을 선택할 수도 있다.

<40> 일 실시예에 있어서, 설정 단계(S31)는 입력된 시작점으로부터 입력된 끝점

까지의 타측 재봉가능선 구간을 타측 재봉선택선으로 설정한다. 일측 재봉선택선과 타측 재봉선택선의 길이가 같은 경우 디지털 의상에 주름 없이 재봉이 이루어질 수 있다. 의도적으로 일측 재봉선택선의 길이와 타측 재봉선택선의 길이를 다르게 함으로써 주름을 생성하고, 이를 통해 미적인 효과를 낼 수 있다. 일측 재봉선택선의 길이와 타측 재봉선택선의 길이가 다르더라도 원단의 늘어남 정도에 따라 주름이 생기지 않을 수 있다.

<41> 일 실시예에 있어서, 일측 재봉가능선 또는 타측 재봉가능선은 직선, 곡선, 다중 분기선 그리고 다각형 및 원을 포함하는 도형 중 적어도 하나일 수 있다. 패턴의 형태가 원인 경우 원 테두리 전체를 재봉하면 일측 재봉가능선 또는 타측 재봉가능선은 원이다. 원의 일부를 재봉하면 일측 재봉가능선 또는 타측 재봉가능선은 곡선이다. 일측 재봉가능선 또는 타측 재봉가능선의 다양한 형태는 도 12에 대한 설명과 함께 후술한다.

<42> 일 양상에 있어서, 디지털 의상 객체 생성 방법은 타측 재봉선택선 설정 단계(S20)가 시작점 입력 단계(S21)와 끝점 입력 단계(S30) 사이에 커서 위치 검출 단계(S22) 및 끝점 후보 표시 단계(S23)를 더 포함할 수 있다.

<43> 일 실시예에 있어서, 커서 위치 검출 단계(S22)는 현재 커서 위치를 검출한

다.

<44> 일 실시예에 있어서, 끝점 후보 표시 단계(S23)는 입력된 시작점으로부터 상기 검출된 현재 커서 위치와 최단 거리이면서 입력된 시작점을 포함하는 타측 재봉 가능선을 따라 일측 재봉선택선의 길이와 같게 되는 점을 타측 재봉선택선의 끝점 후보로 산출하고 이를 표시한다. 끝점 후보가 표시됨에 따라 패턴 상에서 일측 재봉선택선의 길이와 같은 길이를 가지도록 타측 재봉선택선의 끝점을 쉽게 선택할 수 있다. 끝점 후보 표시 단계(S23)에 대한 부가적인 설명은 도 6에 대한 설명과 함께 후술한다.

<45> 일 양상에 있어서, 타측 재봉선택선 설정 단계(S20)는 커서 위치 이동 단계(S24, S25)를 더 포함할 수 있다. 일 실시예에 있어서 커서 위치 이동 단계는 현재 커서 위치와 산출된 끝점 후보 위치 간의 차이가 기준치 이하이면 커서가 산출된 끝점 후보 위치로 이동(S25)하여 표시된다. 예를 들어, 기준치는 15픽셀(Px, Pixel)이다. 기준치는 사용자가 자유롭게 설정할 수 있다. 커서가 끝점 후보 위치 근처에 위치하는 경우 커서가 끝점 후보상으로 이동하여, 일측 재봉선택선과 같은 길이를 가지는 타측 재봉선택선을 쉽게 설정할 수 있다. 커서 위치 이동 단계(S24, S25)에 대한 부가적인 설명은 도 7에 대한 설명과 함께 후술한다.

<46> 일 양상에 있어서, 타측 재봉선 설정 단계(S31)는 길이 표시 단계(S26)를 더

포함할 수 있다. 일 실시예에 있어서, 길이 표시 단계(S26)는 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이 중 적어도 하나를 산출하여 숫자로 표시한다. 커서의 위치가 이동됨에 따라 바뀌는 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이를 지속적으로 확인할 수 있다. 길이 표시 단계(S26)에 대한 추가적인 설명은 도 7에 대한 설명과 함께 후술한다.

<47> 일 양상에 있어서, 디지털 의상 객체 생성 방법은 차이값 표시 단계(S27)를 더 포함할 수 있다. 일 실시예에 있어서, 차이값 표시 단계(S27)는 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 숫자로 표시한다. 사용자는 일측 재봉선택선의 길이, 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이를 확인할 수 있고, 이에 나아가, 일측 재봉선택선의 길이와 차이값 표시 단계(S27)는 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 확인할 수 있다. 사용자는 차이값을 확인하여 일측 재봉선택선과 타측 재봉선택선의 길이가 같도록 설정할 수 있다. 차이값 표시 단계(S27)에 대한 부가적인 설명은 도7, 도 8 및 도 9의 설명과 함께 후술한다.

<48> 일 양상에 있어서, 타측 재봉선택선 설정 단계(S20)는 경고 표시 단계(S28, S29)를 포함할 수 있다. 일 실시예에 있어서, 경고 표시 단계(S28, S29)는 차이값이 기준치 이상이면 경고 표시를 한다. 일 실시예에 있어서, 경고 표시 단계(S28, S29)는 차이값이 기준치 이상이면 산출된 길이 및 차이값의 색깔을 바꾸어 경고 표시(S29)를 한다. 타측 재봉선택선이 일측 재봉선택선에 비해 짧거나 길면 재봉시 주름이 생길 수 있다. 즉, 일측 재봉선택선과 타측 재봉선택선을 재봉시 주름이 생길 수 있는 경우 재봉시 주름이 생기지 않는 경우의 차이값의 색깔과 다른 색깔로 차이값의 색깔을 표시할 수 있다. 예를 들어 빨간색으로 표시 될 수 있다. 차이값이 기준치 이상인 경우 차이값을 빨간색으로 표시하여 경고 표시를 할 수 있다. 일측 재봉선택선과 타측 재봉선택선의 재봉후 드레이핑 과정을 거쳐 생성된 3D 패턴에 주름이 생기는지 여부는 봉제 방식, 원단 종류 등에 따라 달라 질 수 있다. 잘 늘어나는 니트(Knit) 및 Chiffon은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1인치(Inch) 범위 내인 경우에는 주름이 생기지 않을 수 있다. 잘 늘어나지 않는 면 및 데님은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1센티미터(Cm) 범위 내인 경우에 주름이 생기지 않을 수 있다.

<49> 일 양상에 있어서, 비 휘발성 기록 매체는 디지털 의상 객체 생성 방법이 구현된 컴퓨터 프로그램을 저장할 수 있다. 디지털 의상 객체 생성 방법은 다운로드 가능한 컴퓨터 프로그램으로 제작 되어 컴퓨터가 읽을 수 있는 비 휘발성 기록 매

체에 저장될 수 있으며, 컴퓨터가 읽을 수 있는 기록 매체의 예로는 ROM, RAM, CD-ROM, 자기 테이프, 플로피디스크, 광 데이터 저장장치 등이 있으며, 또한 캐리어 웨이브(예를 들어 인터넷을 통한 전송)의 형태로 구현되는 것도 포함한다.

<50> 도 3은 일측 재봉선택선 설정 단계(S10)를 설명하기 위한 일 예를 도시한다. 재봉될 두 개의 패턴(303, 304), 일측 재봉선택선의 시작점(302) 및 커서(301)가 도 3에 도시되어 있다. 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력 하는 위치인 커서는 패턴(303) 상의 한 점(302)에 위치하고 있다. 커서가 패턴 상의 어느 한 점을 선택하면, 선택된 점은 일측 재봉선택선의 시작점이 될 수 있다. 즉, 패턴 상의 재봉 가능선에서 어느 한 점을 입력 장치로 선택하면, 선택된 점은 일측 재봉선택선의 시작점이 될 수 있다. 도 3에서 패턴 상의 재봉가능선은 점과 점 사이에 있는 선들이다. 도 3에서는 재봉가능선이 패턴의 외곽선으로만 설정되어 있지만 이에 한정되는 것은 아니고 패턴 상의 존재하는 두 점을 잇는 임의의 선을 재봉가능선으로 설정할 수 있다. 커서가 어느 하나의 패턴 상에 존재하는 재봉가능선에 존재 하지 않는데, 현재 커서 위치를 시작점으로 선택한 경우 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 시작점으로 할 수 있다.

<51> 도 4는 일측 재봉선택선 설정 단계(S10)를 설명하기 위한 다른 예를 도시한다. 재봉될 두 개의 패턴(303, 304), 일측 재봉선택선의 시작점(302), 일측 재봉선택선의 끝점(305), 일측 재봉선택선(305), 일측 재봉선택선의 길이(308) 및 커서

(301)가 도 4에 도시되어 있다. 도 3과 같이 일측 재봉선택선의 시작점(302)을 선택한 후 사용자가 원하는 일측 재봉 가능선상의 임의의 점을 끝점(305)으로 선택하여 일측 재봉선택선(306)을 설정 할 수 있다. 일측 재봉선택선(306)의 끝점 선택 시 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력하는 위치인 커서가 어느 하나의 2D패턴상에 존재하는 재봉 가능선에 존재 하지 않는데, 현재 커서 위치를 선택한 경우 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 끝점(305)으로 할 수 있다. 사용자가 일측 재봉 가능선의 시작점을 입력 후 시작점으로부터 커서에서 최단 거리에 있는 재봉 가능선 상의 점을 연결하는 선을 길이를 표시할 수 있다. 커서의 이동에 따라 시작점으로부터 커서에서 최단 거리에 있는 재봉 가능선 상의 점을 연결하는 선을 길이는 계속 바뀐다. 일측 재봉선택선의 끝점(305)을 선택하면 일측 재봉선택선의 길이(308)가 정해 진다. 일측 재봉 선택선의 길이(308)의 단위는 센티미터(Cm), 밀리미터(Mm), 미터(M), 인치(Inch) 등 사용자가 다양하게 설정할 수 있다.

<52> 도 5는 타측 재봉선택선 설정 단계(S20)를 설명하기 위한 일 예를 도시한다. 재봉될 두 개의 패턴(303, 304), 일측 재봉선택선의 시작점(302), 일측 재봉선택선의 끝점(305), 일측 재봉선택선(305), 일측 재봉선택선의 길이(308), 타측 재봉선택선의 시작점(309) 및 커서(301)가 도 5에 도시되어 있다. 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력 하는 위치인 커서는 패턴(304) 상의 한 점(309)에 위치하고 있다. 커서가 패턴 상의 어느 한 점을 선택하면, 선택된 점은 타측

재봉선택선의 시작점이 될 수 있다. 즉, 패턴 상의 타측 재봉 가능선에서 어느 한 점을 입력 장치로 선택하면, 선택된 점은 타측 재봉선택선의 시작점이 될 수 있다. 도 5에서 패턴 상의 재봉가능선은 점과 점 사이에 있는 선들이다. 도 5에서는 재봉 가능선이 패턴의 외곽선으로만 설정되어 있지만 이에 한정되는 것은 아니고 패턴 상의 존재하는 두 점을 잇는 임의의 선을 재봉 가능선으로 설정할 수 있다. 커서가 어느 하나의 패턴 상에 존재하는 재봉 가능선 상에 존재 하지 않는데, 현재 커서 위치를 타측 재봉선택선의 시작점으로 선택한 경우 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 시작점으로 할 수 있다.

<53> 도 6은 끝점 후보 표시 단계(S23)를 설명하기 위한 일 예를 도시한다. 재봉될 두 개의 패턴(303, 304), 일측 재봉선택선의 시작점(302), 일측 재봉선택선의 끝점(305), 일측 재봉선택선(305), 일측 재봉선택선의 길이(308), 타측 재봉선택선의 시작점(309), 끝점 후보(310) 및 커서(301)가 도 6에 도시되어 있다. 타측 재봉선택선의 시작점(309)이 입력되면 입력된 시작점(309)으로부터 상기 검출된 현재 커서 위치(301)와 최단 거리이면서 입력된 시작점(309)을 포함하는 타측 재봉가능선을 따라 일측 재봉선택선의 길이와 같게 되는 점을 타측 재봉선택선의 끝점 후보(310)가 표시된다. 현재 커서(301)는 타측 재봉선택선의 시작점(309)을 포함하는 타측 재봉가능선(311, 312) 중 312에 해당하는 타측 재봉가능선에 더 가까이 있어 끝점 후보(310)는 타측 재봉가능선(312)에 생성된다. 만약 커서가 타측 재봉가능선(311)에 더 가까이 있다면, 끝점 후보(310)는 타측 재봉가능선(311)에 생길 수

있다.

<54> 도 7은 커서 위치 이동 단계(S24, S25)를 설명하기 위한 일 예를 도시한다. 재봉될 두 개의 패턴(303, 304), 일측 재봉선택선의 시작점(302), 일측 재봉선택선의 끝점(305), 일측 재봉선택선(305), 일측 재봉선택선의 길이(308), 타측 재봉선택선의 시작점(309), 끝점 후보(310), 타측 재봉선택선의 길이(313), 차이값(314) 및 커서(301)가 도 7에 도시되어 있다. 끝점 후보(310)와 기준치 이하 거리에 위치했던 커서는 끝점 후보(310) 위치로 이동하여 끝점 후보(310)상에 위치하고 있다. 끝점 후보(310)가 표시되고 커서가 일정 조건 하에서 끝점 후보(310) 위치로 이동하여 위치할 수 있어 일측 재봉선택선의 길이와 동일한 길이를 가지는 타측 재봉선택선을 용이하게 설정할 수 있다. 커서(301)의 위치가 이동되면, 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이도 그에 따라 변한다. 도 7에 도시된 것처럼 일측 재봉선택선의 길이 및 타측 재봉선택선의 길이가 동일함을 확인 할 수 있다. 즉, 도 7에서 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값(314)이 0으로 표시됨을 확인 할 수 있다.

<55> 도 8은 차이값 표시 단계(S27) 및 경고 표시 단계(S28, S29)를 설명하기 위한 일 예를 도시한다. 커서(301), 타측 재봉가능선을 따라 입력된 시작점 및 타측

재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이(313) 및 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값(314)이 도 9에 도시되어 있다. 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이(313) 및 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값(314)은 커서(301)의 이동에 따라 변동한다. 도 7에 도시된 차이값은 예를 들어 파란색으로 표시된다. 일측 재봉선택선과 타측 재봉선택선을 재봉시 주름이 생기지 않는 경우 차이값이 파란색으로 표시 될 수 있다. 이에 반해, 도 8에 도시된 차이값은 예를 들어 빨간색으로 표시된다. 도 8에서는 타측 재봉선택선이 일측 재봉선택선에 비해 짧기에 재봉시 주름이 생길 수 있다. 즉, 일측 재봉선택선과 타측 재봉선택선을 재봉시 주름이 생길 수 있는 경우 차이값이 빨간색으로 표시 될 수 있다. 차이값이 기준치 이상인 경우 차이값을 빨간색으로 표시하여 경고 표시를 할 수 있다. 일측 재봉선택선과 타측 재봉선택선의 재봉후 드레이핑 과정을 거쳐 생성된 3D 패턴에 주름이 생기는지 여부는 봉제 방식, 원단 종류 등에 따라 달라 질 수 있다. 잘 늘어나는 니트(Knit) 및 Chiffon은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1인치(Inch) 범위 내인 경우에는 주름이 생기지 않을 수 있다. 잘 늘어나지 않는 면 및 데님은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1센티미터(Cm) 범위 내인 경우에 주름이 생기지 않을 수 있다.

<56> 도 9는 차이값 표시 단계(S27) 및 경고 표시 단계(S28, S29)를 설명하기 위한 다른 예를 도시한다. 커서(301), 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이(313) 및 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값(314)이 도 9에 도시되어 있다. 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이(313) 및 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값(314)은 커서(301)의 이동에 따라 변동한다. 도 7에 도시된 차이값은 예를 들어 파란색으로 표시된다. 일측 재봉선택선과 타측 재봉선택선을 재봉시 주름이 생기지 않는 경우 차이값이 파란색으로 표시 될 수 있다. 이에 반해, 도 9에 도시된 차이값은 예를 들어 빨간색으로 표시된다. 도 9에서는 타측 재봉선택선이 일측 재봉선택선에 비해 길기에 재봉시 주름이 생길 수 있다. 즉, 일측 재봉선택선과 타측 재봉선택선을 재봉시 주름이 생길 수 있는 경우 차이값이 빨간색으로 표시 될 수 있다. 차이값이 기준치 이상인 경우 차이값을 빨간색으로 표시하여 경고 표시를 할 수 있다. 일측 재봉선택선과 타측 재봉선택선의 재봉후 드레이핑 과정을 거쳐 생성된 3D 패턴에 주름이 생기는지 여부는 봉제 방식, 원단 종류 등에 따라 달라 질 수 있다. 잘 늘어나는 니트(Knit) 및 Chiffon은 일측 재봉선택선과 타측 재봉선택선의 길이 차이

가 1인치(Inch) 범위 내인 경우에는 주름이 생기지 않을 수 있다. 잘 늘어나지 않는 면 및 데임은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1센티미터(Cm) 범위 내인 경우에 주름이 생기지 않을 수 있다.

<57> 도 10은 2D 패턴 및 드레이핑 전의 3D 패턴을 도시한다. 2D 패턴 화면(402)에 있는 2D 패턴 상에 일측 재봉선택선 및 타측 재봉선택선을 설정하면 3D 화면(401)에 있는 3D 패턴에도 2D 패턴에 대응되는 위치에 일측 재봉선택선 및 타측 재봉선택선이 설정 된다.

<58> 도 11은 2D 패턴 및 드레이핑 후의 3D 패턴을 도시한다. 2D 패턴 화면(402)에 있는 2D 패턴 상에 일측 재봉선택선 및 타측 재봉선택선을 설정하고 재봉 명령을 하면 재봉 명령에 따라 상기 일측 재봉선택선과 타측 재봉선택선을 재봉 처리하여 3D의상 객체를 생성한다. 3D 화면(401)에 도시된 디지털 의상은 2D 패턴 화면(402)에 있는 2D 패턴 상에 설정된 일측 재봉선택선 및 타측 재봉선택선을 재봉하여 생성된 결과이다.

<59> 도 12는 일측 재봉가능선 및 타측 재봉가능선의 다양한 형태를 도시한다. 도 12의 a, b, c, d 각각은 한 쌍의 일측 재봉선택선 및 타측 재봉선택선을 도시한다.

<60> 도 12의 a는 사각형 형태의 패턴을 재봉하는 것으로 일측 재봉선택선(1201)

및 타측 재봉선택선(1202)은 사각형의 외곽선이다. b의 경우 일측 재봉선택선(1203)은 사각형의 외곽선에 위치하고 타측 재봉선택선(1204)은 사각형 내부에 위치한다. 전술한 것처럼 재봉선택선은 패턴 상에 존재 할 수 있는 두 점을 연결하는 선일 수 있기에 패턴 내부에 위치할 수 있다. 타측 재봉가능선(1209)은 사용자가 설정한 것이고, 도 12에서는 두 개의 타측 재봉가능선 중 사용자는 타측 재봉가능선(1204)을 타측 재봉선택선(1204)으로 선택한 예를 도시한다. c의 경우 일측 재봉선택선은 사각형의 외곽선에 위치하고 타측 재봉선택선은 원 내부에 위치한다. c에 도시된 것처럼 일측 재봉가능선 및 타측 재봉가능선이 다른 형태, 예를 들어 직선과 곡선 형태라도 재봉이 이루어 질 수 있다. d의 경우 일측 재봉선택선은 사각형의 외곽선에 위치하고 타측 재봉선택선은 도형 외곽선이다. 전술한 것처럼, 일측 재봉가능선 및 타측 재봉가능선의 형태가 서로 다르더라도 재봉이 가능하고 d의 경우 타측 재봉선택선이 도형 내부에 위치하더라도 재봉이 이루어 질 수 있다.

<61> 도 13은 일 실시예에 따른 디지털 의상 객체 생성 장치의 구성을 도시한다.

<62> 일 양상에 따른 컴퓨팅 요소와, 패턴 및 드레이핑(draping)된 디지털 의상 객체를 저장하는 저장 요소를 포함하는 디지털 의상 객체 생성 장치에 있어서, 디지털 의상 객체 생성 장치는 사용자 인터페이스부(100), 드레이핑부(200)를 포함한다.

<63> 일 양상에 있어서, 사용자 인터페이스부(100)는 일측 재봉선택선 설정부

(110) 및 타측 재봉선택선 설정부(120)를 포함할 수 있다. 사용자는 사용자 인터페이스부(100)를 통해 일측 재봉선택선 및 타측 재봉선택선을 설정 할 수 있다. 사용자 인터페이스부(100)는 하드웨어 측면에서 키보드, 마우스, 터치 펜 등의 입력 장치를 포함할 수 있다. 사용자 인터페이스부(100)는 소프트웨어 측면에서 디지털 의상 객체 생성 방법이 구현된 컴퓨터 프로그램일 수 있다.

<64> 일 실시예에 있어서, 일측 재봉선택선 설정부(110)는 패턴 상의 일측 재봉가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정한다. 재봉가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정한다. 일측 재봉선택선 설정부(110)는 재봉될 두 개의 선 중 하나의 선인 일측 재봉선택선을 입력할 수 있다. 일측 재봉선택선을 입력 하는 방법은 마우스, 터치 팬, 키보드 등의 입력 장치를 통해 직접 재봉하려는 부분을 선택하거나, 컴퓨터 프로그램을 통하여 어느 하나의 패턴 상에 선택 가능한 외곽선을 제시하여 사용자가 선택하게 할 수도 있다.

<65> 입력 장치를 통해 직접 재봉하려는 일측 재봉선택선을을 선택할 경우, 일측 재봉선택선의 시작점과 끝점을 입력하여 선택할 수 있다. 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력하는 위치인 커서가 어느 하나의 패턴 상에 존재하는 재봉가능선에 존재 하지 않는데, 현재 커서 위치를 시작점 또는 끝점으로 선택한 경우 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 시작점 또는 끝점으로 할 수 있다. 일측 재봉선택선 설정부(110)에 대한 추가적인 설명은 도 3 및 도 4에서 전술하였다.

<66> 일 양상에 있어서, 타측 재봉선택선 설정부(120)는 시작점 입력부(121), 끝점 입력부(122) 및 설정부를 포함할 수 있다. 타측 재봉선택선은 일측 재봉선택선과 재봉될 선으로 이에 대한 구체적인 설명은 후술한다.

<67> 일 양상에 있어서, 드레이핑부(200)는 재봉 명령에 따라 상기 일측 재봉선택선과 타측 재봉선택선을 재봉 처리하여 디지털 의상 객체를 생성한다. 드레이핑부(200)에서는 패턴이 아바타 모델 주위로 배치되면서 사용자가 설정한 재봉선택선에 따라 재봉된다. 드레이핑부(200)에 대한 구체적인 설명은 도 10 및 도 11에서 전술하였다.

<68> 일 실시예에 있어서, 시작점 입력부(121)는 일측 재봉선택선과 재봉될 적어도 하나의 타측 재봉가능선에서 타측 재봉선택선의 시작점을 입력 받는다. 타측 재봉선택선의 시작점은 마우스, 터치 펜, 키보드 등의 입력 장치를 통해 직접 선택될 수 있다. 마우스, 터치 펜과 같은 입력 장치가 화면 내에서 출력하는 위치인 커서가 어느 하나의 패턴 상에 존재하는 재봉가능선에 존재 하지 않는데, 현재 커서 위치를 시작점으로 선택한 경우, 현재 커서로부터 가장 가까운 거리에 있는 재봉가능선 상의 점을 시작점으로 할 수 있다. 시작점 입력부(121)에 대한 추가적인 설명은 도 5 에서 전술하였다.

<69> 일 실시예에 있어서, 끝점 입력부(122)는 포인팅 선택 이벤트 발생시, 상기 시작점이 입력된 타측 재봉가능선에서 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는다. 현재 커서의 위치가 복수의 타측 재봉가능선 중 시작점이 입력된 타측 재봉가능선과 가장 가까운 경우, 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는다. 현재 커서의 위치가 시작점이 입력된 타측 재봉가능선이 아닌 다른 타측 재봉가능선과 더 가까이 있는데 포인팅 선택 이벤트가 발생한 경우, 끝점 입력이 이루어 지지 않을 수 있다. 일측 재봉선택선의 길이와 동일한 길이를 갖도록 타측 재봉선택선의 끝점을 선택할 수 있지만, 이에 한정되는 것은 아니고 일측 재봉선택선의 길이와 다른 길이를 가지도록 타측 재봉선택선의 끝점을 선택할 수도 있다.

<70> 일 실시예에 있어서, 설정부는 입력된 시작점으로부터 입력된 끝점까지의 타측 재봉가능선 구간을 타측 재봉선택선으로 설정한다. 일측 재봉선택선과 타측 재봉선택선의 길이가 같은 경우 디지털 의상에 주름 없이 재봉이 이루어질 수 있다. 의도적으로 일측 재봉선택선의 길이와 타측 재봉선택선의 길이를 다르게 함으로써 주름을 생성하고, 이를 통해 미적인 효과를 낼 수 있다. 일측 재봉선택선의 길이와 타측 재봉선택선의 길이가 다르더라도 원단의 늘어남 정도에 따라 주름이 생기지 않을 수 있다.

<71> 일 실시예에 있어서, 일측 재봉가능선 또는 타측 재봉가능선은 직선, 곡선, 다중 분기선 그리고 다각형 및 원을 포함하는 도형 중 적어도 하나일 수 있다. 패턴의 형태가 원인 경우 원 테두리 전체를 재봉하면 일측 재봉가능선 또는 타측 재봉가능선은 원이다. 원의 일부를 재봉하면 일측 재봉가능선 또는 타측 재봉가능선은 곡선이다. 일측 재봉가능선 또는 타측 재봉가능선의 다양한 형태는 도 12에서 전술 하였다.

<72> 일 양상에 있어서, 디지털 의상 객체 생성 장치는 커서 위치 검출부(210) 및 끝점 후보 표시부(220)를 더 포함할 수 있다.

<73> 일 실시예에 있어서, 커서 위치 검출부(210)는 현재 커서 위치를 검출한다.

<74> 일 실시예에 있어서, 끝점 후보 표시부(220)는 입력된 시작점으로부터 상기 검출된 현재 커서 위치와 최단 거리이면서 입력된 시작점을 포함하는 타측 재봉가능선을 따라 일측 재봉선택선의 길이와 같게 되는 점을 타측 재봉선택선의 끝점 후보로 산출하고 이를 표시한다. 끝점 후보가 표시됨에 따라 패턴 상에서 일측 재봉선택선의 길이와 같은 길이를 가지도록 타측 재봉선택선의 끝점을 쉽게 선택할 수 있다. 끝점 후보 표시부(220)에 대한 부가적인 설명은 도 6에서 전술하였다.

<75> 일 양상에 있어서, 디지털 의상 객체 생성 장치는 커서 위치 이동부(231)를

더 포함할 수 있다. 일 실시예에 있어서 커서 위치 이동부(231)는 현재 커서 위치와 산출된 끝점 후보 위치 간의 차이가 기준치 이하이면 커서가 산출된 끝점 후보 위치로 이동하여 표시된다. 예를 들어, 기준치는 15픽셀(Px, Pixel)이다. 기준치는 사용자가 자유롭게 설정할 수 있다. 커서가 끝점 후보 위치 근처에 위치하는 경우 커서가 끝점 후보상으로 이동하여, 일측 재봉선택선과 같은 길이를 가지는 타측 재봉선택선을 쉽게 설정할 수 있다. 커서 위치 이동부(231)에 대한 부가적인 설명은 도 7에서 전술하였다.

<76> 일 양상에 있어서, 디지털 의상 객체 생성 장치는 길이 표시부(240)를 더 포함할 수 있다. 일 실시예에 있어서, 길이 표시부(240)는 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이 중 적어도 하나를 산출하여 표시한다. 커서의 위치가 이동됨에 따라 바뀌는 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이를 지속적으로 확인할 수 있다. 길이 표시부(240)에 대한 추가적인 설명은 도 7에서 전술하였다.

<77> 일 양상에 있어서, 디지털 의상 객체 생성 장치는 차이값 표시부(250)를 더 포함할 수 있다. 일 실시예에 있어서, 차이값 표시부(250)는 일측 재봉선택선의 길이와 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위

치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 표시한다. 사용자는 일측 재봉선택선의 길이, 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이를 확인할 수 있고, 이에 나아가, 일측 재봉선택선의 길이와 차이값 표시부(250)는 타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 확인할 수 있다. 사용자는 차이값을 확인하여 일측 재봉선택선과 타측 재봉선택선의 길이가 같도록 설정할 수 있다. 차이값 표시부(250)에 대한 부가적인 설명은 도7, 도 8 및 도 9에 대한 설명에서 전술하였다.

<78> 일 양상에 있어서, 디지털 의상 객체 생성 장치는 경고 표시부(260)를 포함할 수 있다. 일 실시예에 있어서, 경고 표시부(260)는 차이값이 기준치 이상이면 경고 표시를 한다. 일 실시예에 있어서, 경고 표시부(260)는 차이값이 기준치 이상이면 산출된 길이 및 차이값의 색깔을 바꾸어 경고 표시를 한다. 타측 재봉선택선이 일측 재봉선택선에 비해 짧거나 길면 재봉시 주름이 생길 수 있다. 즉, 일측 재봉선택선과 타측 재봉선택선을 재봉시 주름이 생길 수 있는 경우 재봉시 주름이 생기지 않는 경우의 차이값의 색깔과 다른 색깔로 차이값의 색깔을 표시할 수 있다. 예를 들어 빨간색으로 표시 될 수 있다. 차이값이 기준치 이상인 경우 차이값을 빨간색으로 표시하여 경고 표시를 할 수 있다. 일측 재봉선택선과 타측 재봉선택선의 재봉후 드레이핑 과정을 거쳐 생성된 3D 패턴에 주름이 생기는지 여부는 봉제 방식, 원단 종류 등에 따라 달라 질 수 있다. 잘 늘어나는 니트(Knit) 및 Chiffon은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1인치(Inch) 범위 내

인 경우에는 주름이 생기지 않을 수 있다. 잘 늘어나지 않는 면 및 데님은 일측 재봉선택선과 타측 재봉선택선의 길이 차이가 1센티미터(Cm) 범위 내인 경우에 주름이 생기지 않을 수 있다.

<79> 이상에서 본 발명을 첨부된 도면을 참조하는 실시예들을 통해 설명하였지만 이에 한정되는 것은 아니며, 이들로부터 당업자라면 자명하게 도출할 수 있는 다양한 변형예들을 포괄하도록 해석되어야 한다. 특허청구범위는 이러한 변형예들을 포괄하도록 의도되었다.

【부호의 설명】

<80> 100: 사용자 인터페이스부

110: 일측 재봉선택선 설정부

120: 타측 재봉선택선 설정부

121: 시작점 입력부

122: 끝점 입력부

200: 드레이핑부

210: 커서 위치 검출부

220: 끝점 후보 표시부

231: 커서 위치 이동부

240: 길이 표시부

250: 차이값 표시부

260: 경고 표시부

【특허청구범위】

【청구항 1】

컴퓨팅 요소와, 패턴 및 드레이핑(draping)된 디지털 의상 객체를 저장하는 저장 요소를 포함하는 컴퓨팅 장치에 의해 실행 가능한 디지털 의상 객체 생성 방법에 있어서,

패턴 상의 일측 재봉가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정하는 일측 재봉선택선 설정 단계; 및

일측 재봉선택선과 재봉될 적어도 하나의 타측 재봉가능선에서 타측 재봉선택선의 시작점을 입력 받는 시작점 입력 단계, 포인팅 선택 이벤트 발생시, 상기 시작점이 입력된 타측 재봉가능선에서 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는 끝점 입력 단계, 상기 입력된 시작점으로부터 입력된 끝점까지의 타측 재봉가능선 구간을 타측 재봉선택선으로 설정하는 설정 단계를 포함하는 타측 재봉선택선 설정 단계; 를

포함하는 디지털 의상 객체 생성 방법.

【청구항 2】

제 1 항에 있어서, 일측 재봉가능선 또는 타측 재봉가능선은

직선, 곡선, 다중 분기선 그리고 다각형 및 원을 포함하는 도형 적어도 하나인 디지털 의상 객체 생성 방법.

【청구항 3】

제 1 항에 있어서, 상기 타측 재봉선택선 설정 단계가 시작점 입력 단계와 끝점 입력 단계 사이에:

현재 커서 위치를 검출하는 커서 위치 검출 단계, 입력된 시작점으로부터 상기 검출된 현재 커서 위치와 최단 거리이면서 입력된 시작점을 포함하는 타측 재봉 가능선을 따라 일측 재봉선택선의 길이와 같게 되는 점을 타측 재봉선택선의 끝점 후보로 산출하고 이를 표시하는 끝점 후보 표시 단계를 더 포함하는 디지털 의상 객체 생성 방법.

【청구항 4】

청구항 3에 있어서, 타측 재봉선택선 설정 단계는

현재 커서 위치와 산출된 끝점 후보 위치 간의 차이가 기준치 이하이면 커서가 산출된 끝점 후보 위치로 이동하여 표시되는 커서 위치 이동 단계; 를 더 포함하는 디지털 의상 객체 생성 방법.

【청구항 5】

제 3 항에 있어서, 타측 재봉선택선 설정 단계는

일측 재봉선택선의 길이와

타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이 중 적어도 하나를 산출하여 표시하는 길이 표시 단계; 를

더 포함하는 디지털 의상 객체 생성 방법.

【청구항 6】

제 3 항에 있어서, 타측 재봉선택선 설정 단계는

일측 재봉선택선의 길이와

타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 표시하는 차이값 표시 단계; 를

더 포함하는 디지털 의상 객체 생성 방법.

【청구항 7】

제 6 항에 있어서, 타측 재봉선택선 설정 단계는

차이값이 기준치 이상이면 경고 표시를 하는 경고 표시 단계; 를

더 포함하는 디지털 의상 객체 생성 방법.

【청구항 8】

제 7 항에 있어서, 경고 표시 단계는

차이값이 기준치 이상이면 산출된 길이 및 차이값의 색깔을 바꾸어 경고 표시를 하는 디지털 의상 객체 생성 방법.

【청구항 9】

제 1항에 따른 디지털 의상 객체 생성 방법이 구현된 컴퓨터 프로그램이 저장된 비 휘발성 기록 매체.

【청구항 10】

컴퓨팅 요소와, 패턴 및 드레이핑(draping)된 디지털 의상 객체를 저장하는 저장 요소를 포함하는 디지털 의상 객체 생성 장치에 있어서,

패턴 상의 일측 재봉가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정하는 일측 재봉선택선 설정부 및 타측 재봉선택선 설정부를 포함하는 사용자 인터페이스부; 를 포함하되

타측 재봉선택선 설정부는

일측 재봉선택선과 재봉될 적어도 하나의 타측 재봉가능선에서 타측 재봉선택선의 시작점을 입력 받는 시작점 입력부, 포인팅 선택 이벤트 발생시, 상기 시작점이 입력된 타측 재봉가능선에서 포인팅 선택 이벤트가 발생한 위치로부터 최단

거리인 점을 끝점으로 입력 받는 끝점 입력부를 포함하는

디지털 의상 객체 생성 장치.

【청구항 11】

제 10 항에 있어서, 일측 재봉가능선 또는 타측 재봉가능선은

직선, 곡선, 다중 분기선 그리고 다각형 및 원을 포함하는 도형 중 적어도 하나인 디지털 의상 객체 생성 장치.

【청구항 12】

제 10 항에 있어서, 디지털 의상 객체 생성 장치는

현재 커서 위치를 검출하는 커서 위치 검출부, 입력된 시작점으로부터 상기 검출된 현재 커서 위치와 최단 거리이면서 입력된 시작점을 포함하는 타측 재봉가능선을 따라 일측 재봉선택선의 길이와 같게 되는 점을 타측 재봉선택선의 끝점 후보로 산출하고 이를 표시하는 끝점 후보 표시부를 더 포함하는 디지털 의상 객체 생성 장치.

【청구항 13】

청구항 12에 있어서, 디지털 의상 객체 생성 장치는

현재 커서 위치와 산출된 끝점 후보 위치 간의 차이가 기준치 이하이면 커서

가 산출된 끝점 후보 위치로 이동하여 표시되는 커서 위치 이동부; 를 더 포함하는 디지털 의상 객체 생성 장치.

【청구항 14】

제 13 항에 있어서, 디지털 의상 객체 생성 장치는

일측 재봉선택선의 길이와

타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이 중 적어도 하나를 산출하여 표시하는 길이 표시부; 를

더 포함하는 디지털 의상 객체 생성 장치.

【청구항 15】

제 13 항에 있어서, 디지털 의상 객체 생성 장치는

일측 재봉선택선의 길이와

타측 재봉가능선을 따라 입력된 시작점 및 타측 재봉가능선에서 커서의 위치로부터 최단 거리인 점을 연결한 선의 길이의 차이값을 표시하는 차이값 표시부; 를

더 포함하는 디지털 의상 객체 생성 장치.

【청구항 16】

제 15 항에 있어서, 디지털 의상 객체 생성 장치는

차이값이 기준치 이상이면 경고 표시를 하는 경고 표시부; 를

더 포함하는 디지털 의상 객체 생성 장치.

【청구항 17】

제 16 항에 있어서, 경고 표시부는

차이값이 기준치 이상이면 산출된 길이 및 차이값의 색깔을 바꾸어 경고 표시를 하는 디지털 의상 객체 생성 장치.

제출 일자 : 2015-04-27

【요약서】

【요약】

컴퓨터 시뮬레이션 기술에 관련된 것으로, 보다 상세하게는 2D 의상 패턴들을 재봉 처리하여 디지털 의상 객체를 생성하는 시뮬레이션 기술에 관한 것이다.

본 발명은 자유 재봉시, 패턴상에서 선택된 선분의 길이와 같은 길이를 가지도록 재봉될 다른 선분의 길이를 쉽게 조절하게 함을 목적으로 한다.

일 양상에 따른, 컴퓨팅 요소와, 패턴 및 드레이핑(draping)된 디지털 의상 객체를 저장하는 저장 요소를 포함하는 컴퓨팅 장치에 의해 실행 가능한 디지털 의상 객체 생성 방법에 있어서, 디지털 의상 객체 생성 방법은 패턴 상의 일측 재봉가능선에서 재봉될 일측 재봉선택선을 입력 받아 일측 재봉선택선을 설정하는 일측 재봉선택선 설정 단계와 일측 재봉선택선과 재봉될 적어도 하나의 타측 재봉가능선에서 타측 재봉선택선의 시작점을 입력 받는 시작점 입력 단계, 포인팅 선택 이벤트 발생시, 상기 시작점이 입력된 타측 재봉가능선에서 포인팅 선택 이벤트가 발생한 위치로부터 최단 거리인 점을 끝점으로 입력 받는 끝점 입력 단계, 상기 입력된 시작점으로부터 입력된 끝점까지의 타측 재봉가능선 구간을 타측 재봉선택선으로 설정하는 설정 단계를 포함하는 타측 재봉선택선 설정 단계 및 재봉 명령에 따라 상기 일측 재봉선택선과 타측 재봉선택선을 재봉 처리하여 3D의상 객체를 생성하는 드레이핑 단계를 포함할 수 있다.

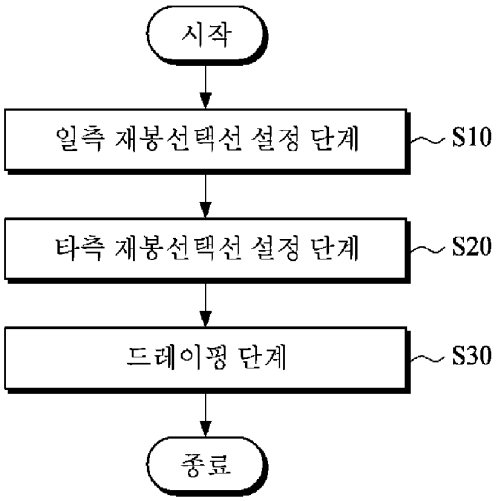
제출 일자 : 2015-04-27

【대표도】

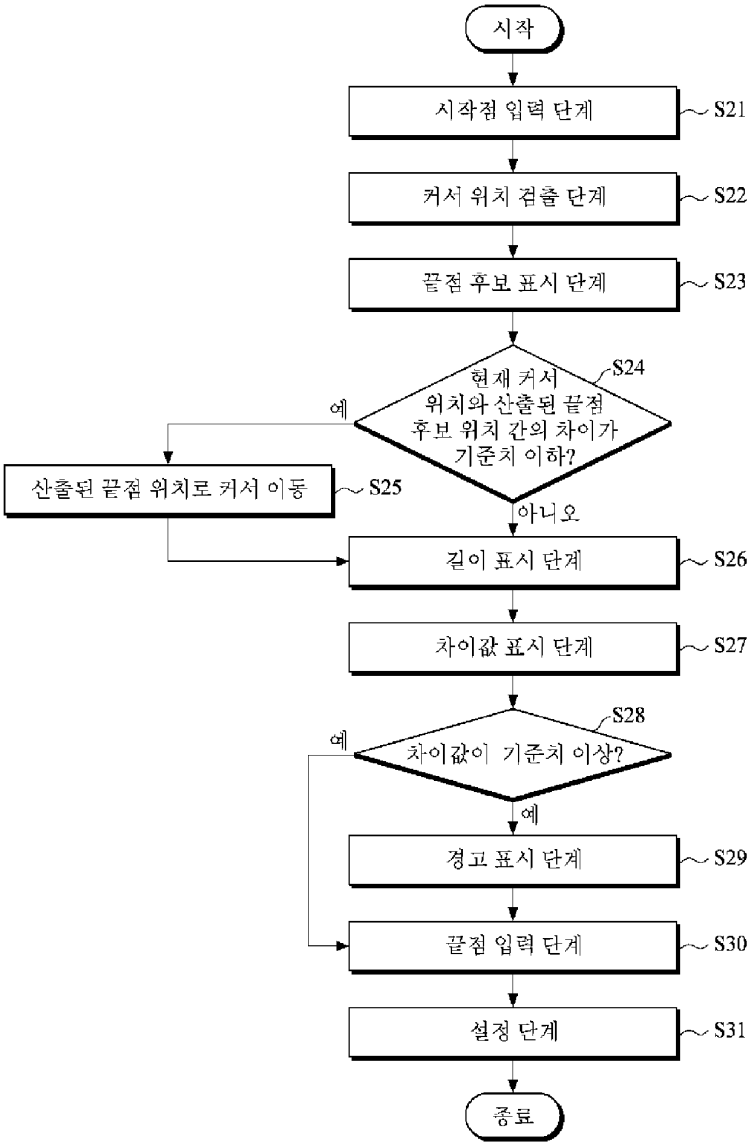
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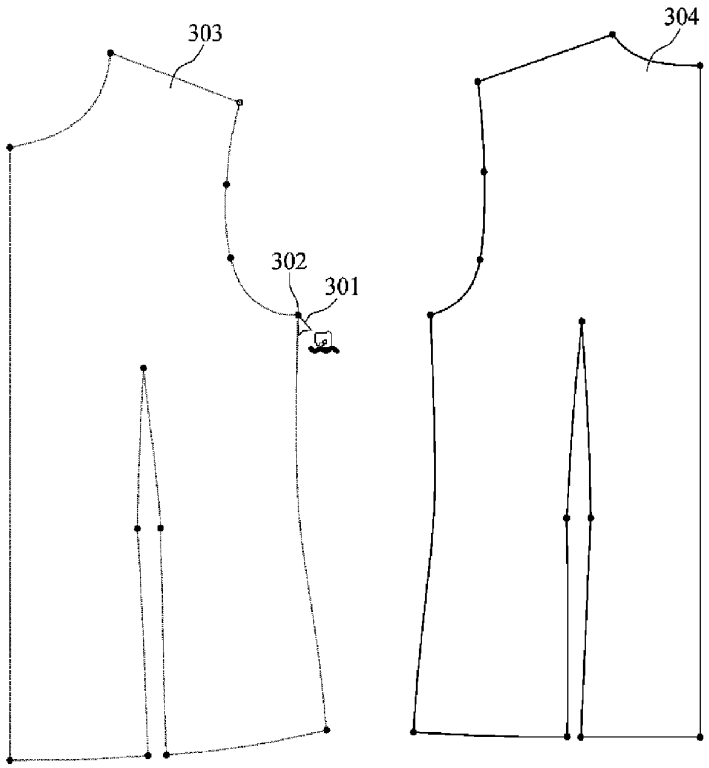
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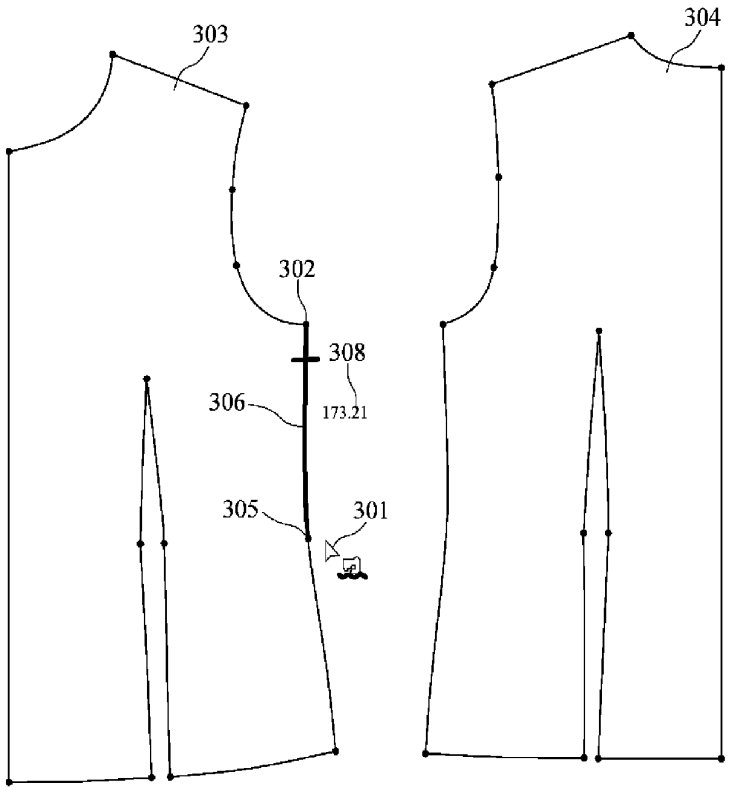
【도 2】


시작
시작점 입력 단계
S21
커서 위치 검출 단계
S22
끝점 후보 표시 단계
S23
현재 커서 위치와 산출된 끝점 후보 위치 간의 차이가 기준치 이하?
S24
예
산출된 끝점 위치로 커서 이동
S25
아니오
길이 표시 단계
S26
차이값 표시 단계
S27
차이값이 기준치 이상?
S28
예
경고 표시 단계
S29
끝점 입력 단계
S30
설정 단계
S31
종료

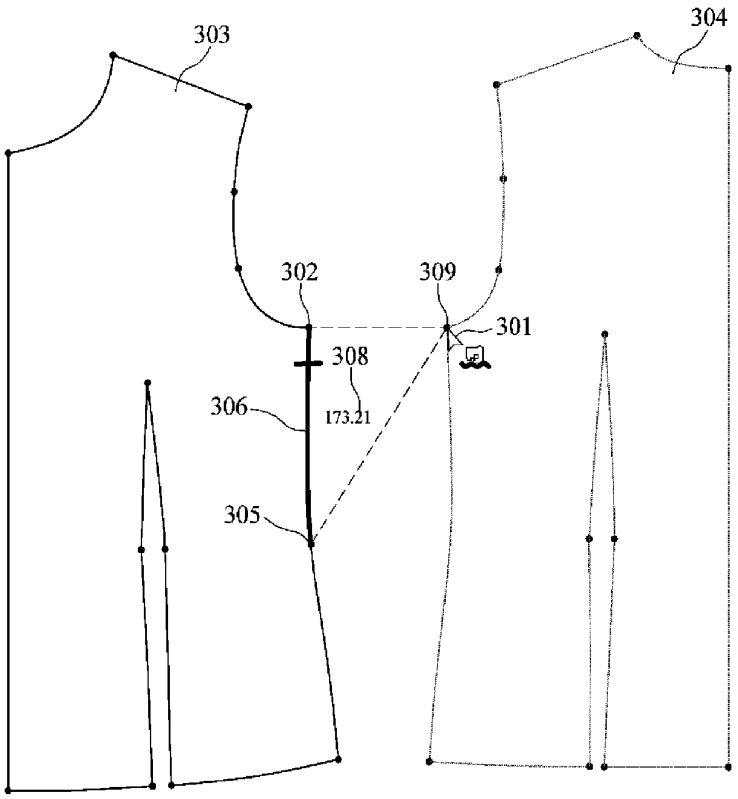
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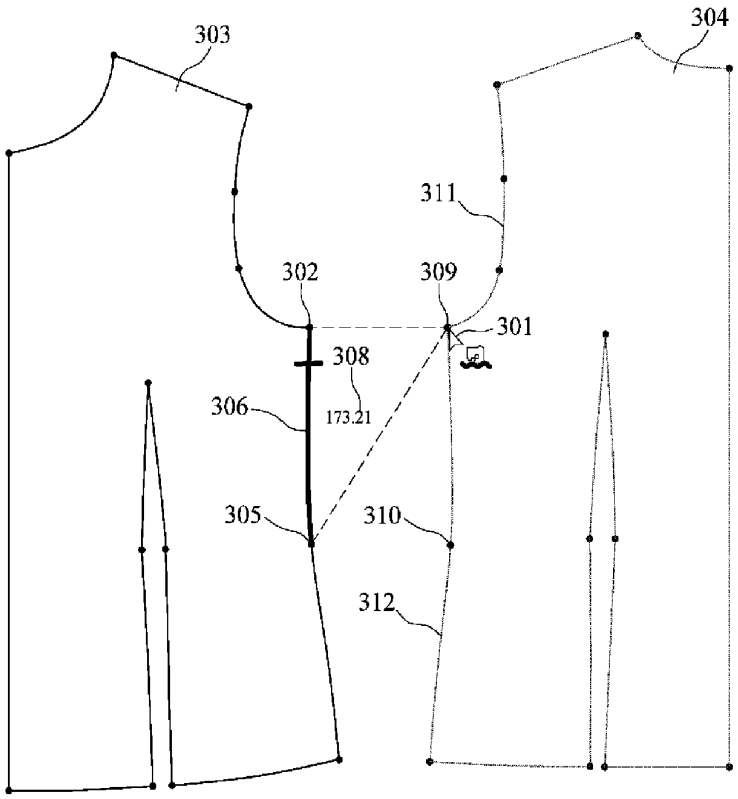
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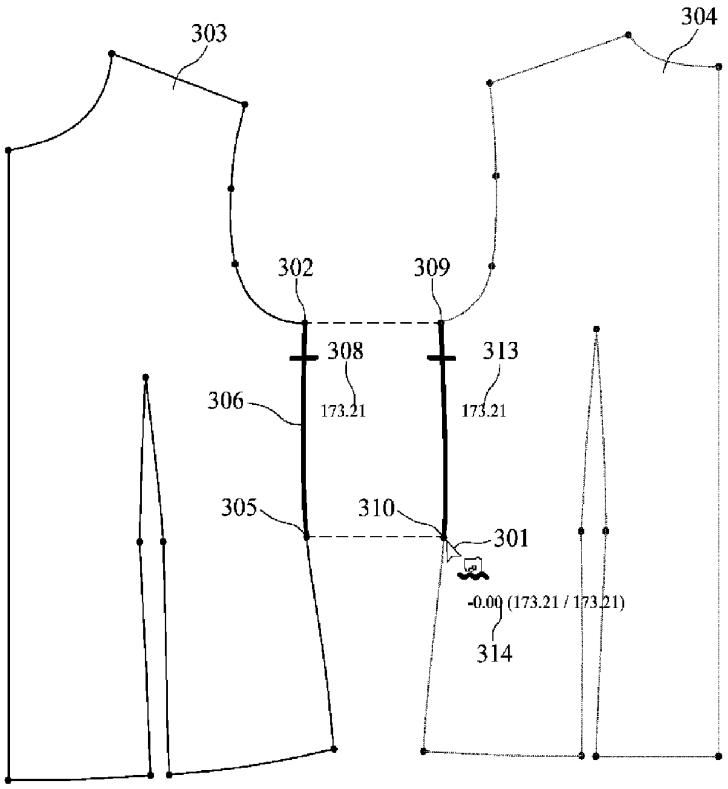
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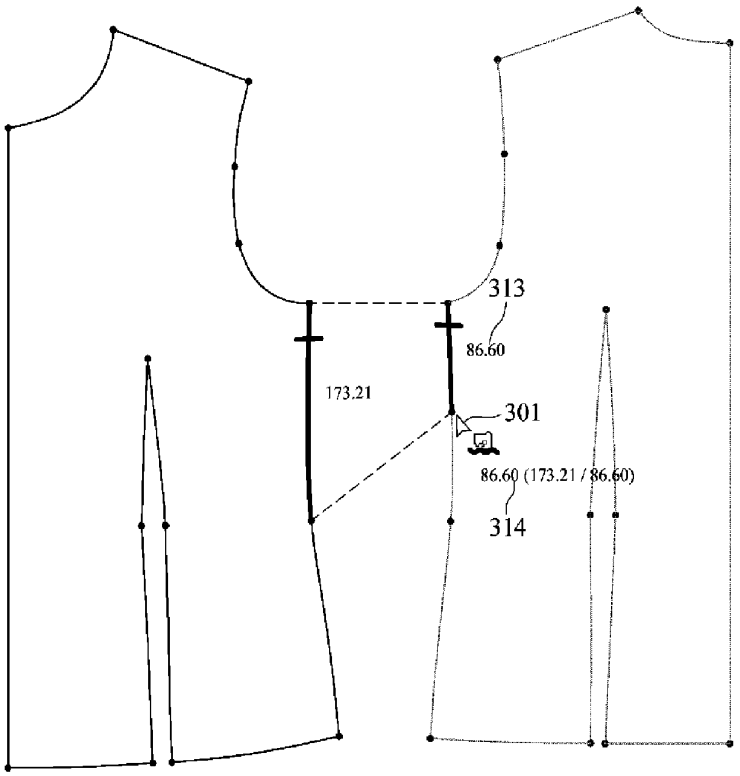
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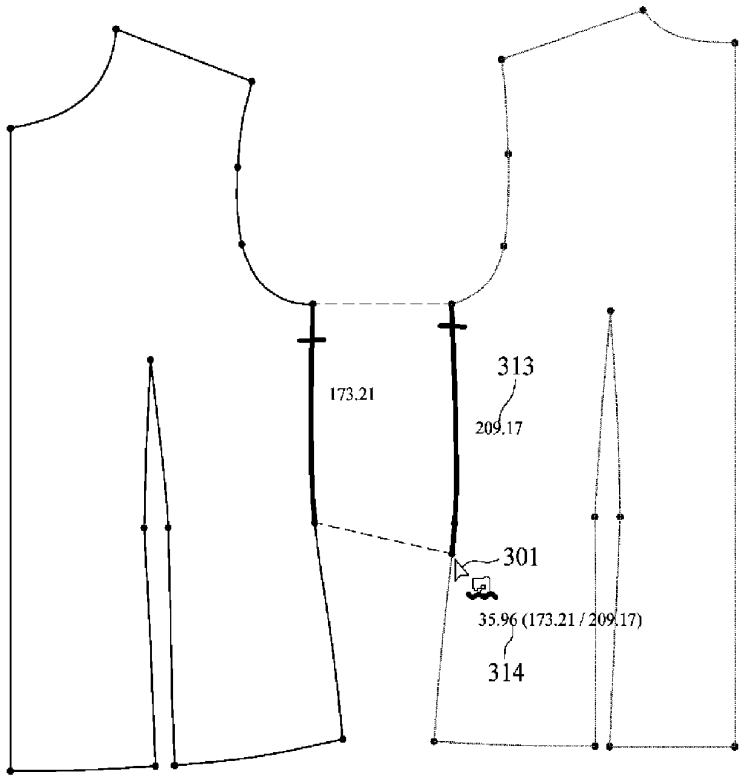
【도 7】


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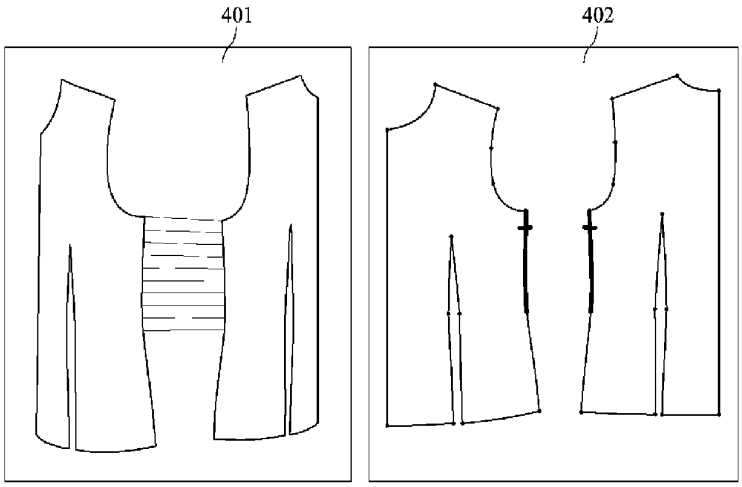
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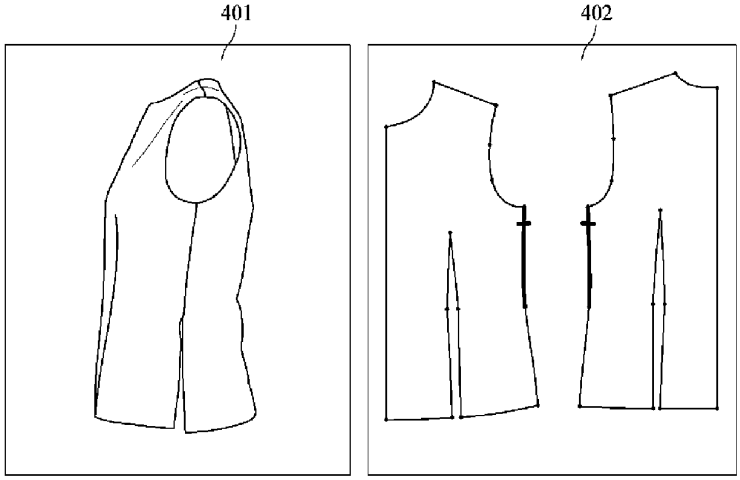
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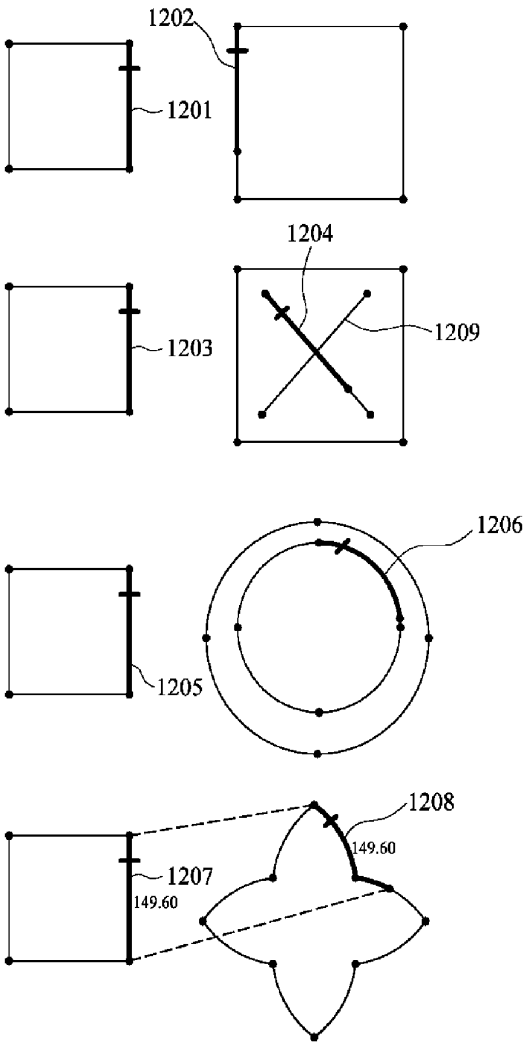
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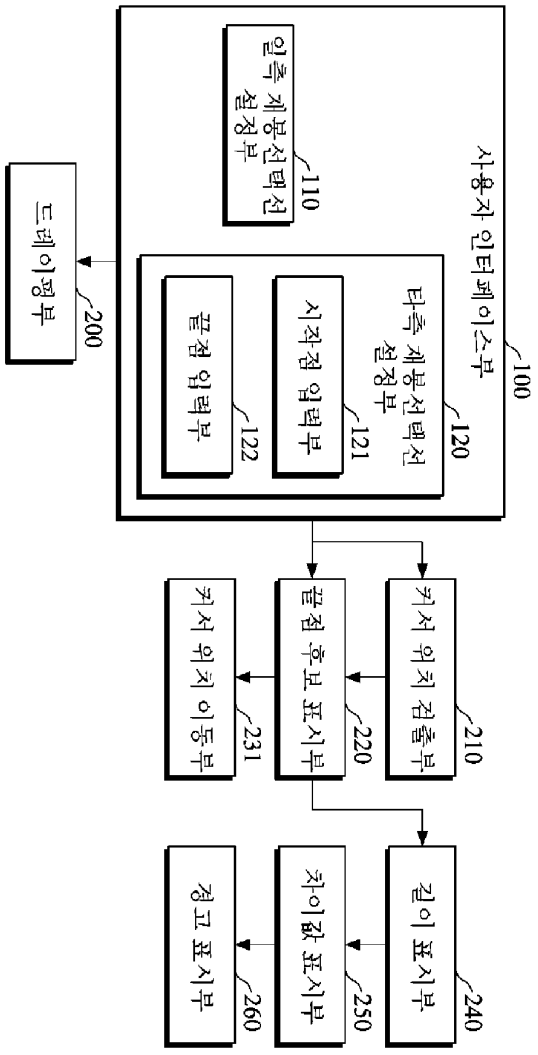
【도 11】



【도 12】



【도 13】


사용자 인터페이스부
100
일측 제동선택선 설정부
110
타측 제동선택선 설정부
120
시작점 입력부
121
끝점 입력부
122
드레이핑부
200
커서 위치 검출부
210
끝점 후보 표시부
220
커서 위치 이동부
231
길이 표시부
240
차이값 표시부
250
경고 표시부
260

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/921,269	10/23/2015	Seung Woo OH	304053.0001

CONFIRMATION NO. 6021

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

POA ACCEPTANCE LETTER

OC000000078732259

Date Mailed: 11/20/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/10/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/zabraha/

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the accompanying transmittal letter (form PTO/AIA/15, PTO/AIA/16, PTO/AIA/18, PTO/AIA/19, PTO/SB/29, PTO/AIA/50, PTO/AIA/82A, or equivalent).

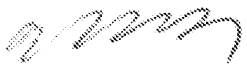
I hereby appoint the practitioners of NSIP Law associated with the following Customer Number as my attorneys or agents to transact all business in the United States Patent and Trademark Office connected with the application identified in the accompanying transmittal letter:

89980

Please recognize the address of NSIP Law associated with the following Customer Number as the correspondence address for the application identified in the accompanying transmittal letter:

89980

I, the below-named Assignee, am the original Applicant (if there is only one Applicant) or an original Applicant (if there is more than one Applicant) of the application identified in the accompanying transmittal letter.

Name of Assignee	**CLO virtual fashion**		
Address of Assignee	(Nonhyeon-dong) 17-4, Dosan-daero 8-gil, Gangnam-gu, Seoul, Republic of Korea		
Signature		Date	2015. 09. 10
Name	Seung Woo Oh		
Title	CEO		

Electronic Acknowledgement Receipt	
EFS ID:	24034109
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Brian H Buck/Nichole McRorie
Filer Authorized By:	Brian H Buck
Attorney Docket Number:	304053.0001
Receipt Date:	10-NOV-2015
Filing Date:	23-OCT-2015
Time Stamp:	10:44:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	MISC20151106_3040530001_37373.pdf	13209 1e271be6623089b16aab42a02ae5fb9144ca42ea	no	1

Warnings:
Information:

2	Power of Attorney	MISC20151106_3040530001_CorrectPOAExecuted.pdf	205531 8635f23e8b7a108d9ff9d86f6b0dc2ff400892a0	no	1

Warnings:	
Information:	
Total Files Size (in bytes):	218740

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Docket No. 304053.0001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Seung Woo OH et al.

Application No. 14/921,269 Art Unit: 2611

Confirmation No. 6021

Filing Date: October 23, 2015 Examiner: Not Yet Assigned

For: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

STATEMENT UNDER 37 CFR 3.73(c)

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

CLO virtual fashion, a corporation of the Republic of Korea, states that it is the assignee of the entire title, right, and interest in Application No. 14/921,269 by virtue of an assignment from the inventors to CLO virtual fashion that was recorded against Application No. 14/921,269 in the United States Patent and Trademark Office on October 23, 2015, at Reel 036866, Frame 0967.

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee CLO virtual fashion, to complete this Statement Under 37 CFR 3.73(**c**).

Respectfully submitted,
/ Brian H. Buck /
Brian H. Buck
Reg. No.: 48,776

Date: November 10, 2015

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Washington, DC 20035
Telephone (202) 429-0020
Facsimile (202) 315-3758
CYP/BHB/nam

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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/921,269	10/23/2015	2611	730	304053.0001	17	2

CONFIRMATION NO. 6021

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

FILING RECEIPT

OC000000078465587

Date Mailed: 11/06/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Seung Woo OH, Seoul, KOREA, REPUBLIC OF;
Kyoung Ae BANG, Seoul, KOREA, REPUBLIC OF;

Applicant(s)

CLO virtual fashion, Seoul, KOREA, REPUBLIC OF;

Assignment For Published Patent Application

CLO virtual fashion, Seoul, KOREA, REPUBLIC OF

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
REPUBLIC OF KOREA 10-2015-0059086 04/27/2015

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 11/03/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/921,269**

Projected Publication Date: 10/27/2016

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

Preliminary Class

345

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/921,269

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	17 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/921,269	10/23/2015	Seung Woo OH	304053.0001

CONFIRMATION NO. 6021

IMPROPER CPOA LETTER

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

OC000000078465614

Date Mailed: 11/06/2015

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the power of attorney filed 10/23/2015. The power of attorney in this application is not accepted for the reason(s) listed below:

- The power of attorney you provided did not comply with the power of attorney rules that became effective on June 25, 2004. See 37 CFR 1.32 and 69 Fed. Reg. 29865.

/qtran/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/AIA/15 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	304053.0001
First Named Inventor	Seung Woo OH
Title	METHOD AND APPARATUS FOR CREATING...
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✔] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [✔] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✔] **Specification** [*Total Pages* 36] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✔] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 13]
6. **Inventor's Oath or Declaration** [*Total Pages* 2] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [✔] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
7. [✔] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ACCOMPANYING APPLICATION PAPERS

10. [ ] **Assignment Papers** (cover sheet & document(s))
    Name of Assignee _____
11. [ ] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [✔] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [✔] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [✔] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:** _____

***Note**: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[✔] The address associated with Customer Number: 89980 **OR** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Brian H. Buck/	Date	October 23, 2015
Name (Print/Type)	Brian H. Buck	Registration No. (Attorney/Agent)	48,776

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/14 (07-14)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	304053.0001
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Seung Woo		OH	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Seoul	Country of Residence [i]	KR

Mailing Address of Inventor:

Address 1	(Eunpyeong New Town Gupabal Apt., Jingwan-dong)
Address 2	926-204, 77, Jingwan 3-ro, Eunpyeong-gu

City	Seoul	State/Province	
Postal Code		Country i	KR

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Kyoung Ae		BANG	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Seoul	Country of Residence [i]	KR

Mailing Address of Inventor:

Address 1	(Sinwol-dong) 43, Nambusunhwan-ro 46-gil
Address 2	Yangcheon-gu

City	Seoul	State/Province	
Postal Code		Country i	KR

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

PTO/AIA/14 (07-14)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	304053.0001
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	89980		
Email Address	pto@nsiplaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING		
Attorney Docket Number	304053.0001	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	13	**Suggested Figure for Publication (if any)**	

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	89980		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	304053.0001
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country	Filing Date (YYYY-MM-DD)	Access Code (if applicable)
10-2015-0059086	KR	2015-04-27	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

PTO/AIA/14 (07-14)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	304053.0001
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

Authorization to Permit Access:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	304053.0001
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

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Title of Invention	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING	

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METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

CROSS-REFERENCE TO RELATED APPLICATION(S)

This application claims the benefit under 35 U.S.C. §119(a) of Korean Patent Application No. 10-2015-0059086, filed on April 27, 2015, in the Korean Intellectual Property Office, the entire disclosure of which is incorporated herein by reference for all purposes.

BACKGROUND

1. Field

The following description relates to computer simulation technology that processes 2D clothing patterns and thus creates digital clothing.

2. Description of the Related Art

Current clothing simulation technology is used in various fields ranging from the fashion industry to games, animations, and movie visual effects. Also, virtual clothing is a billion-dollar market. Such a technology is to model textiles in mesh having the mass so as to simulate movements of the textiles according to the outer movements of the avatar wearing the clothes, wind, lights, etc.

In a sewing simulation method to create digital clothing by using patterns, there are segment sewing and free sewing for a method of sewing each of the different two patterns.

Segment sewing is sewing the two selected segments among the segments that are separated by dots; and free sewing is sewing two segments with the adjusted length that a user wants by freely adjusting each length of the two segments to be sewn.

More specifically, in the case of free sewing, if a user adjusts the two segments to be the same, accuracy is required when adjusting the length of another segment to be the same as the length of the first selected segment through input device e.g., mouse.

In free sewing, even when two segments having the length being different from each other are sewn together, the digital fabric, which stretches well, including the two segments may seem as being sewn with the same length in the same manner as real clothing. However, in the case of the fabric not stretching well, wrinkles may be created on the digital clothing.

Furthermore, in the case the lengths of two segments to be sewn in the free-sewing manner are set to be different, a user is required to recognize how long or short the segment selected later is, during the process of adjusting the segment selected later.

Also, when the difference between each length of the two segments to be sewn together is too large for the two segments to be sewn together, displaying a warning sign is required so as to enable a user to recognize it during the process of adjusting the segment selected later.

SUMMARY

The purpose of the present invention is to allow the user, during free sewing, to easily adjust the length of one digital pattern's line segments to match that of another's.

The purpose of the present disclosure is to, during free sewing, calculate and display the difference between each length of a selected segment on the pattern and another segment to be sewn thereto so as to perform the accurate sewing.

Another purpose of the present disclosure is to, during free sewing, recognize a user a warning sign when the difference between each length of the selected segment on the pattern and another segment to be sewn thereto is too large for the two segments to be sewn together.

In one general aspect, a method of creating digital clothing includes, wherein the method is executable by a computing device including a computing element and a storage element storing patterns and draped digital clothing: setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; setting a second selected segment; and draping the digital clothing by processing the first and second selected segments according to sewing instructions so as to create 3D digital clothing, wherein the setting of the second selected segment includes: inputting a starting point of a second selected segment onto at least one second segment, which is to be sewn to the first selected segment; inputting an ending point, which, upon starting a point-clicking process at the starting point located on a second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point; and setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

The first and second segments may be at least one of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

The setting of the second selected segment may further include, between the inputting of the starting point and the inputting of the ending point: detecting a current cursor position; and displaying a candidate for the ending point by determining, as the candidate for the ending point of the second selected segment, a point, which is the closest in distance to the current detected cursor position and which makes the second selected segment a same as a length of the first selected segment along the second segment that includes the input starting point, wherein the second selected segment is made by connecting the input starting point to such a point.

The setting of the second selected segment may further include: in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value, moving the cursor position to a position of the determined candidate for the ending point and displaying the cursor position.

The setting of the second selected segment may further include: calculating and displaying at least one of: the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is the closest in distance to the current cursor position.

The setting of the second selected segment may further include: displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position.

The setting of the second selected segment may further include: in response to the difference value being greater than a reference value, displaying a warning sign.

The displaying of the warning sign may include: in response to the difference value being greater than the reference value, displaying the warning sign by changing colors of the calculated length and the difference value.

Other features and aspects may be apparent from the following detailed description, the drawings, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a flowchart illustrating a method of creating digital clothing according to an exemplary embodiment.

FIG. 2 is a detailed flowchart illustrating an operation of setting a selected segment in the second seam line according to an exemplary embodiment.

FIG. 3 is a diagram illustrating an example of a method of setting a selected segment in the first seam line.

FIG. 4 is a diagram illustrating another example of setting a selected segment in the first seam line.

FIG. 5 is a diagram illustrating an example of setting a selected segment in the second seam line.

FIG. 6 is a diagram illustrating an example of displaying a candidate for an ending point.

FIG. 7 is a diagram illustrating examples of moving a cursor position, displaying a length, and displaying a difference value.

FIG. 8 is a diagram illustrating an example of displaying a difference value and displaying a warning sign.

FIG. 9 is a diagram illustrating another example of displaying a difference value and displaying a warning sign.

FIG. 10 is a diagram illustrating 2D patterns, and 3D patterns prior to the draping.

FIG. 11 is a diagram illustrating 2D patterns, and 3D patterns after the draping.

FIG. 12 is a diagram illustrating various shapes of segments in the first and second seam lines.

FIG. 13 is a diagram illustrating an apparatus for creating digital clothing according to an exemplary embodiment.

Throughout the drawings and the detailed description, unless otherwise described, the same drawing reference numerals will be understood to refer to the same elements, features, and structures. The relative size and depiction of these elements may be exaggerated for clarity, illustration, and convenience.

DETAILED DESCRIPTION

The following description is provided to assist the reader in gaining a comprehensive understanding of the methods, apparatuses, and/or systems described herein. Accordingly, various changes, modifications, and equivalents of the methods, apparatuses, and/or systems described herein will be suggested to those of ordinary skill in the art. Also, descriptions of well-known functions and constructions may be omitted for increased clarity and conciseness.

Descriptions incorporated herein is omitted to enhance clarity and conciseness, and similar reference numerals are used to refer to similar elements, features, and structures throughout the drawings and the detailed description. Throughout the specification, unless

explicitly described to the contrary, the word "comprise" and variations such as "comprises" or "comprising" will be understood to imply the inclusion of stated elements but not the exclusion of any other elements. In addition, the components, devices, and units described herein indicate "a block configured to enable the systems of hardware or software to be changed or plugged in", which is, in other words, one unit or block that performs functions in hardware or software.

The proposed method of creating digital clothing and the apparatus thereof, and storage media, on which a computer program to execute the method thereof is stored, may be applied to the field of 3D simulation technology.

Digital clothing is created through a computer simulation creating program, which reflects the actual process of making clothes. For example, a clothing manufacturer draws 2D patterns of clothes and then drapes the 2D patterns on an avatar model that is to wear the clothes. The draping result is rendered, which is then shown, and then the 3D virtual clothes are output onto a screen. The avatar model and the 2D clothes patterns may be drawn by the user through a computer program or the user may select preloaded patterns for use. In the case the user wishes to draw the 2D patterns, the user may do so by using various types of graphic software, CAD programs, or the provided tool for making 2D patterns.

In a simulation method of draping digital clothing, a draping simulation method includes: 1) meshing patterns, 2) positioning patterns around an avatar, 3) determining whether the patterns intersect with the avatar, 4) generating intersection removal force, and 5) performing the draping simulation. Meshing patterns may be performed by applying the Delaunay Triangulation technique, and the draping simulation process may be performed using the method

that is disclosed in [Pascal Volino, Nadia MagnenatThalmann: Resolving surface collisions through intersection contour minimization.ACM Trans. Graph. 25(3): 1154-1159 (2006)].

FIG. 1 is a flowchart illustrating a method of creating digital clothing according to an exemplary embodiment.

In one exemplary embodiment, a method of creating digital clothing may include setting a selected segment in the first seam line (hereinafter, referred to as 'first selected segment') in 10, setting a selected segment in the second seam line (hereinafter, referred to as 'second selected segment') in 20, and draping digital clothing in 40, wherein the method may be performed by a computing device, which includes a computing element and a storage element that stores patterns and the draped digital clothing.

In one exemplary embodiment, the operation 10 includes setting a first selected segment by inputting the first selected segment, which is to be sewn on a segment in the first seam line (i.e., a segment to be sewn, which is on the first seam line; hereinafter, referred to as 'first segment')_on the pattern. The operation 10 may include inputting the first selected segment, which is one of the two lines to be sewn. A method of inputting the first selected segment is directly selecting the part to be sewn through input devices e.g., a mouse, a touch pen, a keyboard; or enabling a user to select outlines on one pattern, which are provided through a computer program so that a user can select.

In the case in which the first selected segment to be directly sewn is selected through input devices, a starting point and an ending point of the first selected segment are input and selected. In the case in which a cursor, which is output within a screen by input devices, e.g., a

mouse and a touch pen, does not exist on any segment of a pattern, a point on a segment that is the closest in distance to a current cursor position may be selected as a starting point or an ending point if the current cursor position has been selected as the starting point or the ending point. The operation 10 may be specifically described with reference to FIGS. 3 and 4.

A pattern may include at least one of a 2D pattern and a 3D pattern, wherein the 2D pattern is acquired after simulating, to a 2D object, a clothing sample that is cut for the design of 3D clothing in a computer, and wherein the 3D pattern is acquired after simulating the clothing sample to a 3D object. The 2D pattern is acquired after simulating, to a 2D object, the clothing sample that is cut for the design of the digital clothing in a computer. The 2D patterns are created according to the set attributes of textiles in terms of appearance and physical properties. To show the appearance of 2D patterns, the input of outline information of the 2D patterns is required. The outlines and vertices of the patterns may be created by using the CAD tool or various graphic programs or selecting the patterns from a storage device that includes 2D patterns according to the clothing types. The inside of the 2D patterns of which appearance is determined by the outlines may consist of meshes e.g., triangles or rectangles. The meshes may consist of springs that connect grid points to each other. The 2D patterns' material properties, wrinkling, drapability, etc., may be shown through the grid points and the springs.

The operation 20 of setting the second selected segment may include inputting a starting point in 21, inputting an ending point in 30, and setting the second selected segment in 31. The second selected segment is sewn to the first selected segment, which will be specifically described later.

In the operation 40 of draping the digital clothing, the first and second selected segments are sewn together in response to the sewing instructions so that digital clothing is created. In the operation 40 of draping the digital clothing, 2D patterns are positioned around an avatar model and are sewn to each other along the selected segments that a user has set.

In general, a term 'draping' indicates a technique of creating designs as directly draping fabric onto someone's body, or completing the designs in three dimensions as cutting darts and seams of designated design. The 'draping' in the present disclosure indicates a process of creating 3D clothes from 2D patterns through computer programs. If the selected segment to be sewn is input onto the 2D patterns, the digital clothing is created i.e., is draped onto the 3D object as the 2D patterns are combined. The operation 40 will be specifically described later with reference to FIGS. 10 and 11.

FIG. 2 is a detailed flowchart illustrating an operation of setting a second selected segment according to an exemplary embodiment.

An operation 20 of setting the second selected segment includes inputting a starting point in 21, inputting an ending point, and setting the second selected segment in 31.

The operation 21 includes inputting a starting point of a second selected segment on at least one segment in the second seam line (i.e., a segment to be sewn, which is on the second seam line; hereinafter, referred to as 'second segment'), which is to be sewn to the first selected segment. The starting point of the second selected segment may be input through input devices e.g., a mouse, a touch pen, a keyboard, etc. In the case in which a cursor, which is output within a screen by input devices, e.g., a mouse and a touch pen, does not exist on any segment on

a 2D pattern, a point on a segment that is the closest in distance to a current cursor position may be selected as a starting point if the current cursor position has been selected as the starting point. The operation 21 will be specifically described later with reference to FIG. 5.

The operation 30 includes inputting an ending point, which, upon starting the point-clicking process at the starting point located on the second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point. If the current cursor position is the closest in distance to the second segment, which includes the input starting point, among a plurality of second segments, the point that is the closest to the position, in which the point-clicking process has occurred, is input as an ending point. In the case the point-clicking process occurs when the current cursor is closer to another second segment than the second segment that includes the input starting point, the ending point may not be input. The ending point may be selected so that a length of the second selected segment is the same as that of the first selected segment, which exemplary embodiments are not limited thereto, and the length of the second selected segment may be different from the length of the first selected segment.

The operation 31 includes setting, as the second selected segment, the section of the second segment between the input starting point and the input ending point. If the length of the first selected segment is the same as the second selected segment, the digital clothing may be sewn without the wrinkles thereon. If the lengths of the first and second selected segments are not the same, wrinkles are created on the selected segment with the longer length, thus making

aesthetic effects. However, even if the lengths of the first and second selected segments are not the same, the wrinkles may not be created according to how much the fabric stretches.

The first and second segments may be at least one of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles. In the case of the shape of the pattern being a circle, if the entire border of the circle is sewn, the first segment or the second segment may a circle. If the partial border of the circle is sewn, the first segment or the second segment may be a curved line. Various shapes of the first and second segments will be specifically described with reference to FIG. 12.

In a method of creating digital clothing, the operation 20 may further include detecting a cursor position in 22 and displaying a candidate of an ending point in 23 between the operation 21 and the operation 30.

The operation 22 includes detecting a current cursor position.

The operation 23 includes: determining, as the candidate for the ending point of the second selected segment, a point, which is the closest in distance to the current detected cursor position and which makes the second selected segment the same as the length of the first selected segment along the second segment that includes the input starting point, wherein the second selected segment is made by connecting the input starting point to such a point, and then displaying such a candidate. As the candidate is shown, the ending point on the second selected segment on the pattern may be easily chosen to be the same as the first selected segment. The operation 23 may be specifically described later with reference to FIG. 6.

The operation 20 may further include moving a cursor position in 24 and 25. In the operations 24 and 25, the cursor is moved to the position of the determined candidate for the ending point and displayed in 25 if the difference between the current cursor position and the determined candidate for the ending point is lower than a reference value. For example, the reference value may be 15 pixels (px). The reference value may be set freely by a user. If a cursor is located around the candidate for the ending point, the cursor is moved onto the candidate for the ending point so that the second selected segment may be easily set to be the same as the first selected segment. The operations 24 and 25 will be specifically described later with reference to FIG. 7.

The operation 31 may further include displaying a length in 26. The operation 26 includes calculating at least one of: the length of the first selected segment and the length of the line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position, which is then displayed in number. The line may be consistently monitored, which is acquired by connecting the starting point, which is input along the second segment changed while the cursor is moved, to the point that is on the second segment and that is the closest in distance to the current cursor position. The operation 26 will be specifically described later with reference to FIG. 7.

The method of creating digital clothing may further include displaying the difference value in 27. The operation 27 includes displaying, in number, the difference value between the length of the first selected segment and the length of the line, which is acquired by connecting

the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position. A user may check the length of the first selected segment and the length of the line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position. Furthermore, in the operation 27, a user may check the difference value therebetween. A user may check the difference so as to set the length of the first selected segment to be the same as the length of the second selected segment. The operation 27 may be specifically described later with reference to FIGS. 7, 8, and 9.

The operation 20 may include displaying a warning sign in 28 and 29. In the operations 28 and 29, a warning sign is displayed when the difference value is greater than a reference value. In the operations 28 and 29, when the difference value is greater than a reference value, the warning sign is displayed in 29 by changing the colors of the calculated length and the difference value. If the second selected segment is shorter or longer than the first selected segment, wrinkles may be created when patterns is sewn. In other words, depending on whether the wrinkles are created or not when the first and second selected segments are sewn together, the difference value may be displayed in different color. For example, the difference value may be displayed in red. If the difference value is greater than a reference value, the warning sign may be displayed while the difference value is displayed in red. Whether wrinkles are created on the 3D pattern may depend on the sewing method, the types of fabric, etc., wherein the 3D pattern is created after the first and second selected segments are sewn together and then through the draping process. For example, knit and chiffon stretching well do not create wrinkles if the

difference between the first and second selected segments is lower than one inch. Cotton and denim not stretching well may not create wrinkles if the difference between the first and second selected segments is lower than one centimeter.

Non-volatile media may store computer programs to which a method of creating digital clothing is applied. The method of creating digital clothing may be created to be a downloadable computer program and stored in non-volatile computer-readable storage media, which, for example, includes read-only memory (ROM), random access memory (RAM), CD-ROM, magnetic tape, floppy disks, optical data storage devices, etc., and also implemented in the form of carrier wave (e.g., transmission via the internet).

FIG. 3 is a diagram illustrating an example of a method of setting a first selected segment. FIG. 3 illustrates two patterns 303 and 304 to be sewn, a starting point 302 of a first selected segment, and a cursor 301. The cursor 301, which is the position that input devices e.g., a mouse and a touch pen display on a screen, is positioned at one point 302 on the pattern 303. If the cursor 301 selects any one point on the pattern, the selected point may be a starting point of the first selected segment. In other words, if the cursor 301 selects any one point on the segment on the pattern, the selected point may be the starting point of the first selected segment, wherein the point is input through input devices. In FIG. 3, the segments to be sewn on the pattern are between each of the points on the pattern. In FIG. 3, the segments to be sewn on the pattern are set as an outline of the pattern, which exemplary embodiments are not limited thereto; and any segment, which is acquired after two points on the pattern are connected, may be set as the segment to be sewn. The cursor 301 is not positioned on the segment on any one pattern,

and if a current cursor position is chosen as the starting point, the point on the segment on the pattern that is closest in distance to the current cursor position may be selected as the starting point.

FIG. 4 is a diagram illustrating another example of an operation of setting a first selected segment. FIG. 4 illustrates: two patterns 303 and 304 to be sewn; a starting point 302 of the first selected segment; an ending point 305 of the first selected segment; a first selected segment 306; a length 308 of the first selected segment; and a cursor 301. As in FIG. 3, a user may select the starting point 302 on the first selected segment and then select, as the ending point 305, any point on the first selected segment, which a user wants to select, so as to set the first selected segment 306. When an ending point of the first selected segment 306 is selected, in the case in which a cursor, which is output within a screen by input devices, e.g., a mouse and a touch pen, does not exist on any segment of a 2D pattern, a point on a segment that is the closest in distance to a current cursor position may be selected as the ending point 305 if the current cursor position has been selected as the ending point. After a user inputs the starting point on the first segment, the length of the line may be displayed, wherein the line is acquired after the starting point is connected to the point that is on the first segment and that is closest in distance to the current cursor position. According to the movement of the cursor, the length of the line may be changed, which is acquired after the starting point is connected to the point that is on the segment and that is the closest in distance to the cursor. Once the ending point 305 of the first selected segment is selected, its length 308 is set. A user may set the length 308 in various units e.g., cm, mm, m, inch, etc.

FIG. 5 is a diagram illustrating an example of setting a second selected segment. FIG. 5 illustrates two patterns 303 and 304 to be sewn; a starting point 302 of the first selected segment; an ending point 305 of the first selected segment; a first selected segment 306; a length 308 of the first selected segment; a starting point 309 of the second selected segment; and a cursor 301. The cursor 301, which is the position that input devices e.g., a mouse and a touch pen display on a screen, is positioned at one point 309 on the pattern 304. If the cursor 301 selects any one point on the pattern, the selected point may be a starting point of the second selected segment. In other words, if the cursor 301 selects any one point on the second segment on the pattern, the selected point may be the starting point of the second selected segment, wherein the point is input through input devices. In FIG. 5, the segments to be sewn on the pattern are between each of the points on the pattern. In FIG. 5, the segments to be sewn on the pattern are set as an outline of the pattern, which exemplary embodiments are not limited thereto; and any segment, which is acquired after two points on the pattern are connected, may be set as the segment to be sewn. The cursor 301 is not positioned on the segment on any one pattern, and if a current cursor position is chosen as the starting point of the second selected segment, the point on the segment on the pattern that is closest in distance to the current cursor position may be selected as the starting point.

FIG. 6 is a diagram illustrating an example of displaying a candidate for an ending point. FIG. 6 illustrates: two patterns 303 and 304 to be sewn; a starting point 302 of the first selected segment; an ending point 305 of the first selected segment; a first selected segment 306; a length 308 of the first selected segment; a starting point 309 of the second selected segment; a candidate

310 for an ending point; and a cursor 301. If the starting point 309 of the second selected segment is input, a point is displayed as the candidate 310 for the ending point of the second selected segment, wherein the point is the closest in distance to the position of the current detected cursor 301 and makes the second selected segment the same as the length of the first selected segment along the second segment that includes the input starting point 309, wherein the second selected segment is made by connecting the input starting point 309 to such a point. Since the current detected cursor 301 is closer to a second segment 312 of the second segments 311 and 312 that include the starting point 309 of the second selected segment, a candidate 310 for the ending point is generated on the second segment 312, wherein the second segments 311 and 312 meet together on the same point, which is the starting point 309. If the cursor 301 is closer to the second segment 311, the candidate 310 may be generated on the second segment 311.

FIG. 7 is a diagram illustrating examples of moving a cursor position, displaying a length, and displaying a difference value. FIG. 7 illustrates: two patterns 303 and 304 to be sewn; a starting point 302 of a first selected segment; an ending point 305 of the first selected segment; the first selected segment 306; a length 308 of the first selected segment; a starting point 309 of the second selected segment; a candidate 310 for an ending point; a length 313 of the second selected segment; a difference value 314; and a cursor 301. The cursor 301, which was positioned in the distance lower than a reference value to the candidate 310, moves to the position of the candidate 310 and then positioned on the candidate 310. Since the candidate 310 is displayed, and the cursor 301 moves and is positioned to the position of the candidate 310

under a certain condition, the second selected segment may be easily set to be the same as the first selected segment. Once the position of the cursor 301 is moved, the length of a segment is also changed accordingly, wherein such a segment is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position. As illustrated in FIG. 7, the length of the first selected segment is the same as the length of the second selected segment. That is, in FIG. 7, the difference value 314 between the length of the first selected segment and the length of a line is displayed 0, wherein the line is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position.

FIG. 8 is a diagram illustrating an example of displaying a difference value in 27 and displaying a warning sign in 28 and 29. FIG. 9 illustrates: a cursor 301; a length 313 of a line, which is acquired by connecting the starting point, input along a second segment, to a point that is on the second segment and that is the closest in distance to the current cursor position; and a difference value 314 between a length of a first selected segment and the length of a line, which is acquired by connecting the input starting point to a point that is on the second segment and that is the closest in distance to the current cursor position. The length 313 and the length 314 are changed according to the movement of the cursor 301. For example, the difference value 314 illustrated in FIG. 7 is displayed in blue. On the contrary, the difference value illustrated in FIG. 8 is, for example, displayed in red. In FIG. 8, since the second selected segment is shorter than the first selected segment, wrinkles on the clothes may be created when the two segments

are sewn together. In other words, in the case the wrinkles are likely to be created when the first selected segment is sewn to the second selected segment, the difference value therebetween may be displayed in red. If the difference value is greater than a reference value, the difference value is displayed in red so as to show a warning sign. Whether wrinkles are created on a 3D pattern may depend on the sewing method, the types of fabric, etc., wherein the 3D pattern is created after the first and second selected segments are sewn together and then through a draping process. For example, knit and chiffon stretching well do not create wrinkles if the difference between the first and second selected segments is lower than one inch. Cotton and denim not stretching well may not create wrinkles if the difference between the first and second selected segments is lower than one centimeter.

FIG. 9 is a diagram illustrating another example of displaying a difference value in 27 and displaying a warning sign in 28 and 29. FIG. 9 illustrates: a cursor 301; a length 313 of a line, which is acquired by connecting the starting point, input along a second segment, to a point that is on the second segment and that is the closest in distance to the current cursor position; and a difference value 314 between a length of a first selected segment and the length of a line, which is acquired by connecting the input starting point to a point that is on the second segment and that is the closest in distance to the current cursor position. The length 313 and the length 314 are changed according to the movement of the cursor 301. For example, the difference value 314 illustrated in FIG. 7 is displayed in blue. On the contrary, the difference value illustrated in FIG. 9 is, for example, displayed in red. In FIG. 9, since the second selected segment is longer than the first selected segment, wrinkles on the clothes may be created when

the two segments are sewn together. In other words, in the case the wrinkles are likely to be created when the first selected segment is sewn to the second selected segment, the difference value therebetween may be displayed in red. If the difference value is greater than a reference value, the difference value is displayed in red so as to show a warning sign. Whether wrinkles are created on a 3D pattern may depend on the sewing method, the types of fabric, etc., wherein the 3D pattern is created after the first and second selected segments are sewn together and then through a draping process. For example, knit and chiffon stretching well do not create wrinkles if the difference between the first and second selected segments is lower than one inch. Cotton and denim not stretching well may not create wrinkles if the difference between the first and second selected segments is lower than one centimeter.

FIG. 10 is a diagram illustrating 2D patterns, and 3D patterns prior to the draping. When first and second selected segments on the 2D patterns in a 2D pattern screen 402 are set, the first and second selected segments on the 2D patterns are also set in the positions on 3D patterns in a 3D screen 401, which correspond to the positions of the 2D patterns.

FIG. 11 is a diagram illustrating 2D patterns, and 3D patterns after the draping. After first and second selected segments on 2D patterns in a 2D pattern screen 402 are set, and then sewing instructions are made, the first and second selected segments are sewn together in response to the sewing instructions so that 3D clothing is created. The digital clothing illustrated in the 3D screen 401 is the result acquired by sewing together the first and second selected segments, which have been set, on the 2D patterns in the 2D pattern screen 402.

FIG. 12 is a diagram illustrating various shapes of first and second segments. FIG. 12 illustrates various shapes (a), (b), (c), and (d), each of which illustrates a pair of first and second selected segments.

(a) of FIG. 12 illustrates an example of sewing rectangular patterns, wherein each of a first selected segment 1201 and a second selected segment 1202 is the outline of a rectangle. In (b), a first selected segment 1203 is positioned on the outline of a rectangle, and a second selected segment 1204 is positioned inside a rectangle. As described above, since the selected segment is acquired by connecting two points that is likely to exist on the pattern, the selected segment may be positioned inside the pattern. Second segments 1204 and 1209 are set by a user; and in FIG. 12, a user selects, as the second selected segment 1204, one second segment of two second segments 1204 and 1209. In (c), a first selected segment is positioned on the outline of a rectangle, and a second selected segment is positioned inside a circle. As illustrated in (c), the first and second selected segments may be sewn together even if each of the first and second segments has the different shape e.g., a straight line and a curved line. In (d), a first selected segment is positioned on the outline of a rectangle, and a second selected segment is positioned on the outline of a figure. As described above, even if first and second segments are different from each other, the first and second selected segments may be sewn together. In addition, in the case of (d), even if the second selected segment is positioned inside the figure, the first and second selected segments may be sewn together.

FIG. 13 is a diagram illustrating an apparatus for creating digital clothing according to an exemplary embodiment.

In one exemplary embodiment, an apparatus for creating digital clothing includes a user interface 100 and a draper 200, wherein the apparatus includes a computing element and a storage element that stores patterns and the draped digital clothing.

The interface 100 may include a first selected segment setter 110, which sets a first selected segment, and a second selected segment setter 120, which sets a second selected segment. A user may set the first selected segment and the second selected segment through the interface 100. The user face 100 may include input devices e.g., a key board, a mouse, a touch pen, etc. The user interface 100 may be a computer program, in which a method of creating digital clothing is implemented in terms of software.

The first selected segment setter 110 sets the first selected segment by inputting the first selected segment, which is to be sewn on the first segment on the pattern. The first selected segment setter 110 may input the first selected segment, which is one of the two patterns to be sewn. The method of inputting the first selected segment is directly selecting the part to be sewn through input devices, e.g., a mouse, a touch pen, a keyboard; or enabling a user to select outlines on one pattern, which are provided through a computer program so that a user can select.

In the case in which the first selected segment to be directly sewn is selected through input devices, a starting point and an ending point of the first selected segment are input and selected. In the case in which a cursor, which is output within a screen by input devices, e.g., a mouse and a touch pen, does not exist on any segment of a pattern, a point on a segment that is the closest in distance to a current cursor position may be selected as a starting point or an ending point if the current cursor position has been selected as the starting point or the ending point.

The first selected segment setter 110 is specifically described above with reference to FIGS. 3 and 4.

The second selected segment setter 120 may include a starting point input 121, an ending point input 122, and a setter. The second selected segment is sewn to the first selected segment, which will be specifically described later.

The draper 200 sews together the first and second selected segments in response to the sewing instructions so that digital clothing is created. The draper 200 positions 2D patterns around an avatar model, which are then sewn to each other along the selected segments that a user has set. The draper 200 is specifically described above with reference to FIGS. 10 and 11.

The starting point input 121 inputs a starting point of a second selected segment on at least one second segment, which is to be sewn to the first selected segment. The starting point of the second selected segment may be input through input devices e.g., a mouse, a touch pen, a keyboard, etc. In the case in which a cursor, which is output within a screen by input devices, e.g., a mouse and a touch pen, does not exist on any segment on a pattern, a point on a segment that is the closest in distance to a current cursor position may be selected as a starting point if the current cursor position has been selected as the starting point. The starting point input 121 is specifically described with reference to FIG. 5.

The ending point input 122 inputs an ending point, which, upon starting the point-clicking process at the starting point located on the second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point. If the position of the current cursor is the closest in distance to the second

segment, which includes the input starting point, among a plurality of second segments, the point that is the closest to the position, in which the point-clicking process has occurred, is input as an ending point. In the case the point-clicking process occurs when the current cursor is closer to another second segment than the second segment that includes the input starting point, the ending point may not be input. The ending point may be selected so that a length of the second selected segment is the same as the first selected segment, which exemplary embodiments are not limited thereto, and the length of the second selected segment may be different from the length of the first selected segment.

The setter sets, as the second selected segment, the section of the second segment between the input starting point and the input ending point. If the length of the first selected segment is the same as the second selected segment, the digital clothing may be sewn without the wrinkles thereon. If the lengths of the first and second selected segments are not the same, wrinkles are created on the selected segment with the longer length, thus making aesthetic effects. However, even if the lengths of the first and second selected segments are not the same, the wrinkles may not be created according to how much the fabric stretches.

The first and second segments may be at least one of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles. In the case of the shape of the pattern being a circle, if the entire border of the circle is sewn, the first segment or the second segment may a circle. If the partial border of the circle is sewn, the first segment or the second segment may be a curved line. Various shapes of the first and second segments are specifically described above with reference to FIG. 12.

An apparatus for creating digital clothing may further include a cursor position detector 210 and an ending point candidate display 220.

The cursor position detector 210 detects a current cursor position.

The ending point candidate display 220 determines, as the candidate for the ending point of the second selected segment, a point, which is the closest in distance to the current detected cursor position and which makes the second selected segment the same as the length of the first selected segment along the second segment that includes the input starting point, wherein the second selected segment is made by connecting the input starting point to such a point, and then displaying such a candidate. As the candidate is shown, the ending point on the second selected segment on the pattern may be easily chosen to be the same as the first selected segment. The ending point candidate display 220 is specifically described above with reference to FIG. 6.

The apparatus for creating digital clothing may further include a cursor position mover 231. The cursor position mover 231 moves the position of the cursor to the position of the determined candidate for the ending point and displays it the difference between the current cursor position and the determined candidate for the ending point is lower than a reference value. For example, the reference value may be 15 pixels (px). The reference value may be set freely by a user. If a cursor is located around the candidate for the ending point, the cursor is moved onto the candidate for the ending point so that the second selected segment may be easily set to be the same as the first selected segment. The cursor position mover 231 is specifically described above with reference to FIG. 7.

The apparatus may further include a length display 240. The length display 240 calculates and displays in number at least one of: the length of the first selected segment and the length of the line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position, which is then displayed in number. The line may be consistently monitored, which is acquired by connecting the starting point, which is input along the second segment changed while the cursor is moved, to the point that is on the second segment and that is the closest in distance to the current cursor position. The length display 240 is specifically described above with reference to FIG. 7.

The apparatus may further include a difference value display 250. The difference value display 250 displays, in number, the difference value between the length of the first selected segment and the length of the line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position. A user may check the length of the first selected segment and the length of the line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position. Furthermore, using the difference value 250, a user may check the difference value therebetween. A user may check the difference so as to set the length of the first selected segment to be the same as the length of the second selected segment. The difference value display 250 is specifically described above with reference to FIGS. 7, 8, and 9.

The apparatus may include a warning sign display 260. The warning sign display 260 displays a warning sign when the difference value is greater than a reference value. When the difference value is greater than a reference value, the warning sign display 260 displays the warning sign by changing the colors of the calculated length and the difference value. If the second selected segment is shorter or longer than the first selected segment, wrinkles may be created when patterns is sewn. In other words, depending on whether the wrinkles are created or not when the first and second selected segments are sewn together, the difference value may be displayed in different color. For example, the difference value may be displayed in red. If the difference value is greater than a reference value, the warning sign may be displayed while the difference value is displayed in red. Whether wrinkles are created on the 3D pattern may depend on the sewing method, the types of fabric, etc., wherein the 3D pattern is created after the first and second selected segments are sewn together and then through the draping process. For example, knit and chiffon stretching well do not create wrinkles if the difference between the first and second selected segments is lower than one inch. Cotton and denim not stretching well may not create wrinkles if the difference between the first and second selected segments is lower than one centimeter.

According to the present disclosure, the selected segment on a pattern may be set to be the same as the length of another segment which is to be sewn thereto.

According to the present disclosure, the difference value may be checked when the selected segment on the pattern is not the same as another segment which is to be sewn thereto.

A number of examples have been described above. Nevertheless, it should be understood that various modifications may be made. For example, suitable results may be achieved if the described techniques are performed in a different order and/or if components in a described system, architecture, device, or circuit are combined in a different manner and/or replaced or supplemented by other components or their equivalents. Accordingly, other implementations are within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A method of creating digital clothing, wherein the method is executable by a computing device comprising a computing element and a storage element storing patterns and draped digital clothing, the method comprising:

setting a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

setting a second selected segment, which comprises:

inputting a starting point of a second selected segment onto at least one second segment, which is to be sewn to the first selected segment;

inputting an ending point, which, upon starting a point-clicking process at the starting point located on a second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point; and

setting, as the second selected segment, a section of the second segment between the input starting point and the input ending point.

2. The method of claim 1, wherein the first and second segments are at least one of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

3. The method of claim 1, wherein the setting of the second selected segment further comprises, between the inputting of the starting point and the inputting of the ending point:

detecting a current cursor position; and

displaying a candidate for the ending point by determining, as the candidate for the ending point of the second selected segment, a point, which is the closest in distance to the current detected cursor position and which makes the second selected segment a same as a length of the first selected segment along the second segment that includes the input starting point, wherein the second selected segment is made by connecting the input starting point to such a point.

4. The method of claim 3, wherein the setting of the second selected segment further comprises:

in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value, moving the cursor position to a position of the determined candidate for the ending point and displaying the cursor position.

5. The method of claim 3, wherein the setting of the second selected segment further comprises:

calculating and displaying at least one of: the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second

segment, to a point that is on the second segment and that is the closest in distance to the current cursor position.

6. The method of claim 3, wherein the setting of the second selected segment further comprises:

displaying a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position.

7. The method of claim 6, wherein the setting of the second selected segment further comprises:

in response to the difference value being greater than a reference value, displaying a warning sign.

8. The method of claim 7, wherein the displaying of the warning sign comprises:

in response to the difference value being greater than the reference value, displaying the warning sign by changing colors of the calculated length and the difference value.

9. The method of claim 1, wherein the method is executed in non-volatile storage media storing a computer program to which the method is applied.

10. An apparatus for creating digital clothing, wherein the apparatus comprises a computing element and a storage element storing patterns and draped digital clothing, the apparatus comprising:

a user interface, which comprises:

a first selected segment setter configured to set a first selected segment by inputting the first selected segment to be sewn on a first segment on a pattern; and

a second selected segment setter, which comprises:

a starting point input configured to input a starting point of a second selected segment onto at least one second segment, which is to be sewn to the first selected segment; and

an ending point input configured to input an ending point, which, upon starting a point-clicking process at the starting point located on a second segment, is the closest in distance to a point, where the point-clicking process occurs, on the second segment that includes the input starting point.

11. The apparatus of claim 10, wherein the first and second segments are at least one of a straight line, a curved line, a multi-branch line, and shapes that include polygons and circles.

12. The apparatus of claim 10, further comprising:

a cursor position detector configured to detect a current cursor position; and

an ending point candidate display configured to display a candidate for the ending point by determining, as the candidate for the ending point of the second selected segment, a point, which is the closest in distance to the current detected cursor position and which makes the second selected segment a same as a length of the first selected segment along the second segment that includes the input starting point, wherein the second selected segment is made by connecting the input starting point to such a point.

13. The apparatus of claim 12, further comprising:

a cursor position mover configured to, in response to a difference between the current cursor position and the determined candidate for the ending point being lower than a reference value, move the cursor position to a position of the determined candidate for the ending point and display the cursor position.

14. The apparatus of claim 13, further comprising:

a length display configured to calculate and display at least one of: the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to a point that is on the second segment and that is the closest in distance to the current cursor position.

15. The apparatus of claim 13, further comprising:

a difference value display configured to display a difference value between the length of the first selected segment and a length of a line, which is acquired by connecting the starting point, input along the second segment, to the point that is on the second segment and that is the closest in distance to the current cursor position.

16. The apparatus of claim 15, further comprising:

a warning sign display configured to, in response to the difference value being greater than a reference value, display a warning sign.

17. The apparatus of claim 16, wherein the warning sign display is configured to, in response to the difference value being greater than the reference value, display the warning sign by changing colors of the calculated length and the difference value.

ABSTRACT

A computer simulation technology that processes 2D clothing patterns and thus creates digital clothing.

The purpose of the present disclosure is to easily adjust a length of another segment to be sewn the same as a length of a selected segment on a pattern when free-sewing.

FIG. 1

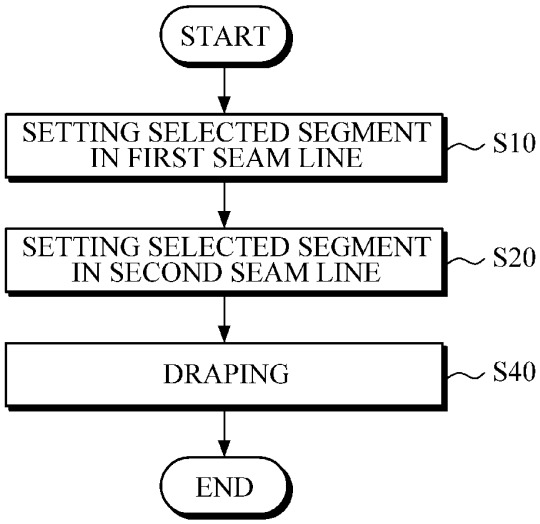

START
SETTING SELECTED SEGMENT IN FIRST SEAM LINE
S10
SETTING SELECTED SEGMENT IN SECOND SEAM LINE
S20
DRAPING
S40
END

FIG. 2

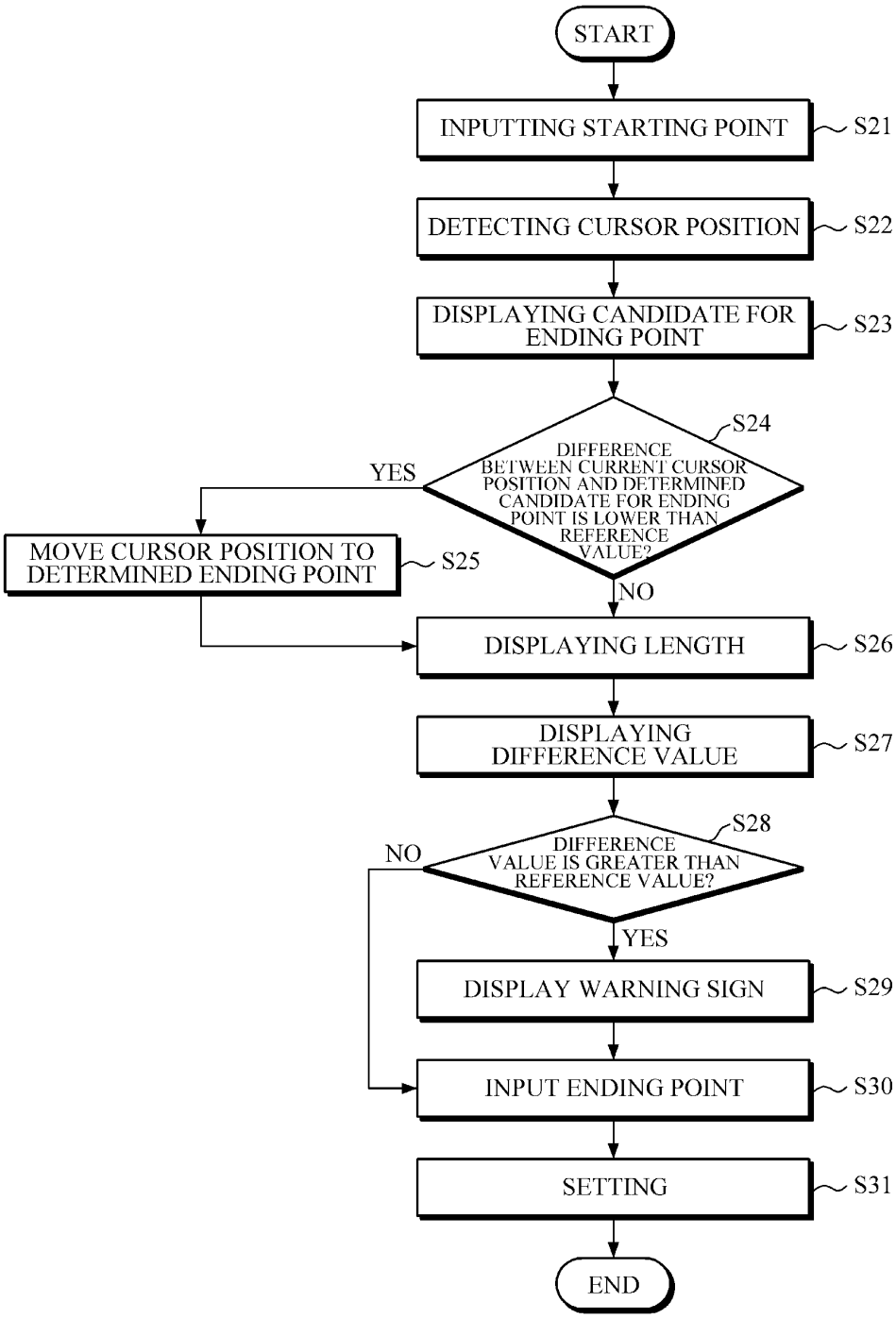

START
INPUTTING STARTING POINT
S21
DETECTING CURSOR POSITION
S22
DISPLAYING CANDIDATE FOR ENDING POINT
S23
S24
DIFFERENCE BETWEEN CURRENT CURSOR POSITION AND DETERMINED CANDIDATE FOR ENDING POINT IS LOWER THAN REFERENCE VALUE?
YES
NO
MOVE CURSOR POSITION TO DETERMINED ENDING POINT
S25
DISPLAYING LENGTH
S26
DISPLAYING DIFFERENCE VALUE
S27
S28
DIFFERENCE VALUE IS GREATER THAN REFERENCE VALUE?
NO
YES
DISPLAY WARNING SIGN
S29
INPUT ENDING POINT
S30
SETTING
S31
END

FIG. 3

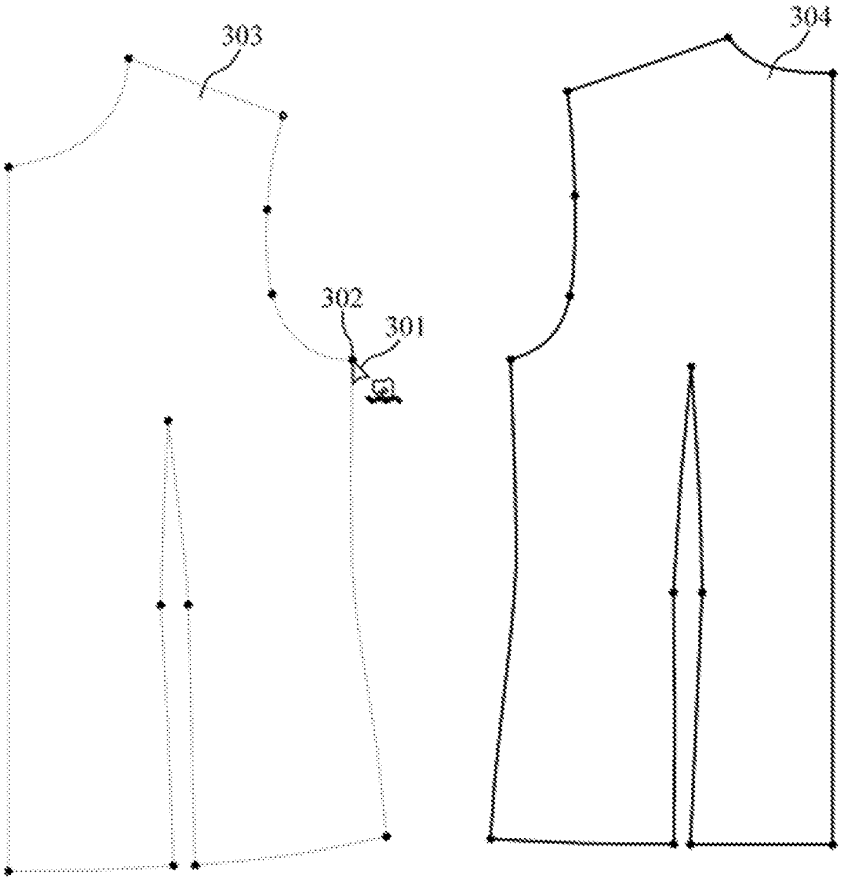


FIG. 4

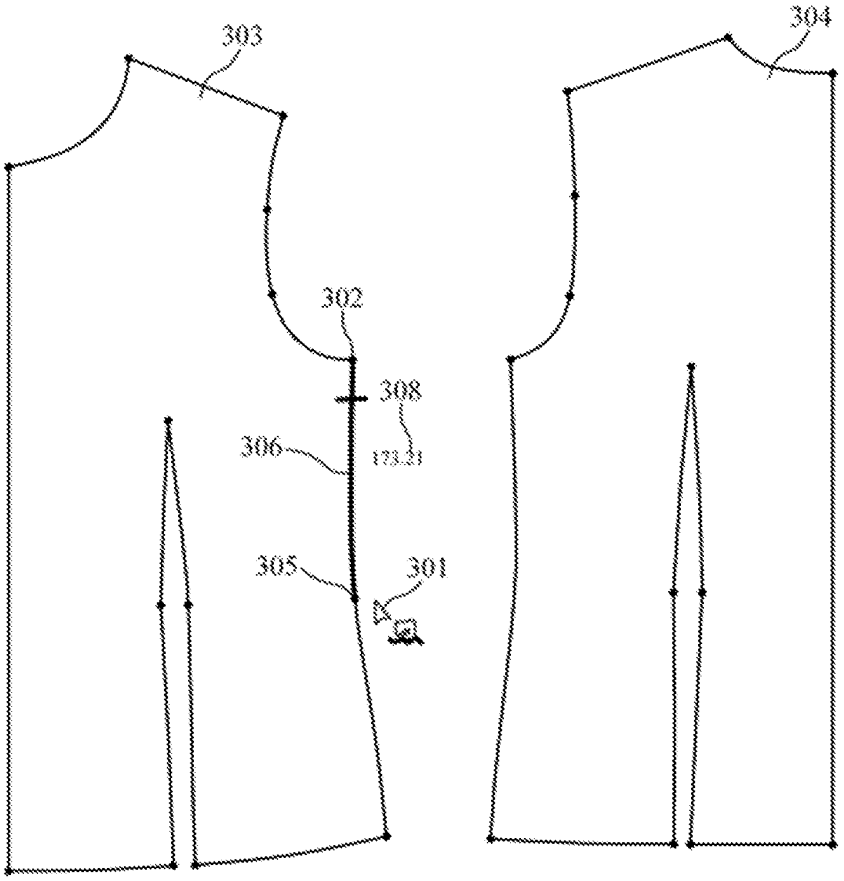


FIG. 5

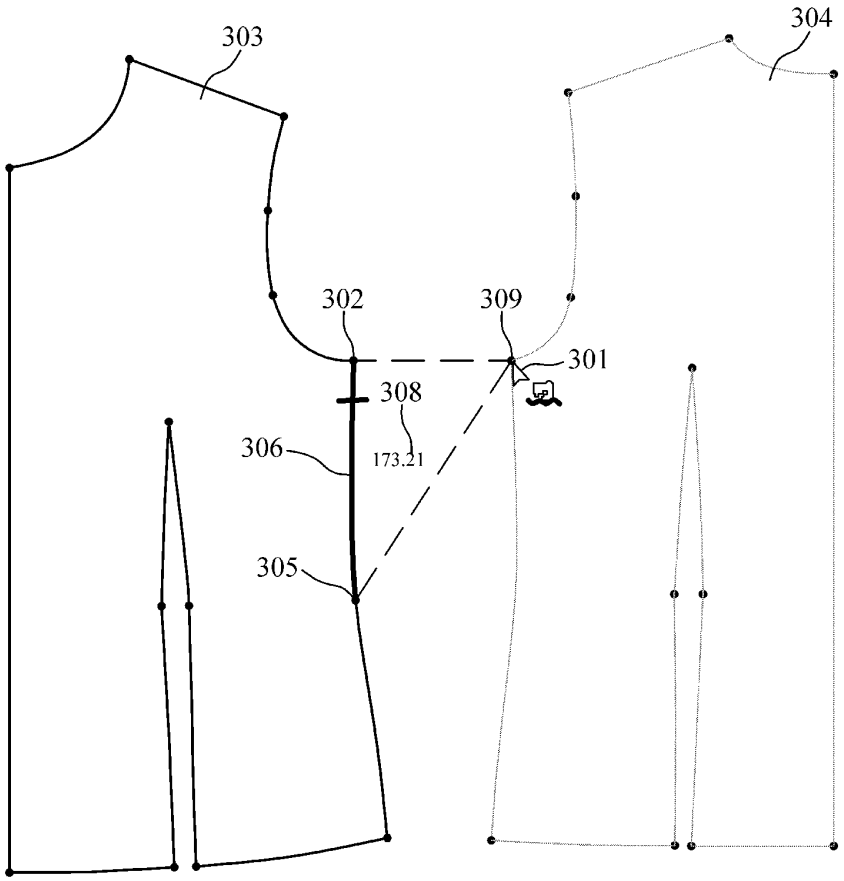


FIG. 6

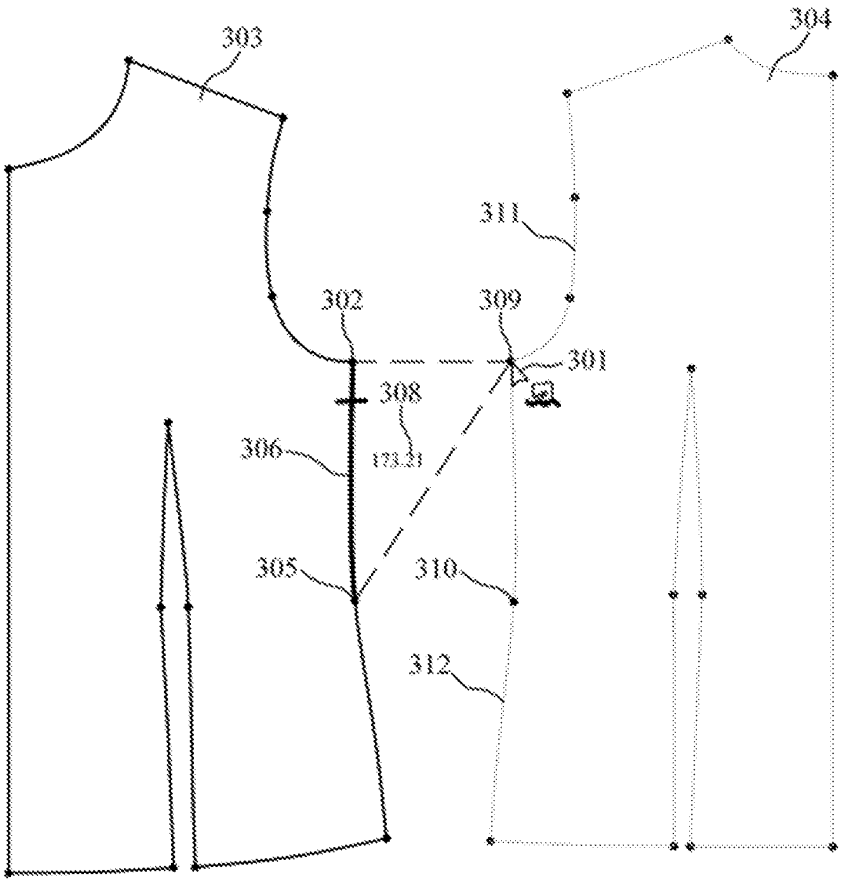


FIG. 7

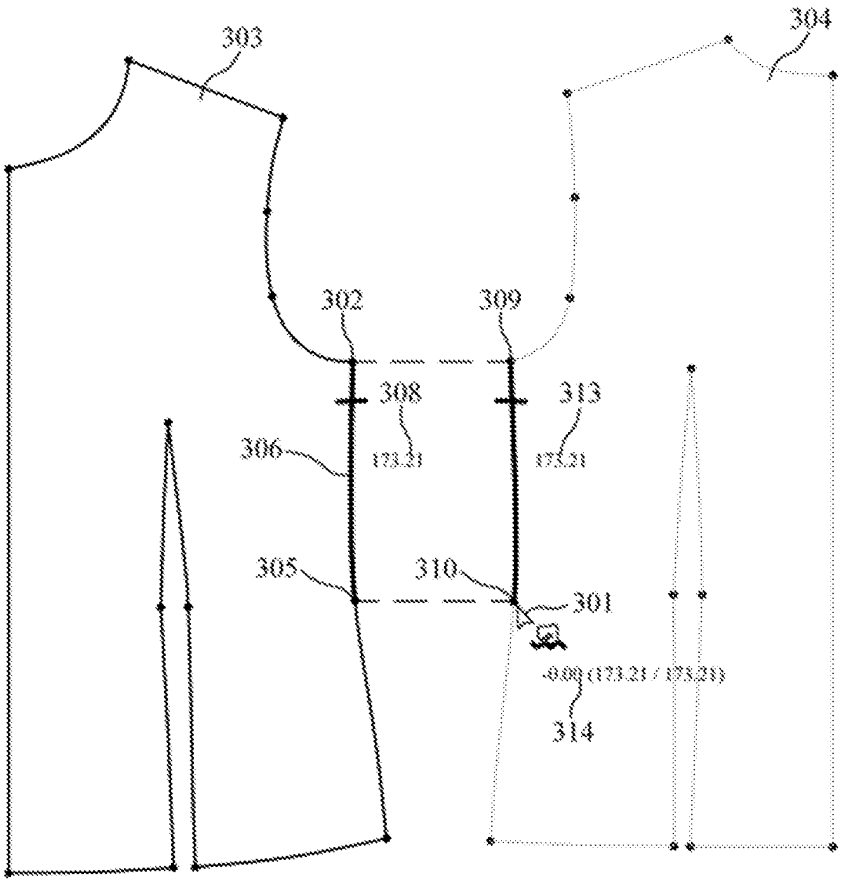


FIG. 8

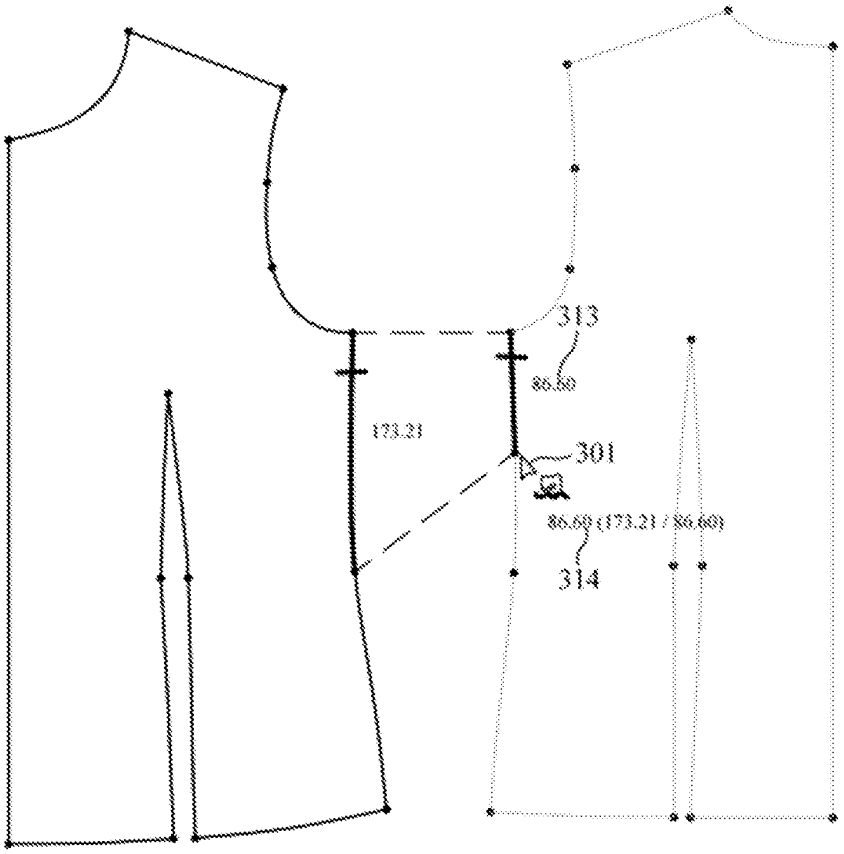


FIG. 9

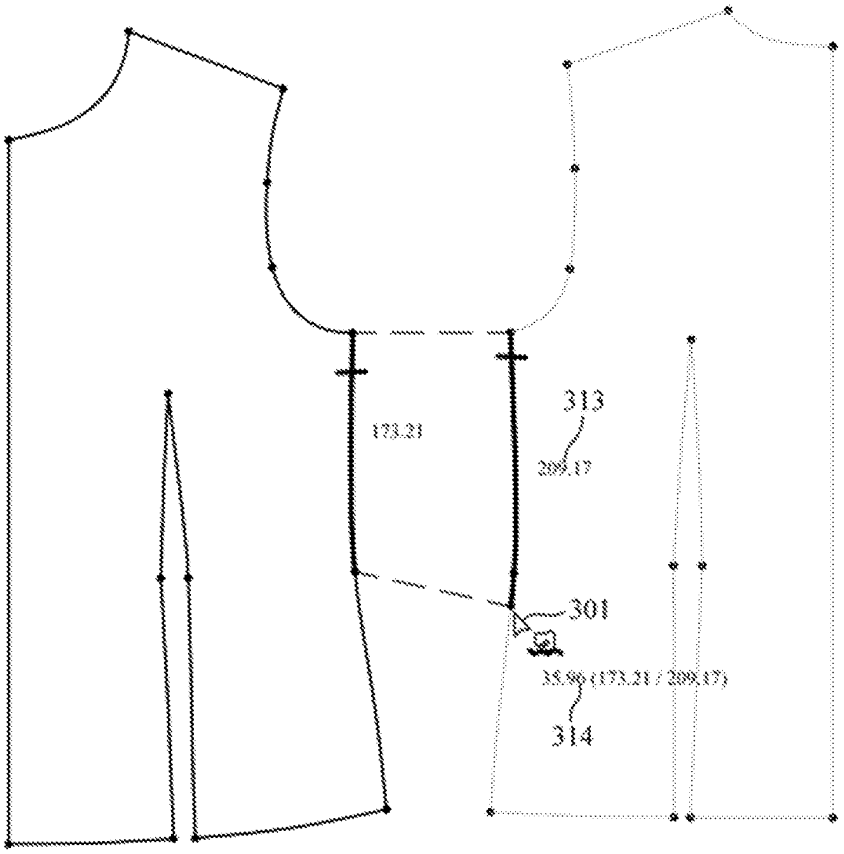


FIG. 10

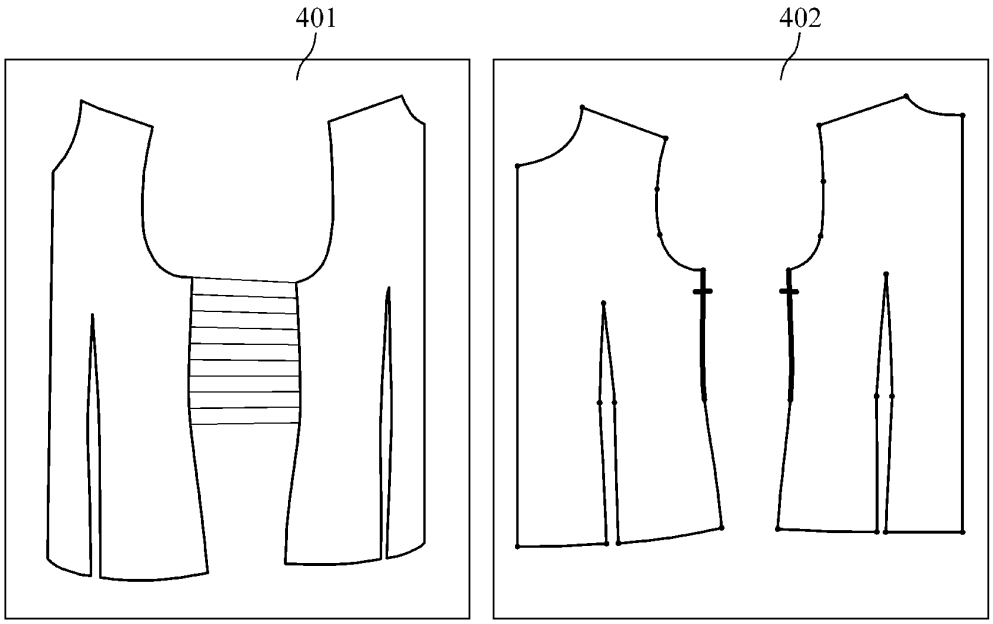


FIG. 11

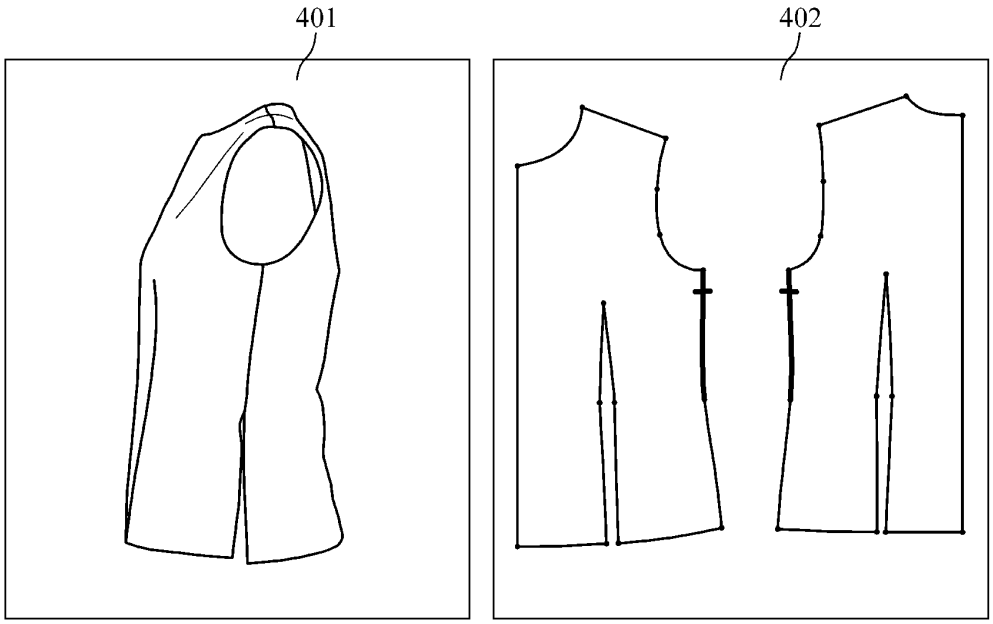


FIG. 12

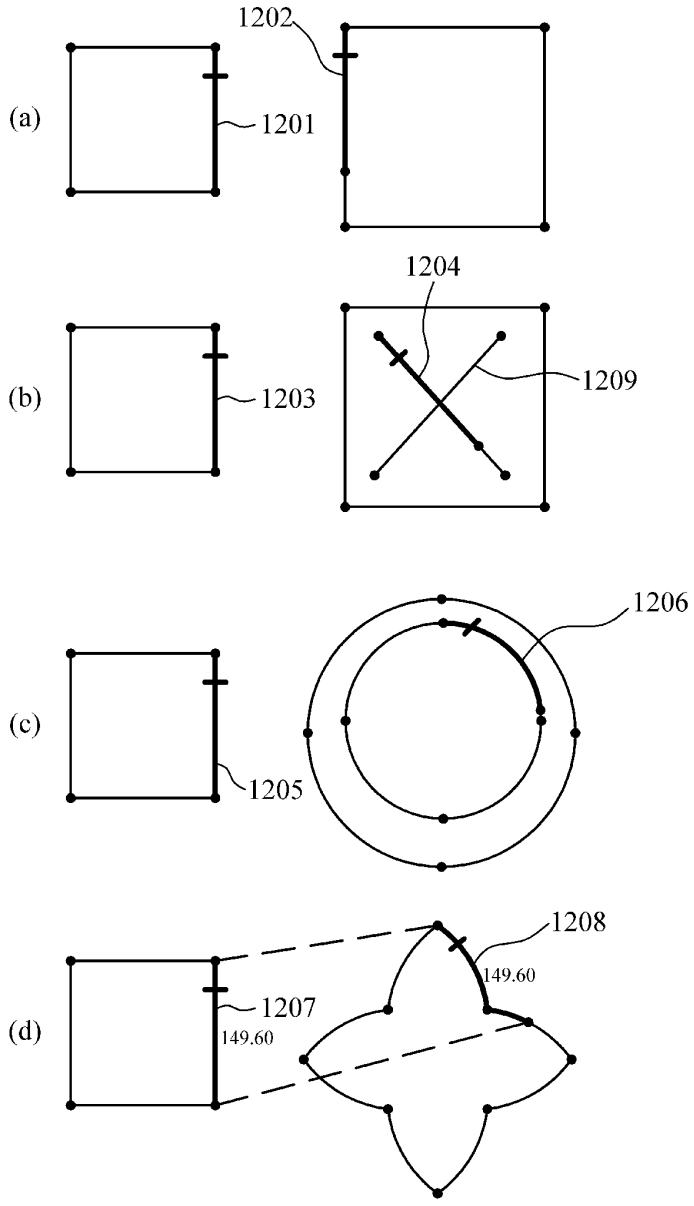
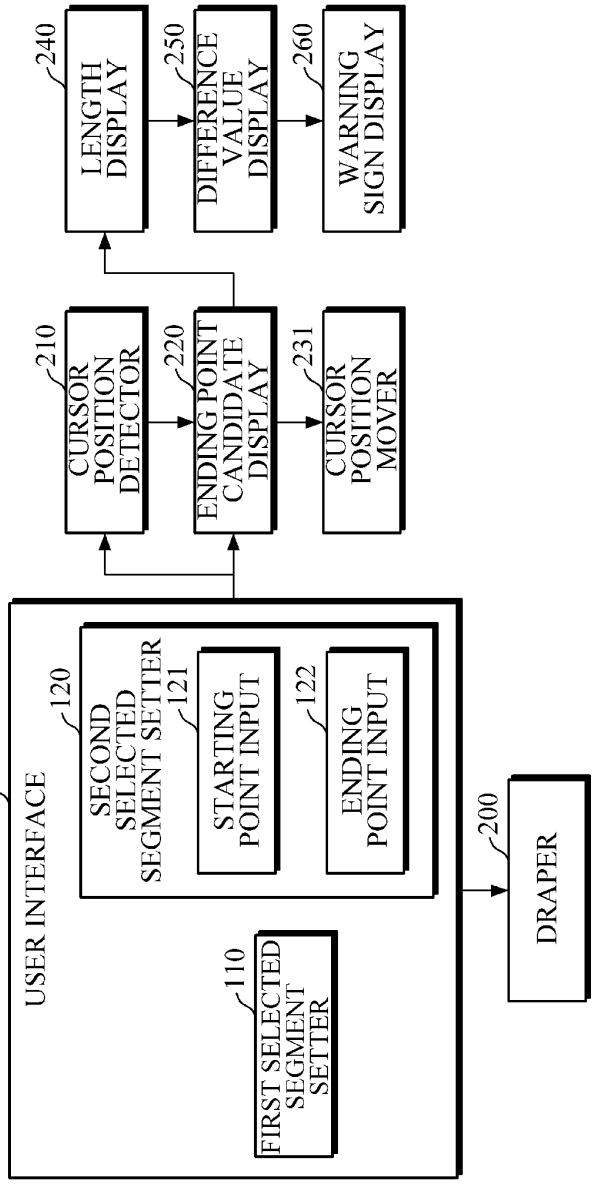

(a)
1201
1202
(b)
1203
1204
1209
(c)
1205
1206
(d)
1207
149.60
1208
149.60

FIG. 13


100
USER INTERFACE
110
FIRST SELECTED SEGMENT SETTER
120
SECOND SELECTED SEGMENT SETTER
121
STARTING POINT INPUT
122
ENDING POINT INPUT
200
DRAPER
210
CURSOR POSITION DETECTOR
220
ENDING POINT CANDIDATE DISPLAY
231
CURSOR POSITION MOVER
240
LENGTH DISPLAY
250
DIFFERENCE VALUE DISPLAY
260
WARNING SIGN DISPLAY

COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)

DECLARATION

As a below-named inventor, I hereby declare that this declaration is directed to the application attached hereto, or to United States Application Number or PCT International Application Number _____ filed on _____ (if applicable), entitled:

METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the above-identified application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

I have reviewed and understand the contents of the above-identified application, including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information that became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

ASSIGNMENT

For valuable consideration, I, as a below-named assignor, hereby assign to:

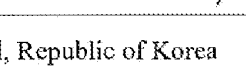
CLO virtual fashion
(Nonhyeon-dong) 17-4, Dosan-daero 8-gil, Gangnam-gu, Seoul, Republic of Korea

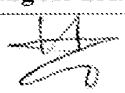
and its successors and assigns (collectively hereinafter called "the Assignee"), the entire right, title, and interest throughout the world in the inventions and improvements that are the subject of the application identified in the above declaration, which is United States Application Number or PCT International Application Number_____ filed on _____.
I authorize and request the attorneys appointed in the above-identified application to hereafter complete this Assignment by inserting above the application number and the filing date of the above-identified application when known, and to correct any typographical errors that may be discovered in this Assignment.

This Assignment includes the above-identified application, any and all United States and foreign patents, utility models, and design registrations granted for any of the inventions and improvements that are the subject of the above-identified application, and the right to claim priority based on the filing date of the

above-identified application under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, and all other treaties of like purposes; and I authorize the Assignee to apply in all countries in my name or in its own name for patents, utility models, design registrations, like rights of exclusion, and inventors' certificates for any of the inventions and improvements that are the subject of the above-identified application; and I agree for myself and my heirs, legal representatives, and assigns without further compensation to perform such lawful acts and to sign such further applications, Assignments, preliminary statements, and other lawful documents as the Assignee may reasonably request to effectuate fully this Assignment.

In witness whereof, I, as a below-named inventor and assignor, intending to be legally bound, have hereunto affixed my signature on the date indicated below next to my signature.

Inventor's Legal Name	**Seung Woo OH**		
Inventor's Signature		Date	2015. 09. 10
Residence (City, Country)	Seoul, Republic of Korea		
Mailing Address	(Eunpyeong New Town Gupabal Apt., Jingwan-dong) 926-204, 77, Jingwan 3-ro, Eunpyeong-gu, Seoul, Republic of Korea		

Inventor's Legal Name	**Kyoung Ae BANG**		
Inventor's Signature		Date	2015. 09. 10
Residence (City, Country)	Seoul, Republic of Korea		
Mailing Address	(Sinwol-dong) 43, Nambusunhwan-ro 46-gil, Yangcheon-gu, Seoul, Republic of Korea		

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the accompanying transmittal letter (form PTO/AIA/15, PTO/AIA/16, PTO/AIA/18, PTO/AIA/19, PTO/SB/29, PTO/AIA/50, PTO/AIA/82A, or equivalent).

I hereby appoint the practitioners of NSIP Law associated with the following Customer Number as my attorneys or agents to transact all business in the United States Patent and Trademark Office connected with the application identified in the accompanying transmittal letter:

Please recognize the address of NSIP Law associated with the following Customer Number as the correspondence address for the application identified in the accompanying transmittal letter:

I, the below-named Assignee, am the original Applicant (if there is only one Applicant) or an original Applicant (if there is more than one Applicant) of the application identified in the accompanying transmittal letter.

Name of Assignee	**CLO virtual fashion**		
Address of Assignee	(Nonhyeon-dong) 17-4, Dosan-daero 8-gil, Gangnam-gu, Seoul, Republic of Korea		
Signature		Date	2015. 09. 10
Name	Seung Woo Oh		
Title	CEO		

Attorney Docket No. 304053.0001
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS: Seung Woo OH et al. **CONFIRMATION NO.:** Not Yet Assigned

APPLICATION NO.: New Application **GROUP ART UNIT:** Not Yet Assigned

FILING DATE: Concurrently Herewith **EXAMINER:** Not Yet Assigned

TITLE: METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby submits the following information in accordance with the duty of disclosure set forth in 37 C.F.R. § 1.56. In accordance with 37 C.F.R. §§ 1.97 and 1.98, copies of the non-US patent documents being submitted are enclosed. For each foreign non-English document submitted, unless otherwise noted and/or provided, a corresponding English Abstract is provided. The documents are being presented concurrently with the filing of the new application, and therefore no fee is due at this time.

To assist the Examiner, the documents are listed on the attached form PTO/SB/08. It is respectfully requested that an Examiner-initialed copy of this form be returned to the undersigned.

Respectfully submitted,

Dated: October 23, 2015

By: /Brian H. Buck/
Brian H. Buck, Reg. No. 48,776
NSIP Law
P.O. Box 65745
Washington, DC 20035
Tel: (202) 429-0020

CYP/BHB/nam

Substitute for PTO/SB/08a/b

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(Use as many sheets as necessary)*				***Complete if Known***	
				Application Number	New Application
				Filing Date	Concurrently Herewith
				First Named Inventor	Seung Woo OH
				Art Unit	Not Yet Assigned
				Examiner Name	Not Yet Assigned
Sheet	1	of	1	Attorney Docket Number	304053.0001

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number - Kind Code[2] (*if known*)	Patent or Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] - Number[4] - Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	1	Volino, Pascal, and Nadia Magnenat-Thalmann. “Resolving surface collisions through intersection contour minimization.” Vol. 25., No. 3., ACM, 2006. (6 pages)	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04(a). [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached (X indicates Abstract only provided).

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Filer:	Alicia M. Choi/Nichole McRorie
Attorney Docket Number:	304053.0001
Filed as Small Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**730**

Electronic Acknowledgement Receipt	
EFS ID:	23874915
Application Number:	14921269
International Application Number:	
Confirmation Number:	6021
Title of Invention:	METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING
First Named Inventor/Applicant Name:	Seung Woo OH
Customer Number:	89980
Filer:	Alicia M. Choi/Nichole McRorie
Filer Authorized By:	Alicia M. Choi
Attorney Docket Number:	304053.0001
Receipt Date:	23-OCT-2015
Filing Date:	
Time Stamp:	13:58:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$730
RAM confirmation Number	208
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	NewApp_3040530001_UtillityTransmittal.pdf	310539 902535c7634803625881fc3cb6c9831ce8bca7ed	no	2
Warnings:					
Information:					
2	Application Data Sheet	NewApp_3040530001_ADS.pdf	1819006 d4aaec36f6b68ccae2c110898df502df967cc7d1	no	7
Warnings:					
Information:					
3		NewApp_3040530001_AppAsFiled.pdf	148087 8785a740db40b9803bbc1c800cf2844bda8d67bf	yes	36

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	29
Claims	30	35
Abstract	36	36

Warnings:					
Information:					
4	Drawings-only black and white line drawings	NewApp_3040530001_DrawingsAsFiled.pdf	1302877 2841d1c989091920ae09869e9fe9abe599e8a392	no	14
Warnings:					
Information:					
5	Oath or Declaration filed	NewApp_3040530001_ExecutedCDA.pdf	1024178 08560da75a925bfa91c836d7c625f3626cb056a0	no	2
Warnings:					
Information:					
6	Power of Attorney	NewApp_3040530001_POA.pdf	74228 f62cc5c572566be6c55e1fa52f5b24b8171e66b5	no	1

Warnings:					
Information:					
7	Transmittal Letter	IDS20151022_3040530001_Stmt.pdf	16677 9c38ef0752b3663fd8cf41e77bce6ca3d7f4ff88	no	1
Warnings:					
Information:					
8	Information Disclosure Statement (IDS) Form (SB08)	IDS20151022_3040530001_IDS.pdf	31385 c5bf293dea5d47f8f9a2f1e12dd0e443e926b9da	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
9	Non Patent Literature	IDS20151022_3040530001_NPL_1_Volino.pdf	2697686 017ccb4d1faf14c6c40e0ad4754db20b24d96307	no	6
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	34892 13170855ebf04196a90d1b6a7ba027ed428f90a7	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	7459555		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT3583996

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
SEUNG WOO OH	09/10/2015
KYOUNG AE BANG	09/10/2015

RECEIVING PARTY DATA

Name:	CLO VIRTUAL FASHION
Street Address:	(NONHYEON-DONG) 17-4, DOSAN-DAERO 8-GIL, GANGNAM-GU
City:	SEOUL
State/Country:	KOREA, REPUBLIC OF

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	14921269

CORRESPONDENCE DATA

Fax Number: (202)315-3758

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 202-429-0020
Email: pto@nsiplaw.com
Correspondent Name: NSIP LAW
Address Line 1: P.O. BOX 65745
Address Line 4: WASHINGTON, D.C. 20035

ATTORNEY DOCKET NUMBER:	304053.0001
NAME OF SUBMITTER:	BRIAN H. BUCK
SIGNATURE:	/Brian H. Buck/
DATE SIGNED:	10/23/2015
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 2
source=NewApp_3040530001_ExecutedAssignment#page1.tif
source=NewApp_3040530001_ExecutedAssignment#page2.tif

COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)

DECLARATION

As a below-named inventor, I hereby declare that this declaration is directed to the application attached hereto, or to United States Application Number or PCT International Application Number _____ filed on _____ (if applicable), entitled:

METHOD AND APPARATUS FOR CREATING DIGITAL CLOTHING

The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the above-identified application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

I have reviewed and understand the contents of the above-identified application, including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information that became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

ASSIGNMENT

For valuable consideration, I, as a below-named assignor, hereby assign to:

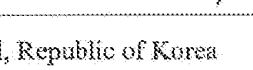
CLO virtual fashion
(Nonhyeon-dong) 17-4, Dosan-daero 8-gil, Gangnam-gu, Seoul, Republic of Korea

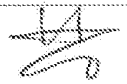
and its successors and assigns (collectively hereinafter called "the Assignee"), the entire right, title, and interest throughout the world in the inventions and improvements that are the subject of the application identified in the above declaration, which is United States Application Number or PCT International Application Number 14/921,269 filed on October 23, 2015.
I authorize and request the attorneys appointed in the above-identified application to hereafter complete this Assignment by inserting above the application number and the filing date of the above-identified application when known, and to correct any typographical errors that may be discovered in this Assignment.

This Assignment includes the above-identified application, any and all United States and foreign patents, utility models, and design registrations granted for any of the inventions and improvements that are the subject of the above-identified application, and the right to claim priority based on the filing date of the

above-identified application under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, and all other treaties of like purposes; and I authorize the Assignee to apply in all countries in my name or in its own name for patents, utility models, design registrations, like rights of exclusion, and inventors' certificates for any of the inventions and improvements that are the subject of the above-identified application; and I agree for myself and my heirs, legal representatives, and assigns without further compensation to perform such lawful acts and to sign such further applications, Assignments, preliminary statements, and other lawful documents as the Assignee may reasonably request to effectuate fully this Assignment.

In witness whereof, I, as a below-named inventor and assignor, intending to be legally bound, have hereunto affixed my signature on the date indicated below next to my signature.

Inventor's Legal Name	**Seung Woo OH**		
Inventor's Signature		Date	2015. 09. 10
Residence (City, Country)	Seoul, Republic of Korea		
Mailing Address	(Eunpyeong New Town Gupabal Apt., Jingwan-dong) 926-204, 77, Jingwan 3-ro, Eunpyeong-gu, Seoul, Republic of Korea		

Inventor's Legal Name	**Kyoung Ae BANG**		
Inventor's Signature		Date	2015. 09. 10
Residence (City, Country)	Seoul, Republic of Korea		
Mailing Address	(Sinwol-dong) 43, Nambusunhwan-ro 46-gil, Yangcheon-gu, Seoul, Republic of Korea		

DocCode - SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 14921269 Document Date: 10/23/2015

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- Drawings – Other than Black and White Line Drawings

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Form Revision Date: September 30, 2013