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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
12/705,558	02/12/2010		1310	8802.078.NPUS00[P8551US1]	20	4

CONFIRMATION NO. 8742

77970
Apple Inc.
1000 Louisiana Street
Fifty-Third Floor
Houston, TX 77002

FILING RECEIPT



Date Mailed: 03/05/2010

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**

Applicant(s)

Jaron Waldman, Palo Alto, CA;

Assignment For Published Patent Application

Apple Inc., Cupertino, CA

Power of Attorney: The patent practitioners associated with Customer Number 77970

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 03/01/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/705,558**

Projected Publication Date: 08/18/2011

Non-Publication Request: No

Early Publication Request: No

Title

AUGMENTED REALITY MAPS

Preliminary Class

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 (1-866-999-4158).

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 Assets Control, 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).



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/705,558	02/12/2010	Jaron Waldman	8802.078.NPUS00[P8551US1]

CONFIRMATION NO. 8742

POA ACCEPTANCE LETTER

77970
Apple Inc.
1000 Louisiana Street
Fifty-Third Floor
Houston, TX 77002



Date Mailed: 03/05/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/12/2010.

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.

/asahle/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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.

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

8802.078.NPUS00[P8551US1]

First Inventor

Jaron Waldman

Title

AUGMENTED REALITY MAPS

Express Mail Label No.

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
2. ☐ **Applicant claims small entity status.**
See 37 CFR 1.27.
3. ☒ **Specification** [Total Pages 21]
Both the claims and abstract must start on a new page
(For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ **Drawing(s)** (35 U.S.C. 113) [Total Sheets 6]
5. **Oath or Declaration** [Total Sheets 1]
a. ☒ Newly executed (original or copy)
b. ☐ A copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 18 completed)
i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s)
name in the prior application, see 37 CFR
1.63(d)(2) and 1.33(b).
6. ☒ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or
Computer Program (Appendix)
☐ Landscape Table on CD
8. **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 PARTS**

9. ☐ **Assignment Papers** (cover sheet & document(s))
Name of Assignee _____
10. ☒ **37 CFR 3.73(b) Statement** ☒ **Power of Attorney**
(when there is an assignee)
11. ☐ **English Translation Document** (if applicable)
12. ☒ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
☒ Copies of citations attached
13. ☐ **Preliminary Amendment**
14. ☐ **Return Receipt Postcard** (MPEP 503)
(Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
(if foreign priority is claimed)
16. ☐ **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i).
Applicant must attach form PTO/SB/35 or equivalent.
17. ☐ Other: _____

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Prior application information: Examiner _____ Art Unit: _____

19. CORRESPONDENCE ADDRESS☒ The address associated with Customer Number: 77970 OR ☐ Correspondence address below

Name

Address

City

State

Zip Code

Country

Telephone

Email

Signature

/Brian K. McKnight/

Date

February 12, 2010

Name

(Print/Type)

Brian K. McKnight

Registration No.

(Attorney/Agent)

59,914

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8802.078.NPUS00[P8551US1]
		Application Number	
Title of Invention	AUGMENTED REALITY MAPS		
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.)

Applicant Information:

Applicant 1					
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	
				☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jaron		Waldman		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Palo Alto	State/Province	CA	Country of Residence	US
Citizenship under 37 CFR 1.41(b)		US			
Mailing Address of Applicant:					
Address 1	Apple Inc., 1 Infinite Loop, MS 301-4JW				
Address 2					
City	Cupertino	State/Province	CA		
Postal Code	95014	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					

Correspondence Information:

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	77970		
Email Address	amy.drury@novakdruce.com	Add Email	Remove Email

Application Information:

Title of the Invention	AUGMENTED REALITY MAPS		
Attorney Docket Number	8802.078.NPUS00[P8551US1]	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8802.078.NPUS00[P8551US1]
		Application Number	
Title of Invention	AUGMENTED REALITY MAPS		

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). Enter either 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	77970		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(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(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
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.			

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).			
			Remove
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☒ Yes ☐ No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.
Assignee 1

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8802.078.NPUS00[P8551US1]
		Application Number	
Title of Invention	AUGMENTED REALITY MAPS		

If the Assignee is an Organization check here. ☒			
Organization Name	Apple Inc.		
Mailing Address Information:			
Address 1	1 Infinite Loop		
Address 2			
City	Cupertino	State/Province	CA
Country	US	Postal Code	95014
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the Add button.			

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
Signature	/Brian K. McKnight/			Date (YYYY-MM-DD)	2010-02-12
First Name	Brian	Last Name	McKnight	Registration Number	59914

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**Title of
Invention**AUGMENTED REALITY MAPS**

As the below named inventor(s), I/we declare that:

This declaration is directed to:



The attached application, or



Application No. _____ filed on _____



As amended on _____ (if applicable);

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT International filing date of the continuation-in-part application.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

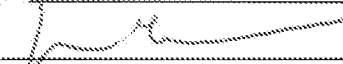
All statements made herein of my/our own knowledge are true, all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

FULL NAME OF INVENTOR(S)

Inventor one: Jaron Waldman

Date:

Feb 12, 2010

Signature: 

Citizen of: US

Inventor two: _____

Date: _____

Signature: _____

Citizen of: _____

☐ Additional inventors or a legal representative are being named on _____ additional form(s) attached hereto.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

77970

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

77970

OR



Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

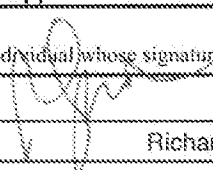
Assignee Name and Address:

Apple Inc.
1 Infinite Loop
Cupertino, CA 950104

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	1/28/2010
Name	Richard J. Lutton, Jr.	Telephone	(408)974-9453
Title	Assistant Secretary and Sr. Director of Patents		

This collection of information is required by 37 CFR 1.31, 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.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Jaron Waldman

Application No./Patent No.: not yet assigned

Filed/Issue Date: herewith

Titled: AUGMENTED REALITY MAPS

Apple Inc., a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Brian K. McKnight/

Signature

February 12, 2010

Date

Brian K. McKnight - Reg. No. 59,914

Printed or Typed Name

Attorney for Assignee

Title

This collection of information is required by 37 CFR 3.73(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.

**ASSIGNMENT
(SOLE INVENTOR)**

THIS ASSIGNMENT, by **Jaron Waldman**, an individual residing in Palo Alto, California (hereinafter referred to as the "Assignor"), witnesseth:

WHEREAS, said Assignor has invented certain new and useful improvements in: **AUGMENTED REALITY MAPS**, set forth in an application for Letters Patent of the United States filed herewith.

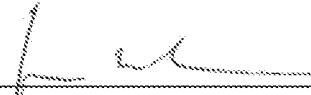
WHEREAS, **Apple Inc.**, a corporation duly organized under and pursuant to the laws of the State of California, and having a principal place of business at 1 Infinite Loop, Cupertino, California 95014 (hereinafter referred to as the "Assignee"), is desirous of acquiring the entire right, title and interest in and to said inventions and applications for Letters Patent of the United States, and in and to any Letters Patent or Patents, United States or foreign, to be obtained therefor and thereon:

NOW, THEREFORE, for good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, said Assignor has sold, assigned, transferred and set over, and by these presents does sell, assign, transfer and set over, unto said Assignee, its successors, legal representatives and assigns, Assignor's interest in the entire right, title and interest in and to the above-mentioned inventions, application for Letters Patent, and any and all Letters Patent or Patents in the United States of America and all foreign countries which may be granted therefor and thereon, and in and to any and all divisions, continuations, and continuations-in-part of said application, or reissues or extensions of said Letters Patent or Patents, and all rights under the International Convention for the Protection of Industrial Property, the same to be held and enjoyed by said Assignee, for its own use and behalf and the use and behalf of its successors, legal representatives and assigns, to the full end of the term or terms for which Letters Patent or Patents may be granted, as fully and entirely as the same would have been held and enjoyed by the Assignor, had this sale and assignment not been made; and

FOR THE SAME CONSIDERATION, said Assignor hereby covenants and agrees to and with said Assignee, its successors, legal representatives and assigns, that, at the time of execution and delivery of these presents, said Assignor is the lawful owner of the entire right, title and interest in and to said invention and the application for Letters Patent above mentioned, and that the same is unencumbered and that said Assignor has good and full right and lawful authority to sell and convey the same in the manner herein set forth; and

FOR THE SAME CONSIDERATION, said Assignor hereby covenants and agrees to and with said Assignee, its successors, legal representatives and assigns, that said Assignor will, whenever counsel of said Assignee, or the counsel of its successors, legal representatives and assigns, shall advise that any proceeding in connection with said inventions, or said application for Letters Patent, or any proceeding in connection with Letters Patent for said inventions in any country, including interference proceedings, is lawful and desirable, or that any division, continuation or continuation-in-part of any application for Letters Patent, or any reissue or extension of any Letters Patent, to be obtained thereon, is lawful and desirable, sign all papers and documents, take all lawful oaths, and do all acts necessary or required to be done for the procurement, maintenance, enforcement and defense of Letters Patent for said inventions, without charge to said Assignee, its successors, legal representatives and assigns, but at the cost and expense of said Assignee, its successors, legal representatives and assigns.

IN WITNESS WHEREOF, Assignor has thus set his hand on the date below written.

Date: Feb. 12, 2010 Signature: 
Jaron Waldman

PATENT APPLICATION
AUGMENTED REALITY MAPS

Inventors:
Jaron Waldman

Filing Date:
February 12, 2010

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AUGMENTED REALITY MAPS

FIELD:

[0001] The following relates to searching for nearby points of interest, and more particularly to displaying information related to nearby points of interest overlaid onto a video feed of a surrounding area.

BACKGROUND:

[0002] Augmented reality systems supplement reality, in the form of a captured image or video stream, with additional information. In many cases, such systems take advantage of a portable electronic device's imaging and display capabilities and combine a video feed with data describing objects in the video. In some examples, the data describing the objects in the video can be the result of a search for nearby points of interest.

[0003] For example, a user visiting a foreign city can point a handheld communication device and capture a video stream of a particular view. A user can also enter a search term, such as museums. The system can then augment the captured video stream with search term result information related to nearby museums that are within the view of the video stream. This allows a user to supplement their view of reality with additional information available from search engines.

[0004] However, if a user desires to visit one of the museums, the user must switch applications, or at a minimum, switch out of an augmented reality view to learn directions to the museum. However, such systems can fail to orient a user's with a poor sense of direction and force the user to correlate the directions with objects in reality. Such a transition is not always as easy as it might seem. For example, an instruction that directs a user to go north on Main St. assumes that the user can discern which direction is north. Further, in some instances, street signs might be missing or indecipherable, making it difficult for the user to find the directed route.

SUMMARY:

[0005] Such challenges can be overcome using the present technology. Therefore, a method and system for displaying augmented reality maps are disclosed. By interpreting the data describing the surrounding areas, the device can determine what objects are presently being viewed on the display. The device can further overlay information regarding the presently viewed objects, thus enhancing reality. In some embodiments, the device can also display search results overlaid onto the displayed video feed. Search results need not be actually viewable by a user in real life. Instead, search results can also include more-distant objects.

[0006] The user can interact with the display using an input device such as a touch screen. Using the input device, the user can select from among objects represented on the screen, including the search results.

[0007] In one form of interaction, a device can receive an input from the user requesting directions from a present location to a selected search result. Directions can be overlaid onto the presently displayed video feed, thus showing a course and upcoming turns. As the user and associated device progress along a route, the overlaid directions can automatically update to show the updated path.

[0008] In some embodiments the display can also include indicator graphics to point the user in a proper direction. For example, if the user is facing south but a route requires the user to progress north, “no route” would be displayed in the display because the user would be looking to the south but the route would be behind him or her. In such instances, an indicator can point the user in the proper direction to find the route.

[0009] In some embodiments, multiple display views can be presented based on the orientation of the device. For example, when the device is held at an angle with respect to the ground of 45 degrees to 180 degrees, the display view can present the augmented reality embodiments described herein. However, when the device is held at an angle less than 45 degrees, an illustrated or schematic view can be represented. In such embodiments, when the device is held at an angle with respect to the ground of less than 45 degrees, the device is likely pointed at the ground, where few objects of interest are likely to be represented in the displayed video. In such instances, a different map view is

more likely to be useful. It should be appreciated that precise range of tilt can be adjusted according the actual environment or user preferences.

[0010] In practice, a user points a handheld communication device to capture and display a real-time video stream of a view. The handheld communication device detects a geographic position, camera direction, and tilt of the image capture device. The user sends a search request to a server for nearby points of interest. The handheld communication device receives search results based on the search request, geographic position, camera direction, and tilt of the handheld communication device. The handheld communication device visually augments the captured video stream with data related to each point of interest. The user then selects a point of interest to visit. The handheld communication device visually augments the captured video stream with a directional map to a selected point of interest in response to the user input.

[0011] A method of augmenting a video stream of a device's present surrounding with navigational information is disclosed. The user can instruct the device to initiate a live video feed using an onboard camera and display the captured video images on a display. By polling a Global Positioning System (GPS) device, a digital compass, and optionally, an accelerometer, location, camera direction, and orientation information can be determined. By using the location, camera direction, and orientation information, the device can request data describing the surrounding areas and the objects therein. In some embodiments, this data includes map vector data. The can be requested from an onboard memory or a server. The data describing surrounding areas can further be requested in conjunction with a search request. The search request can also include a request for information about nearby places of interest.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0012] FIG. 1 illustrates an exemplary visually augmented captured image with data related to a search for points of interest;

[0013] FIG. 2 illustrates a the results of a field-of-view and point-of-interest search;

[0014] FIG. 3 illustrates an exemplary captured image visually augmented with a route to a selected point of interest;

[0015] FIG. 4 is a flow chart illustrating an exemplary method of preparing and displaying an augmented reality map;

[0016] FIG. 5 is a schematic illustration of an exemplary system embodiment; and

[0017] FIG. 6 is a schematic illustration of an exemplary system embodiment.

DESCRIPTION:

[0018] The technology described herein visually augments a captured image or video stream with data for points of interest related to search terms entered by the user. The technology also visually augments the captured image or video stream with a directional map to a selected point of interest.

[0019] FIG. 1 is a screenshot illustrating an augmented reality embodiment as described herein. As illustrated, a handheld communication device has captured an image 102 of the northwest corner of the intersection of Dolores St and 17th St. using its image-capturing device and displayed the image on its display. In this way, the display can function as a viewfinder. As illustrated, the captured image 102 has been augmented with information corresponding to points of interest 104, 106 and street labels 110, 112.

[0020] FIG. 1 illustrates a captured and presented image 102 using an image capture device, i.e., the camera of a smart phone, which is but one type of handheld communication device to which the present disclosure can be applied. In this illustrated embodiment, the user has entered a search term “parks” in search bar 108 to conduct a search for nearby parks, i.e., a specific type of point of interest. Using map data that describes the area surrounding the present location of the device and the points of interest located in the surrounding area, the device augments the displayed image with additional information. In this instance, the smart phone or handheld communication device displays points of interest described by the data that are displayed in the viewfinder (such as Dolores St. 110 and 17th St. 112) or within a field of view and range from the geographic position of the device but that are obstructed by other in-screen objects, e.g., Golden Gate Park 104 and Buena Vista Park 106. While other parks might also be

nearby, they are not shown because they fall outside the field of view of the device. However, the user could locate these parks by panning the device around the intersection, in which case those parks would appear on the screen.

[0021] In the captured image 102, the handheld communication device augments the captured image with bubbles showing the relative geographic position of “Golden Gate Park” 104 and “Buena Vista Park” 106 within the captured image 102. This allows the user to determine a general direction to a point of interest. A user can then select a point of interest, e.g., by selecting the “Buena Vista Park” 106 point of interest information bubble, e.g., by touching the point of interest information bubble with a finger or stylus if the smart phone employs a touch screen. In other implementations, a cursor and mouse can be used to select a desired point of interest.

[0022] Points of interest can be any map feature, but most often a point of interest can be a map feature that identified as result of a search for a category of such map features. For example, a point of interest can be a park when a user searches for nearby parks. Likewise a point of interest can be places, buildings, structures, even friends that can be located on a map, when the point of interest is searched for. In some instances a point of interest is not necessarily identified as a result of a search. A point of interest can also be a map feature that is identified by the present system because it can be viewed in the captured image. In short, a point of interest can be any map feature for which the user has an interest.

[0023] FIG. 2 illustrates search results for point of interest results for nearby parks based on geographic position and also illustrates how a range and field of view correspond to the results displayed in the viewfinder. A handheld communication device captures a video stream of the view as shown in FIG. 1. The handheld communication device detects the geographic position, camera direction, and tilt of the handheld communication device.

[0024] The geographic position of the handheld communication device can be determined using GPS coordinates or using triangulation methods using cell phone towers. In yet another example, a blend of GPS coordinates and triangulation information can be used to determine the position of the device.

[0025] The camera direction is a direction relative to a planet's magnetic field (i.e., Earth's magnetic field) in which the camera is pointing. The camera direction can be considered a direction that can be identified using a compass, such as a digital compass. The camera direction can be used to identify the direction in which the camera is pointing as it acquires an image to be augmented using the present technology.

[0026] The tilt direction is a direction that determines the direction in which either the camera device or display device is pointing relative to a horizontal or vertical axis. The tilt direction can most commonly be determined using an accelerometer.

[0027] The user can enter a search request for nearby points of interest based on a search term. In this example, upon entry by the user of a search for nearby "Parks" the handheld communication device sends a request for data related to nearby parks to a map database.

[0028] Either the request itself, or the database being queried can determine a relevant range from within which search results must be encompassed. Upon receipt of the request, the database will return search results for points of interest related to the search term that are also within a defined radius of the handheld communication device as illustrated in FIG. 2. As shown in this example, the server returned points of interest "Golden Gate Park" 208, "Buena Vista Park" 206, "Midtown Terrace Playground" 210, and "Mission Dolores Park" 212. The handheld communication device determines that of the point-of-interest search results, only "Golden Gate Park" 208 and "Buena Vista Park" 206 are within the field of view of the handheld communication device. The point-of-interest results "Golden Gate Park" 208 and "Buena Vista Park" 206 are displayed with their relative spatial relationship to the handheld communication device. In the example shown in FIG. 2, the camera direction of the handheld communication device is northwest.

[0029] A field of view can be determined using a digital compass to inform the device of the camera direction in which the camera is facing or, alternatively, the user could enter in a heading. As explained above, in Figures 1 and 2, the camera is facing northwest and its theoretical line of sight is represented as 214 in FIG. 2. Any search results that are to be displayed on the viewfinder must be within a certain angle of line

214. For example, a camera on a handheld communication device might only be able to display range of view encompassing 30 degrees. In such an instance, a given display would represent those items encompassed within 15 degrees in each direction from the center of the field of view. This concept is illustrated in FIG. 2 wherein 214 illustrates the center of the field of view and angles θ_1 216 = θ_2 218 and they represent angles from the center of the field of view to the outer limits of the field of view. A distance from the device's geographic location can also be used to define a field of view. As discussed above, a distance or range can be defined by the device in its request for search results or by the database serving the request. Only search results encompassed in this field of view will be displayed on the display.

[0030] In some embodiments, a device can also use an accelerometer to inform the device of what objects are displayed in its viewfinder. For example, if the device is in a hilly location, the accelerometer can tell the device that it is pointing downhill. In another example, the device can determine that, due to the topography surrounding its present location (described by map data) an object viewed at a certain angle from the horizon must be a neighboring hill or mountain peak in the distance. In yet another example, an angle from a horizon can indicate that the user is viewing a multiple story building having places of interest in multiple stories of the building. An accelerometer can inform the device of the angle at which the device is pointed.

[0031] FIG. 3 illustrates a captured image that has been visually augmented with route data to a selected point of interest. In this example, a user has selected the "Buena Vista Park" point of interest and, in response, the smart phone has visually augmented the captured image 302 with a directional map 310 to the selected point of interest, i.e., "Buena Vista Park". The route shows a direction 312 that the user must travel on Dolores St. to begin travelling to reach "Buena Vista Park." The directional map 310 further indicates a turn 314 that the user must take, i.e., a turn left onto Duboce Ave. from Dolores St. In the illustrated example, the map is shown overlaid onto Dolores St.

[0032] The route 310 guides the user with complete navigation illustrations to reach "Buena Vista Park," including any required turns. In some embodiments, the route can

be represented as a schematic map, i.e., a simplified map that includes only relevant information for the user in an easy-to-read format.

[0033] A schematic map can be thought of as similar to a subway map one would see on a subway train. While the subway track itself might wind and turn, a typical subway map represents the subway route as a mostly straight line. Further, the subway map often does not have any particular scale and frequently shows every destination approximately evenly dispersed along the route. Thus, a schematic map as discussed below is one that does not adhere to geographic “reality,” but rather represents map features in a schematic fashion by illustrating directions as a route made of one or more roads, trails, or ways that can be represented as substantially straight lines instead of by their actual shapes (which would be represented in a non-schematic map by adhering to geographic reality). The schematic map can also be devoid of uniform scale. Thus, in some parts of the map, such as an area of the map representing a destination, such area can be “distorted” somewhat to clearly illustrate important details, while map areas that represent portions of a route where there are no turns or other significant features can be very condensed. In short, the map can be a schematic of the real world that can provide a simple and clear representation that is sufficient to aid the user in guidance or orientation without displaying unnecessary map features or detail that could otherwise clutter a small display space.

[0034] FIG. 4 is a flow chart illustrating an exemplary method of preparing and displaying an augmented reality map. As shown at block 402, the method includes capturing and displaying a video stream on a handheld communication device. Although described here in reference to a video stream, another embodiment of the disclosed technology includes capturing and displaying a single still image or a series of still images.

[0035] As shown at block 404, the method includes detecting geographic position, camera direction, and/or tilt of the handheld communication device. This allows the device to determine features, such as streets, buildings, points of interest, etc., that are within a field of view for the captured video stream.

[0036] As shown at block 406, the method includes sending a request for nearby points of interest based on one or more search terms. For example, the user can search for nearby hotels, parks, or restaurants. The request can be sent to a database located on a server that is separate from the handheld communication device and communicate via a wireless protocol. In another embodiment, the database can be stored locally on the device and the search request remains internal (sometimes termed “onboard” the device) to the handheld communication device.

[0037] In block 408, the method includes receiving nearby points of interest in response to the request. The server can filter point of interest results in one example. In this example, if the number of returned points of interest exceeds a set threshold, the server can filter the results to only return a fixed number of the best results. Various algorithms can be employed to filter points of interest to a desired number for visual augmentation of a captured video stream. In another embodiment, the handheld communication device can filter point-of-interest results received from the server for optimal display on a handheld communication device.

[0038] In block 410, the handheld communication device visually augments the captured video stream with data related to each point of interest. As shown in FIG. 2, the handheld communication device can visually augment a captured video stream with a bubble for each point of interest within the field of view for the handheld communication device. The handheld communication device determines which points of interest are within its field of view by analyzing the geographic position, camera direction, and/or tilt of the handheld communication device in concert with the known geographic position of the returned points of interest.

[0039] In block 412, the handheld communication device visually augments the captured video stream with a directional map to a selected point of interest in response to the user input. For example, as described in connection with FIG. 3, the smart phone now visually augments the captured image 302 with a directional map 310 to the selected point of interest in response to the user input. The user input can be a selection of a displayed point of interest to indicate that the user wishes to view navigation data for reaching the selected point of interest.

[0040] In some embodiments, the display can also include indicator graphics to point the user in a proper direction. For example, if the user is facing south but a route requires the user to progress north, “no route” would be shown in the display because the route would be behind him or her. In such instances, an indicator can point the user in the proper direction to find the displayed route.

[0041] In some embodiments, multiple display views can be presented based on the orientation of the device. For example, when the device is held at an angle with respect to the ground of 45 degrees to 180 degrees, the display view can present the augmented reality embodiments described herein. However, when the device is held at an angle less than 45 degrees, an illustrated or schematic view can be presented. In such embodiments, when the device is held at an angle with respect to the ground of less than 45 degrees, the device is likely pointed at the ground, where few objects of interest are likely to be represented in the displayed video. In such instances, a different map view than the augmented reality map is more likely to be useful. It should be appreciated that precise range of tilt can be adjusted according to the actual environment or user preferences.

[0042] FIG. 5 illustrates a computer system 500 used to execute the described method and generate and display augmented reality maps. Computer system 500 is an example of computer hardware, software, and firmware that can be used to implement the disclosures above. System 500 includes a processor 520, which is representative of any number of physically and/or logically distinct resources capable of executing software, firmware, and hardware configured to perform identified computations. Processor 520 communicates with a chipset 522 that can control input to and output from processor 520. In this example, chipset 522 outputs information to display 540 and can read and write information to non-volatile storage 560, which can include magnetic media and solid state media, for example. Chipset 522 also can read data from and write data to RAM 570. A bridge 535 for interfacing with a variety of user interface components can be provided for interfacing with chipset 522. Such user interface components can include a keyboard 536, a microphone 537, touch-detection-and-processing circuitry 538, a pointing device such as a mouse 539, and so on. In general, inputs to system 500 can come from any of a variety of machine-generated and/or human-generated sources.

[0043] Chipset 522 also can interface with one or more data network interfaces 525 that can have different physical interfaces 517. Such data network interfaces can include interfaces for wired and wireless local area networks, for broadband wireless networks, as well as personal area networks. Some applications of the methods for generating and displaying and using the augmented reality user interface disclosed herein can include receiving data over physical interface 517 or be generated by the machine itself by processor 520 analyzing data stored in memory 560 or 570. Further, the machine can receive inputs from the user via devices keyboard 536, microphone 537, touch device 538, and pointing device 539 and execute appropriate functions, such as browsing functions by interpreting these inputs using processor 520.

[0044] While FIG. 5 illustrates an example of a common system architecture, it should also be appreciated that other system architectures are known and can be used with the present technology. For example, systems wherein most or all of the components described within FIG. 5 can be joined to a bus, or the peripherals could write to a common shared memory that is connected to a processor or a bus can be used. Other hardware architectures are possible and such are considered to be within the scope of the present technology.

[0045] FIG. 6 illustrates an exemplary system embodiment. A server 602 is in electronic communication with a handheld communication device 618 having functional components such as a processor 620, memory 622, graphics accelerator 624, accelerometer 626, communications interface 628, compass 630, GPS 632, display 634, input device 636, and camera 638. None of the devices are limited to the illustrated components. The components may be hardware, software, or a combination of both.

[0046] In some embodiments, the server can be separate from the handheld communication device. The server and handheld communication device can communicate wirelessly, over a wired-connection, or through a mixture of wireless and wired connections. The handheld communication device can communicate with the server over a TCP/IP connection. In another embodiment, the handheld communication device can be directly connected to the server. In another embodiment, the handheld communication device can also act as a server and store the points of interest locally.

[0047] In some embodiments, instructions are input to the handheld electronic device 618 through an input device 636 that instructs the processor 620 to execute functions in an augmented reality application. One potential instruction can be to generate an augmented reality map of travel directions to a point of interest. In that case, the processor 620 instructs the camera 638 to begin feeding video images to the display 634. In some embodiments, video images recorded by the camera are first sent to graphics accelerator 624 for processing before the images are displayed. In some embodiments, the processor can be the graphics accelerator. The image can be first drawn in memory 622 or, if available, memory directly associated with the graphics accelerator 624.

[0048] The processor 620 can also receive location and orientation information from devices such as a GPS device 632, communications interface 628, digital compass 630 and accelerometer 626. The GPS device can determine GPS coordinates by receiving signals from Global Positioning System (GPS) satellites and can communicate them to the processor. Likewise, the processor can determine the location of the device through triangulation techniques using signals received by the communications interface 628. The processor can determine the orientation of the device by receiving directional information from the digital compass 620 and tilt information from the accelerometer.

[0049] The processor can also direct the communications interface to send a request to the server 602 for map data corresponding to the area surrounding the geographical location of the device. In some embodiments, the processor can receive signals from the input device, which can be interpreted by the processor to be a search request for map data including features of interest.

[0050] The processor can interpret the location and orientation data received from the accelerometer 626, compass 630, or GPS 632 to determine the direction in which the camera 638 is facing. Using this information, the processor can further correlate the location and orientation data with the map data and the video images to identify objects recorded by the camera 638 and displayed on the display 634.

[0051] The processor can receive other inputs via the input device 636 such as an input that can be interpreted as a selection of a point of interest displayed on the display 634 and a request for directions. The processor 620 can further interpret the map data to

generate and display a route over the displayed image for guiding the user to a destination (selected point of interest).

[0052] As the user follows the specified direction to the selected points of interest, the processor can continue to receive updated location and directional information and video input and update the overlaid route.

[0053] Methods according to the above-described examples can be implemented using computer-executable instructions that are stored or otherwise available from computer-readable media. Such instructions comprise, for example, instructions and data which cause or otherwise configure a general-purpose computer, a special-purpose computer, or a special-purpose processing device to perform a certain function or group of functions. Portions of computer resources used can be accessible over a network. The computer-executable instructions may be, for example, binaries, intermediate format instructions such as assembly language, firmware, or source code. Examples of computer-readable media that may be used to store instructions, information to be used, and/or information created during methods according to described examples include magnetic or optical disks, flash memory, USB devices provided with non-volatile memory, networked storage devices, and so on.

[0054] Devices implementing methods according to this disclosure can comprise hardware, firmware, and/or software and can take any of a variety of form factors. Typical examples of such form factors include laptops, smart phones, small-form-factor personal computers, personal digital assistants, and so on. Functionality described herein also can be embodied in peripherals or add-in cards. Such functionality also can be implemented on a circuit board among different chips or different processes executing in a single device, by way of further example.

[0055] The instructions, media for conveying such instructions, computing resources for executing them, and other structures for supporting such computing resources are means for providing the functions described in this disclosure.

[0056] Although a variety of examples and other information have been used to explain various aspects within the scope of the appended claims, no limitation of the claims should be implied based on particular features or arrangements in such examples, as one

of ordinary skill would be able to use these examples to derive a wide variety of implementations. Furthermore, and although some subject matter may have been described in language specific to examples of structural features and/or method steps, it should be understood that the subject matter defined in the appended claims is not necessarily limited to those described features or acts. For example, functionality of the various components can be distributed differently or performed in components other than those identified herein. Therefore, the described features and steps are disclosed as examples of components of systems and methods that are deemed to be within the scope of the following claims.

CLAIMS:

1. A method implemented on a handheld communication device having a processor, an image-capture device, and a display, the method comprising:
 - presenting a captured image on the display;
 - detecting a geographic position of the handheld communication device and a camera direction of the image capture device;
 - processing map data describing map objects including streets, buildings, and points of interest near the geographic position of the device, the map data further being processed to generate a route from the geographic position of the device to a selected place of interest; and
 - overlaying an illustration representing at least a portion of the route on the captured image by correlating the map data describing the route to the geographic position and the camera direction of the image capture device to match objects depicted in the captured image with objects described by the map data.
2. The method of claim 1, further comprising:
 - requesting, from a server, the map data describing an area surrounding the geographic position of the device.
3. The method of claim 1, further comprising:
 - searching for places of interest fitting a description that has been input by a user using an input device.
4. The method of claim 1, further comprising:
 - receiving inputs from a touch screen device effective to select a point of interest and generate and display the route to the point of interest.
5. The method of claim 1, wherein the route is overlaid over streets in the captured image.

6. The method of claim 1, wherein turn arrows are overlaid onto the captured image to indicate upcoming turns in the route as the user travels along the route.

7. A system comprising:

a video capture device configured to capture video images;

a global positioning system device (GPS device) configured to determine GPS coordinates identifying the location of the video capture device;

a digital compass configured to determine a camera direction of the video capture device;

a server for receiving and servicing requests for map data for areas surrounding the GPS location identified by the GPS device, the map data being descriptive of features such as places, roads, buildings, and points of interest; and

a general-purpose processor in digital communication with the video capture device, the GPS device, the digital compass, a graphics processor, and a display, the general-purpose processor for correlating objects represented in the images captured by the video capture device with the same objects as represented by the map data, the correlating being accomplished by using the GPS location and camera direction to match an object as represented in the map data with its position in reality as captured in video;

the graphics processor configured to overlay an illustrated portion of a route from the location identified by the GPS device to a point of interest, the route being determined based on the map data, the graphics processor further configured to update the illustrated portion of the route as the GPS location of the video capture device changes with movement along the route; and

the display configured to present the captured video images with the portion of the route overlaid.

8. The system of claim 7, wherein the display is a touch screen for accepting inputs from the user effective to enter into the general-purpose processor, search terms used to define a request for a point of interest.

9. The system of claim 8, wherein the touch screen display further accepts inputs from the user to select a point of interest, the selection of a point of interest causing the communications interface to request a route to the point of interest from a map database.

10. The system of claim 7, further comprising an accelerometer for determining a tilt orientation of the video capture device.

11. The system of claim 10, wherein the display changes from presentation of the captured video images with the portion of the route overlaid to display of a schematic map with route information when the accelerometer determines that the video capture device is substantially facing the ground.

12. The system of claim 10, wherein the general-purpose processor also uses the tilt orientation to match the location of the object as represented in the map data with its position in reality as captured in video.

13. A product, comprising:
a computer-readable medium, and
computer-executable instructions on the computer-readable medium for causing a computer having a processor and a display to perform the method comprising
presenting a captured image on the display;
detecting a geographic position, camera direction, and tilt orientation of the image capture device;
sending a search request to a server for nearby points of interest based on the detected geographic position, camera direction, and tilt orientation of the capture device;
receiving points of interest in response to the search request;
visually augmenting the captured image with data related to each point of interest by correlating the location of the points of interest to a location relative to the captured image using the geographic position, camera direction and tilt

orientation of the image capture device to identify the objects represented in the captured image; and

visually augmenting the captured image with an illustrated route to a selected point of interest in response to a user input.

14. The product of claim 13, wherein the method further comprises filtering the received points of interest before visually augmenting the captured image.

15. The product of claim 13, wherein the method further comprises augmenting the captured image with a turn indication corresponding to turns in the route.

16. The product of claim 13, wherein the method further comprises overlaying the illustrated route onto the displayed streets.

17. A handheld communication device, comprising:

an image-capture device for recording an image, the image including objects and the image capture device having a field of view of a limited angle;

a global positioning system device (GPS device) for determining GPS coordinates for a present location of the device;

a digital compass for detecting a camera direction of the device;

an accelerometer for detecting a tilt orientation of the device;

a communications interface for requesting and receiving map information data for an area surrounding the present location of the device; the map information data includes search results for a requested category of points of interest;

a processor configured to correlate visible objects in the recorded image with objects represented in the map information data by matching a location on a map with the GPS coordinates; to determine which map objects are in the field of view by determining at least the camera direction of the device and calculating which map objects are within

the captured image; and to determine which points of interest fall within the field of view when it is extended a certain range beyond the visible objects;

a touch screen display device for displaying the recorded image the map data correlated to the recorded image and determined to be within the field of view, the touch screen display further configured to accept the user input selecting a point of interest; and

the processor configured to respond to the user input to cause the communications device to request and receive directions forming a route from the present GPS coordinates to the selected point of interest, the processor further configured to cause the display device to display a portion of the route overlaid onto the recorded image.

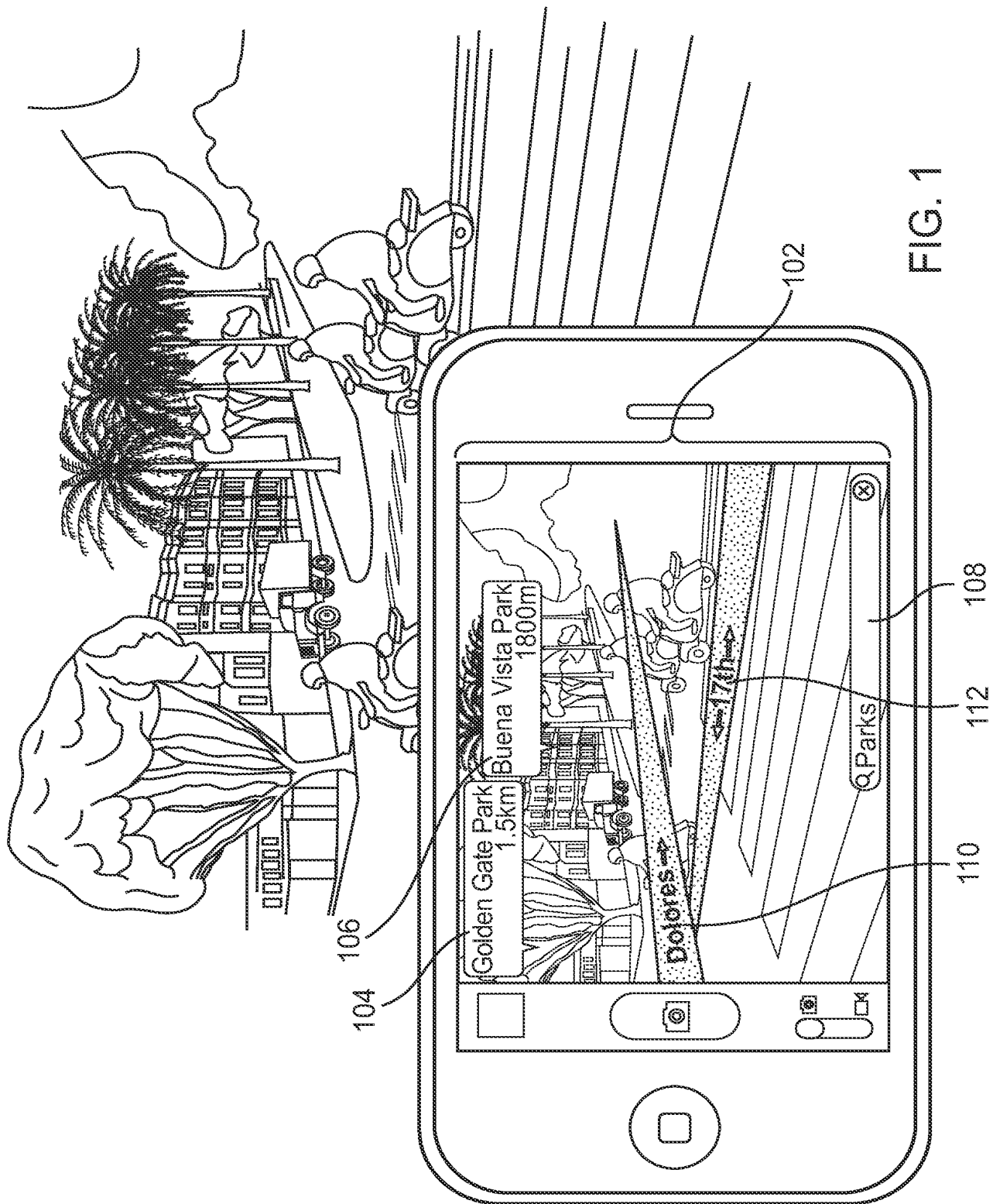
18. The device of claim 17, wherein the processor instructs the display to change from display of the captured video images with the portion of the route overlaid to displaying a schematic map with route information when the tilt information indicates that the device is substantially facing the ground.

19. The device of claim 17, wherein the processor is further configured to cause the display to present indicator arrows indicating that points of interest are outside the field of view.

20. The device of claim 17, wherein the processor is further configured to use the tilt information to determine what objects are in the captured image.

ABSTRACT

A user points a handheld communication device to capture and display a real-time video stream. The handheld communication device detects geographic position, camera direction, and tilt of the image capture device. The user sends a search request to a server for nearby points of interest. The handheld communication device receives search results based on the search request, geographic position, camera direction, and tilt of the handheld communication device. The handheld communication device visually augments the captured video stream with data related to each point of interest. The user then selects a point of interest to visit. The handheld communication device visually augments the captured video stream with a directional map to a selected point of interest in response to the user input.



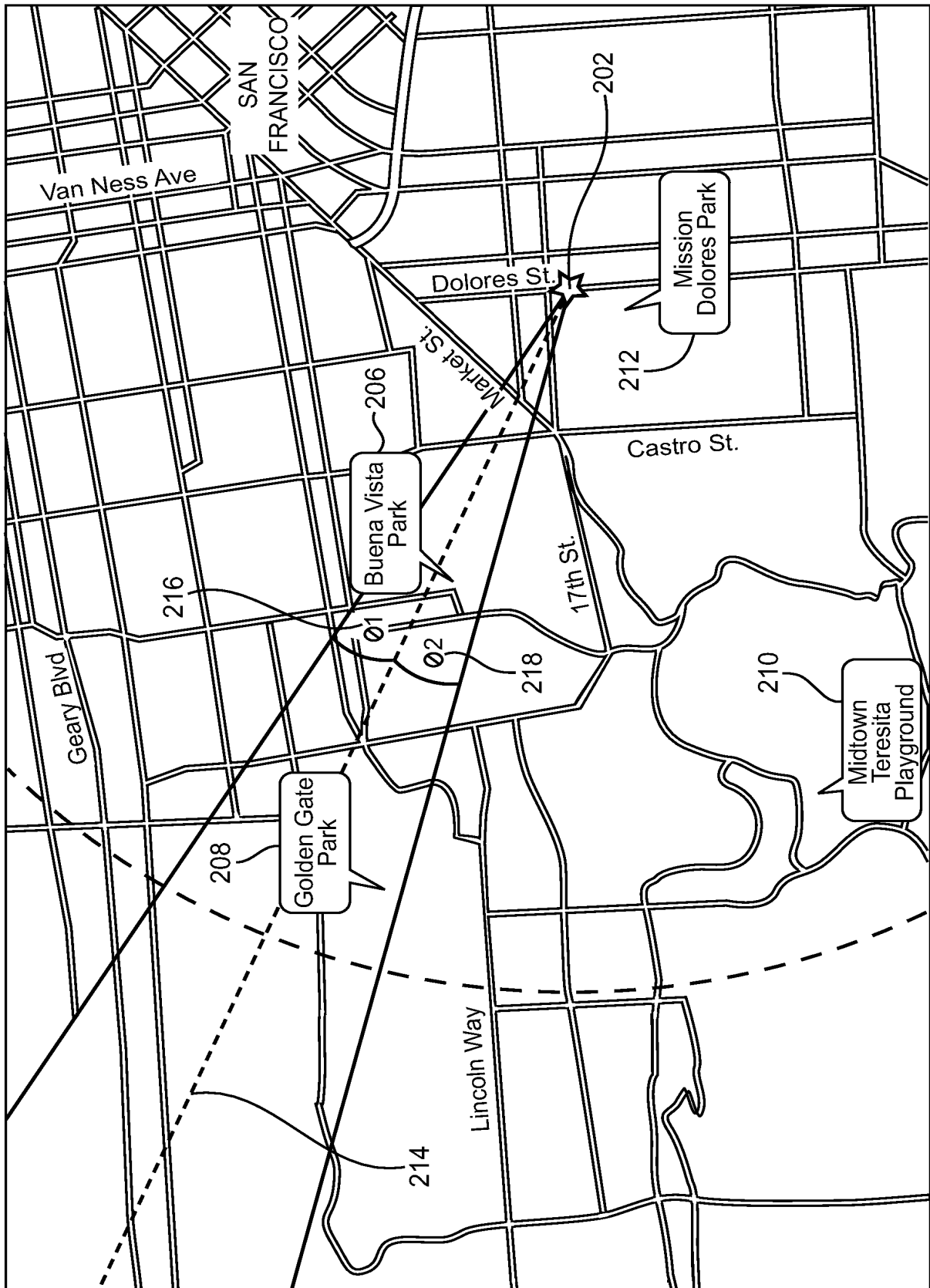


FIG. 2

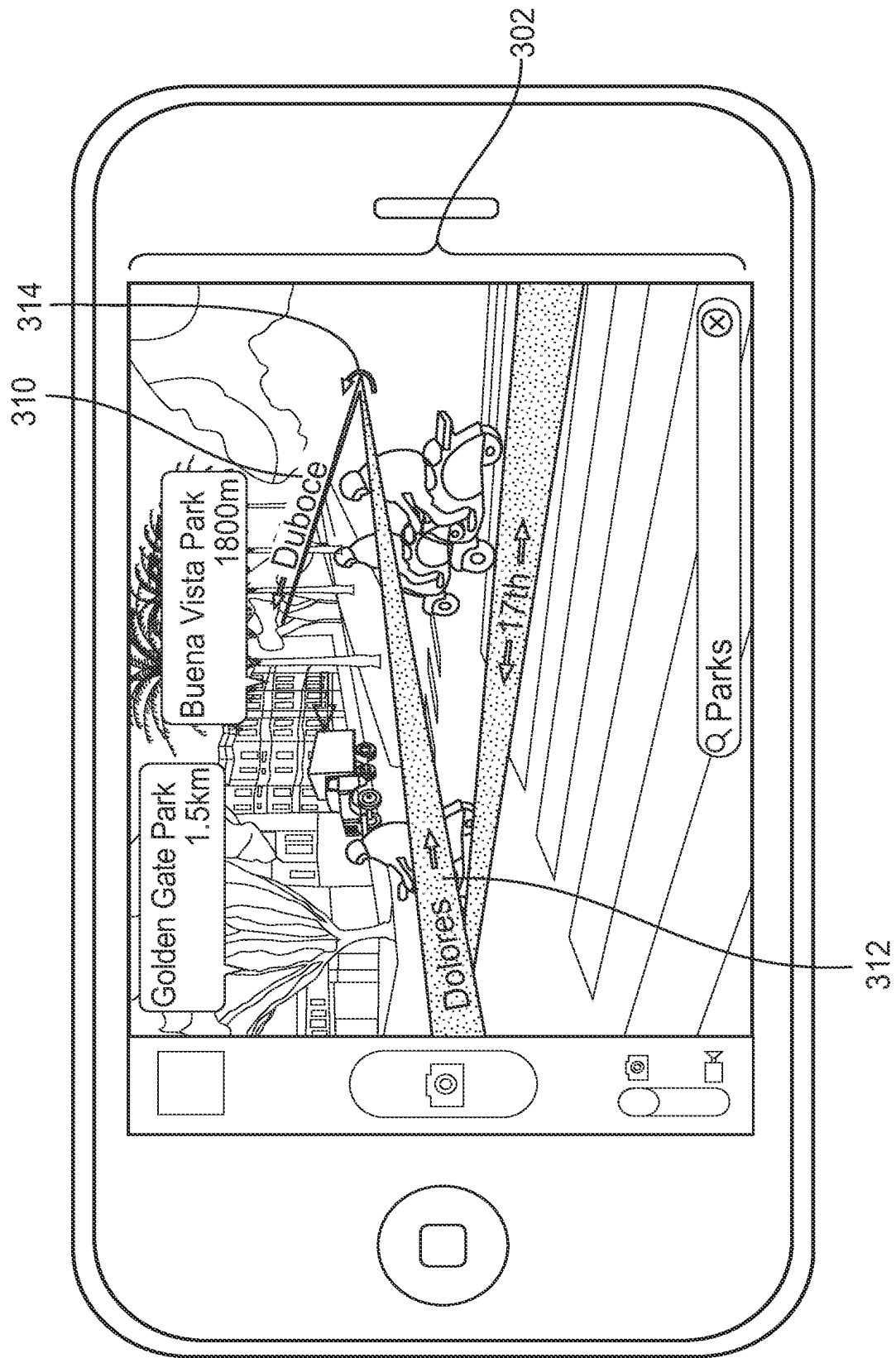


FIG. 3

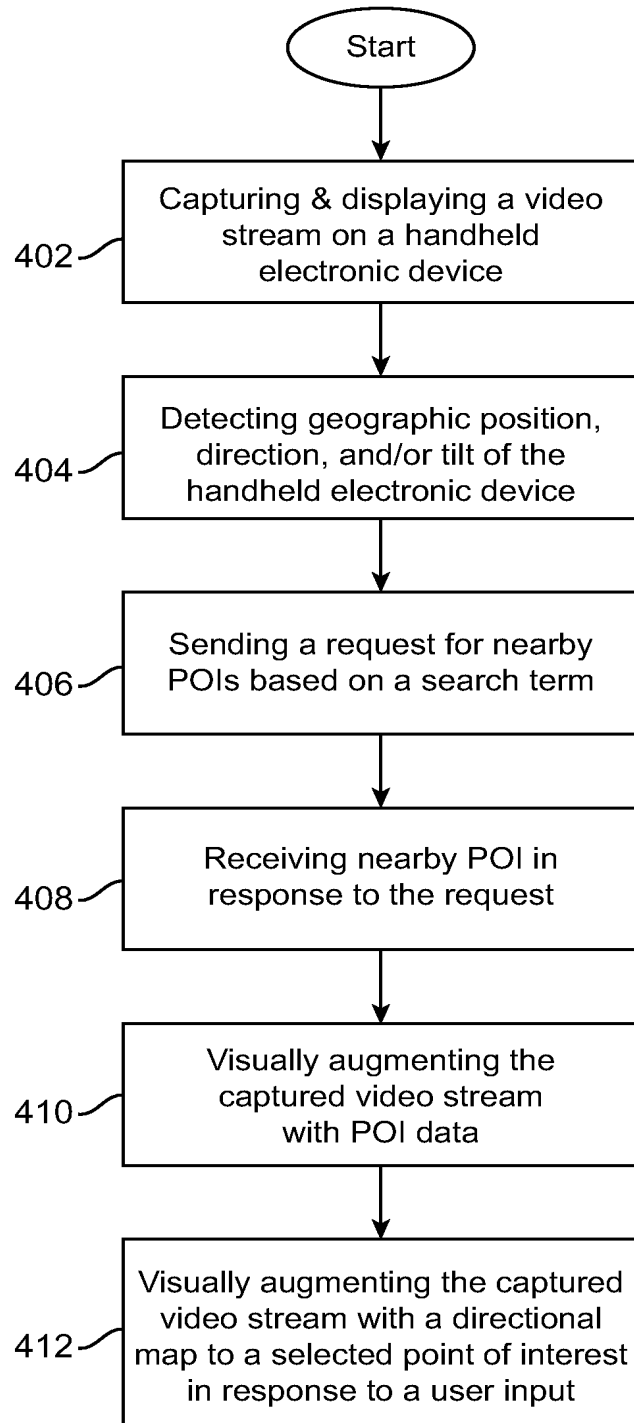


FIG. 4

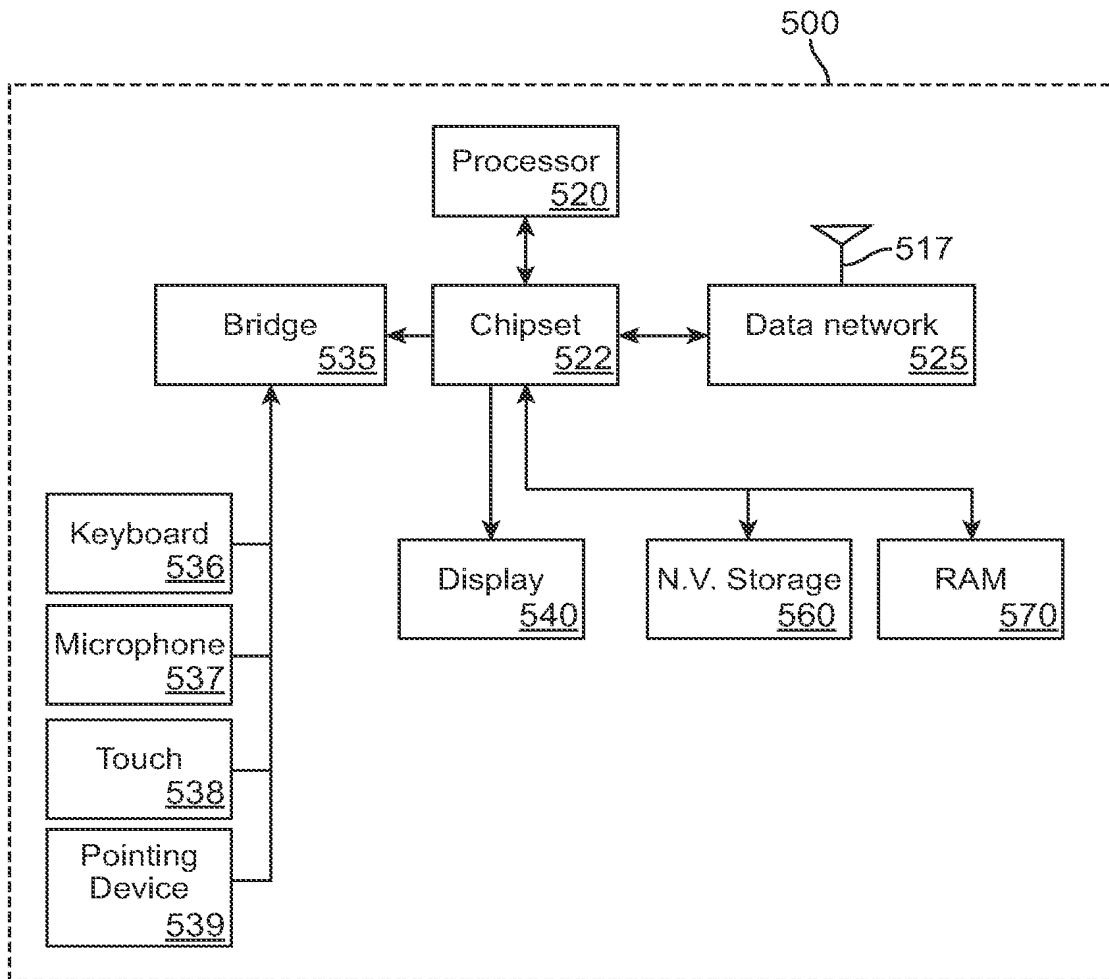


FIG. 5

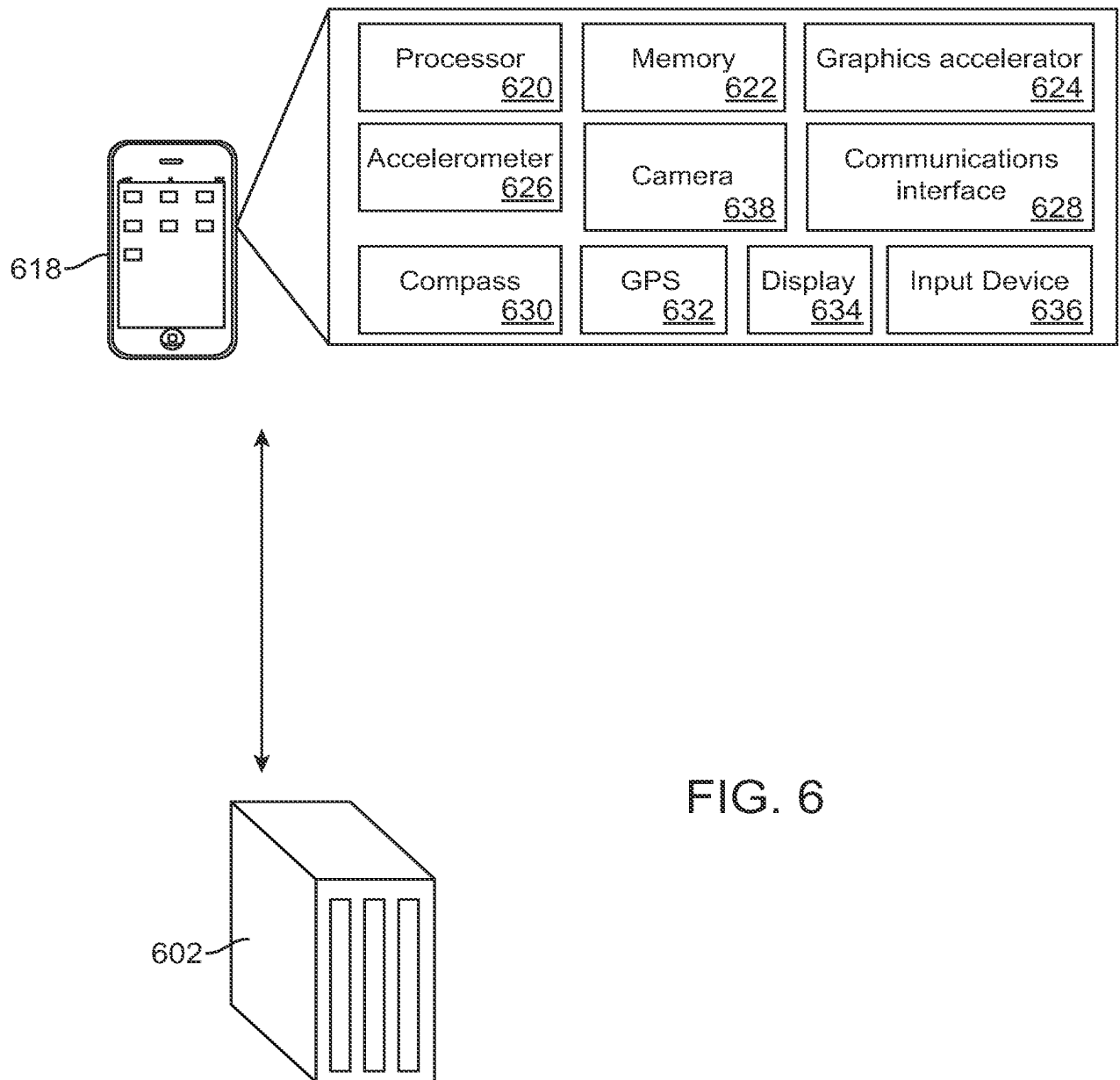


FIG. 6