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CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Eric Leuthardt	Nonprovisional Application Number (if known):	
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Lucas M. Amodio/	Date 03/26/2020
Name (Print/Typed) Lucas M. Amodio	Practitioner Registration Number 70239

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.**

☑ *Total of one forms are submitted.

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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)).
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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.

EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application No. 16/397,787, entitled "EXPRESSION RECOGNITION IN MESSAGING SYSTEMS," which was filed on April 30, 2019, which is a continuation of U.S. Patent Application No. 14/643,810, entitled "EXPRESSION RECOGNITION IN MESSAGING SYSTEMS," which was filed on March 10, 2015, which claims the benefit of U.S. Provisional Patent Application No. 61/950,423, entitled "BIOMETRIC FOR MOBILE ACCESS," which was filed on Mar. 10, 2014; U.S. Provisional Patent Application No. 61/985,059, entitled "USE OF BIOMETRIC FOR ACCESS TO DATA DEVICE AND ASSOCIATED SOLUTIONS FOR DIFFICULT BIOMETRIC READING SCENARIOS," which was filed on Apr. 28, 2014; and U.S. Provisional Patent Application No. 62/051,031, entitled "EXPRESSION RECOGNITION IN MESSAGING SYSTEMS," which was filed on Sep. 16, 2014; which are all incorporated by reference herein in their entirety.

RELATED FIELD

[0002] At least one embodiment of this disclosure relates generally to an electronic messaging system, and in particular to privacy and security of an electronic messaging system.

BACKGROUND

[0003] With the wide availability of mobile devices, in some areas/cultures, electronic messaging is becoming an integral part of a person's life. Because of this, privacy and security concerns arise over the use of such systems. Conventional technology protects against privacy violations by providing a screen lock on a mobile device whenever the mobile device is not used. An authorized user can unlock the screen by typing a passcode into the mobile device. However, the

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passcode is knowledge that is transferable, and hence may be stolen. Furthermore, the screen lock prevents access to other applications on the mobile device, making it unnecessarily inconvenient. Other solutions protect against violation by scheduling the destruction of a message to ensure that its content therein does not survive indefinitely.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1A is a diagram illustrating a messaging application of a mobile device revealing content of a message when a facial profile associated with a recipient account is recognized, in accordance with various embodiments.

[0005] FIG. 1B is a diagram illustrating a messaging application of a mobile device hiding content of a message when a facial profile associated with a recipient account is not detected, in accordance with various embodiments.

[0006] FIG. 1C is a diagram illustrating a messaging application of a mobile device hiding content of a message when a facial profile associated with a recipient account is detected and a second unauthorized facial profile is detected, in accordance with various embodiments.

[0007] FIG. 2 is a block diagram of a system environment of a messaging system implementing a biometric security mechanism, in accordance with various embodiments.

[0008] FIG. 3 is a flow chart of a method of operating a messaging application on a computing device that implements an expression recognition process, in accordance with various embodiments.

[0009] FIG. 4 is a flow chart of a method of operating a messaging application on a computing device capable of delivering advertisements, in accordance with various embodiments.

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[0010] FIG. 5 is a flow chart of a method of operating a message server system that facilitates conversations between computing devices, in accordance with various embodiments.

[0011] FIG. 6 is a block diagram of an example of a computing device, which may represent one or more computing devices or servers described herein, in accordance with various embodiments.

[0012] The figures depict various embodiments of this disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following discussion that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the invention described herein.

DETAILED DESCRIPTION

[0013] Disclosed is a technology that pertains to protecting messages through a messaging system via a biometric security mechanism. The messaging system includes a message server system comprising one or more computer servers and messaging applications running on end-user devices. The end-user devices can include personal computers, smart phones, tablets, wearable devices, gaming consoles, smart TVs, other electronic gadgets, or any combination thereof. The messaging applications act as independent agents for the messaging system. For example, a messaging application may be installed on a general-purpose operating system (e.g., Windows, android, iOS, etc.). The messaging application can also be implemented by client-side script (e.g., JavaScript) that may be executed on a web browser of the end-user devices.

[0014] The biometric security mechanism is implemented via the messaging application. Unlike the conventional security mechanisms for a recipient user device that protect privacy only of the user of the recipient user device, the disclosed biometric security mechanism also protects the privacy and security of the sender of the message. This enables a new paradigm of protection for stakeholders

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(e.g., the message senders) who are conventionally dependent solely on the message recipients to protect their interests.

[0015] In various embodiments, the disclosed technology uses sensors in end-user devices to monitor and profile an end-user. Such profiling can serve to ensure security (for example, by utilizing biometric recognition, such as facial recognition or ear recognition). Such profiling can also serve to enhance context mining (for example, by utilizing expression recognition). In some embodiments, the expression recognition can be implemented without implementing the biometric recognition. In some embodiments, the biometric recognition can be implemented without implementing the expression recognition.

Security

[0016] The biometric security mechanism implements a biometric recognition process to verify one or more identities as authorized by the message senders. For example, the biometric recognition process may be based on facial recognition, ear recognition, silhouette recognition, speaker recognition, fingerprint recognition, device motion pattern recognition, contact pattern recognition, etc. The biometric security mechanism can detect biometric patterns utilizing a sensor, such as a camera, a microphone, an accelerometer, a touch sensor, a gyroscope, etc. The biometric security mechanism can then profile (e.g., by recording patterns and then training one or more computational functions that recognize one or more shared attributes or characteristic of the patterns) the biometric patterns of one or more users into a profile model utilizing machine learning algorithms, such as support vector machines, Gaussian mixture models, hidden Marcov models, etc. Based on the profiles of the users, the biometric security mechanism can recognize a user in real-time by matching the biometric pattern detected by a sensor with the profile model.

[0017] The biometric security mechanism is instantiated whenever the messaging interface of the message application is actively opened and running on an end-user device (e.g., such that the mechanism is active while the message application is open). The biometric security mechanism utilizes one or more types of

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biometric recognition processes to determine whether the people who have access to the end-user device (e.g., looking at the screen of the end-user device) are consistent with the privacy settings of the sender account and the recipient account.

[0018] To use the messaging application on a user device, a user may have to identify a messaging system account associated with the messaging system. The biometric security mechanism uses the one or more types of biometric recognition processes to ensure that an operator using the messaging application matches a biometric profile of the messaging system account. This procedure ensures that a third party (e.g., a brother or a classmate) cannot send messages on behalf of the user. In the case that there are multiple operators for the same end-user device, this procedure also ensures that independent private sessions of using the messaging application can be established based on automatic biometric recognition.

[0019] The biometric security mechanism can provide customizable privacy shields per message or conversation. These privacy shields may be customized by privacy settings dictated by the sender of the message or the initiator of the conversation. The biometric security mechanism can use the one or more types of biometric recognition processes to ensure that the operator using the messaging application matches an authorized biometric profile in accordance with a privacy setting of an individual conversation or message. For example, the default privacy setting may be that the message or conversation is revealed when a biometric profile of the recipient account is recognized by the biometric security mechanism. In another example, the default privacy setting may be that the message or conversation is revealed only when the biometric profile of the recipient account is recognized without the presence of other detected human beings in the proximate area of the recipient end-user device.

[0020] In some embodiments, the privacy setting can indicate a single authorized account or biometric profile. In some embodiments, the privacy setting can indicate a group of authorized accounts or biometric profiles. In some embodiments, the privacy setting can indicate an attribute of a biometric profile, such

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as age, gender, facial gesture, facial expression, vocal pitch, etc. The attribute can be the sole variable to authorize a person. For example, the privacy setting can indicate that any female face (e.g., in the case of facial recognition) or any female voice (e.g., in the case of speaker recognition) would be authorized. The attribute can be an additional conditional on top of a specific account or biometric profile. For example, a sender account (e.g., John) may send a message with a privacy setting indicating Nancy as the recipient account. In some cases, the privacy setting can add an attribute of the recipient profile being female.

[0021] The privacy shield may be implemented, for example, as a screen lock, a scrambling of the message content, a blur of the message content, a blackout of the message content, or any combination thereof. In some embodiments, the biometric security mechanism continuously loops through the one or more types of biometric recognition processes. In some embodiments, the biometric security mechanism disengages the privacy shield whenever an authorized biometric profile is recognized and detected. In some embodiments, the biometric security mechanism engages the privacy shield whenever a non-authorized biometric profile is detected.

[0022] A sender account or a recipient account can be associated with a single individual or a group of individuals. In the case of a group of individuals, biometric profiles of every member are associated with the sender account or the recipient account.

Expression Recognition

[0023] The use of the biometric security mechanism provides a dependable authentication process that improves or guarantees privacy of the users of the messaging system. Accordingly, the users can trust that the biometric recognition process is used for protection instead of exploitation. Because of this trust, an expression recognition process can be run concurrently to the biometric recognition process. That is, a user, who otherwise would not use a messaging application with an expression recognition process, would use that same messaging application if the biometric recognition process were there to guarantee security and privacy.

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[0024] The disclosed technology can implement expression recognition process in addition to the biometric recognition process to provide additional contextual information associated with a user's emotional/mood state when using a messaging application. The expression recognition of a user of the messaging system can provide several benefits. For example, the message server system can maintain a stimulus response database that maps associations between stimuli presented on the messaging interface and expressions recognized by the expression recognition process. The message server system can then generate and provide a query interface to present consumer data (e.g., anonymized consumer data) based on the stimulus response database for advertisers, researchers, or business intelligence departments.

[0025] For another example, the messaging application can use the expression recognition process to personalize the messaging application. In some cases, based on the responding expression of a user when viewing a particular type of message (e.g., from a particular sender or during a particular time of day), the messaging application can determine whether or not to present another message of the same type via the messaging interface.

[0026] For another example, the messaging application can use the expression recognition process to add gesture control to the messaging application. In some cases, certain facial expressions can correspond to a gesture control to activate or deactivate an interactive component of the messaging application. In one specific example, a frown detected by the expression recognition process can cause the messaging application to suspend.

[0027] For another example, the messaging application can use the expression recognition process to customize targeted advertisement. In some cases, an advertisement may be selected based on the current mood of the user. The current mood of the user, in turn, can be estimated based on the expression recognized. In some cases, presentation of an advertisement may be triggered based on a user

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expression condition. For example, an advertisement may be shown only when the user is recognized to be smiling.

[0028] For another example, the messaging application can use the expression recognition process to add context to conversations between users of the messaging system. In some cases, the recognized expression of a sender user can be added as an emoticon to a message. In some cases, the recognized expression of a viewer user can be fed back to the sender as a status update.

Alternative Embodiments

[0029] The disclosure above pertains to the specific example of an electronic messaging system for delivery of text, images, audio clips, or video clips. However, it is within the contemplation of this disclosure to implement the biometric security mechanism to other similar systems that include registration of a sender account and the receiver account. For example, the biometric security mechanism can apply to email, social network, dating network, event/meet up invitation, physical delivery of goods, enterprise messaging (e.g., financial agent to customer messaging, real estate agent to customer messaging, medical professional messaging, etc.), or any combination thereof. The biometric security mechanism is advantageous in enforcing privacy settings of the sender at the device of the recipient. This is an improvement over existing technology that only seeks to protect against unauthorized exposure of content on behalf of the device owner but not on behalf of the sender.

[0030] The biometric security mechanism is also advantageous in preventing impersonation attempts, such as for the purpose of cyber bullying, by verifying the identity of a message sender when composing a message. This improves the overall accountability of messaging within the messaging system. Similarly, in an enterprise environment, the authentication in both viewing and composition of the message enhances enterprise-level security and compliance (e.g., eHealth compliance when the message content involves medical information).

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[0031] The disclosure above assumes that the messaging application implements both the biometric security mechanism and a messaging interface (e.g., to compose and read messages). However, it is within the contemplation of this disclosure to implement the biometric security mechanism on a separate device or application from where the messaging interface is implemented. For example, in the case of an enterprise email system, an email access interface may be provided on a desktop computer while the biometric security mechanism may be implemented on a mobile device (e.g., a smart phone). In this example, the biometric security mechanism can require the mobile device to connect with the email access interface on the desktop computer. The biometric security mechanism can perform the biometric recognition process to verify that there is a secure environment near the desktop computer (e.g., no unauthorized user is around and/or an authorized user is present). In response to verifying a secure environment, the biometric security mechanism can notify the email access interface to reveal content of a message.

[0032] FIGS. 1A through 1C illustrate an example of the biometric security mechanism that implements a facial recognition process to protect the privacy of both a sender of a message and a recipient of the message. FIG. 1A is a diagram illustrating a messaging application of a mobile device revealing content of a message when a facial profile associated with a recipient account is recognized, in accordance with various embodiments. FIG. 1B is a diagram illustrating a messaging application of a mobile device hiding content of a message when a facial profile associated with a recipient account is not detected, in accordance with various embodiments. FIG. 1C is a diagram illustrating a messaging application of a mobile device hiding content of a message when a facial profile associated with a recipient account is detected and a second unauthorized facial profile is detected, in accordance with various embodiments.

[0033] FIG. 2 is a block diagram of a system environment of a messaging system 200 implementing a biometric security mechanism, in accordance with various embodiments.

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[0034] The messaging system 200 can communicate with client devices 202 (e.g., mobile phones, tablets, desktop computers, laptops, other network-enabled devices, or any combination thereof). The messaging system 200 can include a messaging platform system 204 (e.g., one or more computer servers) configured to provide a service to facilitate human-understandable electronic communication between user accounts. The human-understandable electronic communication can include emoticons, text, photos, audio clips, videos, links, images, or any combination thereof. The human-understandable content of the electronic communication may be part of an electronic message or can be referenced in the electronic message (e.g., stored elsewhere that is accessible through a network).

[0035] In some embodiments, each of the client devices 202 can have its own instance of a messaging interface 206 and a corresponding instance of a biometric security engine 207 running thereon that communicates with the messaging platform system 204. In some embodiments, the messaging interface 206 and the biometric security engine 207 are part of a messaging application running and/or installed on the client device. In some embodiments, the messaging interface 206 is installed and/or running on a first client device and the biometric security engine 207 is installed and/or running on a second client device. In these embodiments, the biometric security engine 207 on the second client device can control a privacy shield implemented by the messaging interface 206.

[0036] For example, the messaging interface 206 and/or the biometric security engine 207 can be embodied as a mobile application running on operating systems of some of the client devices 202. In another example, the messaging interface 206 and/or the biometric security engine 207 can be implemented as a web-based application running on web browsers on some of the client devices 202.

[0037] The client devices 202 can be associated with user accounts. In some embodiments, a user account of the messaging system 200 can have multiple client devices associated therewith. In some embodiments, a client device can have

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multiple user accounts associated therewith. Conversations between user accounts are tracked by the messaging system 200 such that the messaging system 200 can deliver an electronic message from a client device of one user account to a client device of another user account.

[0038] In some embodiments, the messaging system 200 can include a user profile database 208. The user profile database 208 is configured to store user profiles of one or more user accounts. The user profiles may be associated with one or more social networking systems (e.g., an affiliated social networking system, a social networking system integrated with the messaging system 200, or an external social networking system) and social network profiles in the social networking systems.

[0039] In various embodiments, the messaging interface 206 can implement a privacy shield. The biometric security engine 207, for example, can recognize whether or not an authorized user is present by analyzing a video feed from its respective client device using a facial recognition algorithm. The messaging platform system 204 can maintain biometric profiles of user accounts in the user profile database 208. The messaging platform system 204 associates a sender account and a receiver account with every message (e.g., as specified by the sender account). The biometric profiles of the sender account and the receiver account can both be considered "authorized users." One or more lists of authorized users may be stored in an authorization database 210. The authorization database 210 can also maintain one or more lists of blacklisted user accounts that are explicitly unauthorized. In some embodiments, the sender account, the receiver account, or both can add additional user accounts to the list of authorized users. In some embodiments, the sender account, the receiver account, or both can add one or more user accounts to the list of "blacklisted" user accounts.

[0040] The authorization database 210 can store a list of authorized users specific to a message conversation or specific to a user account (e.g., specific to a sender account, a receiver account, or both). For example, for each message or conversation sent or each message or conversation received, a user can add or remove

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one or more accounts from the list of authorized users or blacklisted users. For another example, a first user account can add a second user account as an authorized user (e.g., a spouse) or a blacklisted user (e.g., a rival friend or sibling) for all conversations that the first user account participates in. In some embodiments (e.g., as required by law) the authorization database 210 can also store a list of globally authorized users.

[0041] The messaging platform system 204 can communicate with the biometric security engine 207 to secure content of messages. For example, the messaging platform system 204 can send biometric profiles (e.g., facial profiles) of the authorized users and/or expressly unauthorized users to be verified on a client device by the biometric security engine 207. The biometric security engine 207 can monitor outputs of a sensor 214 (e.g., a camera) to detect and recognize biometric profiles. In some embodiments, the messaging platform system 204 can request the biometric security engine 207 to capture and send an image or a video of its operator to be verified on the messaging platform system 204. In those embodiments, the messaging platform system 204 returns the result of the verification back to the biometric security engine 207.

[0042] Once the biometric security engine 207 determines that a secure environment is present, the biometric security engine 207 can control the privacy shield implemented in the messaging interface 206 to either reveal or hide content of a message. The privacy shield implemented by the messaging interface 206 can reveal content of a message conversation when the authorized user is detected. In some embodiments, the privacy shield can hide the content in response to detecting both an authorized user and an unauthorized user (e.g., implicitly unauthorized or expressly unauthorized). In some embodiments, the privacy shield can hide the content whenever an expressly unauthorized user account is detected.

[0043] In some embodiments, the client devices 202 can each also include an expression recognition engine 216. The expression recognition engine 216 can configure a client device 202 to execute the disclosed expression recognition

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process. For example, the expression recognition engine 216 can implement the methods described in FIG. 3, FIG. 4, and FIG. 5. In some embodiments, the expression recognition engine 216 can be integrated with the biometric security engine 207. In some embodiments, the expression recognition engine 216 can be part of the same messaging application as the messaging interface 206.

[0044] The expression recognition engine 216 can utilize the one or more sensors 214 to monitor at least a biometric signature of an operating user. For example, the biometric signature can be a facial profile, a head profile, a mouth profile, a hand gesture profile, a gait profile, a vocal profile, or any combination thereof. From the biometric signature, the expression recognition engine 216 can determine an expression state. The expression state can correspond to an emotion, a mood, or other patterns recognizable across the biometric signatures of various people.

[0045] In some embodiments, the expression recognition engine 216 can upload recognized expression states of an operating user to the messaging platform system 204. The expression recognition engine 216 can also upload associated metadata (e.g., time stamp, associated user identifier, etc.) to the messaging platform system 204. Based on the expression states and the associated metadata, the messaging platform system 204 can maintain a stimulus response database 218. The stimulus response database 218 logs and tracks the expression state of an operating user in response to an activity occurring on the messaging interface 206. The activity, for example, can be the operating user composing a message, viewing a message, viewing an advertisement, viewing a media object, or any combination thereof. The stimulus response database 218 can generate a query interface such that an authorized agent of the messaging system 200 can access statistic of specific users or groups of users.

[0046] FIG. 3 is a flow chart of a method 300 of operating a messaging application (e.g., the expression recognition engine 216 of FIG. 2) on a

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computing device (e.g., one of the client devices 202 of FIG. 2) that implements an expression recognition process, in accordance with various embodiments.

[0047] At step 302, the computing device can monitor a video feed from a camera of the computing device to detect a biometric signature when a messaging interface of the messaging application is actively being used. At step 304, the computing device can match the detected biometric signature against a known profile utilizing a facial recognition process to authenticate an operating user to use the messaging application. The known profile can be stored in the computing device or a messaging server system (e.g., the messaging platform system 204 of FIG. 2). In some embodiments, the biometric signature is a facial profile and the biometric recognition process is a facial recognition process.

[0048] As step 306, the computing system can determine a human expression based on the detected biometric signature utilizing an expression recognition process to associate a contextual tag with an activity on the messaging interface. At step 308, the computing system can communicate with the message server system to associate the contextual tag with a conversation involving or participated by the operating user (e.g., where the operating user engaged in the conversation through the messaging application).

[0049] In some cases, the messaging interface is being used to compose a message in the conversation. In those cases, communicating with the message server system can include sending the contextual tag as an emoticon embedded as part of the message to configure the message server system to distribute the emoticon to another participant of the conversation. In another example, communicating with the message server system can include sending the contextual tag as an emotion status that is time stamped to configure the message server system to maintain an emotion status record of at least a participant of the conversation. In some cases, the messaging interface is being used to read a message in the conversation. In those cases, communicating with the message server system can include sending the contextual tag as an emotion status that is time stamped to

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configure the message server system to present the emotion status to another participant of the conversation. The other participant, for example, can be the writer of the message.

[0050] In some cases, communicating with the message server system can include personalizing the messaging application based on the contextual tag. In some cases, communicating with the message server system can include archiving an expression log associated with the operating user on the message server system.

[0051] Optionally, at step 310, the computing device can activate or deactivate an interactive component of the messaging interface in response to detecting a specific expression via the expression recognition process. That is, biometric expressions (e.g., facial expressions) can be used as a gesture control of the messaging interface/messaging application.

[0052] FIG. 4 is a flow chart of a method 400 of operating a messaging application (e.g., the expression recognition engine 216 of FIG. 2) on a computing device (e.g., one of the client devices 202 of FIG. 2) capable of delivering advertisements, in accordance with various embodiments. At step 402, the computing device monitors a video feed from a camera (e.g., one of the sensors 214 of FIG. 2) to detect a biometric signature when a messaging interface of the messaging application is actively being used. At step 404, the computing device can match the detected biometric signature against a known profile utilizing a facial recognition process to authenticate an operating user to use the messaging application.

[0053] At step 406, the computing device determines a human expression based on the detected biometric signature utilizing an expression recognition process to associate a contextual tag with an activity on the messaging interface. Optionally, at step 408, the computing device can receive an expression trigger condition associated with the targeted advertisement from a message server system or an advertisement service server. At step 410, the computing device presents a targeted advertisement on the messaging interface based on the contextual tag and

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an identity of the operating user. The targeted advertisement can be presented in response to determining that the contextual tag corresponds to the expression trigger condition. The expression trigger condition, for example, can include a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. The expression trigger condition can include an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

[0054] Presenting the targeted advertisement can include selecting the targeted advertisement from multiple options based on the contextual tag. Selecting the targeted advertisement can be based on a time stamp of the contextual tag in relation to an activity (e.g., user action or messaging-app-side activity) occurring on the messaging interface near or at the time stamp. Selecting the targeted advertisement can be based on an expression trigger condition associated with the targeted advertisement.

[0055] FIG. 5 is a flow chart of a method 500 of operating a message server system (e.g., the messaging platform system 204 of FIG. 2) that facilitates conversations between computing devices (e.g., the client devices 202 of FIG. 2), in accordance with various embodiments. At step 502, the message server system implements a messaging service to facilitate a messaging application executing on a first computing device. At step 504, the message server system authenticates an operating user of the first computing device based on a facial recognition process in conjunction with the messaging application when the operating user is actively using a messaging interface of the messaging application.

[0056] At step 506, the message server system receives an expression status from the messaging application based on an expression recognition process. Receiving the expression status can include receiving metadata associated with the expression status. The metadata, for example, can include a time stamp, a user identifier, a language identifier (e.g., identifies the language used in the conversation), an ethnic identifier of the user, an associated user action identifier (e.g., what the user

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was doing on the messaging interface), user response time, or any combination thereof.

[0057] At step 508, the message server system associates the expression status in a stimulus response database maintained by the message server system. At step 510, the message server system generates a query interface to the stimulus response database to provide associated expressions in response to a stimulus identifier.

[0058] The stimulus identifier, for example, can correspond to a corporate word, a political word, or a social word. The stimulus identifier, for another example, can correspond to a media object (e.g., image, text string, audio, video clip, etc.). The stimulus identifier can also correspond to an advertisement.

[0059] While processes or methods are presented in a given order, alternative embodiments may perform routines having steps, or employ systems having blocks, in a different order, and some processes or blocks may be deleted, moved, added, subdivided, combined, and/or modified to provide alternative or sub-combinations. Each of these processes or blocks may be implemented in a variety of different ways. In addition, while processes or blocks are at times shown as being performed in series, these processes or blocks may instead be performed in parallel, or may be performed at different times.

[0060] FIG. 6 is a block diagram of an example of a computing device 600, which may represent one or more computing devices or servers described herein, in accordance with various embodiments. The computing device 600 can be one or more computing devices that implement the messaging system 200 of FIG. 2 or methods and processes described in this disclosure. The computing device 600 includes one or more processors 610 and memory 620 coupled to an interconnect 630. The interconnect 630 shown in FIG. 6 is an abstraction that represents any one or more separate physical buses, point-to-point connections, or both, connected by appropriate bridges, adapters, or controllers. The interconnect 630, therefore, may include, for example, a system bus, a Peripheral Component Interconnect (PCI) bus or

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PCI-Express bus, a HyperTransport or industry standard architecture (ISA) bus, a small computer system interface (SCSI) bus, a universal serial bus (USB), IIC (I2C) bus, or an Institute of Electrical and Electronics Engineers (IEEE) standard 1494 bus, also called "Firewire".

[0061] The processor(s) 610 is/are the central processing unit (CPU) of the computing device 600 and thus controls the overall operation of the computing device 600. In certain embodiments, the processor(s) 610 accomplishes this by executing software or firmware stored in memory 620. The processor(s) 610 may be, or may include, one or more programmable general-purpose or special-purpose microprocessors, digital signal processors (DSPs), programmable controllers, application-specific integrated circuits (ASICs), programmable logic devices (PLDs), trusted platform modules (TPMs), or the like, or a combination of such devices.

[0062] The memory 620 is or includes the main memory of the computing device 600. The memory 620 represents any form of random access memory (RAM), read-only memory (ROM), flash memory, or the like, or a combination of such devices. In use, the memory 620 may contain a code 670 containing instructions according to the mesh connection system disclosed herein.

[0063] Also connected to the processor(s) 610 through the interconnect 630 are a network adapter 640 and a storage adapter 650. The network adapter 640 provides the computing device 600 with the ability to communicate with remote devices over a network and may be, for example, an Ethernet adapter or Fibre Channel adapter. The network adapter 640 may also provide the computing device 600 with the ability to communicate with other computers. The storage adapter 650 enables the computing device 600 to access a persistent storage, and may be, for example, a Fibre Channel adapter or SCSI adapter.

[0064] The code 670 stored in memory 620 may be implemented as software and/or firmware to program the processor(s) 610 to carry out actions described above. In certain embodiments, such software or firmware may be initially

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provided to the computing device 600 by downloading it from a remote system through the computing device 600 (e.g., via network adapter 640).

[0065] The techniques introduced herein can be implemented by, for example, programmable circuitry (e.g., one or more microprocessors) programmed with software and/or firmware, or entirely in special-purpose hardwired circuitry, or in a combination of such forms. Special-purpose hardwired circuitry may be in the form of, for example, one or more application-specific integrated circuits (ASICs), programmable logic devices (PLDs), field-programmable gate arrays (FPGAs), etc.

[0066] Software or firmware for use in implementing the techniques introduced here may be stored on a machine-readable storage medium and may be executed by one or more general-purpose or special-purpose programmable microprocessors. A "machine-readable storage medium," as the term is used herein, includes any mechanism that can store information in a form accessible by a machine (a machine may be, for example, a computer, network device, cellular phone, personal digital assistant (PDA), manufacturing tool, any device with one or more processors, etc.). For example, a machine-accessible storage medium includes recordable/non-recordable media (e.g., read-only memory (ROM); random access memory (RAM); magnetic disk storage media; optical storage media; flash memory devices; etc.), etc.

[0067] The term "logic," as used herein, can include, for example, programmable circuitry programmed with specific software and/or firmware, special-purpose hardwired circuitry, or a combination thereof.

[0068] Some embodiments of the disclosure have other aspects, elements, features, and steps in addition to or in place of what is described above. These potential additions and replacements are described throughout the rest of the specification.

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WHAT IS CLAIMED IS:

1. A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

receive a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon based on the detected human facial expression to generate a modified emoticon, wherein the modified emoticon simulates the detected human facial expression on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

2. The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

3. The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

4. The computer device of Claim 1, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

5. The computer device of Claim 1, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a

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micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

6. The computer device of Claim 1, where the at least one processor is further programmed to analyze the human facial expression using an expression recognition process to detect the human facial expression.

7. The computer device of Claim 1, wherein the modified emoticon is embedded at a displayable portion of the message.

8. The computer device of Claim 1, wherein the human facial expression is captured in real-time from the one or more sensors.

9. A computer-implemented method of operating a messaging application, the method comprising:

receiving a selection of an emoticon;

detecting a human facial expression using one or more sensors of a computer device;

automatically the selected emoticon based on the detected human facial expression to generate a modified emoticon, wherein the modified emoticon simulates the detected human facial expression on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

10. The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

11. The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

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12. The computer-implemented method of Claim 9, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

13. The computer-implemented method of Claim 9, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

14. The computer-implemented method of Claim 9, further comprising analyzing the human facial expression using an expression recognition process to detect the human facial expression.

15. The computer-implemented method of Claim 9, wherein the modified emoticon is embedded at a displayable portion of the message.

16. The computer-implemented method of Claim 9, wherein the human facial expression is captured in real-time from the one or more sensors.

17. At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device, the computer-executable instructions cause the processor to:

receive a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon based on the detected human facial expression to generate a modified emoticon, wherein the modified emoticon simulates the detected human facial expression on the selected emoticon; and

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route a message with the modified emoticon to a second computer device.

18. The at least one non-transitory computer-readable storage media of Claim 17, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

19. The at least one non-transitory computer-readable storage media of Claim 17, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

20. The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

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EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

ABSTRACT

Some embodiments include a messaging system capable of expression-based communication and/or expression-based actions. The messaging system can run on a computing device. For example, the messaging system monitors a camera feed from a camera of the computing device to detect a biometric signature when a messaging interface of the messaging application is actively being used. The messaging system can match the detected biometric signature against a known profile utilizing a facial recognition process to authenticate an operating user to use the messaging application. The messaging system can determine a human expression based on the detected biometric signature utilizing an expression recognition process to associate a contextual tag with an activity on the messaging interface. The messaging system can then communicate with a message server system to associate the contextual tag with content presented to the operating user or a conversation participated by the operating user via the messaging application.

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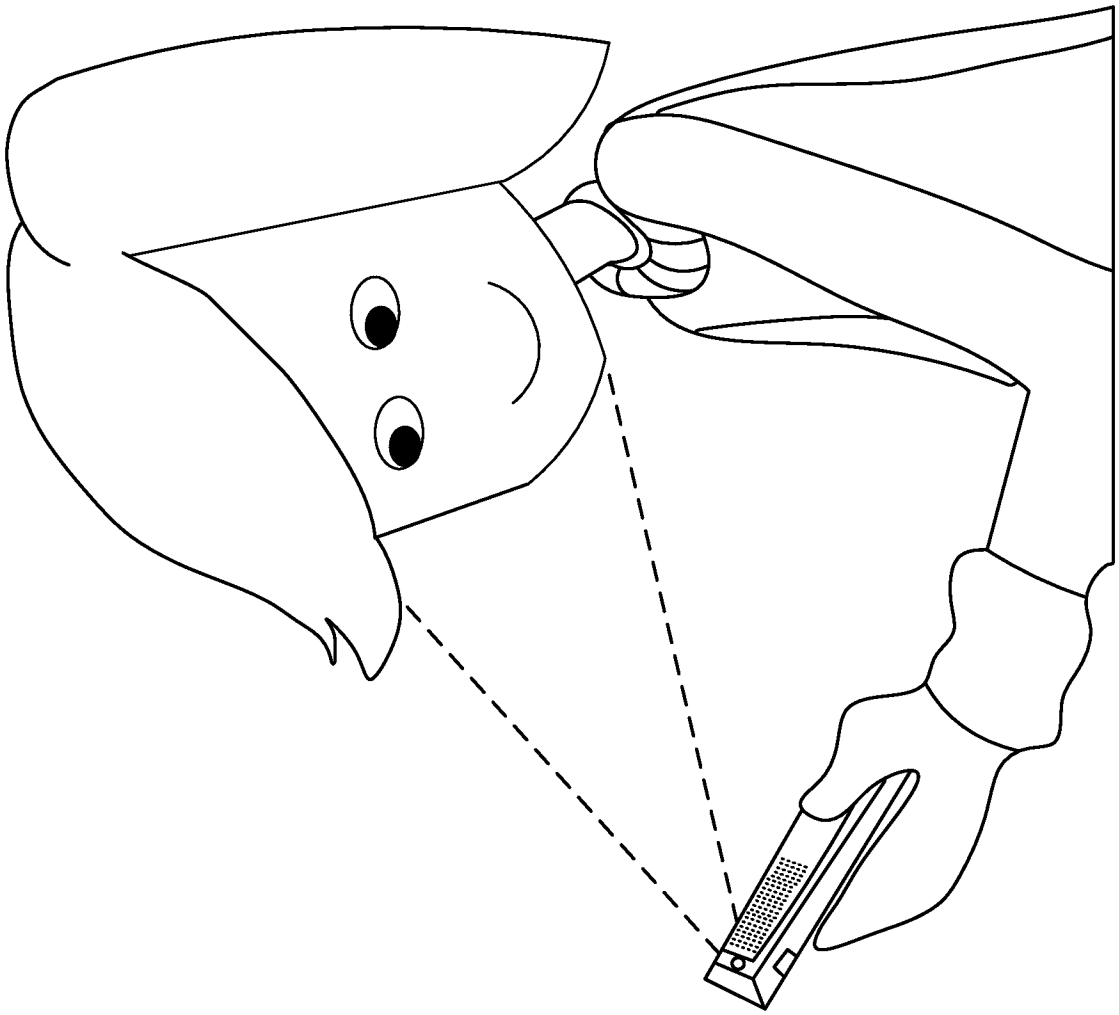


FIG. 1A

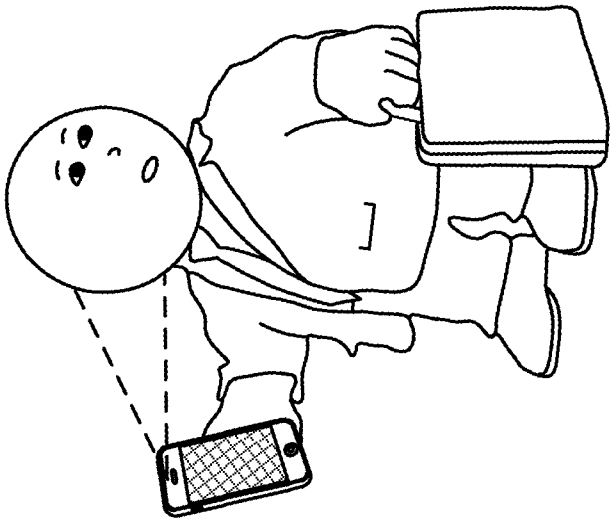


FIG. 1B

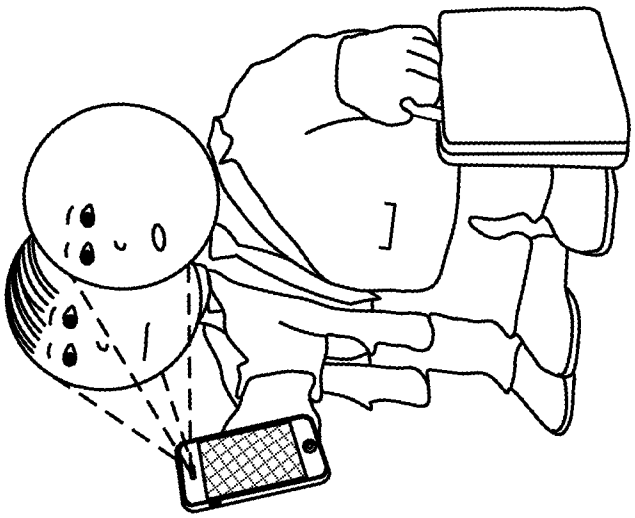


FIG. 1C

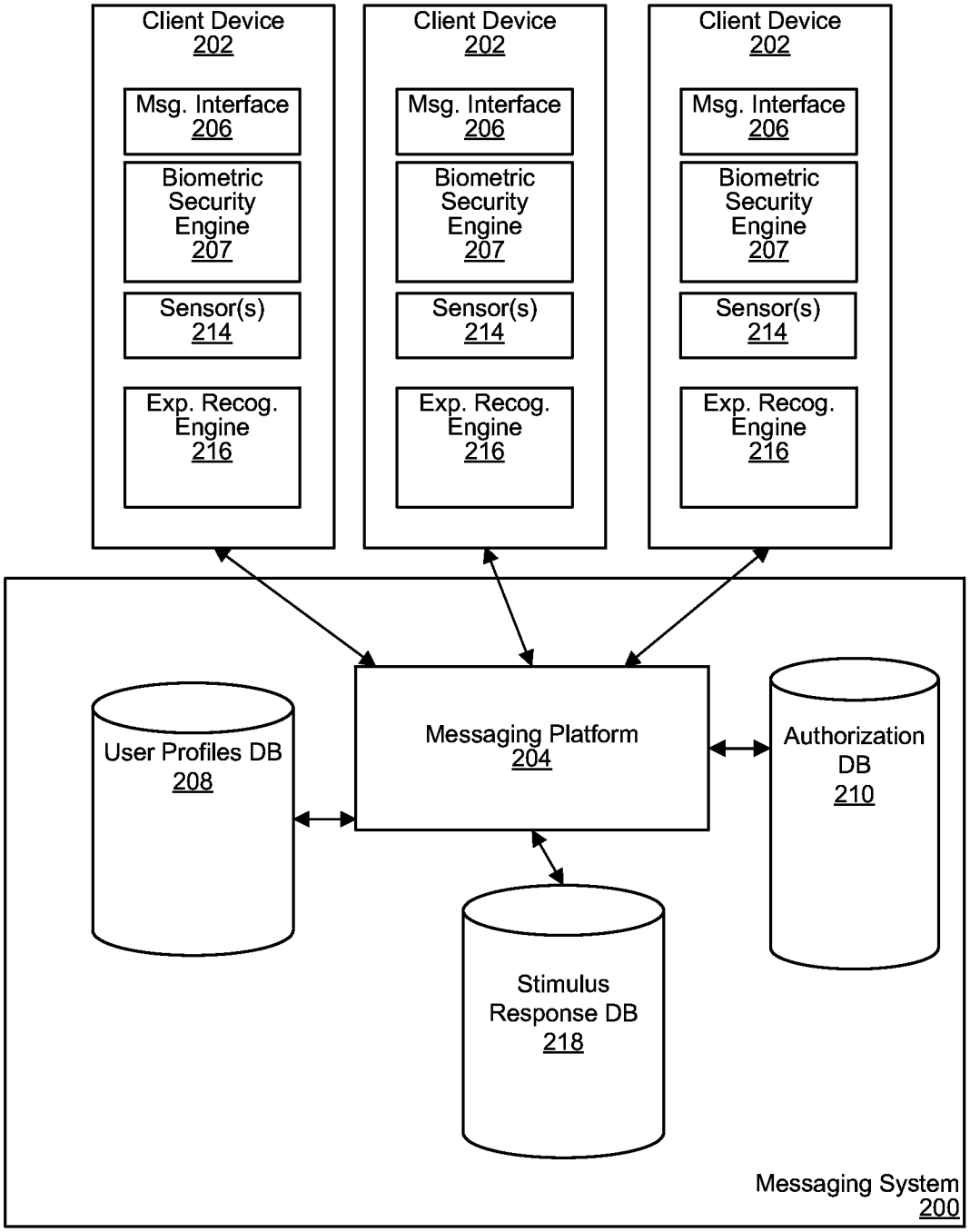

Client Device
202
Msg. Interface
206
Biometric Security Engine
207
Sensor(s)
214
Exp. Recog. Engine
216
Client Device
202
Msg. Interface
206
Biometric Security Engine
207
Sensor(s)
214
Exp. Recog. Engine
216
Client Device
202
Msg. Interface
206
Biometric Security Engine
207
Sensor(s)
214
Exp. Recog. Engine
216
Messaging Platform
204
User Profiles DB
208
Authorization DB
210
Stimulus Response DB
218
Messaging System
200

FIG. 2

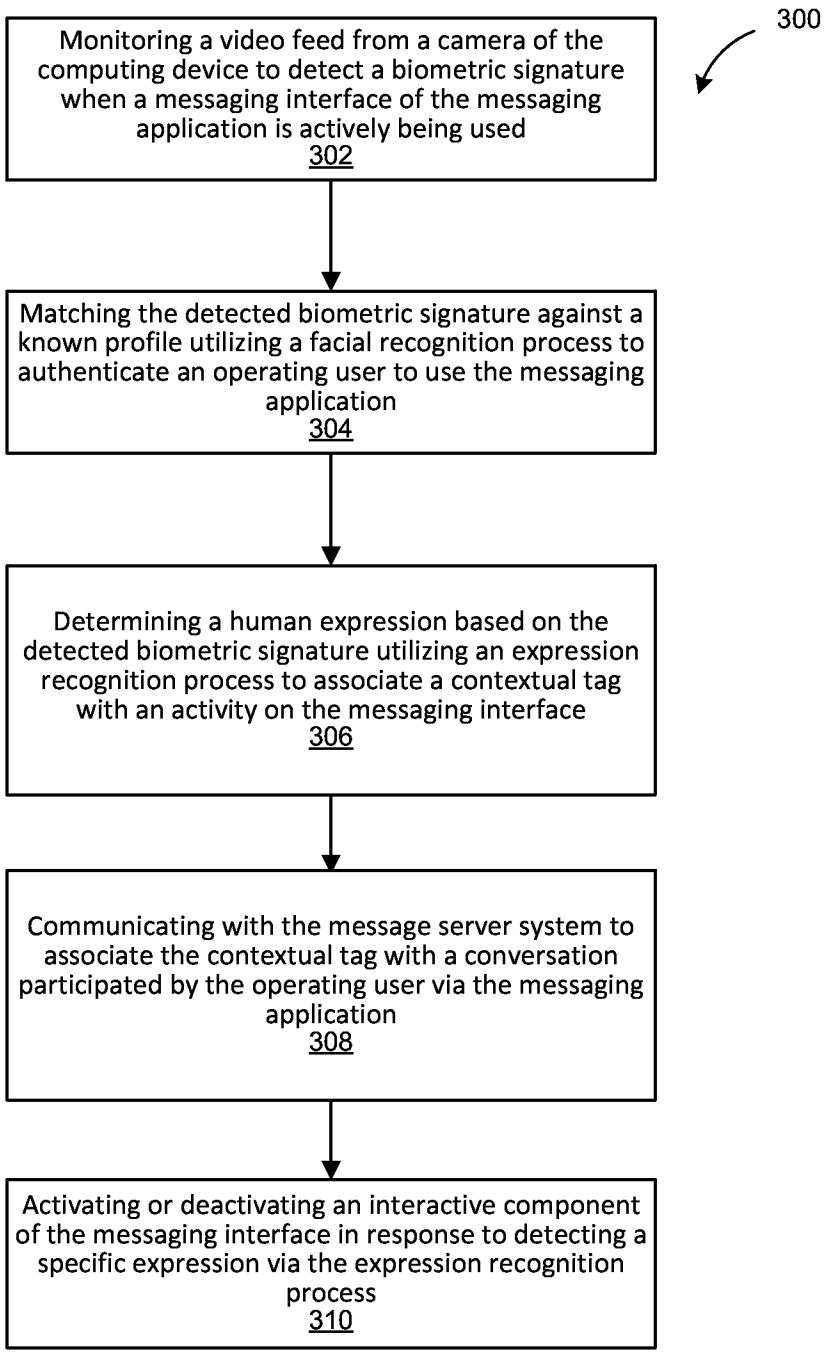

300
Monitoring a video feed from a camera of the computing device to detect a biometric signature when a messaging interface of the messaging application is actively being used
302
Matching the detected biometric signature against a known profile utilizing a facial recognition process to authenticate an operating user to use the messaging application
304
Determining a human expression based on the detected biometric signature utilizing an expression recognition process to associate a contextual tag with an activity on the messaging interface
306
Communicating with the message server system to associate the contextual tag with a conversation participated by the operating user via the messaging application
308
Activating or deactivating an interactive component of the messaging interface in response to detecting a specific expression via the expression recognition process
310

FIG. 3

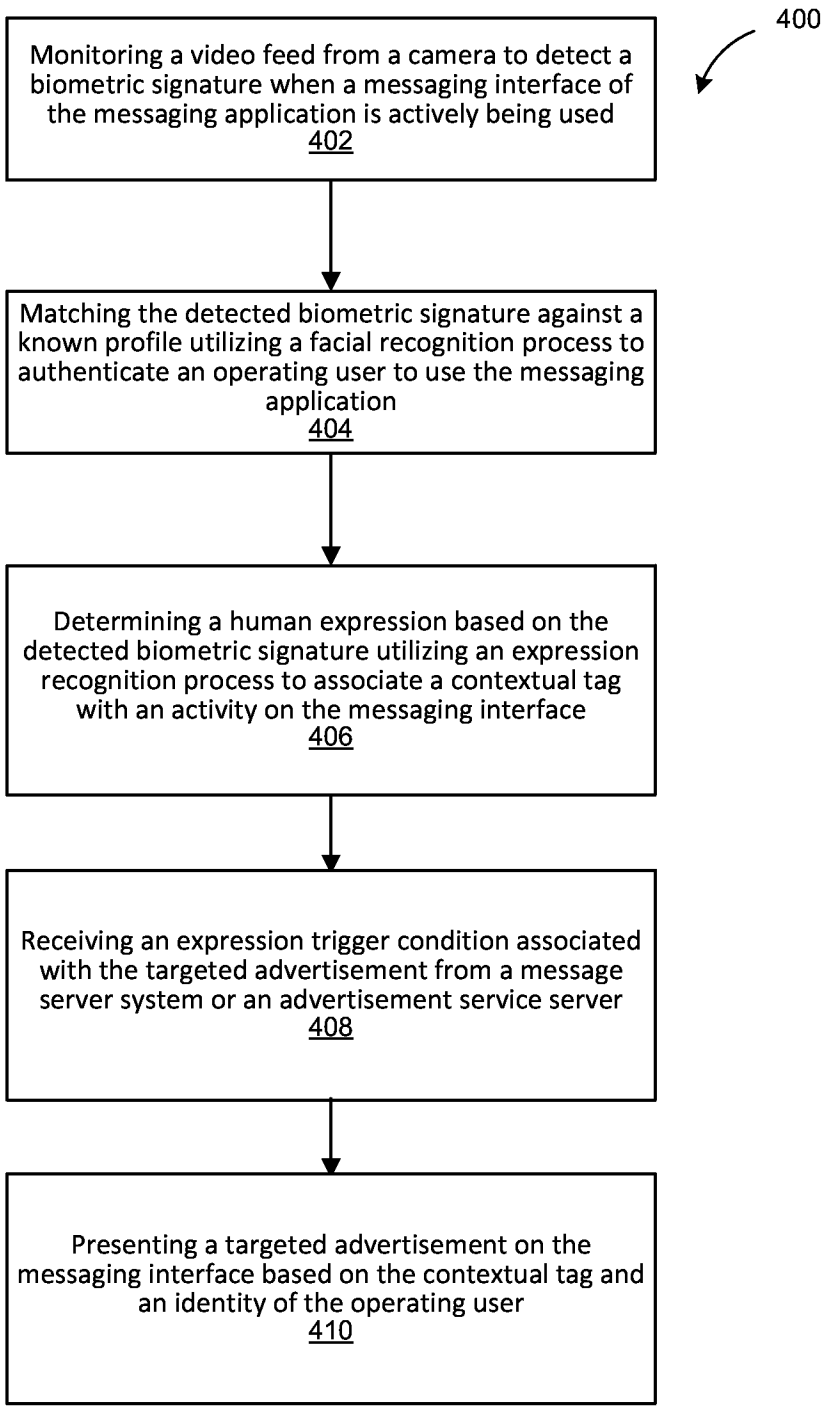

400
Monitoring a video feed from a camera to detect a biometric signature when a messaging interface of the messaging application is actively being used
402
Matching the detected biometric signature against a known profile utilizing a facial recognition process to authenticate an operating user to use the messaging application
404
Determining a human expression based on the detected biometric signature utilizing an expression recognition process to associate a contextual tag with an activity on the messaging interface
406
Receiving an expression trigger condition associated with the targeted advertisement from a message server system or an advertisement service server
408
Presenting a targeted advertisement on the messaging interface based on the contextual tag and an identity of the operating user
410

FIG. 4

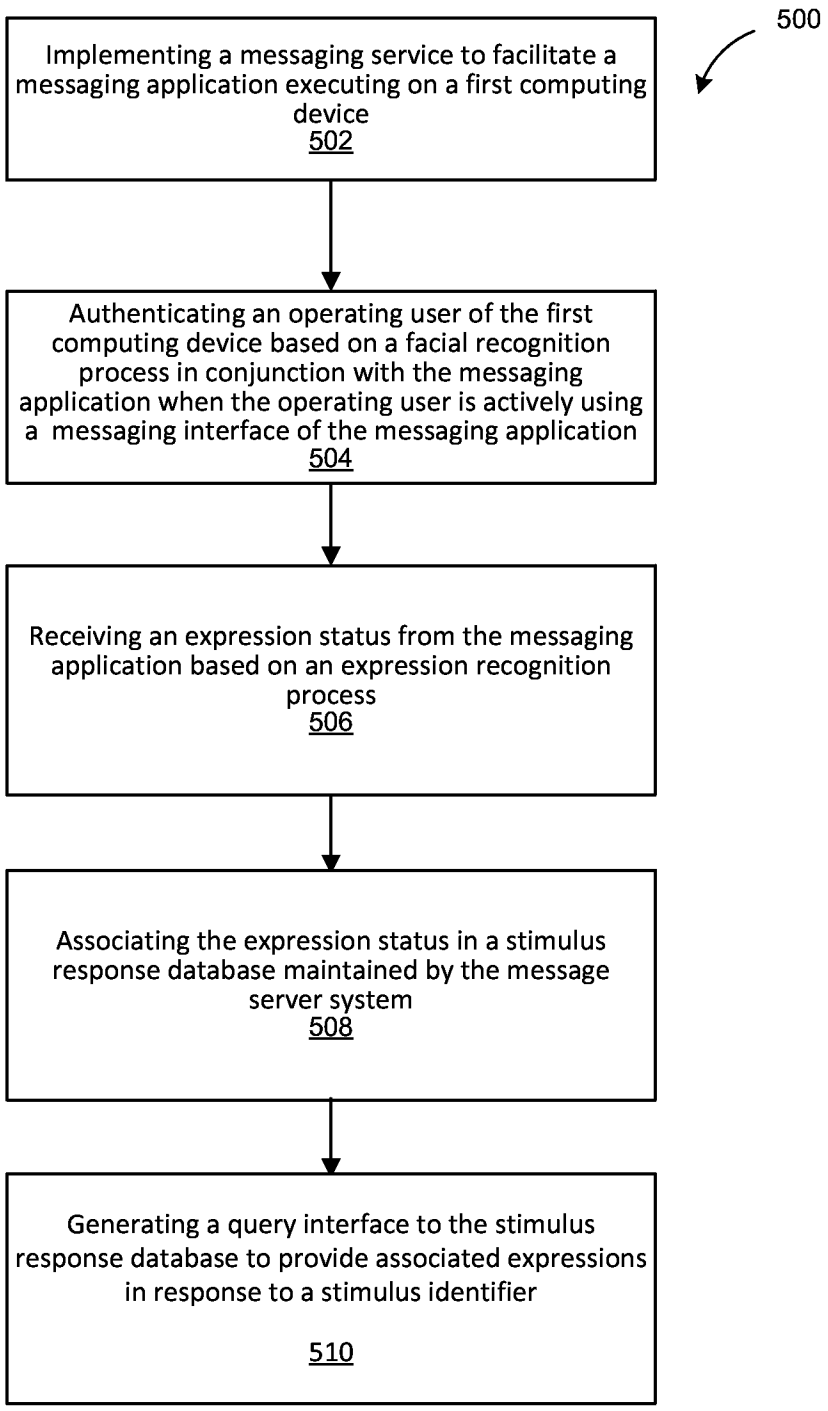

500
Implementing a messaging service to facilitate a messaging application executing on a first computing device
502
Authenticating an operating user of the first computing device based on a facial recognition process in conjunction with the messaging application when the operating user is actively using a messaging interface of the messaging application
504
Receiving an expression status from the messaging application based on an expression recognition process
506
Associating the expression status in a stimulus response database maintained by the message server system
508
Generating a query interface to the stimulus response database to provide associated expressions in response to a stimulus identifier
510

FIG. 5

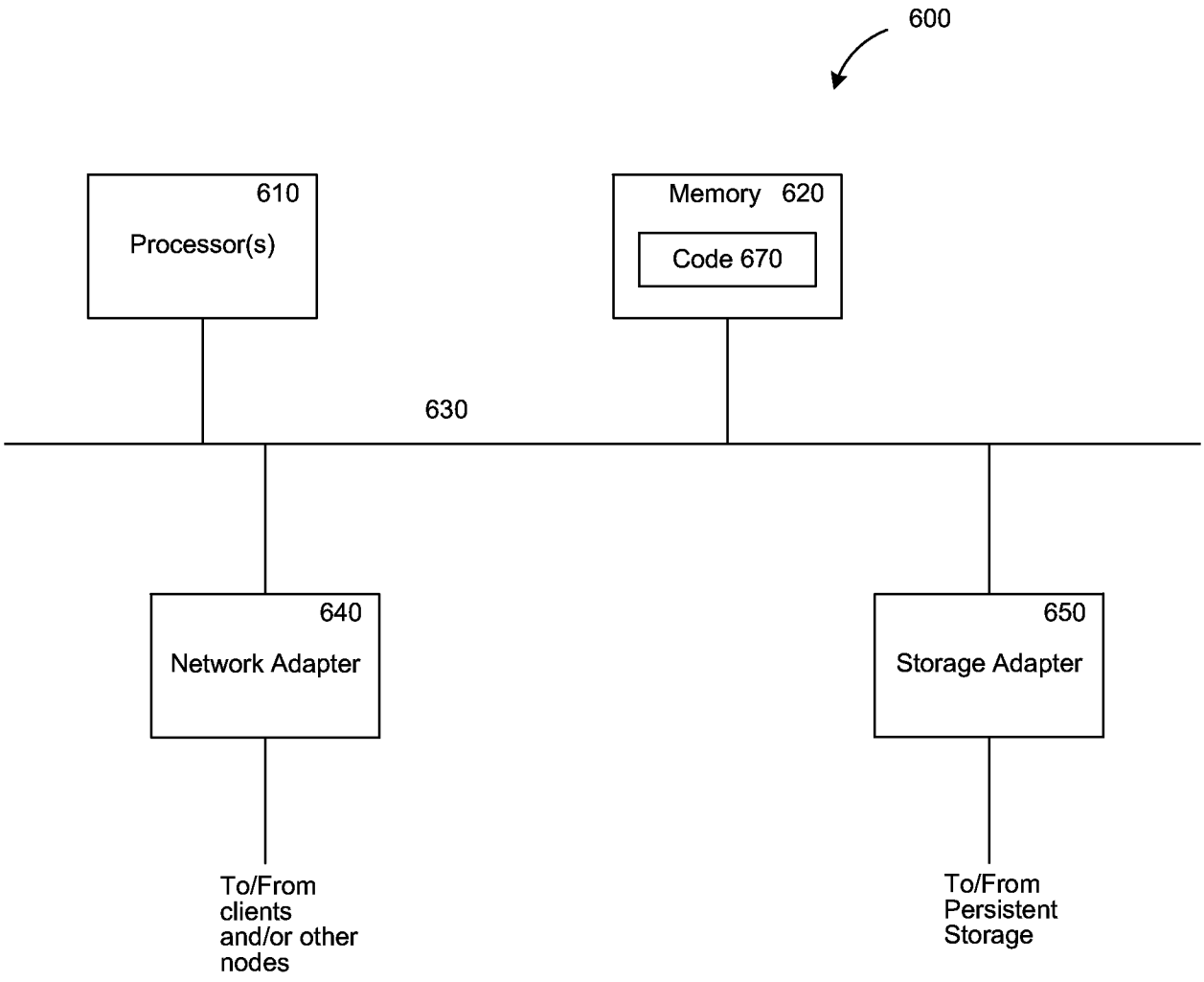

600
610
Processor(s)
Memory 620
Code 670
630
640
Network Adapter
650
Storage Adapter
To/From clients and/or other nodes
To/From Persistent Storage

FIG. 6

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	MESSAGE SENDER SECURITY IN MESSAGING SYSTEM

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number **14/643,800** filed on **March 10, 2015** .

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment.

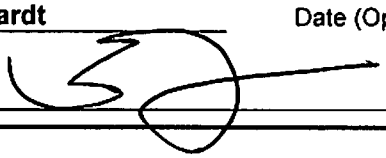
I acknowledge the duty to disclose information material to patentability as defined in 37 C.F.R. 1.56 including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the 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.

LEGAL NAME OF INVENTOR

Inventor: **Eric Leuthardt** Date (Optional): 3/19/15

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	MESSAGE SENDER SECURITY IN MESSAGING SYSTEM

As the below named inventor, I hereby declare that:

This declaration is directed to:
- ☐ The attached application, or
- ☒ United States application or PCT international application number **14/643,800** filed on **March 10, 2015**.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment.

I acknowledge the duty to disclose information material to patentability as defined in 37 C.F.R. 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.

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LEGAL NAME OF INVENTOR

Inventor: **Scott Stern** Date (Optional): 3·23·15

Signature: Scott Stern

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

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.

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☐ 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
	Eric		Leuthardt	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
St. Louis	MO	US

Mailing Address of Inventor:

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Address 2	
City	St. Louis
State/Province	MO
Postal Code	63124
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Scott		Stern	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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St. Louis	MO	US

Mailing Address of Inventor:

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Address 2	
City	St. Louis
State/Province	MO
Postal Code	63124
Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	76656		
Email Address	uspatents@armstrongteasdale.com	Add Email	Remove Email

Application Information:

Title of the Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS		
Attorney Docket Number	36893-7	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	**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	76656		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

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 benefit claim 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" field blank.

Prior Application Status	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
	Continuation of	16397787	2019-04-30	
Prior Application Status	Patented			Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16397787	Continuation of	14643810	2015-03-10	10275583	2019-04-30

Prior Application Status	Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
14643810	Claims benefit of provisional	61950423	2014-03-10	
Prior Application Status	Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
14643810	Claims benefit of provisional	61985059	2014-04-28	
Prior Application Status	Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
14643810	Claims benefit of provisional	62051031	2014-09-16	

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)[i] 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).

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Remove

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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● 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 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	FaceToFace Biometrics, Inc.		
Mailing Address Information For Applicant:			
Address 1	4 Chateau Oaks		
Address 2			
City	St. Louis	**State/Province**	MO
Country	US	Postal Code	63124
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Lucas M. Amodio/			Date (YYYY-MM-DD)	2020-03-26
First Name	Lucas M.	Last Name	Amodio	Registration Number	70239

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. 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	36893-7
	Application Number	
Title of Invention	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	

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.**

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 CooperationTreaty.

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.

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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	
Filing Date	03/26/2020
First Named Inventor	Eric Leuthardt
Title	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
Art Unit	
Examiner Name	
Attorney Docket Number	36893-7

SIGNATURE of Applicant or Patent Practitioner

Signature	/Lucas M. Amodio/	Date (Optional)	03/26/2020
Name	Lucas M. Amodio	Registration Number	70239
Title (if Applicant is a juristic entity)			
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)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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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: 76656

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):

FaceToFace Biometrics, 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)	
Name	SCOTT STERN		
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.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	
Examiner Name	
Attorney Docket Number	36893-7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6836846	B1	2004-12-28	Kanevsky et al.	
	2	7698745	B2	2010-04-13	Pauker et al.	
	3	8336766	B1	2012-12-25	Miller et al.	
	4	6873710	B1	2005-03-29	Cohen Solal et al.	
	5	8600120	B2	2013-12-03	Gonion et al.	
	6	10275583	B2	2019-04-30	LEUTHARDT et al.	
	7	9817960	B2	2017-11-14	LEUTHARDT et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140085191	A1	2014-03-27	Gonion et al.	
	2	20030135740	A1	2003-07-17	Talmor et al.	
	3	20060282466	A1	2006-12-14	Yasukaga et al.	
	4	20140351163	A1	2014-11-27	Tussy	
	5	20140372301	A1	2014-12-18	Anamanamuri	
	6	20100014720	A1	2010-01-21	Hoyos et al.	
	7	20020019852	A1	2002-02-14	Bahar	
	8	20150033017	A1	2015-01-29	Uliyar et al.	
	9	20030214535	A1	2003-11-20	Hymel	
	10	20020116508	A1	2002-08-22	Khan et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

	11	20100205667	A1	2010-08-12	ANDERSON et al.		
	12	20140201844	A1	2014-07-17	BUCK		
	13	20150254447	A1	2015-09-10	Leuthardt et al.		
	14	20140198958	A1	2014-07-17	Nathan et al.		

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	KEERTHANA CHINTAPUDI; Online Signature Verification for Secure Transactions; International Journal of Scientific Engineering and Technology Research Volume.04, Issue No.35, August-2015, Pages: 7283–7286.	
	2	"Google Scholar Search; Shoulder Surfing Prevention; available at http:l/scholar.google.corn/scholar?hl=en&as_sdt=0,47&q=shoulder+surfing+prevention [last visited 6/26/2017 9:59:33 AM]."	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

	3	G. Di Crescenzo; Approximate Message Authentication and Bio-metric Entity Authentication; Springer; pp. 240-254, (Year: 2005)
	4	Statista, ("Number of smartphones sold to end users worldwide from 2007 to 2017 (in million units)", online at www. statista.com/statistics/263437/global-smartphone-sales-to-end-users-s- ince-2007/ (Year: 2018).

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

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.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Lucas M. Amodio/	Date (YYYY-MM-DD)	2020-03-26
Name/Print	Lucas M. Amodio	Registration Number	70239

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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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 record s.

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.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Filer:	Lucas M Amodio/Gwendolyn Menz
Attorney Docket Number:	36893-7

Filed as Small Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
REQUEST FOR PRIORITIZED EXAMINATION	2817	1	2000	2000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70

Petition:	
Patent-Appeals-and-Interference:	
Post-Allowance-and-Post-Issuance:	
Extension-of-Time:	
Miscellaneous:	
Total in USD ($)	**2855**

Electronic Acknowledgement Receipt

EFS ID:	38982150
Application Number:	16831432
International Application Number:	
Confirmation Number:	9096
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Customer Number:	76656
Filer:	Lucas M Amodio/Gwendolyn Menz
Filer Authorized By:	Lucas M Amodio
Attorney Docket Number:	36893-7
Receipt Date:	26-MAR-2020
Filing Date:	
Time Stamp:	17:54:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$2855
RAM confirmation Number	E20203PH55435397
Deposit Account	012384
Authorized User	Gwendolyn Menz

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	36893-7_Track1_Request_26MAR2020-35771226.pdf	115545 f0d2486a3ec792b702d16261fa10cb40d444eae7	no	2
Warnings:					
Information:					
2		36893-7_Application_26MAR2020-35770831.pdf	146398 afd6a8a2330215133c1d73c1916756b951c032d1	yes	24

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	19
Claims	20	23
Abstract	24	24

Warnings:					
Information:					
3	Drawings-only black and white line drawings	36893-7_drawings_26MAR2020-35770362.pdf	306112 427f9afabed07195900259ab19878cbb92efa33c	no	8
Warnings:					
Information:					
4	Oath or Declaration filed	36893-7_parent_declarations_25MAR2020-35760390.pdf	99121 a356d800ab2ce88676698c4c6704209ec95ab5c3	no	2
Warnings:					
Information:					
5	Application Data Sheet	36893-7_ADS_26MAR2020-35760388.pdf	1371304 8290ed870189d5450d3085bfa13da94d50f48e35	no	9

Warnings:					
Information:					
6	Power of Attorney	36893-7_POA_26MAR2020-35760375.pdf	318495 84167b2b3f68a4d5a26cfc7865807ae291b1f3d3	no	2
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	36893-7_IDS_26MAR2020-35623228.pdf	1009304 bee814fdb6eae0a480cae4de6a22ed44d2d67d1d	no	6
Warnings:					
Information:					
8	Non Patent Literature	Smartphone_Sales_Statistics_NPL-35623289.pdf	228222 02191da0abee854104d733558e063849a41da5fd	no	4
Warnings:					
Information:					
9	Non Patent Literature	Google_Scholar_Search-35623287.pdf	146319 0f0a734cd2559e6acaa9669cac20bdfeae7c8d9d	no	2
Warnings:					
Information:					
10	Non Patent Literature	NPL_DiCrescenzo-35623283.pdf	759152 5edd4d180be6557642b1e1f63e5231084bfb6b57	no	15
Warnings:					
Information:					
11	Non Patent Literature	NPL_CHINTAPUDI-35623282.pdf	488949 18b6637287c1ef2f150d0deff9021658567d0cb8	no	4
Warnings:					
Information:					
12	Fee Worksheet (SB06)	fee-info.pdf	40273 16e88510c7ba6fe1ed73c5042daa4fa6fad91d39	no	2
Warnings:					
Information:					

Total Files Size (in bytes):	5029194

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.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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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
16/831,432	03/26/2020	2668	785	36893-7	20	3

CONFIRMATION NO. 9096

FILING RECEIPT

OC000000118021585

76656
Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105
UNITED STATES OF AMERICA

Date Mailed: 04/08/2020

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)

Eric Leuthardt, St. Louis, MO;
Scott Stern, St. Louis, MO;

Applicant(s)

FaceToFace Biometrics, Inc., St. Louis, MO;

Power of Attorney: The patent practitioners associated with Customer Number 76656

Domestic Priority data as claimed by applicant

This application is a CON of 16/397,787 04/30/2019
which is a CON of 14/643,810 03/10/2015 PAT 10275583
which claims benefit of 61/950,423 03/10/2014
and claims benefit of 61/985,059 04/28/2014
and claims benefit of 62/051,031 09/16/2014

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Apple EX1002 Page 60

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

If Required, Foreign Filing License Granted: 04/07/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/831,432**

Projected Publication Date: 07/16/2020

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

Preliminary Class

382

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

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Apple EX1002 Page 61

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

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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).

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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

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technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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Apple EX1002 Page 63

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/831,432

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	75		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 230 =	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	785		TOTAL	

APPLICATION AS AMENDED - PART II

		(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($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	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	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	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.

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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

76656 7590 04/10/2020

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	

ART UNIT	PAPER NUMBER
3694	

NOTIFICATION DATE	DELIVERY MODE
04/10/2020	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):

USpatents@armstrongteasdale.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/831,432	**Applicant(s)** Leuthardt et al.	
	Examiner BRIAN W BROWN	**Art Unit** OPET	**AIA (FITF) Status** Yes

1. THE REQUEST FILED 26 March 2020 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☑ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to BRIAN BROWN at (571)272-5338. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/BRIAN W BROWN/ Petitions Examiner, OPET	

PLUS Search Results for S/N 16831432, Searched Tue Apr 21 10:42:03 EDT 2020

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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6111517 79
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

76656 7590 04/24/2020

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	
ANDERSON, SCOTT C	

ART UNIT	PAPER NUMBER
3694	

NOTIFICATION DATE	DELIVERY MODE
04/24/2020	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):

USpatents@armstrongteasdale.com

Office Action Summary	Application No. 16/831,432	Applicant(s) Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	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 26 March 2020.

☐ 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) 1-20 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) 1-20 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 26 March 2020 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 3/26/2020.

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

4) ☐ Other: _____.

DETAILED ACTION

This Office action is in reply to application no. 16/831,432, filed 26 March 2020. Claims 1-20 are pending and are considered below.

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.

Claim Objections

2. **Claim 9 is objected to** because of the following informalities: in the "automatically modifying" step, the word "modifying" seems to have inadvertently been omitted, and "route a message" is not the appropriate verb form in the context of the claim; the Examiner suggests "routing a message". Appropriate correction is required.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46

USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

4. **Claims 1, 8, 9, 16 and 17 are rejected on the ground of nonstatutory double patenting** as being unpatentable over claim 1 of U.S. Patent No. 10,275,583. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims of the present invention are broader, but they are sufficiently similar that anyone practicing the invention disclosed by the patent would be literally infringing the claims at issue in the present invention.

Claim Analysis - 35 USC § 101

The claims of the present invention have been analyzed using the two-step process based on *Alice*, *Mayo* and the *Guidance* cited below. They are not herein rejected under 35 U.S.C. § 101, based on the following. First, the claims are directed to statutory categories of invention. (*Guidance*, step 1) Claim 1 is directed to a device which includes a processor and memory, which is a type of machine; claim 9 is directed to a method, or process; claim 17 is a "Beauregard claim" which is an article of manufacture, and the others depend from these.

The claims recite a mental process, (*Guidance*, step 2A, prong 1) as a person can mentally "detect a human facial expression". So we look to what else is in the claim to see whether it integrates the abstract idea into a practical application. (*Guidance*, step 2A, prong 2) The step of automatically modifying a previously-selected emoticon based on the detected human facial expression to generate a modified emoticon which simulates the detected facial expression applies the abstract idea "in some other meaningful way beyond generally linking [it] to a particular technological environment".

See MPEP § 2106.05(e). As such, the claims are not "directed to" an abstract idea and it is not necessary to reach step 2B.

For further guidance please see "2019 Revised Patent Subject Matter Eligibility Guidance", 84 Fed. Reg. 50, 55 (7 January 2019).

Claim Rejections - 35 USC § 103

5. 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.

6. **Claims 1, 4, 5, 9, 12, 13, 17 and 20 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. (U.S. Publication No. 2015/0015690, with priority to Korea patent application no. 10-2013-0081220, filed 10 July 2013) in view of Kim (U.S. Publication No. 2013/0185648).

In-line citations are to Roh.

With regard to Claim 1:

Roh teaches: **A computer device comprising at least one processor** [0088; "processors"] **in communication with at least one memory device,** [0089; "software codes may be stored in the memory 160 and executed by the controller 180" which comprises the processors] **wherein the at least one processor is programmed to…**

detect a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"]

automatically… the selected emoticon based on the detected human facial expression to generate a… emoticon, wherein the… emoticon simulates the detected human facial expression on the selected emoticon; [0234; "captured image 61 of the user may be displayed in the comment entry field 81 of the execution screen 80 of the SNS. Also, an emoticon 62 that looks similar to the user's expression included in the captured image may be displayed in the comment entry field"] **and**

route a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receive a selection of an emoticon** or to **modify** an emoticon, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order

to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

With regard to Claim 4:

The computer device of Claim 1, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

With regard to Claim 5:

The computer device of Claim 1, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof. [*id.*; either of a surprised look or smile reads on an expression corresponding to a mood or emotion]

With regard to Claim 9:

Roh teaches: **A computer-implemented** [0087; the steps are performed using a "computer"] **method of operating a messaging application, the method comprising...**

detecting a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"]

automatically the selected emoticon based on the detected human facial expression to generate a… emoticon, wherein the… emoticon simulates the detected human facial expression on the selected emoticon; [0234; "captured image 61 of the user may be displayed in the comment entry field 81 of the execution screen 80 of the SNS. Also, an emoticon 62 that looks similar to the user's expression included in the captured image may be displayed in the comment entry field"] **and**

routing a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receiving a selection of an emoticon** or to **modify** an emoticon, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

With regard to Claim 12:

The computer-implemented method of Claim 9, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

With regard to Claim 13:

The computer-implemented method of Claim 9, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof. [*id.*; either of a surprised look or smile reads on an expression corresponding to a mood or emotion]

With regard to Claim 17:

Roh teaches: **At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device,** [0088; "processors"; 0089; "software codes may be stored in the memory 160 and executed by the controller 180" which comprises the processors] **the computer-executable instructions cause the processor to…**

detect a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"]

automatically… the selected emoticon based on the detected human facial expression to generate a… emoticon, wherein the… emoticon simulates the detected human facial expression on the selected emoticon; [0234; "captured image 61 of the user may be displayed in the comment entry field 81 of the execution screen 80 of the SNS. Also, an emoticon 62 that looks similar to the user's expression included in the captured image may be displayed in the comment entry field"] **and**

route a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receive a selection of an emoticon** or to **modify** an emoticon, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

With regard to Claim 20:

The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

7. **Claims 2, 7, 10, 15 and 18 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Goossens et al. (U.S. Publication No. 2011/0296324).

Claims 2, 10 and 18 are similar so are analyzed together

With regard to Claim 2:

The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

With regard to Claim 10:

The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

With regard to Claim 18:

The at least one non-transitory computer-readable storage media of Claim 17, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

Roh and Kim teach the device of claim 1, method of claim 9 and media of claim 17, but do not explicitly teach adding their emoticon to a message which has been composed using an interface, but it is known in the art. Goossens teaches

a system for creating and using avatars to reflect user states. [abstract] Users can “insert emoticons in their messages”. [0063] This can be done via a “user interface” used to send a “text message” to “another user”. [0063] Goossens and Roh are analogous art as each is directed to electronic means for managing emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Goossens with that of Roh and Kim in order to be able to use emoticons to represent a user’s state within a message, as taught by Goossens; further, it is simply a combination of known parts with predictable results, simply taking the emoticon of Roh, Kim or Goossens and inserting it into a message composed using an interface such as that of Goossens; each part works independently of the other, and each works in combination identically to how it works when not combined, with no new and unexpected result inherent or disclosed.

With regard to Claim 7:

The computer device of Claim 1, wherein the modified emoticon is embedded at a displayable portion of the message. [Goossens, 0063; “when the user inserts an emoticon ":-)" in a text message sent to another user, the user's avatar appearing in the chat session between the two users can be updated to show the avatar instance associated with the ‘Happiness’ user state”; Sheet 7, Fig. 6B]

It would have been obvious to one then of ordinary skill in the art to combine this feature of Goossens with the teaching of Roe and Kim in order to display an emoticon on the same screen as the message, as taught by Goossens.

With regard to Claim 15:

The computer-implemented method of Claim 9, wherein the modified emoticon is embedded at a displayable portion of the message. [Goossens, 0063; "when the user inserts an emoticon ":-)" in a text message sent to another user, the user's avatar appearing in the chat session between the two users can be updated to show the avatar instance associated with the 'Happiness' user state"; Sheet 7, Fig. 6B]

It would have been obvious to one then of ordinary skill in the art to combine this feature of Goossens with the teaching of Roe and Kim in order to display an emoticon on the same screen as the message, as taught by Goossens.

8. **Claims 3, 11 and 19 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Wong (U.S. Publication No. 2013/0322705).

These claims are similar so are analyzed together.

With regard to Claim 3:

The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

With regard to Claim 11:

The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

With regard to Claim 19:

The at least one non-transitory computer-readable storage media of Claim 17, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

Roh and Kim teach the device of claim 1, method of claim 9 and media of claim 17, including "detecting a facial expression", [0231] which reads on a facial profile, but do not explicitly teach using a picture of a face in this way, but it is known in the art. Wong teaches facial and fingerprint identification. [title] The system may "unlock a device when the captured facial image matches [a] reference facial image". [abstract] The reference facial image is a "stored

reference facial image", [0021] and the captured facial image is captured "utilizing a first camera". [0004] Wong and Roh are analogous art as each is directed to electronic processing of facial images captured by cameras.

It would have been obvious to one of ordinary skill in the art to combine the teaching of Wong with that of Roh in order to be able to use a facial image in a comparison, as taught by Wong; further, it is simply a combination of known parts with predictable results, simply performing Wong's step after all others; each part works independently of the other, and each works in combination identically to how it works when not combined, with no new and unexpected result inherent or disclosed.

9. **Claims 6 and 14 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Pfister et al. (U.S. Publication No. 2013/0300900).

These claims are similar so are analyzed together.

With regard to Claim 6:

The computer device of Claim 1, where the at least one processor is further programmed to analyze the human facial expression using an expression recognition process to detect the human facial expression.

With regard to Claim 14:

The computer-implemented method of Claim 9, further comprising analyzing the human facial expression using an expression recognition process to detect the human facial expression.

Roh and Kim teach the device of claim 1 and method of claim 9, including detecting a human facial expression as cited above, and though it seems inherent that any computer that can detect a facial expression is using some sort of "expression recognition process" and performing analysis, as Roh and Kim are not explicit about it, it is, nonetheless, known in the art. Pfister teaches an automated recognition algorithm for detecting facial expressions [title] which uses "video analysis" [0017] to analyze "feature points of a model face and a face contained in video frames"; [0012] the actual analysis using the feature points is then described in elaborate detail [0030] in order to "detect facial micro-expressions". [0032] Pfister and Roh are analogous art as each is directed to electronic means for detecting facial expressions.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Pfister with that of Roh and Kim in order to provide for a particular process for detecting a facial expression such as that of Pfister; further, it is simply a substitution of one known part for another with predictable results, simply using Pfister's recognition process in place of, or in addition to, that of Roh; the substitution produces no new and unexpected result.

10. **Claims 8 and 16 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Winchester (U.S. Publication No. 2011/0304629).

These claims are similar so are analyzed together.

With regard to Claim 8:

The computer device of Claim 1, wherein the human facial expression is captured in real-time from the one or more sensors.

With regard to Claim 16:

The computer-implemented method of Claim 9, wherein the human facial expression is captured in real-time from the one or more sensors.

Roh and Kim teach the device of claim 1 and method of claim 9 but do not explicitly teach that the facial expression is captured in real time, though there is no hint of any delay or batch processing; but in any event, it is known in the art. Winchester teaches real-time animation of facial expressions [title] which includes "capturing facial expressions of an individual and causing such facial expressions to be reflected in real-time on an animated avatar". [0006] The facial expressions are within an image captured by "an image sensor 108 such as a RGB video camera that can capture images and/or motion of the individual".

[0021] Winchester and Roh are analogous art as each is directed to electronic means for depicting animated images based on a human facial expression.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Winchester with that of Roh and Kim in order to perform processing explicitly in real time, as taught by Winchester; further, it is simply and at most a substitution of one known part for another, simply capturing images in real time as explicitly taught by Winchester rather than as only implied by the lack of any alternative in Roh; the substitution produces no new and unexpected result.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT C ANDERSON whose telephone number is (571)270-7442. The examiner can normally be reached on M-F 9:00 to 5:30.

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, Bennett Sigmond can be reached on (303) 297-4411. 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.

/SCOTT C ANDERSON/
Examiner, Art Unit 3694

Notice of References Cited	Application/Control No. 16/831,432	Applicant(s)/Patent Under Reexamination Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20150015690-A1	01-2015	ROH; Hyeongseok	G06F3/0484	348/77
*	B	US-20130185648-A1	07-2013	KIM; Hyun-Jun	G06F3/048	715/744
*	C	US-20110296324-A1	12-2011	Goossens; Thomas	G06F3/04883	715/763
*	D	US-20130322705-A1	12-2013	Wong; Warwick Ka Kui	G06F21/40	382/118
*	E	US-20130300900-A1	11-2013	Pfister; Tomas	G06K9/00315	348/239
*	F	US-20110304629-A1	12-2011	Winchester; Royal Dwayne	G06T13/40	345/473
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

CPC - Searched*		
Symbol	**Date**	**Examiner**
G06F3/00, 011, 0304	04/21/2020	sca
G06Q30/0271, G06F21/629, G06F2203/011	04/21/2020	sca
H04W4/12, 21, H04W12/06, H04W12/00504	04/21/2020	sca

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**
PLUS search	04/21/2020	sca
Inventor search	04/21/2020	sca
EAST search including EPO	04/21/2020	sca

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

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Apple EX1002 Page 90

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

✓	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	04/21/2020								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
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	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								

Bibliographic Data

Application No: 16/831,432

Foreign Priority claimed: ○ Yes ◉ No

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

Verified and Acknowledged: /SCOTT C ANDERSON/ (Examiner's Signature) | (Initials)

Title: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/26/2020	705	3694	36893-7
RULE			

APPLICANTS

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Scott Stern St. Louis, MO, UNITED STATES

CONTINUING DATA

This application is a CON of 16397787 04/30/2019

16397787 is a CON of 14643810 03/10/2015 PAT 10275583

14643810 has PRO of 62051031 09/16/2014

14643810 has PRO of 61985059 04/28/2014

14643810 has PRO of 61950423 03/10/2014

FOREIGN APPLICATIONS

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Suite 1800
St. Louis, MO 63105
UNITED STATES

FILING FEE RECEIVED

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	
Examiner Name	
Attorney Docket Number	36893-7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6836846	B1	2004-12-28	Kanevsky et al.	
	2	7698745	B2	2010-04-13	Pauker et al.	
	3	8336766	B1	2012-12-25	Miller et al.	
	4	6873710	B1	2005-03-29	Cohen Solal et al.	
	5	8600120	B2	2013-12-03	Gonion et al.	
	6	10275583	B2	2019-04-30	LEUTHARDT et al.	
	7	9817960	B2	2017-11-14	LEUTHARDT et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.L./ 03/26/2020

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	
Examiner Name	
Attorney Docket Number	36893-7

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140085191	A1	2014-03-27	Gonion et al.	
	2	20030135740	A1	2003-07-17	Talmor et al.	
	3	20060282466	A1	2006-12-14	Yasukaga et al.	
	4	20140351163	A1	2014-11-27	Tussy	
	5	20140372301	A1	2014-12-18	Anamanamuri	
	6	20100014720	A1	2010-01-21	Hoyos et al.	
	7	20020019852	A1	2002-02-14	Bahar	
	8	20150033017	A1	2015-01-29	Uliyar et al.	
	9	20030214535	A1	2003-11-20	Hymel	
	10	20020116508	A1	2002-08-22	Khan et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-03-26
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	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

	11	20100205667	A1	2010-08-12	ANDERSON et al.	
	12	20140201844	A1	2014-07-17	BUCK	
	13	20150254447	A1	2015-09-10	Leuthardt et al.	
	14	20140198958	A1	2014-07-17	Nathan et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	KEERTHANA CHINTAPUDI; Online Signature Verification for Secure Transactions; International Journal of Scientific Engineering and Technology Research Volume.04, Issue No.35, August-2015, Pages: 7283–7286.	
	2	"Google Scholar Search; Shoulder Surfing Prevention; available at http:l/scholar.google.corn/scholar?hl=en&as_sdt=0,47&q=shoulder+surfing+prevention [last visited 6/26/2017 9:59:33 AM]."	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

	3	~~G. Di Crescenzo, Approximate Message Authentication and Bio-metric Entity Authentication, Springer, pp. 240-254,~~ (Year: 2005)
	4	~~Statista, ("Number of smartphones sold to end users worldwide from 2007 to 2017 (in million units)", online at www.~~ statista.com/statistics/263437/global-smartphone-sales-to-end-users-s- ince-2007/ (Year: 2018).

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/SCOTT C ANDERSON/	Date Considered	04/21/2020

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Application Number	
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	
	Examiner Name	
	Attorney Docket Number	36893-7

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.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Lucas M. Amodio/	Date (YYYY-MM-DD)	2020-03-26
Name/Print	Lucas M. Amodio	Registration Number	70239

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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Apple EX1002 Page 98

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 record s.

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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.C./

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Apple EX1002 Page 99

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L8	1055	select$3 near3 emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 11:54
L9	235	(alter$5 or modify$3 or modification or chang$3) near3 emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 11:54
L10	88	8 and L9	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 11:54
L11	303	((insert$3 or add$3) near3 emoticon) with message	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 12:19
L12	145	11 and @pd<"20150101"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 12:20
L13	14882	(fac$3 near3 (recogniz$3 or recognition or match$3)) same authenticat$3	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 12:33
L14	3632	13 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 12:33
L15	153	14 and (match$3 with (stored near3 fac$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 12:34
L16	1073	(analy$3 near4 (face or facial)) same ((detect$3 or determin$5) near3 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:40
L17	286	16 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:40

L18	196	16 and (feature near2 point)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:41
L19	71	17 and 18	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:41
L20	804	(captur$3 near3 (face or facial)) with (real adj time)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:59
L21	191	20 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:59
L22	52	21 and (fac$3 near3 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 13:59
S1	235	(alter$5 or modify$3 or modification or chang$3) near3 emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 08:58
S2	17059	(human or person or user or consumer or customer) with (facial near3 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 08:59
S3	3	S1 same S2	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 08:59
S4	6	S1 same2 S2	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:00
S5	4041	(alter$5 or modify$3 or modification or chang$3) near3 (facial near2 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:02
S6	5	S1 and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:02
S7	2315	leuthardt.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:25

S8	275	S7 and (emoticon or (facial near2 expression))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:26
S9	74	S8 and (detect$3 with expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:26
S10	51978	(g06f3/00 or g06f3/011 or g06f3/0304).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:27
S11	11273	(g06f21/629 or g06q30/0271 or g06f2203/011).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:27
S12	81953	(ho4w4/12 or ho4w4/21 or h04w12/06).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:28
S13	2336	h04w12/00504.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:28
S14	928	(S10 or S11 or S12 or S13) and (detect$3 with (facial near2 expression))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:28
S15	266	(S10 or S11 or S12 or S13) and (detect$3 with (smil$3 or frown$3 or pout$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:28
S16	63	(S14 or S15) and emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/04/21 09:29

4/21/2020 3:01:50 PM
C:\Users\sanderson2\Documents\EAST\Workspaces\16831432.wsp

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

76656 7590 05/19/2020

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	
ANDERSON, SCOTT C	

ART UNIT	PAPER NUMBER
3694	

NOTIFICATION DATE	DELIVERY MODE
05/19/2020	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):

USpatents@armstrongteasdale.com

Applicant-Initiated Interview Summary	**Application No.** 16/831,432	**Applicant(s)** Leuthardt et al.	
	Examiner SCOTT C ANDERSON	**Art Unit** 3694	**AIA (FITF) Status** Yes

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

(1) SCOTT C. ANDERSON. (3) _____.

(2) Lucas Amodio. (4) _____.

Date of Interview: 14 May 2020.

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

Exhibit shown or demonstration conducted: ☑ Yes ☐ No.
If Yes, brief description: Draft amendment for discussion purposes.

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: Roh, Kim.

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...)

We discussed the proposed amendment and the Examiner proposed a slight rewording which, if formally submitted, would likely overcome the prior art of record and require further search and consideration. No specific agreement was reached, and the Office will await the applicant's formal reply.

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

/SCOTT C ANDERSON/ Examiner, Art Unit 3694	

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.

Do not enter. /S.C.A./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Leuthardt et al.	:	
	:	Art Unit: 3694
Serial No.: 16/831,432	:	
	:	Examiner: Anderson, Scott C.
Filed: March 26, 2020	:	
	:	Confirmation No: 9096
For: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	:	

INTERVIEW AGENDA - NOT FOR ENTRY INTO THE RECORD

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

For the Examiner Interview scheduled for the above-referenced application, the following interview agenda is provided:

- An overview of the application and the claims.
- Discussion of the amendments in view of the Kim reference.
- Further discussion of the present claims and the cited art.

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DRAFT CLAIM – FOR DISCUSSION ONLY

1. (proposed) A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

receive a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon ~~based on the detected human facial expression to generate a modified emoticon, wherein the modified emoticon simulates~~ to simulate the detected human facial expression on the selected emoticon to generate a modified emoticon; and

route a message with the modified emoticon to a second computer device.

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IPR2023-00833
Apple EX1002 Page 107

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Eric Leuthardt	:	
	:	Art Unit: 3694
Serial No.: 16/831,432	:	
	:	Examiner: Anderson, Scott C.
Filed: March 26, 2020	:	
	:	Confirmation No: 9096
For: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	:	

AMENDMENT

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

In response to the Office Action dated April 24, 2020, please amend the above-identified patent application and consider the following remarks.

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IN THE CLAIMS:

1. (Currently amended) A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

receive a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon ~~based on the detected human facial expression~~ to generate a modified emoticon~~, wherein the modified emoticon simulates~~ by simulating the detected human facial expression on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

2. (Original) The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

3. (Original) The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

4. (Original) The computer device of Claim 1, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

5. (Original) The computer device of Claim 1, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

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6. (Original) The computer device of Claim 1, where the at least one processor is further programmed to analyze the human facial expression using an expression recognition process to detect the human facial expression.

7. (Original) The computer device of Claim 1, wherein the modified emoticon is embedded at a displayable portion of the message.

8. (Original) The computer device of Claim 1, wherein the human facial expression is captured in real-time from the one or more sensors.

9. (Currently amended) A computer-implemented method of operating a messaging application, the method comprising:

receiving a selection of an emoticon;

detecting a human facial expression using one or more sensors of a computer device;

automatically modifying the selected emoticon ~~based on the detected human facial expression~~ to generate a modified emoticon~~, wherein the modified emoticon simulates~~ by simulating the detected human facial expression on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

10. (Original) The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

11. (Original) The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

12. (Original) The computer-implemented method of Claim 9, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

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13. (Original) The computer-implemented method of Claim 9, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

14. (Original) The computer-implemented method of Claim 9, further comprising analyzing the human facial expression using an expression recognition process to detect the human facial expression.

15. (Original) The computer-implemented method of Claim 9, wherein the modified emoticon is embedded at a displayable portion of the message.

16. (Original) The computer-implemented method of Claim 9, wherein the human facial expression is captured in real-time from the one or more sensors.

17. (Currently amended) At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device, the computer-executable instructions cause the processor to:

receive a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon ~~based on the detected human facial expression~~ to generate a modified emoticon~~, wherein the modified emoticon simulates~~ by simulating the detected human facial expression on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

18. (Original) The at least one non-transitory computer-readable storage media of Claim 17, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

19. (Original) The at least one non-transitory computer-readable storage media of Claim 17, wherein the at least one processor is further programmed to detect

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a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

20. (Original) The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

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REMARKS

The Office Action dated April 24, 2020, has been carefully reviewed and the foregoing amendments and following remarks have been made in consequence thereof.

Claims 1-20 are pending in this application. Claims 1-20 stand rejected. Claims 1, 9, and 17 have been amended. No new matter is added.

Examiner Interview Summary

Applicant wishes to thank Examiner Anderson for his time and the courtesies extended during an Examiner Interview conducted on May 14, 2020 with Applicant's representative. During the interviews, the present rejection and a proposed amendment to the Claims was discussed. In the Interview, the Examiner indicated a modification to the proposed amendment that would overcome the prior art of record. Amendments similar to those discussed have been made to the independent claims.

Claim Objections

The objection to Claim 9 is respectfully traversed. To expedite prosecution, Claim 9 has been amended to address the typographical error in the original claim. Applicant respectfully request that the objection to Claim 9 be withdrawn.

Double Patenting

Claims 1, 8, 9, 16, and 17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claim 1 of U.S. Patent No. 10,275,583. Applicant will consider filing a terminal disclaimer to obviate the rejection when it is the last remaining rejection in the application and the presently pending claims have been indicated as allowable, but for the rejection.

35 U.S.C. 103 Rejection

The rejection of Claims 1, 4, 5, 9, 12, 13, 17, and 20 under 35 U.S.C. § 103 as being allegedly unpatentable over U.S. Patent Application Publication No. 2015/0015690 to Roh et al. (hereinafter referred to as "Roh") in view of U.S. Patent Application Publication No. 2013/0185648 to Kim is respectfully traversed.

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As agreed in the Examiner Interview, Roh in view of Kim does not describe or suggest the limitations of amended Claim 1. Accordingly, Applicant submits that Claim 1 is patentable over Roh in view of Kim.

Claims 4 and 5 depend from independent Claim 1. When the recitations of Claims 4 and 5 are considered in combination with the recitations of independent Claim 1, Applicant submits that Claims 4 and 5 likewise are patentable over Roh in view of Kim.

To the extent claims 9 and 17 recite limitations similar to those in Claim 1, Claims 9 and 17 are also patentable over Roh in view of Kim.

Claims 12 and 13 depend from independent Claim 9. Claim 20 depends from independent Claim 17. When the recitations of Claims 12, 13, and 20 are considered in combination with the recitations of their respective independent claims, Applicant respectfully submits that dependent Claims 12, 13, and 20 likewise are patentable over Roh in view of Kim.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 1, 4, 5, 9, 12, 13, 17, and 20 be withdrawn.

The rejection of Claims 2, 7, 10, 15, and 18 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and further in view of U.S. Patent Application Publication No. 2011/0296324 to Goossens et al. (hereinafter referred to as "Goossens") is respectfully traversed.

Claims 2 and 7 depend from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh and Kim. Goossens does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claims 2 and 7 are patentable over Roh in view of Kim and further in view of Goossens.

Claims 10 and 15 depend from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh and Kim. Goossens does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claims 10 and 15 are patentable over Roh in view of Kim and further in view of Goossens.

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Claim 18 depends from Claim 17, which is recited above.

As explained above Claim 17 is patentable over Roh and Kim. Goossens does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 18 is patentable over Roh in view of Kim and further in view of Goossens.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 2, 7, 10, 15, and 18 be withdrawn.

The rejection of Claims 3, 11, and 19 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and further in view of U.S. Patent Application Publication No. 2013/0322705 to Wong is respectfully traversed.

Claim 3 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh and Kim. Wong does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 3 is patentable over Roh in view of Kim and further in view of Wong.

Claim 11 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh and Kim. Wong does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 11 is patentable over Roh in view of Kim and further in view of Wong.

Claim 19 depends from Claim 17, which is recited above.

As explained above Claim 17 is patentable over Roh and Kim. Wong does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 19 is patentable over Roh in view of Kim and further in view of Wong.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 3, 11, and 19 be withdrawn.

The rejection of Claims 6 and 14 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and further in view of U.S. Patent Application

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Publication No. 2013/0300900 to Pfister et al. (hereinafter referred to as "Pfister") is respectfully traversed.

Claim 6 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh and Kim. Pfister does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 6 is patentable over Roh in view of Kim and further in view of Pfister.

Claim 14 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh and Kim. Pfister does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 14 is patentable over Roh in view of Kim and further in view of Pfister.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 6 and 14 be withdrawn.

The rejection of Claims 8 and 16 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and further in view of U.S. Patent Application Publication No. 2011/0304629 to Winchester is respectfully traversed.

Claim 8 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh and Kim. Winchester does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 8 is patentable over Roh in view of Kim and further in view of Winchester.

Claim 16 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh and Kim. Winchester does not cure the deficiencies of Roh and Kim. Accordingly, Applicant submits that dependent Claim 16 is patentable over Roh in view of Kim and further in view of Winchester.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 8 and 16 be withdrawn.

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Conclusion

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully requested.

Respectfully submitted,

/Patrick E. Brennan/

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/831,432	05/26/2020 05:21:51 PM ET	36893-7

Title of Invention

EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	9096	FILED BY	Gwendolyn Menz
PATENT CENTER #	60028066	FILING DATE	03/26/2020
CUSTOMER #	76656	FIRST NAMED INVENTOR	Eric Leuthardt
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Lucas Amodio

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
36893_7_Amendment_26MAY2020-36502997.pdf		10	-	106 KB
36893_7_Amendment_26MAY2020-36502997-A....pdf	(1-1)	1	Amendment/Req. Reconsideration-After Non-Final Reject	69 KB
36893_7_Amendment_26MAY2020-36502997-CLM.pdf	(2-5)	4	Claims	65 KB
36893_7_Amendment_26MAY2020-36502997-REM.pdf	(6-10)	5	Applicant Arguments/Remarks Made in an Amendment	80 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
36893_7_Amendment_26MAY2020-36502997.pdf	002469961D0FFF22AA8184F0164F14B6809B9E51A1FF0BE65D54B71B744ADCDE8C227020CD29D593B010553ACB1CFB9C46EEAF72012AF5640E36AAC6CC05C8D0
36893_7_Amendment_26MAY2020-36502997-A....pdf	367BE59785FC63D02E18830206E0986E733E4EAD55AF59920B82F36C2F4191C2DFD5C53CE085D0691B6795A76C7EA4ACAED0F647E5D7A897D5FF245529A9B106
36893_7_Amendment_26MAY2020-36502997-CLM.pdf	E214B92F7E62E8FFF9EFB5083AF3B3C4CF9FC02C650CEBC260F8D4888A9B83C2775E4915DC4BF4C770ABDF048925674385C8C398824EFD2CC00506D65BBECCDA
36893_7_Amendment_26MAY2020-36502997-REM.pdf	77B4E48AD82F16A57D7BF763F79895B20BDA4EDAB243D28A01CA757058C1071F45406C30B600775032AC01E65BBFD5064B0737E3968B616C30E9090664E77D5E

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 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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/831,432	Filing Date 03/26/2020	☐ 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 $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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	05/26/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 3	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.	Non-Examiner
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/RICARDO ANTONIO CAMOU/
*** 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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

76656 7590 06/23/2020

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	
ANDERSON, SCOTT C	

ART UNIT	PAPER NUMBER
3694	

NOTIFICATION DATE	DELIVERY MODE
06/23/2020	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):

USpatents@armstrongteasdale.com

Office Action Summary	Application No. 16/831,432	Applicant(s) Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	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 26 May 2020.

☐ 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) 1-20 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) 1-20 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

This Office action is in reply to correspondence filed 26 May 2020 in regard to application no. 16/831,432. Claims 1-20 are pending and are considered below.

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.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory

double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. **Claims 1, 8, 9, 16 and 17 are rejected on the ground of nonstatutory double patenting** as being unpatentable over claim 1 of U.S. Patent No. 10,275,583. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims of the present invention are broader, but they are sufficiently similar that anyone practicing the invention disclosed by the patent would be literally infringing the claims at issue in the present invention.

Claim Rejections - 35 USC § 103

4. 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.

5. **Claims 1, 4, 5, 9, 12, 13, 17 and 20 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. (U.S. Publication No. 2015/0015690, with priority to Korea patent application no. 10-2013-0081220, filed 10 July 2013) in view of Kim (U.S. Publication No. 2013/0185648) further in view of Breen et al. (U.S. Publication No. 2008/0218472).

In-line citations are to Roh.

With regard to Claim 1:

Roh teaches: **A computer device comprising at least one processor** [0088; "processors"] **in communication with at least one memory device,** [0089; "software codes may be stored in the memory 160 and executed by the controller 180" which comprises the processors] **wherein the at least one processor is programmed to...**

detect a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"] **automatically... the selected emoticon… to generate a... emoticon… and**

route a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receive a selection of an emoticon**, to use a **selected emoticon**, or to **modify an emoticon**, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon" which may be used in "sending an e-mail communication or a text message". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

Roh comes close to, but does not explicitly, teach **simulating the detected human facial expression on the selected emoticon**, though he does detect a

facial expression as cited above, but it is known in the art. Breen teaches an interface to convert facial expressions to application input. [title] His system can "generate emoticons" in a "chat session". [0026] A "mental state or a facial expression of a subject can be detected and classified". [0018] His invention includes a "simulator". [0057] When "a user begins to smile, the detection result will change from absence of smile to presence of smile. This can trigger the converter application to generate an input event, e.g., keyboard input of a smile emoticon ':-)'." [0035] Again, "if the detection algorithm 14 detects either the facial expression of a smile or the emotional state of happiness, the converter application 40 could generate a smile text emoticon ':-)'". [0037] It is not limited to keyboard emoticons, as if an "application 32 supports graphic emoticons, then a code for the graphic emoticon could be used rather than the text". [0041]

Breen and Roh are analogous art as each is directed to electronic means for displaying images symbolic of a user's facial expression. It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Breen with that of Roh and Kim in order to simulate a facial expression with an emoticon once detected, as taught by Breen; further, it is simply a substitution of one known part for another with predictable results, simply using Breen's technique to produce an emoticon, such as the modification of a selected emoticon of Kim, in place of Roh or Kim's own method; the substitution produces no new and unexpected result.

With regard to Claim 4:

The computer device of Claim 1, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

With regard to Claim 5:

The computer device of Claim 1, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof. [*id.*; either of a surprised look or smile reads on an expression corresponding to a mood or emotion]

With regard to Claim 9:

Roh teaches: **A computer-implemented method** [0087; the steps are performed using a "computer"] **of operating a messaging application, the method comprising…**

detecting a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"]

automatically... the selected emoticon… to generate a... emoticon… and

route a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receiving a selection of an emoticon**, to use a **selected emoticon**, or **modifying an emoticon**, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon" which may be used in "sending an e-mail communication or a text message". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

Roh comes close to, but does not explicitly, teach **simulating the detected human facial expression on the selected emoticon**, though he does detect a

facial expression as cited above, but it is known in the art. Breen teaches an interface to convert facial expressions to application input. [title] His system can "generate emoticons" in a "chat session". [0026] A "mental state or a facial expression of a subject can be detected and classified". [0018] His invention includes a "simulator". [0057] When "a user begins to smile, the detection result will change from absence of smile to presence of smile. This can trigger the converter application to generate an input event, e.g., keyboard input of a smile emoticon ':-)'." [0035] Again, "if the detection algorithm 14 detects either the facial expression of a smile or the emotional state of happiness, the converter application 40 could generate a smile text emoticon ':-)'". [0037] It is not limited to keyboard emoticons, as if an "application 32 supports graphic emoticons, then a code for the graphic emoticon could be used rather than the text". [0041]

Breen and Roh are analogous art as each is directed to electronic means for displaying images symbolic of a user's facial expression. It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Breen with that of Roh and Kim in order to simulate a facial expression with an emoticon once detected, as taught by Breen; further, it is simply a substitution of one known part for another with predictable results, simply using Breen's technique to produce an emoticon, such as the modification of a selected emoticon of Kim, in place of Roh or Kim's own method; the substitution produces no new and unexpected result.

With regard to Claim 12:

The computer-implemented method of Claim 9, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

With regard to Claim 13:

The computer-implemented method of Claim 9, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof. [*id.*; either of a surprised look or smile reads on an expression corresponding to a mood or emotion]

With regard to Claim 17:

Roh teaches: **At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device,** [0088; "processors"; 0089; "software codes may be stored in the memory 160 and executed by the controller 180" which comprises the processors] **the computer-executable instructions cause the processor to...**

detect a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the

camera"; 0231; "detecting a facial expression" of "the user"] **automatically... the selected emoticon… to generate a... emoticon… and route a message with the modified emoticon to a second computer device.** [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receive a selection of an emoticon**, to use a **selected emoticon**, or to **modify an emoticon**, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon" which may be used in "sending an e-mail communication or a text message". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

Roh comes close to, but does not explicitly, teach **simulating the detected human facial expression on the selected emoticon**, though he does detect a facial expression as cited above, but it is known in the art. Breen teaches an interface to convert facial expressions to application input. [title] His system can "generate emoticons" in a "chat session". [0026] A "mental state or a facial expression of a subject can be detected and classified". [0018] His invention includes a "simulator". [0057] When "a user begins to smile, the detection result will change from absence of smile to presence of smile. This can trigger the converter application to generate an input event, e.g., keyboard input of a smile emoticon ':-)'." [0035] Again, "if the detection algorithm 14 detects either the facial expression of a smile or the emotional state of happiness, the converter application 40 could generate a smile text emoticon ':-)'". [0037] It is not limited to keyboard emoticons, as if an "application 32 supports graphic emoticons, then a code for the graphic emoticon could be used rather than the text". [0041]

Breen and Roh are analogous art as each is directed to electronic means for displaying images symbolic of a user's facial expression. It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Breen with that of Roh and Kim in order to simulate a facial expression with an emoticon once detected, as taught by Breen; further, it is simply a substitution of one known part for another with predictable results, simply using Breen's technique to produce an emoticon, such as the

modification of a selected emoticon of Kim, in place of Roh or Kim's own method; the substitution produces no new and unexpected result.

With regard to Claim 20:

The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

6. **Claims 2, 7, 10, 15 and 18 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Goossens et al. (U.S. Publication No. 2011/0296324).

Claims 2, 10 and 18 are similar so are analyzed together.

With regard to Claim 2:

The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

With regard to Claim 10:

The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

With regard to Claim 18:

The at least one non-transitory computer-readable storage media of Claim 17, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

Roh, Kim and Breen teach the device of claim 1, method of claim 9 and media of claim 17, but do not explicitly teach adding their emoticon to a message which has been composed using an interface, but it is known in the art. Goossens teaches a system for creating and using avatars to reflect user states. [abstract] Users can "insert emoticons in their messages". [0063] This can be done via a "user interface" used to send a "text message" to "another user". [0063] Goossens and Roh are analogous art as each is directed to electronic means for managing emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Goossens with that of Roh, Kim and Breen in order to be able to use emoticons to represent a user's state within a message, as taught by Goossens; further, it is simply a combination of known parts with predictable results, simply taking the emoticon of Roh, Kim, Breen or Goossens and inserting it into a message composed using an interface such as that of Goossens; each part works independently of the other, and each

works in combination identically to how it works when not combined, with no new and unexpected result inherent or disclosed.

With regard to Claim 7:

The computer device of Claim 1, wherein the modified emoticon is embedded at a displayable portion of the message. [Goossens, 0063; "when the user inserts an emoticon in a text message sent to another user, the user's avatar appearing in the chat session between the two users can be updated to show the avatar instance associated with the 'Happiness' user state"; Sheet 7, Fig. 6B]

It would have been obvious to one then of ordinary skill in the art to combine this feature of Goossens with the teaching of Roe and Kim in order to display an emoticon on the same screen as the message, as taught by Goossens.

With regard to Claim 15:

The computer-implemented method of Claim 9, wherein the modified emoticon is embedded at a displayable portion of the message. [Goossens, 0063; "when the user inserts an emoticon in a text message sent to another user, the user's avatar appearing in the chat session between the two users can be updated to show the avatar instance associated with the 'Happiness' user state"; Sheet 7, Fig. 6B]

It would have been obvious to one then of ordinary skill in the art to combine this feature of Goossens with the teaching of Roe and Kim in order to display an emoticon on the same screen as the message, as taught by Goossens.

7. **Claims 3, 11 and 19 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Wong (U.S. Publication No. 2013/0322705).

These claims are similar so are analyzed together.

With regard to Claim 3:

The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

With regard to Claim 11:

The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

With regard to Claim 19:

The at least one non-transitory computer-readable storage media of Claim 17, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

Roh, Kim and Breen teach the device of claim 1, method of claim 9 and media of claim 17, including "detecting a facial expression", [0231] which reads on a facial profile, but do not explicitly teach using a picture of a face in this way, but it is known in the art. Wong teaches facial and fingerprint identification. [title] The system may "unlock a device when the captured facial image matches [a] reference facial image". [abstract] The reference facial image is a "stored reference facial image", [0021] and the captured facial image is captured "utilizing a first camera". [0004] Wong and Roh are analogous art as each is directed to electronic processing of facial images captured by cameras.

It would have been obvious to one of ordinary skill in the art to combine the teaching of Wong with that of Roh, Kim and Breen in order to be able to use a facial image in a comparison, as taught by Wong; further, it is simply a combination of known parts with predictable results, simply performing Wong's step after all others; each part works independently of the other, and each works in combination identically to how it works when not combined, with no new and unexpected result inherent or disclosed.

8. **Claims 6 and 14 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Pfister et al. (U.S. Publication No. 2013/0300900).

These claims are similar so are analyzed together.

With regard to Claim 6:

The computer device of Claim 1, where the at least one processor is further programmed to analyze the human facial expression using an expression recognition process to detect the human facial expression.

With regard to Claim 14:

The computer-implemented method of Claim 9, further comprising analyzing the human facial expression using an expression recognition process to detect the human facial expression.

Roh, Kim and Breen teach the device of claim 1 and method of claim 9, including detecting a human facial expression as cited above, and though it seems inherent that any computer that can detect a facial expression is using some sort of "expression recognition process" and performing analysis, as Roh, Kim and Breen are not explicit about it, it is, nonetheless, known in the art. Pfister teaches an automated recognition algorithm for detecting facial expressions [title] which uses "video analysis" [0017] to analyze "feature points of a model face and a face contained in video frames"; [0012] the actual analysis using the feature

points is then described in elaborate detail [0030] in order to "detect facial microexpressions". [0032] Pfister and Roh are analogous art as each is directed to electronic means for detecting facial expressions.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Pfister with that of Roh, Kim and Breen in order to provide for a particular process for detecting a facial expression such as that of Pfister; further, it is simply a substitution of one known part for another with predictable results, simply using Pfister's recognition process in place of, or in addition to, that of Roh; the substitution produces no new and unexpected result.

9. **Claims 8 and 16 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Winchester (U.S. Publication No. 2011/0304629).

These claims are similar so are analyzed together.

With regard to Claim 8:

The computer device of Claim 1, wherein the human facial expression is captured in real-time from the one or more sensors.

With regard to Claim 16:

The computer-implemented method of Claim 9, wherein the human facial expression is captured in real-time from the one or more sensors.

Roh, Kim and Breen teach the device of claim 1 and method of claim 9 but do not explicitly teach that the facial expression is captured in real time, though there is no hint of any delay or batch processing; but in any event, it is known in the art. Winchester teaches real-time animation of facial expressions [title] which includes "capturing facial expressions of an individual and causing such facial expressions to be reflected in real-time on an animated avatar". [0006] The facial expressions are within an image captured by "an image sensor 108 such as a RGB video camera that can capture images and/or motion of the individual". [0021] Winchester and Roh are analogous art as each is directed to electronic means for depicting animated images based on a human facial expression.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Winchester with that of Roh, Kim and Breen in order to perform processing explicitly in real time, as taught by Winchester; further, it is simply and at most a substitution of one known part for another, simply capturing images in real time as explicitly taught by Winchester rather than as only implied by the lack of any alternative in Roh; the substitution produces no new and unexpected result.

Response to Arguments

10. Applicant's arguments with respect to claims 1-20 in regard to rejections made under 35 U.S.C. § 103 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection. As a preliminary matter, the Examiner agrees that the amendment to claim 9 overcomes the objection raised in the previous Office action, and will simply continue to maintain the double patenting rejection until the applicant either files a terminal disclaimer or amends the claims of this invention sufficiently to overcome it.

In regard to § 103, the Examiner has herein incorporated the reference to Breen to meet the claim limitations which all agree were not taught by the combination of Roh and Kim. The bases of rejection of the dependent claims are not argued with particularity so there is no need for discussion of those claims here.

Conclusion

11. 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.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT C ANDERSON whose telephone number is (571)270-7442. The examiner can normally be reached on M-F 9:00 to 5:30.

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, Bennett Sigmond can be reached on (303) 297-4411. 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.

/SCOTT C ANDERSON/
Examiner, Art Unit 3694

Notice of References Cited	Application/Control No. 16/831,432	Applicant(s)/Patent Under Reexamination Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20080218472-A1	09-2008	Breen; Randy	G06F3/015	345/156
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

✓	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	04/21/2020	06/17/2020							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
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	15	✓	✓							
	16	✓	✓							
	17	✓	✓							
	18	✓	✓							
	19	✓	✓							
	20	✓	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

CPC - Searched*		
Symbol	**Date**	**Examiner**
G06F3/00, 011, 0304	04/21/2020	sca
G06Q30/0271, G06F21/629, G06F2203/011	04/21/2020	sca
H04W4/12, 21, H04W12/06, H04W12/00504	04/21/2020	sca
G06Q30/0271	06/17/2020	sca

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**
PLUS search	04/21/2020	sca
Inventor search	04/21/2020	sca
EAST search including EPO	04/21/2020	sca
EAST search including EPO	06/17/2020	sca

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
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	SCOTT C ANDERSON	3694

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

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STIC Scientific & Technical Information Center

EIC 3600 Search Report

To: Scott Anderson Location: KNX-4A05 Art Unit: 3694 Monday, June 08, 2020 Case Serial Number: 16/831432	
Access Search Log Number:	618946

Searcher:	**James Jenkins**
Location:	**EIC3600 KNX 2A80-B**
Phone:	**(571) 272-5817**
Email:	**james.jenkins1@uspto.gov**
Date Completed:	6/8/2020

This search report contains the following content:

- **Search Histories**
  Keyword/synonym strings and search strategies used by the EIC Searcher in completing the prior art search are included. The search history for each database or resource utilized appears at the top of each database/resource section, indicated by the database/resource section headings.
- **Search Results**
  Only on-topic results are included in the search report. On-topic results include all references found that are related to the art area being searched. These references may not necessarily be useful for a rejection or other office action, but are included for the Examiner's review. Off-topic, unrelated, or irrelevant search results ("false drops" or "false hits") were removed by the Searcher. Off-topic results include all references that are unrelated to the art area being searched.

If you have any questions about this search, or about how to interpret this search report, please do not hesitate to contact the Searcher using the contact information listed above.

If you need assistance retrieving the full text of any of the references contained in this report, please contact the Searcher listed above, or the EIC 3600 Reference Desk at 571-272-3488 (x23488) or STIC-EIC3600@uspto.gov.

Thank you for using the EIC, and we look forward to your next search!

Potential references/documents of interest

CN102750555B Expression identification device applied to instant messaging tool

PUBLICATION NUMBER: CN 102750555 B PUBLICATION DATE: 22-Apr-2015
APPLICATION NUMBER: CN 201210224496 A FILING DATE: 28-Jun-2012
SIMPLE FAMILY: 47030719 (size 2) EARLIEST PRIORITY DATE: 28-Jun-2012

Abstract (English):
The invention discloses an expression robot applied to an instant messaging tool. The expression robot can recognize expression marks used by users in real time and can make same responses as the meaning represented by the expression marks. In addition, an expression recognizing method overcomes the defects that the complexity degree is high, the real-time performance is poor, and a secret key needs to be decoded again after the instant messaging tool is updated. In a system, a chat window monitoring module intercepts chat window images as pictures and stores the pictures when the instant messaging tool has new chat message display, or the chat window monitoring module regularly is timed to intercept the chat window images as pictures and to store the pictures; an expression mark positioning module finds expression marks in the intercepted pictures, and the positions of the expression marks are sent to an expression mark recognizing module; the expression mark recognizing module comprises the positions of the expression marks and expression marks in the existing expression mark bank, and the meanings of the expression marks are determined and are sent to a response module; and the response module makes responses in set expression modes after receiving results sent by the expression mark recognizing module.

Inventors:
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General immediate communication tool all has the function inserting emoticon, greatly facilitates the expression of user, enhances and exchanges enjoyment and Consumer's Experience. At present, emoticon is mainly towards more polynary, and more lively and complicated future development, the present invention proposes a creationary road for development: allow emoticon actualization more. The program can be monitored the window interface of immediate communication tool, then identifies the implication of the emoticon that user uses, and makes the response meeting this emoticon implication for the emoticon be identified. The **emoticon** used in chat process can be experienced more intuitively by **expression recognition** apparatus user, increase experience sense and the enjoyment of instant communication user thus. This is the product of a novelty, rarely has the reference to forefathers' experience.

Summary of the invention
In view of this, the invention provides a kind of **expression recognition** apparatus based on immediate communication tool, it can identify the **emoticon** that user uses in real time, and makes the response the same with implication representated by this **emoticon.** And, its **expression recognition** method not adopts the method packet of immediate communication tool transmission being decrypted to analysis, avoids the defect that the complexity adopting

this scheme to bring is high, real-time is not good, immediate communication tool needs again to decode key after upgrading.
The method is achieved in that
This is based on the **expression recognition** apparatus of immediate communication tool, and it comprises chat window monitoring modular, **emoticon** locating module, **emoticon** identification module and respond module;

Described chat window monitoring modular, for after determining that current focus window is the chat window of immediate communication tool, described chat window is monitored, timing or when user has new chat messages to show, the image interception of chat window is got off, and saves as picture;
Described emoticon locating module, for analyze chat window monitoring modular intercept the picture got off, find emoticon wherein, after finding emoticon, the position of emoticon sent to described emoticon identification module;
Described emoticon identification module, for when behind the position receiving the emoticon that emoticon locating module sends, emoticon in the emoticon of this position and known emoticon storehouse is contrasted, thus determine the meaning representated by this emoticon, then result is sent to respond module;
Described respond module, for after receiving the result that emoticon identification module sends over, is responded by the technique of expression of setting;
Identification module in described **emoticon** identification module, for according to the position range of acquiescence **emoticon** each in known global image and expression meanings, judge the position of the **emoticon image that described matching module is found out which expression meanings corresponding, expression meanings is sent to respond module.**
Further, described respond module is responded by sound, image and/or action.

Beneficial effect:
The invention provides a kind of expression recognition apparatus being applied to immediate communication tool, the **emoticon** that user uses can be identified in real time, and make the response the same with implication representated by this **emoticon**, and the more important thing is, the expression recognition method of this expression and people thereof not adopts the method packet of immediate communication tool transmission being decrypted to analysis, do not need again to decode key after immediate communication tool upgrading, therefore versatility is good, is applicable to various immediate communication tool. And the method relies on sectional drawing to carry out Expression Recognition, method is simple, can, by a lot of existing image processing method, implement very simple, and amount of calculation be also little, thus be conducive to the real-time improving Expression Recognition.

KR20070071850A Method for expressing emotion of mobile phone

PUBLICATION NUMBER: KR 2007-0071850 A PUBLICATION DATE: 04-Jul-2007
APPLICATION NUMBER: KR 2005-0135637 A FILING DATE: 30-Dec-2005
SIMPLE FAMILY: 38506951 (size 1) EARLIEST PRIORITY DATE: 30-Dec-2005

Inventors:
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Applicants:
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Abstract (English):
The present invention relates to an **emotional expression** method of a mobile communication terminal, and more particularly, to an **emotional expression** method of a mobile communication terminal to express the **emotional state** of a terminal user by recognizing contents of a call voice and a text message transmitted / received.
In addition, the mobile terminal having a specific voice data and a specific text data is stored in the mobile communication terminal having a voice / text recognition function, (a) recognizing the contents of the voice or a text message to be transmitted / received; (b) determining whether the content recognized in the step (a) is specific voice data or specific text data stored in the memory; and (c) as a result of the determination in the step (b), the recognized content is the specific voice. In the case of data or specific character data, the method may include generating a predetermined event.
A method for expressing a user's sensitivity in a mobile terminal is provided to enable a user to recognize his sensitivity state by grasping the user's call voice or the contents of transmitted/received short messages and generating an associated event. If a short message is received through an RF transceiver part(S11), a control part recognizes the received short message through a text recognition program stored in a text recognition program storage part(S13). The control part confirms whether a specific word stored in a specific word data storage part is detected among the received short message(S15). In case that a specific word is detected, the control part drives an LED panel, displays a preappointed image or **emoticon** through a plane display unit, and notifies the user that the short message has been received(S17,S19). Meantime, if a key to transmit a short message is inputted, the control part recognizes the short message through the text recognition program(S23,S25). The control part confirms whether a specific word stored in a specific word data storage part is detected among the short message to be transmitted(S27). If a specific word is detected, the control part drives the LED panel and displays a preappointed image or **emoticon** through the plane display unit(S29,S31). In this case, the control part confirms whether the detected word is a curse or a four-letter word(S33). If so, the control part pauses to transmit the short message and displays a message to ask the user whether the short message containing the detected curse or four-letter word should be transmitted(S35,S37). In case that a key to edit the short message is inputted, the control part displays a short message editing window so that the user can make out the short message again.

For example, when a word reminiscent of joy is found among the received text contents, that is, 'love', 'happy', and the like, each LED of the plurality of heart-shaped LED panels 150 is sequentially turned on. In addition, when a word indicating abusive language or slang is found, the LED panel 150 is turned on for a predetermined time. **In the next step S19, a predetermined image or emoji is displayed on the flat panel display** 122, the terminal user is notified that the text message has been received, and the flow proceeds to step S57**. For example, when a specific letter is a word related to joy, an emoticon or image of a brightly smiling shape may be expressed.**

In addition to the mobile communication terminal to which the present invention is applied, a camera driver 280 for driving the CCD camera 282 under the control of the control unit 210 and the CCD camera 282 installed in place of the main body 110 or the slider 120.), **An image processing unit 284 for processing image data output from the CCD camera** 282, and a GPS processing unit (not shown) for receiving wireless signals emitted from GPS satellites and generating absolute position data of the terminal as necessary. It may be further provided.

In order to achieve the above object, a method of expressing emotion of a mobile communication terminal of the present invention is performed in a mobile communication

terminal having a voice / text recognition function and having a memory in which specific voice data and specific text data are stored. Recognizing the contents of a voice or a text message transmitted / received; (b) determining whether the content recognized in the step (a) is specific voice data or specific text data stored in the memory; and (c) as a result of the determination in the step (b), the recognized content is the specific voice. In the case of data or specific character data, an **emotional expression** method of a mobile communication terminal including generating a predetermined event is provided.
Hereinafter, with reference to the accompanying drawings will be described in detail with respect to the expression method of the mobile terminal according to a preferred embodiment of the present invention.

The present invention relates to an **emotional expression** method of a mobile communication terminal, and more particularly, to an **emotional expression** method of a mobile communication terminal to express the emotional state of a terminal user by recognizing contents of a call voice and a text message transmitted / received.

Next, the controller 210 stores the text data or the voice stored in the data storage unit 244 in a call voice or a text message transmitted / received based on the text recognition program and the voice recognition program stored in the program storage unit 242. If data is found, the LED panel 150 is driven in a predetermined manner, **or an image or emoticon corresponding to the found specific character or specific voice is displayed on the flat panel display 122.**

For example, when a specific letter is a word related to joy, an emoticon or image of a brightly smiling shape may be expressed.

JP2002318649A System, method and program for inputting face mark

PUBLICATION NUMBER: JP 2002-318649 A PUBLICATION DATE: 31-Oct-2002
APPLICATION NUMBER: JP 2001-121694 A FILING DATE: 19-Apr-2001
SIMPLE FAMILY: 18971512 (size 2) EARLIEST PRIORITY DATE: 19-Apr-2001

Abstract (English):
(57) [Summary] [Purpose] A system for improving the efficiency of emoticon input.
Provide methods and programs. A facial character for recording a plurality of types of facial characters in advance in association with "a plurality of facial images having different facial expressions or data related thereto (for example, data indicating characteristics of each facial image)" A database, an imaging unit for imaging the face of the user, an imaging control unit for imaging the user's face when the user instructs input of the emoticon by the imaging unit, When an input of a face character is instructed, based on the face image data from the image pickup means or data related thereto (for example, data indicating characteristics of the face image of the user), the face from the face character database and the face from the image pickup means An emoticon selecting means for selecting an emoticon corresponding to the image data; and an emoticon selected by the emoticon selecting means. But the beginning of the sentence you are typing, intermediate,
Or, a system, a method, and a program for inputting
an emoticon, comprising: emoticon inputting means for inputting at a position designated by a user at the end.

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In FIG. 1, reference numeral 7 denotes an emoticon input instruction unit for instructing the information processing unit 3 that the user inputs an emoticon, for example, inputting an emoticon which is not a normal character. (For example, a "#" key or "*" key for a mobile phone). Reference numeral 8 denotes image data (face image data) of the user's face from the camera 2 and face images from the face character database 1 (a plurality of face images recorded in advance in association with a plurality of face characters, respectively). (For example, by extracting a face image most similar to the user's face image from the camera 2 from a plurality of face images recorded in the emoticon database 1). A face image of the user from the camera 2 (a face image of the user when the user deforms his / her face so as to have an expression corresponding to the type of the face character desired to be input) or data relating thereto (For example, the face character selection unit 8 is a face character selection unit for selecting a face character corresponding to the data representing the characteristics of each face image (the face character selection unit 8 actually constitutes the information processing unit 3). That may be configured by CPU). In FIG. 1, reference numeral 9 denotes a display for displaying data from the information processing unit 3 on a screen, and reference numeral 10 denotes a printer for outputting data from the information processing unit 8 to paper.

Next, the operation of the first embodiment will be described. In the first embodiment, the user operates the emoticon input instruction unit 7
When inputting instruction data for inputting an emoticon into the information processing unit 3 (for example, pressing a predetermined button or key, or clicking a predetermined icon with a mouse)
The information processing unit 3 controls the camera 2 to deform the user's face at that time (the user's face is deformed so that the user's face has an expression corresponding to the type of emoticon desired to be input). The user's face). Then, the information processing section 3 controls the camera 2 to cause the face image data of the [redacted] user to be transmitted to the face character selecting section 8. That is, in the first embodiment,
When capturing the face of the user with the camera 2, the user can select the type of emoticon that the user wants to input (for example,
Change the facial expression to an expression corresponding to "laughing emoticon" (for example, "laughing expression"), and have the camera 2 image the own face having that expression. To
The emoticon selection unit 8 outputs the user's facial image data from the camera 2 (image data showing the facial expression of the user when the user instructs the input of the emoticon) or data related thereto (For example, data indicating characteristics of the user's face image), a plurality of face images recorded in the emoticon database 1 (face images respectively corresponding to the plurality of face characters), or data related thereto. (E.g., data indicating the characteristics of each face image) and compare the expression with the facial expression (e.g.,
A face image (eg, "laughing face image") in the emoticon database 1 having an expression most similar to "laughing expression" or data related thereto (eg, data indicating characteristics of each face image)) Is specified. Then, the emoticon selection unit 8 extracts and selects an emoticon (for example, "laughing emoticon") corresponding to the specified facial image data from the emoticon database 1, and selects the selected emoticon. Is sent to the information processing section 3. The information processing unit 3
The emoticon data from the emoticon selection unit 8 is input (inserted / added) to the position

designated by the input position designation unit 6 (the beginning, end, or intermediate position of the sentence being input by the user).
As described above, according to the first embodiment, the user instructs the information processing unit 3 to input a face character, and expresses an expression corresponding to the face character to be input (the user inputs his / her face). The camera 2, the emoticon selection unit 8 and the information processing unit 3 automatically generate the desired emoticon by the camera 2, without any special operation by the user. Is selected and input at a predetermined input position in the sentence, so that the input of the emoticon can be made very efficient.

Sony Corporation; Patent Issued for Overlaying Camera-Derived Viewer Emotion Indication on Video Display

Publication info: Journal of Engineering [Atlanta] 01 May 2013: 7792.
Databases: Mechanical & Transportation Engineering Abstracts, ProQuest Newsstand Professional

Keywords in context:

Full text: ... is not a common feature on TVs. As understood herein, it would be desirable to enable friends or family members who are not viewing the same TV to share facial expressions with one another via a network such as the Internet." As a supplement to the background information on this patent, VerticalNews correspondents also obtained the inventor's summary information for this patent: "As understood herein, facial recognition software is able to detect emotion of a person based on an image taken of them. Present principles recognize that the emotion information can be converted into animated images, or 'emoticons,' or descriptive words that correspond to the detected emotion to, e.g., allow a TV viewer's image to be converted into an emoticon and sent to a friend's TV display. "Accordingly, a system includes a viewer video display and a processor coupled to the viewer video display. A camera communicates with the processor to provide the processor with captured images. The processor can execute logic on a computer readable storage medium to facilitate a viewer of the viewer video display selecting to have an ... plural emoticons to an actual facial image from the camera, and the image of the viewer derived from the camera may be one of plural emoticons. The presentation video display can be established by the viewer video display and can be a display other than the viewer video display. The viewer of the viewer video ... with the first audio video display. The method includes, based on the image, selecting an emoticon using a processor associated with the first audio video display, and displaying the emoticon on the first audio video display and/or on a second audio video display. "In another aspect, an audio video apparatus has a video display, a processor controlling the display to present video, and a computer readable storage medium accessible to the processor and bearing instructions executable by the processor to receive a viewer selection of actual image or emoticon. Responsive to a viewer selection of actual image, the processor generates an actual image of a viewer of the display and overlay the image on the video. On the other hand, responsive to a viewer selection of emoticon, the processor correlates the image to an emoticon and overlays the emoticon on the video. "Example implementation details of present principles are set forth ... to present his or her actual image as captured by the camera; "FIG. 4 is a screen shot of a friend's display device, assuming the viewer has selected to present the emoticon thereon, showing that the viewer has opted to present an emoticon derived from the viewer's image as captured by the camera; and "FIG. 5 is a flow chart of example logic in accordance with present principles." For additional information ...

Search Strategy

Databases: Argentina Patents Fulltext, Australia Patents Fulltext, Austria Patents Fulltext, Belgium Patents Fulltext, Brazil Patents Fulltext, Canada Patents Fulltext, China Patents Fulltext, Denmark Patents Fulltext, Derwent Patents Citation Index®, Derwent World Patents Index®, Eurasia Patents Fulltext, European Patents Fulltext, Finland Patents Fulltext, France Patents Fulltext, Germany Patents Fulltext, Global Patents Bibliographic, Great Britain Patents Fulltext, IFI CLAIMS® US Patents and Legal Status, IMS Patent Focus, India Patents Fulltext™, INPADOC / Family and Legal Status, Ireland Patents Fulltext, Italy Patents Fulltext, Japan Patents Fulltext, JAPIO - Patent Abstracts of Japan, Korea Patents Fulltext, Luxembourg Patents Fulltext, Mexico Patents Fulltext, Monaco Patents Fulltext, Netherlands Patents Fulltext, Norway Patents Fulltext, Portugal Patents Fulltext, Russia Patents Fulltext, Spain Patents Fulltext, Sweden Patents Fulltext, Switzerland Patents Fulltext, United States Patents Fulltext, WIPO PCT Patents Fulltext

Set#	Searched for	Results
S1	(display$3 or show$3 Or render$3 Or present$3 Or view$3 or depict$3 Or (made or make$1 or making) p/2 (known or visible or access$4)) n/5 (graphic$3 p/0 image$1 or emoticon$1 or emotion p/0 icon$1 or emoji$1 or emotag$1 or kaomoji or smilely-face$1 or smiley$1)	144851
S2	(expression$1 or facial-expression$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1)) n/4 (recogni$4 or detect$3 or sens$3 or perceiv$3 or identif$7 or discern$3 or distinguish$3 or determin$5)	1859927
S3	(match$3 or "same" or equal or equivalent or identical or associat$3 or mated or mating or (paired or pairing or put or puts or putting or gather$3) p/0 together or interrelated or relat$8 or correlat$4) n/4 (expression$1 or facial-expression$1 or sentiment$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1))	2397905
S4	(captured or scanned) p/0 (image or photo* or picture or pic$1 or GIF or JPEG OR JPG) n/4 (person$1 or people or individual$1 or someone$1 or user$1 or customer$1 or consumer$1)	77999
S5	(sms or mms or messaging or (short p/0 message or multi p/0 media or multimedia or transmedia) p/0 service or text or texts or texting or texted or txt or textmessag$3 or text p/0 messag$3 or mobile)	44737655
S6	s1 n/750 s2	2548
S7	s6 n/750 s3	903
S8	s7 n/750 s4	22
S9	s8 n/750 s5	22
S10	s9 and CPC,IPC("G06F 3/00" OR "G06F 2203/011" OR "G06K 9/00302" OR "G06K 9/00335" OR "G06K 9/00328")	15
S11	s10 and APD(<20140310)	2

S12	s7 n/750 (captured or scanned) p/0 (image or photo* or picture or pic$1 or GIF or JPEG OR JPG)	92
S13	s12 n/750 s5	75
S14	s13 and CPC,IPC("G06F 3/00" OR "G06F 2203/011" OR "G06K 9/00302" OR "G06K 9/00335" OR "G06K 9/00328")	41
S15	s14 and APD(<20140310)	6
S16	s14 and APD(<20140310)	4°

° Duplicates are removed from the search and from the result count.

Capturing Media Content in Accordance with a Viewer Expression

Assignee: Google Inc. (US Company)Mountain View, CA, US

Inventor: Zheng, YingMountain View, CA, USPatent rights: US Only

Publication info: Zheng, Ying (Inventor). Google Inc. (Assignee). US 20150110471 A1 .

Abstract (English): Systems and methods for capturing media content in accordance with viewer expression are disclosed. In some implementations, a method includes: at a computer system having one or more processors and memory storing one or more programs for execution by the one or more processors: detecting display of a media content item; while the media content item is being displayed: detecting a viewer expression corresponding to a predefined viewer expression; and in response to detecting the viewer expression: identifying a portion of the media content item corresponding in time to the viewer expression. In some implementations, the viewer expression—selected from one of: a facial expression, a body movement, a voice, or an arm, leg or finger gesture—is presumed to be a viewer reaction to the portion of the media content item.

Publication number: US 20150110471 A1 (23 April 2015)

Application number: US 201360515 (22 October 2013)

Priority number: US 201360515 (22 October 2013)

Keywords in context:

CPC classification: G06F 2203/011; G06K 9/00302;

- **Specification:** ... or an arm, leg or finger gesture. In some implementations, the portion of the media content is one of: a video or audio clip, a text, or a photo. In some implementations, the one or more programs further include instructions for: uploading (i) the portion of the media content item ... or an arm, leg or finger gesture. In some implementations, the portion of the media content is one of a video or audio clip, a text, or a photo. In some implementations, the one or more programs further include instructions to: upload (i) the portion of the media content item ... finishing viewing the media item, the viewer can review both his/her reactions (e.g., a horrified face), and the associated movie clips (e.g., scary movie scenes) associated with that horrified expression. Similarly, without interrupting the viewing experience, viewers may review a portion of a recorded standup comedy performance, as well as photos or sound clips ... as well as their reactions (e.g., laughing, horrified, or scared) with their friends. In some implementations, such sharing can be done using social media posts, text messages or email messages. Some implementations are configured to create such posts or messages based on user input and previous recordings of media clips and associated user expressions. Because viewers are not required to take any extraneous actions to capture their expressions while viewing media content items (e.g., finding and positioning a ... as they occur,

the captured viewer expressions are less likely to appear orchestrated or artificial. By requiring prior user consent, explicit or implicit, the viewer expression is captured and/or detected and then used for various social purposes, but only as authorized by the user, so as to protect user privacy and to comply with relevant ... agreeing in advance to having their image captured and potentially made available for transmission to a server for possible sharing in a social media post, text or email message, etc.), viewer expressions and/or reactions are captured without sacrificing spontaneity. Additional details of implementations are now described in relation to the Figures. ... being displayed (e.g., on the display device **108**). In some implementations, e.g., while a media content item is being displayed, the electronic device **102** detects a viewer expression corresponding to a predefined viewer expression For example, the electronic device **102** identifies a viewer expression as a smile by (i) capturing an image of a viewer's face (e.g., using the camera **114**); and then (ii) comparing the captured facial ... 2) that includes user expressions confirmed or verified as smiles, for similarities or lack thereof. In some implementations, the electronic device **102**, responsive to detecting the viewer expression, identifying a portion of the media content item corresponding in time to the viewer expression. For example, after identifying a viewer as smiling or crying, the electronic device **102** captures an audio and/or video clip of a movie or TV episode that the viewer ... **118** was watching when the viewer laughed or cried. In some implementations, detecting viewer expression requires more than a de minimis amount of processing time, and as such the electronic device **102** stores (or caches), in a temporary or permanent ... (e.g., past 30 seconds or past 2 minutes) of the media content item being displayed on the display device **108**. In some implementations, after detecting a predefined viewer expression, the electronic device **102** retrieves the corresponding portion of the media content item previously cached in the temporary or permanent storage device. In some ... camera **114** and optionally a microphone **116**. In some implementations, the camera **114** collects image, or audio or video clip of a viewer (e.g., viewer expressions **115**), such as a smiley face, a raised arm or leg, and a viewer covering his/her eyes, nodding or shaking his/her head. In some implementations, the microphone **116** collects audio ... as "GOODNESS!" "No!" or "Yes!" In some implementations, the electronic device **102** determines whether a viewer **118** is laughing, crying, or horrified, by comparing the captured image/video/audio clips (e.g., the predefined expressions **240** in FIG. 2) to saved clips known to include certain types of viewer expressions (e.g., a clip including ... comparison module **218**, an expression database **220**, a content processing module **222**, and a content database **224**. In some implementations, the expression processing module **216** detects and captures viewer expressions, using the camera **114** and/or the microphone **116**, and selectively stores captured viewer expressions in the expression database **220**. In some implementations, the comparison module **218** compares captured viewer expressions with viewer expression known or confirmed to include a particular type of view expression, e.g., **a smiley-face photo,** and an audio clip including a loud laugh or a series of chuckles. In some implementations, upon a determination that a captured viewer expression matches a particular type of known viewer expression (e.g., a smile, a cry, or shedding tears), the comparison module **218** determines (or identifies) what type of viewer expression was captured, e.g., a viewer is captured laughing, smiling, horrified, or shocked. In some implementations, the upload processing module **226** uploads, upon a user request, ... (e.g., textbox, button, radio button, drop-down list) to a user/viewer;

- an expression processing module **216** for collecting and processing (e.g., image adjustment, such as facial recognition, cropping, and rotating) viewer expressions contained or captured in an image or an audio/video clip, or a portion thereof: e.g., identifying distinct expressions of two different viewers captured in the same photo;

- a comparison module **218** for comparing captured viewer expressions with predefined expressions (e.g., comparing view expressions ...

- photos known to describe/illustrate a set of expressions (such as a person crying or

laughing), and/or associated sound clips or video frames confirmed to be associated with the same expressions; these predefined expressions **240** serve as templates for the purpose of comparison to captured user expressions;

- one or more viewer expression and media content pairs **242**, each ...

- content item **244**- *i* that includes media content, or a portion thereof, that was displayed on the display device **108** and then captured in association with a particular viewer expression **246**- *i*. For example, a media content item might be 10 video frames and/or a 5 second sound clip of a TV episode ...

Apparatus and method of customizing animated entities for use in a multi-media communication application

Assignee: AT&T Intellectual Property II, L.P. (U.S. Company or Corporation)New York, NY, USStandardized: AT&T Intellectual Property II L P (080287)

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Publication info: Civanlar, Mehmet Reha; del Valle, Ana Cristina Andres; Haffner, Patrick; Ostermann, Joern (Inventors). AT&T Intellectual Property II, L.P.; AT&T Intellectual Property II L P (Assignees). US 7671861 B1 . (Published 02 Mar 2010).

Abstract (English): A method of creating an animated entity for delivering a multi-media message from a sender to a recipient comprises receiving from the sender an image file to a server, the image file having associated sender-assigned name, gender, category and indexing information. The server presents to the sender the image file and a group of generic face model templates. After the sender selects one of the generic face model templates, the server presents the image file and the selected model template to the sender and requests the sender to mark features on the image file. After the sender marks the image file, the server presents to the sender a preview of at least one expression associated with the marked image file. If the user does not accept the image file after the preview, the server presents again the image file and selected model template for the sender to redo or add marked features on the image file. If the user accepts the image file after the preview, the server presents the image file as an optional animated entity when the sender chooses an animated entity to deliver a multi-media message.

Publication number: US 7671861 B1 (02 March 2010)

Application number: US 20013092 (02 November 2001)

Keywords in context:

IPC classification: G06F 3/00; G06F 3/00; ... Fewer detailsIPC version 8:

Specification: ... a sender name 82 and sender e-mail address 84. A subject line 86 and recipient address field 88 are also provided. The sender enters the text of the message within a standard text field 92. Various animated entities 94 are available from which the sender may choose (90) for delivering the message. Typically the animated entities are faces ... be any entity such as an animal, car, tree, robot, or anything that may be animated.

The sender may also insert emoticons 103 into the text of the message. The system includes predefined emoticons 96, such as ":-)" for a smile, "::-)" for a head nod, "*w*" for an eye wink, and so forth. The predefined emoticons are represented either as icons or as text, such as ";-)". As shown in FIG. 6, the window 80 includes a sample group of emoticon icons 96. The sender inserts an emoticon into a text message at the location of the cursor 102 by clicking on one of the emoticon icons 100. The sender may also type in the desired emoticon as text. Emoticon icons 96 save the sender from needing to type three keys, such as ":" and "-" and ")" for a smile. The icons ... or a icon representation of the characters ";-)" 100, or other information indicating to the sender that clicking on that emoticon icon will insert the associated emotion 103 into the text at the location of the cursor 102.

Once the sender composes the text of the message, chooses an animated entity 94, and inserts the desired emoticons 103, he or she generates the multi-media message by clicking on the ... The animation server 68 creates an animated video of the selected animated entity 94 for audibly delivering the message. The TTS server 66 converts the text to speech as mentioned above. Emoticons 103 in the message are translated into their corresponding facial expressions such as smiles and nods. The position of an emoticon 103 in the text determines when the facial expression is executed during delivery of the message.

Execution of a particular expression preferably occurs before the specific location of the emoticon in the text. This is in contrast to the LifeFX (TM) system, discussed above, in which the execution of the smile emoticon in the text "Hello, Jonathan :-) how are you?" starts and ends between the words "Jonathan" and "how". In the present invention, the expression of the emoticon begins a predefined number of words or a predefined time before the emoticon's location in the text ... . Furthermore, the end of the expressions of an emoticon may be a predefined number of words after the location of the emoticon in the text or a predetermined amount of time after the location of the emoticon.

For example, according to an aspect of the present invention, the smile in ... may last longer. Therefore, the starting and stopping points for a wink may be defined in terms of 0.1 seconds before its location in the text to 0.5 seconds after the location of the wink emoticon in the text. In contrast, the smile emoticon's starting, stopping, and duration parameters may be defined in terms of the words surrounding the emoticons.

An embodiment of the present invention relates to a system and method of enabling a sender to customize an animated entity for use in delivering a multi-media message. In this ... image file can also be presented, at the time of creating the multi-media message, as a selectable background image with the larger animated entity. Many scanned images may be of a person with some background scenery. The user may wish to use the background scenery from, for example, a vacation picture used as the image file. Thus, ...

Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, Abstracts in New Technology & Engineering, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, Allied & Complementary Medicine™, APA PsycInfo®, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, Drug Information Fulltext, EconLit, Ei Compendex®, Embase®, EMCare®, FLUIDEX (Fluid Engineering Abstracts), Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, Inspec®, International Pharmaceutical Abstracts, King's Fund, Lancet Titles, Mechanical & Transportation Engineering Abstracts, Mechanical & Transportation Engineering Abstracts, MEDLINE®, New England Journal of Medicine, NTIS: National Technical Information Service, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Advanced Tech & Aerospace Professional, ProQuest Newsstand Professional, Prous Science Drug Data Report, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, Transport Research International Documentation, UBM Computer Full Text

Set#	Searched for	Results
S1	(display$3 or show$3 Or render$3 Or present$3 Or view$3 or depict$3 Or (made or make$1 or making) p/2 (known or visible or access$4)) n/5 (graphic$3 p/0 image$1 or emoticon$1 or emotion p/0 icon$1 or emoji$1 or emotag$1 or kaomoji or smilely-face$1 or smiley$1)	34705*
S2	(expression$1 or facial-expression$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1)) n/4 (recogni$4 or detect$3 or sens$3 or perceiv$3 or identif$7 or discern$3 or distinguish$3 or determin$5)	3004317*
S3	(match$3 or "same" or equal or equivalent or identical or associat$3 or mated or mating or (paired or pairing or put or puts or putting or gather$3) p/0 together or interrelated or relat$8 or correlat$4) n/4 (expression$1 or facial-expression$1 or sentiment$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1))	4881928*
S4	(captured or scanned) p/0 (image or photo* or picture or pic$1 or GIF or JPEG OR JPG)	133182*
S5	(sms or mms or messaging or (short p/0 message or multi p/0 media or multimedia or transmedia) p/0 service or text or texts or texting or texted or txt or textmessag$3 or text p/0 messag$3 or mobile)	82895126*
S6	s1 n/750 s2	267°
S7	s6 n/750 s3	53°
S8	s7 n/750 s4	3°

S9	s8 n/750 s5	1°

* Duplicates are removed from the search, but included in the result count.
° Duplicates are removed from the search and from the result count.

Sony Corporation; Patent Issued for Overlaying Camera-Derived Viewer Emotion Indication on Video Display

Publication info: Journal of Engineering [Atlanta] 01 May 2013: 7792.
Databases: Mechanical & Transportation Engineering Abstracts, ProQuest Newsstand Professional

Keywords in context:

Full text: ... is not a common feature on TVs. As understood herein, it would be desirable to enable friends or family members who are not viewing the same TV to share facial expressions with one another via a network such as the Internet." As a supplement to the background information on this patent, VerticalNews correspondents also obtained the inventor's summary information for this patent: "As understood herein, facial recognition software is able to detect emotion of a person based on an image taken of them. Present principles recognize that the emotion information can be converted into animated images, or 'emoticons,' or descriptive words that correspond to the detected emotion to, e.g., allow a TV viewer's image to be converted into an emoticon and sent to a friend's TV display. "Accordingly, a system includes a viewer video display and a processor coupled to the viewer video display. A camera communicates with the processor to provide the processor with captured images. The processor can execute logic on a computer readable storage medium to facilitate a viewer of the viewer video display selecting to have an ... plural emoticons to an actual facial image from the camera, and the image of the viewer derived from the camera may be one of plural emoticons. The presentation video display can be established by the viewer video display and can be a display other than the viewer video display. The viewer of the viewer video ... with the first audio video display. The method includes, based on the image, selecting an emoticon using a processor associated with the first audio video display, and displaying the emoticon on the first audio video display and/or on a second audio video display. "In another aspect, an audio video apparatus has a video display, a processor controlling the display to present video, and a computer readable storage medium accessible to the processor and bearing instructions executable by the processor to receive a viewer selection of actual image or emoticon. Responsive to a viewer selection of actual image, the processor generates an actual image of a viewer of the display and overlay the image on the video. On the other hand, responsive to a viewer selection of emoticon, the processor correlates the image to an emoticon and overlays the emoticon on the video. "Example implementation details of present principles are set forth ... to present his or her actual image as captured by the camera; "FIG. 4 is a screen shot of a friend's display device, assuming the viewer has selected to present the emoticon thereon, showing that the viewer has opted to present an emoticon derived from the viewer's image as captured by the camera; and "FIG. 5 is a flow chart of example logic in accordance with present principles." For additional information ...

Collections: US Patents; US Designs; US Applications; Canada Patents; Canada Applications; Mexico Patents; Mexico Applications; EPO Patents; EPO Applications; Austria Patents; Austria Applications; Belgium Patents, Belgium Applications; Denmark Patents; Denmark Applications; Finland Patents; Finland Applications; France Patents; France Applications; Germany Patents; Germany Applications; Great Britain Patents; Great Britain Applications; Ireland Patents; Ireland Applications; Italy Patents; Italy Applications; Luxembourg Patents; Netherlands Patents; Netherlands Applications; Poland Patents ; Poland Applications ; Romania Patents; Romania Applications; Spain Patents; Spain Applications; Sweden Patents; Sweden Applications; Switzerland Patents; Switzerland Applications; Ukraine Patents; China Patents; China Applications; India Patents; India Applications; Israel Applications; Japan Patents; Japan Applications; Korea Patents; Korea Applications; Malaysia Patents; Philippines Patents; Philippines Applications; Taiwan Patents; Taiwan Applications; WIPO Applications; Argentina Patents; Argentina Applications; Australia Patent Documents; Brazil Patents; Brazil Applications; EAPO Patents; EAPO Applications; New Zealand Patents; Russia Patents; Russia Applications; South Africa Patents

I performed a search in IP.com using the terms:

	Concept searched for:
L1	expression recognition in messaging systems
L2	displaying a graphic image emoticon emoji emotag kaomoji smiley with an expression matching the expression of a captured image of a person

CN102750555B Expression identification device applied to instant messaging tool

PUBLICATION NUMBER: CN 102750555 B PUBLICATION DATE: 22-Apr-2015
APPLICATION NUMBER: CN 201210224496 A FILING DATE: 28-Jun-2012
SIMPLE FAMILY: 47030719 (size 2) EARLIEST PRIORITY DATE: 28-Jun-2012

Abstract (English):
The invention discloses an expression robot applied to an instant messaging tool. The expression robot can recognize expression marks used by users in real time and can make same responses as the meaning represented by the expression marks. In addition, an expression recognizing method overcomes the defects that the complexity degree is high, the real-time performance is poor, and a secret key needs to be decoded again after the instant messaging tool is updated. In a system, a chat window monitoring module intercepts chat window images as pictures and stores the pictures when the instant messaging tool has new chat message display, or the chat window monitoring module regularly is timed to intercept the chat window images as pictures and to store the pictures; an expression mark positioning module finds expression marks in the intercepted pictures, and the positions of the expression marks are sent to an expression mark recognizing module; the expression mark recognizing module comprises the positions of the expression marks and expression marks in the existing expression mark bank, and the meanings of the expression marks are determined and are sent to a response module; and the response module makes responses in set expression modes after receiving results sent by the expression mark recognizing module.

Inventors:
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Assignees:
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General immediate communication tool all has the function inserting emoticon, greatly facilitates the [redacted] of user, enhances and exchanges enjoyment and Consumer's Experience. At present, emoticon is mainly towards more polynary, and more lively and complicated future development, the present invention proposes a creationary road for development: allow emoticon actualization more. The program can be monitored the window interface of immediate communication tool, then identifies the implication of the emoticon that user uses, and makes the response meeting this emoticon implication for the emoticon be identified. The **emoticon** used in chat process can be experienced more intuitively by **expression recognition** apparatus user, increase experience sense and the enjoyment of instant communication user thus. This is the product of a novelty, rarely has the reference to forefathers' experience.

Summary of the invention

In view of this, the invention provides a kind of **expression recognition** apparatus based on immediate communication tool, it can identify the **emoticon** that user uses in real time, and makes the response the same with implication represented by this **emoticon.** And, its **expression recognition** method not adopts the method packet of immediate communication tool transmission being decrypted to analysis, avoids the defect that the complexity adopting this scheme to bring is high, real-time is not good, immediate communication tool needs again to decode key after upgrading.

The method is achieved in that

This is based on the **expression recognition** apparatus of immediate communication tool, and it comprises chat window monitoring modular, **emoticon** locating module, **emoticon** identification module and respond module;

Described chat window monitoring modular, for after determining that current focus window is the chat window of immediate communication tool, described chat window is monitored, timing or when user has new chat [redacted] to show, the image interception of chat window is got off, and saves as picture;

Described emoticon locating module, for analyze chat window monitoring modular intercept the picture got off, find emoticon wherein, after finding emoticon, the position of emoticon sent to described emoticon identification module;

Described emoticon identification module, for when behind the position receiving the emoticon that emoticon locating module sends, emoticon in the emoticon of this position and known emoticon storehouse is contrasted, thus determine the meaning represented by this emoticon, then result is sent to respond module;

Described respond module, for after receiving the result that emoticon identification module sends over, is responded by the technique of [redacted] of setting;

Identification module in described **emoticon** identification module, for according to the position range of acquiescence **emoticon** each in known global image and [redacted] meanings, judge the position of the **emoticon image that described matching module is found out which expression meanings corresponding, expression meanings is sent to respond module.**

Further, described respond module is responded by sound, image and/or action.

Beneficial effect:
The invention provides a kind of expression recognition apparatus being applied to immediate communication tool, the **emoticon** that user uses can be identified in real time, and make the response the same with implication representated by this **emoticon**, and the more important thing is, the expression recognition method of this expression and people thereof not adopts the method packet of immediate communication tool transmission being decrypted to analysis, do not need again to decode key after immediate communication tool upgrading, therefore versatility is good, is applicable to various immediate communication tool. And the method relies on sectional drawing to carry out Expression Recognition, method is simple, can, by a lot of existing image processing method, implement very simple, and amount of calculation be also little, thus be conducive to the real-time improving Expression Recognition.

KR20070071850A Method for expressing emotion of mobile phone

PUBLICATION NUMBER: KR 2007-0071850 A PUBLICATION DATE: 04-Jul-2007
APPLICATION NUMBER: KR 2005-0135637 A FILING DATE: 30-Dec-2005
SIMPLE FAMILY: 38506951 (size 1) EARLIEST PRIORITY DATE: 30-Dec-2005

Inventors:
KANG YOUNG SOON (KR)

Applicants:
VK CORP (KR)

Abstract (English):
The present invention relates to an **emotional expression** method of a mobile communication terminal, and more particularly, to an **emotional expression** method of a mobile communication terminal to express the **emotional state** of a terminal user by recognizing contents of a call voice and a text message transmitted / received.
In addition, the mobile terminal having a specific voice data and a specific text data is stored in the mobile communication terminal having a voice / text recognition function, (a) recognizing the contents of the voice or a text message to be transmitted / received; (b) determining whether the content recognized in the step (a) is specific voice data or specific text data stored in the memory; and (c) as a result of the determination in the step (b), the recognized content is the specific voice. In the case of data or specific character data, the method may include generating a predetermined event.
A method for expressing a user's sensitivity in a mobile terminal is provided to enable a user to recognize his sensitivity state by grasping the user's call voice or the contents of transmitted/received short messages and generating an associated event. If a short message is received through an RF transceiver part(S11), a control part recognizes the received short message through a text recognition program stored in a text recognition program storage part(S13). The control part confirms whether a specific word stored in a specific word data storage part is detected among the received short message(S15). In case that a specific word is detected, the control part drives an LED panel, displays a preappointed image or **emoticon** through a plane display unit, and notifies the user that the short message has been received(S17,S19). Meantime, if a key to transmit a short message is inputted, the control part recognizes the short message through the text recognition program(S23,S25). The control part confirms whether a specific word stored in a specific word data storage part is detected among the short message to be transmitted(S27). If a specific word is detected, the control part drives

the LED panel and displays a preappointed image or **emoticon** through the plane display unit(S29,S31). In this case, the control part confirms whether the detected word is a curse or a four-letter word(S33). If so, the control part pauses to transmit the short message and displays a message to ask the user whether the short message containing the detected curse or four-letter word should be transmitted(S35,S37). In case that a key to edit the short message is inputted, the control part displays a short message editing window so that the user can make out the short message again.

For example, when a word reminiscent of joy is found among the received text contents, that is, 'love', 'happy', and the like, each LED of the plurality of heart-shaped LED panels 150 is sequentially turned on. In addition, when a word indicating abusive language or slang is found, the LED panel 150 is turned on for a predetermined time. **In the next step S19, a predetermined image or emoji is displayed on the flat panel display** 122, the terminal user is notified that the text message has been received, and the flow proceeds to step S57**. For example, when a specific letter is a word related to joy, an emoticon or image of a brightly smiling shape may be expressed.**

In addition to the mobile communication terminal to which the present invention is applied, a camera driver 280 for driving the CCD camera 282 under the control of the control unit 210 and the CCD camera 282 installed in place of the main body 110 or the slider 120.), **An image processing unit 284 for processing image data output from the CCD camera** 282, and a GPS processing unit (not shown) for receiving wireless signals emitted from GPS satellites and generating absolute position data of the terminal as necessary. It may be further provided.

In order to achieve the above object, a method of expressing emotion of a mobile communication terminal of the present invention is performed in a mobile communication terminal having a voice / text recognition function and having a memory in which specific voice data and specific text data are stored. Recognizing the contents of a voice or a text message transmitted / received; (b) determining whether the content recognized in the step (a) is specific voice data or specific text data stored in the memory; and (c) as a result of the determination in the step (b), the recognized content is the specific voice. In the case of data or specific character data, an **emotional expression** method of a mobile communication terminal including generating a predetermined event is provided.
Hereinafter, with reference to the accompanying drawings will be described in detail with respect to the expression method of the mobile terminal according to a preferred embodiment of the present invention.

The present invention relates to an **emotional expression** method of a mobile communication terminal, and more particularly, to an **emotional expression** method of a mobile communication terminal to express the emotional state of a terminal user by recognizing contents of a call voice and a text message transmitted / received.

Next, the controller 210 stores the text data or the voice stored in the data storage unit 244 in a call voice or a text message transmitted / received based on the text recognition program and the voice recognition program stored in the program storage unit 242. If data is found, the LED panel 150 is driven in a predetermined manner, **or an image or emoticon corresponding to the found specific character or specific voice is displayed on the flat panel display 122.**

For example, when a specific letter is a word related to joy, an emoticon or image of a brightly smiling shape may be expressed.

ProQuest Dialog – Inventors search

Search Strategy

Databases: Argentina Patents Fulltext, Australia Patents Fulltext, Austria Patents Fulltext, Belgium Patents Fulltext, Brazil Patents Fulltext, Canada Patents Fulltext, China Patents Fulltext, Denmark Patents Fulltext, Derwent Patents Citation Index®, Derwent World Patents Index®, Eurasia Patents Fulltext, European Patents Fulltext, Finland Patents Fulltext, France Patents Fulltext, Germany Patents Fulltext, Global Patents Bibliographic, Great Britain Patents Fulltext, IFI CLAIMS® US Patents and Legal Status, IMS Patent Focus, India Patents Fulltext™, INPADOC / Family and Legal Status, Ireland Patents Fulltext, Italy Patents Fulltext, Japan Patents Fulltext, JAPIO - Patent Abstracts of Japan, Korea Patents Fulltext, Luxembourg Patents Fulltext, Mexico Patents Fulltext, Monaco Patents Fulltext, Netherlands Patents Fulltext, Norway Patents Fulltext, Portugal Patents Fulltext, Russia Patents Fulltext, Spain Patents Fulltext, Sweden Patents Fulltext, Switzerland Patents Fulltext, United States Patents Fulltext, WIPO PCT Patents Fulltext

Set#	Searched for	Results
S1	inv(LEUTHARDT PRE/1 E* or STERN PRE/1 S*)	10967
S2	s1 and (display$3 or show$3 Or render$3 Or present$3 Or view$3 or depict$3 Or (made or make$1 or making) p/2 (known or visible or access$4)) n/5 (graphic$3 p/0 image$1 or emoticon$1 or emotion p/0 icon$1 or emoji$1 or emotag$1 or kaomoji or smilely-face$1 or smiley$1)	109
S3	s2 and (expression$1 or facial-expression$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1)) n/4 (recogni$4 or detect$3 or sens$3 or perceiv$3 or identif$7 or discern$3 or distinguish$3 or determin$5)	11
S4	s3 and (match$3 or "same" or equal or equivalent or identical or associat$3 or mated or mating or (paired or pairing or put or puts or putting or gather$3) p/0 together or interrelated or relat$8 or correlat$4) n/4 (expression$1 or facial-expression$1 or sentiment$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1))	3
S5	s4 and (sms or mms or messaging or (short p/0 message or multi p/0 media or multimedia or transmedia) p/0 service or text or texts or texting or texted or txt or textmessag$3 or text p/0 messag$3 or mobile)	3

Expression recognition in messaging systems

Publication info: Leuthardt, Eric; Stern, Scott (Inventors). FACETOFACE BIOMETRICS, INC. (Assignee). US 10275583 B2 . (Published 30 Apr 2019).
Databases: United States Patents Fulltext (1790 - current)

Computer-implemented method for operating a messaging application on a computing device, such as personal computer, involves determining human expression based on the detected biometric signature

Publication info: Leuthardt, E; Stern, S (Inventors). FACETOFACE BIOMETRICS INC (Assignee). US 10275583 B2 . (Published 30 Apr 2019). 201562 (First update). 201931 (Last update). Drawing available.
Databases: Derwent World Patents Index® (1963 - current)

ProQuest Dialog – Authors search

Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, Abstracts in New Technology & Engineering, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, Allied & Complementary Medicine™, APA PsycInfo®, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, Drug Information Fulltext, EconLit, Ei Compendex®, Embase®, EMCare®, FLUIDEX (Fluid Engineering Abstracts), Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, Inspec®, International Pharmaceutical Abstracts, King's Fund, Lancet Titles, Mechanical & Transportation Engineering Abstracts, Mechanical & Transportation Engineering Abstracts, MEDLINE®, New England Journal of Medicine, NTIS: National Technical Information Service, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Advanced Tech & Aerospace Professional, ProQuest Newsstand Professional, Prous Science Drug Data Report, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, Transport Research International Documentation, UBM Computer Full Text

Set#	Searched for	Results
S1	au(LEUTHARDT N/2 ERIC or STERN N/2 SCOTT)	449°
S2	s1 and (display$3 or show$3 Or render$3 Or present$3 Or view$3 or depict$3 Or (made or make$1 or making) p/2 (known or visible or access$4)) n/5 (graphic$3 p/0 image$1 or emoticon$1 or emotion p/0 icon$1 or emoji$1 or emotag$1 or kaomoji or smilely-face$1 or smiley$1)	0°
S3	s1 and (expression$1 or facial-expression$1 or feel$4 or emotion$1 or emotional p/0 (state or context or attitude$1)) n/4 (recogni$4 or detect$3 or sens$3 or perceiv$3 or identif$7 or discern$3 or distinguish$3 or determin$5)	1°
S4	s3 and (captured or scanned) p/0 (image or photo* or picture or pic$1 or GIF or JPEG OR JPG) n/4 (person$1 or people or individual$1 or someone$1 or user$1 or customer$1 or consumer$1)	0°

° Duplicates are removed from the search and from the result count.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	31	G06Q30/0271.cpc. and emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/06/17 19:21

EAST Search History (Interference)

<This search history is empty>

6/17/2020 7:21:46 PM

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	1	"20130185648".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/06/17 18:34
S1	602	simulat$3 with (facial near2 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/06/17 16:42
S2	10	S1 and emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/06/17 16:45

EAST Search History (Interference)

<This search history is empty>

6/17/2020 7:20:34 PM
C:\Users\sanderson2\Documents\EAST\Workspaces\16831432a.wsp

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/831,432	03/26/2020	Eric Leuthardt	36893-7

CONFIRMATION NO. 9096

PUBLICATION NOTICE

76656
Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

OC000000118514842

Title:EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

Publication No.US-2020-0226239-A1
Publication Date:07/16/2020

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 Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, 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 https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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

IPR2023-00833
Apple EX1002 Page 172

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

76656 7590 09/04/2020

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	
ANDERSON, SCOTT C	

ART UNIT	PAPER NUMBER
3694	

NOTIFICATION DATE	DELIVERY MODE
09/04/2020	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):

USpatents@armstrongteasdale.com

Applicant-Initiated Interview Summary	**Application No.** 16/831,432	**Applicant(s)** Leuthardt et al.	
	Examiner SCOTT C ANDERSON	**Art Unit** 3694	**AIA (FITF) Status** Yes

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

(1) SCOTT C. ANDERSON. (3) _____.

(2) Lucas Amodio. (4) _____.

Date of Interview: 31 August 2020.

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

Exhibit shown or demonstration conducted: ☑ Yes ☐ No.
If Yes, brief description: Draft amendment for discussion purposes.

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: Breen, Kim.

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...)

We discussed the proposed amendment and the Examiner explained how he would use the combination of Breen and Kim disclosed in the prior Office action to meet the revised limitations. We discussed the double patenting rejections and the options available to the applicant in regard to that. No specific agreement was reached, and the Office will await the applicant's formal reply.

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

/SCOTT C ANDERSON/ Examiner, Art Unit 3694	

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.

Do not enter. /S.C.A./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Leuthardt et al.	:	
	:	Art Unit: 3694
Serial No.: 16/831,432	:	
	:	Examiner: Anderson, Scott C.
Filed: March 26, 2020	:	
	:	Confirmation No: 9096
For: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	:	

INTERVIEW AGENDA - NOT FOR ENTRY INTO THE RECORD

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

For the Examiner Interview scheduled for the above-referenced application, the following interview agenda is provided:

- An overview of the application and the claims.
- Discussion of the amendments in view of the Breen reference.
- Further discussion of the present claims and the cited art.

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DRAFT CLAIM – FOR DISCUSSION ONLY

1. (proposed) A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

receive, from a user, a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the user selected emoticon to generate a modified emoticon ~~by simulating~~ that simulates the detected human facial expression on the user selected emoticon; and

route a message with the modified emoticon to a second computer device.

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Apple EX1002 Page 177

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. 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.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16831432	Filing Date	2020-03-26	Docket Number (if applicable)	36893-7	Art Unit	3694
First Named Inventor	Eric Leuthardt			Examiner Name	Anderson, Scott C.		

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 _____

☒ 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 012384

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

X Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. 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	/Lucas M. Amodio/	Date (YYYY-MM-DD)	2020-09-23
Name	Lucas M. Amodio	Registration Number	70239

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.

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.

Electronic Patent Application Fee Transmittal

Application Number:	16831432
Filing Date:	26-Mar-2020
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Filer:	Lucas M Amodio/Gwendolyn Menz
Attorney Docket Number:	36893-7

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:				
INDEPENDENT CLAIMS IN EXCESS OF 3	2201	1	230	230
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
RCE- 1ST REQUEST	2801	1	650	650
		Total in USD ($)		**880**

Electronic Acknowledgement Receipt

EFS ID:	40647088
Application Number:	16831432
International Application Number:	
Confirmation Number:	9096
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Customer Number:	76656
Filer:	Lucas M Amodio/Gwendolyn Menz
Filer Authorized By:	Lucas M Amodio
Attorney Docket Number:	36893-7
Receipt Date:	23-SEP-2020
Filing Date:	26-MAR-2020
Time Stamp:	17:41:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$880
RAM confirmation Number	E20209MH41462861
Deposit Account	012384
Authorized User	Gwendolyn Menz

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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		36893-7_Amendment_After_Final_23SEP2020-37797021.pdf	114814 3f2c2c4abef6e0408e19ee66f230409601e79297	yes	11

	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	11

Warnings:					
Information:					
2	Request for Continued Examination (RCE)	36893-7_RCE_23SEP2020-37797057.pdf	1349924 a74244c6130dc1ec1e5aa7b35fc5ec7b7282e0f1	no	3
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32148 ce3db4c77ac11b63a4e91647ac8189b55dba5bf4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1496886		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Eric Leuthardt	:	
	:	Art Unit: 3694
Serial No.: 16/831,432	:	
	:	Examiner: Anderson, Scott C.
Filed: March 26, 2020	:	
	:	Confirmation No: 9096
For: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	:	

AMENDMENT AFTER FINAL

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

In response to the Office Action dated June 23, 2020, and made Final, please amend the above-identified patent application and consider the following remarks.

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IN THE CLAIMS:

1. (Currently amended) A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

receive a selection of an emoticon;

detect a plurality of human facial expressions using one or more sensors of the computer device;

automatically modify the selected emoticon to generate a modified emoticon ~~by simulating~~ that simulates the detected that simulates plurality of human facial expressions on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

2. (Original) The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

3. (Original) The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

4. (Original) The computer device of Claim 1, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

5. (Original) The computer device of Claim 1, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

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6. (Original) The computer device of Claim 1, where the at least one processor is further programmed to analyze the human facial expression using an expression recognition process to detect the human facial expression.

7. (Original) The computer device of Claim 1, wherein the modified emoticon is embedded at a displayable portion of the message.

8. (Original) The computer device of Claim 1, wherein the human facial expression is captured in real-time from the one or more sensors.

9. (Currently amended) A computer-implemented method of operating a messaging application, the method comprising:

receiving a selection of an emoticon;

detecting a first human facial expression and a second subsequent human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon to generate a modified emoticon ~~by simulating~~ that simulates the detected first human facial expression and then the subsequent second human facial expression on the selected emoticon; and

route a message with the modified emoticon to a second computer device.

10. (Original) The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

11. (Original) The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

12. (Original) The computer-implemented method of Claim 9, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

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13. (Original) The computer-implemented method of Claim 9, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

14. (Original) The computer-implemented method of Claim 9, further comprising analyzing the human facial expression using an expression recognition process to detect the human facial expression.

15. (Cancelled)

16. (Original) The computer-implemented method of Claim 9, wherein the human facial expression is captured in real-time from the one or more sensors.

17. (Currently amended) At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device, the computer-executable instructions cause the processor to:

receive a selection of an emoticon;

detect a human facial expression using one or more sensors of the computer device;

automatically modify the selected emoticon to generate a modified emoticon ~~by simulating~~ that displays the selected emoticon changing to the detected human facial expression ~~on the selected emoticon~~; and

route a message with the modified emoticon to a second computer device, wherein the second computer device displays the selected emoticon changing to the detected human facial expression.

18. (Cancelled)

19. (Cancelled)

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20. (Original) The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

21. (New) A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

detect a human facial expression using one or more sensors of the computer device;

determine a contextual tag for the detected human facial expression; and

store the contextual tag for the detected human facial expression.

22. (New) The computer-implemented method of Claim 9, further comprising continuously detecting human facial expressions using one or more sensors of the computer device after detecting the first human facial expression

23. (New) The computer device of Claim 1, wherein the at least one processor is further programmed to detect a human facial expression on a periodic basis based on a predetermined period of time

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REMARKS

The Office Action dated June 23, 2020, and made Final, has been carefully reviewed and the foregoing amendments and following remarks have been made in consequence thereof.

Claims 1-14, 16, 17, and 20-23 are pending in this application. Claims 1-20 stand rejected. Claims 1, 9, and 17 have been amended. Claims 15, 18, and 19 have been cancelled. Claims 21-23 are herein added. No new matter is added. Support for these amendments can at least be found in Paragraphs [0021] and [0048].

Examiner Interview Summary

Applicant wishes to thank Examiner Anderson for his time and the courtesies extended during an Examiner Interview conducted on August 31, 2020 with Applicant's representative. During the interviews, the present rejection and a proposed amendment to the Claims was discussed. The Examiner made suggestions of different ways forward. No agreements were reached. This response is in furtherance of that discussion.

Double Patenting

Claims 1, 8, 9, 16, and 17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claim 1 of U.S. Patent No. 10,275,583. Applicant will consider filing a terminal disclaimer to obviate the rejection when it is the last remaining rejection in the application and the presently pending claims have been indicated as allowable, but for the rejection.

35 U.S.C. 103 Rejection

The rejection of Claims 1, 4, 5, 9, 12, 13, 17, and 20 under 35 U.S.C. § 103 as being allegedly unpatentable over U.S. Patent Application Publication No. 2015/0015690 to Roh et al. (hereinafter referred to as "Roh") in view of U.S. Patent Application Publication No. 2013/0185648 to Kim and further in view of U.S. Patent Application Publication No. 2008/0218472 to Breen et al. (hereinafter referred to as "Breen") is respectfully traversed.

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Roh describes an electronic device 100. The electronic device 100 includes a touch screen; a camera 121; a microphone 122; and a controller 180 configured to display the execution screen of a predetermined application on the touch screen, control the camera 121 and the microphone 122 to operate upon entering reaction capture mode, acquire a reaction image by capturing a video or still image of a user through the camera 121 upon detecting the user making a facial expression or gesture through the camera 121 or the user's voice through the microphone 122, and display the acquired reaction image on the touch screen. (See Abstract). Roh does not describe or suggest a computer device programmed to detect a plurality of human facial expressions using one or more sensors of the computer device and automatically modify the selected emoticon to generate a modified emoticon that simulates the detected that simulates plurality of human facial expressions on the selected emoticon, as is recited in amended Claim 1.

Kim does not rectify the deficiencies of Roh. Kim is cited to describe "a user may 'select an emoticon'". Accordingly, Kim does not describe or suggest a computer device programmed to detect a plurality of human facial expressions using one or more sensors of the computer device and automatically modify the selected emoticon to generate a modified emoticon that simulates the detected that simulates plurality of human facial expressions on the selected emoticon, as is recited in amended Claim 1.

Breen does not rectify the deficiencies of Roh. Breen describes a method of interacting with an application 32. The method includes receiving data generated based on signals from one or more bio-signal detectors 12 on a user, the data representing a mental state or facial expression of the user. The method also includes generating an input event based on the data representing the mental state or facial expression of the user. The method further includes passing the input event to an application 32. Breen describes using the input event to generate a keyboard event for generate an emoticon in a chat session. Breen does not describe display changing the emoticon to a detected human facial expression. Accordingly, Breen does not describe or suggest a computer device programmed to detect a plurality of human facial expressions using one or more sensors of the computer device and automatically modify the selected emoticon to generate a modified emoticon that simulates the detected that simulates plurality of human facial expressions on the selected emoticon, as is recited in amended Claim 1

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No combination of Roh, Kim, and Breen describes or suggests a computer device as is recited in Claim 1. More specifically, no combination of Roh, Kim, and Breen describes or suggests a computer device programmed to detect a plurality of human facial expressions using one or more sensors of the computer device and automatically modify the selected emoticon to generate a modified emoticon that simulates the detected that simulates plurality of human facial expressions on the selected emoticon, as is recited in amended Claim 1. Accordingly, Applicant submits that Claim 1 is patentable over Roh in view of Kim and further in view of Breen.

Claims 4 and 5 depend from independent Claim 1. When the recitations of Claims 4 and 5 are considered in combination with the recitations of independent Claim 1, Applicant submits that Claims 4 and 5 likewise are patentable over Roh in view of Kim and further in view of Breen.

To the extent claims 9 and 17 recite limitations similar to those in Claim 1, Claims 9 and 17 are also patentable over Roh in view of Kim and further in view of Breen.

Claims 12 and 13 depend from independent Claim 9. Claim 20 depends from independent Claim 17. When the recitations of Claims 12, 13, and 20 are considered in combination with the recitations of their respective independent claims, Applicant respectfully submits that dependent Claims 12, 13, and 20 likewise are patentable over Roh in view of Kim and further in view of Breen.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 1, 4, 5, 9, 12, 13, 17, and 20 be withdrawn.

The rejection of Claims 2, 7, 10, 15, and 18 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2011/0296324 to Goossens et al. (hereinafter referred to as "Goossens") is respectfully traversed.

Claims 2 and 7 depend from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Goossens does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that

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dependent Claims 2 and 7 are patentable over Roh in view of Kim and Breen and further in view of Goossens.

Claim 10 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Goossens does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 10 is patentable over Roh in view of Kim and Breen and further in view of Goossens.

Claims 15 and 18 are herein cancelled.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 2, 7, 10, 15, and 18 be withdrawn.

The rejection of Claims 3, 11, and 19 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2013/0322705 to Wong is respectfully traversed.

Claim 3 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Wong does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 3 is patentable over Roh in view of Kim and Breen and further in view of Wong.

Claim 11 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Wong does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 11 is patentable over Roh in view of Kim and Breen and further in view of Wong.

Claim 19 is herein cancelled.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 3, 11, and 19 be withdrawn.

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The rejection of Claims 6 and 14 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2013/0300900 to Pfister et al. (hereinafter referred to as "Pfister") is respectfully traversed.

Claim 6 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Pfister does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 6 is patentable over Roh in view of Kim and Breen and further in view of Pfister.

Claim 14 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Pfister does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 14 is patentable over Roh in view of Kim and Breen and further in view of Pfister.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 6 and 14 be withdrawn.

The rejection of Claims 8 and 16 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2011/0304629 to Winchester is respectfully traversed.

Claim 8 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Winchester does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 8 is patentable over Roh in view of Kim and Breen and further in view of Winchester.

Claim 16 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Winchester does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that

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dependent Claim 16 is patentable over Roh in view of Kim and Breen and further in view of Winchester.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 8 and 16 be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully requested.

Respectfully submitted,

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Apple EX1002 Page 196

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/831,432	Filing Date 03/26/2020	☐ 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 $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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	09/23/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 3	= 1		x $230 =	230
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	230

		(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".	/RANELL D GRAY/
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16831432
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	3694
Examiner Name	Scott C. Anderson
Attorney Docket Number	36893-7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8203530	B2	2012-06-19	CHIANG	
	2	9104907	B2	2015-08-11	WHITEHILL et al.	
	3	9105119	B2	2015-08-11	WHITEHILL et al.	
	4	9189797	B2	2015-11-17	GHOSH et al.	
	5	9008416	B2	2015-04-14	MOVELLAN et al.	
	6	8922480	B1	2014-12-30	FREED et al.	
	7	9104905	B2	2015-08-11	WHITEHILL et al.	
	8	9450957	B1	2016-09-20	DANIEL	

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	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	3694
	Examiner Name	Scott C. Anderson
	Attorney Docket Number	36893-7

	9	9443167	B2	2016-09-13	MOVELLAN et al.	

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	1	20120054039	A1	2012-03-01	PATWA et al.	
	2	20070208610	A1	2007-09-06	PISARIS HENDERSON et al.	
	3	20100141662	A1	2010-06-10	STOREY et al.	
	4	20150049953	A1	2015-02-19	MOVELLAN et al.	
	5	20150046996	A1	2015-02-12	SLABY et al.	
	6	20140316881	A1	2014-10-23	MOVELLAN et al.	
	7	20120011120	A1	2012-01-12	BURNAND et al.	
	8	20120054311	A1	2012-03-01	MIZUNO et al.	

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	First Named Inventor	Eric Leuthardt
	Art Unit	3694
	Examiner Name	Scott C. Anderson
	Attorney Docket Number	36893-7

	9	20090016617	A1	2009-01-15	BREGMAN-AMITAI et al.	
	10	20140366158	A1	2014-12-11	HAN et al.	
	11	20140314284	A1	2014-10-23	MOVELLAN et al.	
	12	20050251688	A1	2005-11-10	NANAVATI et al.	
	13	20110125844	A1	2011-05-26	COLLIER et al.	
	14	20150381575	A1	2015-12-31	BHARGAV-SPANTZEL et al.	
	15	20150287054	A1	2015-10-08	MOVELLAN et al.	
	16	20090141895	A1	2009-06-04	ANDERSON et al.	
	17	20130005443	A1	2013-01-03	KOSTA et al.	

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	Application Number	16831432
	Filing Date	2020-03-26
	First Named Inventor	Eric Leuthardt
	Art Unit	3694
	Examiner Name	Scott C. Anderson
	Attorney Docket Number	36893-7

	1	2014127065	WO	A2	2014-08-21	EMOTIENT		
	2	2014127065	WO	A3	2014-10-16	EMOTIENT		
	3	2014127333	WO	A1	2014-08-21	EMOTIENT		

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	1	Alan Mislove; A secure, resilient, cooperative messaging system; researchgate.net: 2003; page: 1-6	

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	Application Number	16831432
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	Art Unit	3694
	Examiner Name	Scott C. Anderson
	Attorney Docket Number	36893-7

CERTIFICATION STATEMENT

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Lucas M. Amodio/	Date (YYYY-MM-DD)	2020-11-23
Name/Print	Lucas M. Amodio	Registration Number	70239

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17 February 2014 (17.02.2014)

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61/765,570 15 February 2013 (15.02.2013) US

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Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

WO 2014/127333 A1

(54) **Title**: FACIAL EXPRESSION TRAINING USING FEEDBACK FROM AUTOMATIC FACIAL EXPRESSION RECOGNITION

(57) **Abstract**: A machine learning classifier is trained to compute a quality measure of a facial expression with respect to a predetermined emotion, affective state, or situation. The expression may be of a person or an animated character. The quality measure may be provided to a person. The quality measure may also used to tune the appearance parameters of the animated character, including texture parameters. People may be trained to improve their expressiveness based on the feedback of the quality measure provided by the machine learning classifier, for example, to improve the quality of customer interactions, and to mitigate the symptoms of various affective and neurological disorders. The classifier may be built into a variety of mobile devices, including wearable devices such as Google Glass and smart watches.

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FACIAL EXPRESSION TRAINING USING FEEDBACK FROM AUTOMATIC FACIAL EXPRESSION RECOGNITION

Inventors:

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Marian Steward Bartlett,

Joshua Susskind,

Ian Fasel,

Gwen Ford Littlewort,

Ken Denman,

and

Jacob Whitehill

CROSS-REFERENCE TO RELATED APLICATION

[0001] This application claims priority from United States provisional patent application Serial Number 61/765,570, entitled FACIAL EXPRESSION TRAINING USING FEEDBACK FROM AUTOMATIC FACIAL EXPRESSION RECOGNITION, filed on February 15, 2013, Attorney Docket Reference MPT-1017-PV, which is hereby incorporated by reference in its entirety as if fully set forth herein, including text, figures, claims, tables, and computer program listing appendices (if present), and all other matter in the United States provisional patent application.

FIELD OF THE INVENTION

[0002] This document generally relates to utilization of feedback from automatic recognition/analysis systems for recognizing expressions conveyed by faces, head poses, and/or

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gestures. In particular, the document relates to the use of feedback for training individuals to improve their expressivity, training animators to improve their ability to generate expressive animation characters, and to automatic selection of animation parameters for improved expressivity.

BACKGROUND

[0003] There is a need for helping people – whether actors, customer service representatives, people with affective or neurological/motor control disorders, or simply people who want to improve their non-verbal communication skills – to learn improved control of their facial expressions, head poses, and/or gestures. There is an additional need to improve parameter selection in computer animation, including parameter selection for texture control. There is also a need to improve the quality of expressivity of facial expression in computer animation, including expression morphology, expression dynamics, and changes in facial texture caused by the changes in morphology and dynamics of the facial expression. This document describes methods, apparatus, and articles of manufacture that may satisfy these and possibly other needs.

SUMMARY

[0004] In an embodiment, a computer-implemented method includes receiving from a user device facial expression recording of a face of a user; analyzing the facial expression recording with a machine learning classifier to obtain a quality measure estimate of the facial expression recording with respect to a predetermined targeted facial expression; and sending to the user device the quality measure estimate for displaying the quality measure to the user.

[0005] In an embodiment, a computer-implemented method for setting animation parameters includes synthesizing an animated face of a character in accordance with current values of one or more animation parameters, the one or more animation parameters comprising at least one texture parameter; computing a quality measure of the animated face synthesized in accordance with current values of one or more animation parameters with respect to a predetermined facial expression; varying the one or more animation parameters according to an optimization algorithm; repeating the steps of synthesizing, computing, and varying until a

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predetermined criterion is met; and displaying facial expression of the character in accordance with values of the one or more animation parameters at the time the predetermined criterion is met. Examples of search and optimization algorithms include stochastic gradient ascent/descent, Broyden–Fletcher–Goldfarb–Shanno ("BFGS"), Levenberg–Marquardt, Gauss-Newton methods, Newton-Raphson methods, conjugate gradient ascent, natural gradient ascent, reinforcement learning, and others.

[0006] In an embodiment, a computer-implemented method includes capturing data representing extended facial expression appearance of a user. The method also includes analyzing the data representing the extended facial expression appearance of the user with a machine learning classifier to obtain a quality measure estimate of the extended facial expression appearance with respect to a predetermined prompt. The method further includes providing to the user the quality measure estimate.

[0007] In an embodiment, a computer-implemented method for setting animation parameters includes obtaining data representing appearance of an animated character synthesized in accordance with current values of one or more animation parameters with respect to a predetermined facial expression. The method also includes computing a current value of quality measure of the appearance of the animated character appearance synthesized in accordance with current values of one or more animation parameters with respect to the predetermined facial expression. The method additionally includes varying the one or more animation parameters according to an algorithm searching for improvement in the quality measure of the appearance of the animated character. The steps of synthesizing, computing, and varying may be repeated until a predetermined criterion of the quality measure is met, in searching for an improved set of the values for the parameters.

[0008] In an embodiment, a computing device includes at least one processor, and machine-readable storage coupled to the at least one processor. The machine-readable storage stores instructions executable by the at least one processor. When the instructions are executed by the at least one processor, the instructions configure the at least one processor to implement a machine learning classifier trained to compute a quality measure of facial expression appearance with a machine learning classifier to obtain a quality measure estimate of the facial expression appearance with respect to a predetermined prompt. The instructions further configure the

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processor to provide to a user the quality measure estimate. The facial appearance may be that of the user, another person, or an animated character.

[0009] These and other features and aspects of the present invention will be better understood with reference to the following description, drawings, and appended claims.

BRIEF DESCRIPTION OF THE FIGURES

[0010] Figures 1A and 1B are simplified block diagram representations of a computer-based systems configured in accordance with selected aspects of the present description;

[0011] Figure 2 illustrates selected steps of a process for providing feedback relating to the quality of a facial expression; and

[0012] Figure 3 illustrates selected steps of a reinforcement learning process for adjusting animation parameters.

DETAILED DESCRIPTION

[0013] In this document, the words "embodiment," "variant," "example," and similar expressions refer to a particular apparatus, process, or article of manufacture, and not necessarily to the same apparatus, process, or article of manufacture. Thus, "one embodiment" (or a similar expression) used in one place or context may refer to a particular apparatus, process, or article of manufacture; the same or a similar expression in a different place or context may refer to a different apparatus, process, or article of manufacture. The expression "alternative embodiment" and similar expressions and phrases may be used to indicate one of a number of different possible embodiments. The number of possible embodiments/variants/examples is not necessarily limited to two or any other quantity. Characterization of an item as "exemplary" means that the item is used as an example. Such characterization of an embodiment/variant/example does not necessarily mean that the embodiment/variant/example is a preferred one; the embodiment/variant/example may but need not be a currently preferred one. All embodiments/variants/examples are described for illustration purposes and are not necessarily strictly limiting.

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[0014] The words "couple," "connect," and similar expressions with their inflectional morphemes do not necessarily import an immediate or direct connection, but include within their meaning connections through mediate elements.

[0015] "Facial expression" as used in this document signify (1) large scale facial expressions, such as expressions of primary emotions (Anger, Contempt, Disgust, Fear, Happiness, Sadness, Surprise), Neutral expressions, and expression of affective state (such as boredom, interest, engagement, liking, disliking, wanting to buy, amusement, annoyance, confusion, excitement, contemplation/thinking, disbelieving, skepticism, certitude/sureness, doubt/unsureness, embarrassment, regret, remorse, feeling touched); (2) intermediate scale facial expression, such as positions of facial features, so-called "action units" (changes in facial dimensions such as movements of mouth ends, changes in the size of eyes, and movements of subsets of facial muscles, including movement of individual muscles); and (3) changes in low level facial features, *e.g.*, Gabor wavelets, integral image features, Haar wavelets, local binary patterns (LBPs), Scale-Invariant Feature Transform (SIFT) features, histograms of gradients (HOGs), Histograms of flow fields (HOFFs), and spatio-temporal texture features such as spatiotemporal Gabors, and spatiotemporal variants of LBP, such as LBP-TOP; and other concepts commonly understood as falling within the lay understanding of the term.

[0016] "Extended facial expression" means "facial expression" (as defined above), head pose, and/or gesture. Thus, "extended facial expression" may include only "facial expression"; only head pose; only gesture; or any combination of these expressive concepts.

[0017] The word "image" refers to still images, videos, and both still images and videos. A "picture" is a still image. "Video" refers to motion graphics.

[0018] "Causing to be displayed" and analogous expressions refer to taking one or more actions that result in displaying. A computer or a mobile device (such as a smart phone, tablet, Google Glass and other wearable devices), under control of program code, may cause to be displayed a picture and/or text, for example, to the user of the computer. Additionally, a server computer under control of program code may cause a web page or other information to be displayed by making the web page or other information available for access by a client computer or mobile device, over a network, such as the Internet, which web page the client computer or mobile device may then display to a user of the computer or the mobile device.

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[0019] "Causing to be rendered" and analogous expressions refer to taking one or more actions that result in displaying and/or creating and emitting sounds. These expressions include within their meaning the expression "causing to be displayed," as defined above. Additionally, the expressions include within their meaning causing emission of sound.

[0020] A quality measure of an expression is a quantification or rank of the expressivity of an image with respect to a particular expression, that is, how closely the expression is conveyed by the image. The quality of an expression generally depends on multiple factors, including these: (1) spatial location of facial landmarks, (2) texture, (3) timing and dynamics. Some or all of these factors may be considered in computing the measure of the quality of the he quali9ty of an expression will depend on multiple factors including: (1) spatial location of facial landmarks, (2) texture. (3) timing and dynamics. The system we propose takes these factors into consideration to provide the user with a measure of the quality of the expression in the image.

[0021] Other and further explicit and implicit definitions and clarifications of definitions may be found throughout this document.

[0022] Reference will be made in detail to several embodiments that are illustrated in the accompanying drawings. Same reference numerals are used in the drawings and the description to refer to the same apparatus elements and method steps. The drawings are in a simplified form, not to scale, and omit apparatus elements, method steps, and other features that may be added to the described systems and methods, while possibly including certain optional elements and steps.

[0023] In selected embodiments, a computer system is specially configured to measure the quality of the expressions of an animated character, and to apply reinforcement learning to select the values for the character's animation parameters. The basic process is analogous to what is described throughout this document in relation to providing feedback regarding extended facial expressions of human users, except that the graphic flow or still pictures of an animated character may be input into the system, rather than the videos or pictures of a human. Here, the quality of expression of the animation character is evaluated and used as a feedback signal, and the animation parameters are automatically or manually adjusted based on this feedback signal from the automated expression recognition. Adjustments to the parameters may be selected using reinforcement learning techniques such as temporal difference (TD) learning. The parameters may include conventional animation parameters that relate essentially to facial

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appearance and movement, as well as animation parameters that relate and control the surface or skin texture, that is, the appearance characteristics that suggest or convey the tactile quality of the surface, such as wrinkling and goose bumps. Furthermore, we include in the meaning of "texture" grey and other shading properties. A texture parameter is something that an animator can control directly, *e.g.*, the degree of curvature of a surface in a 3D model. This will result on a change in texture that can be measured using Gabor filters. Texture parameters may be pre-defined.

[0024] The reinforcement learning method may be geared towards learning how to adjust animation parameters, which change the positions of facial features, to maximize extended facial expression response, and/or how to change the texture patterns on the image to maximize the facial expression response. Reinforcement learning algorithms may attempt to increase/maximize a reward function, which may essentially be the quality measure output of a machine learning extended facial expression system trained on the particular expression that the user of the system desires to express with the animated character. The animation parameters (which may include the texture parameters) are adjusted or "tweaked" by the reinforcement learning process to search the animation parameter landscape (or part of the landscape) for increased reward (quality measure). In the course of the search, local or global maxima may be found and the parameters of the character may be set accordingly, for the targeted expression.

[0025] A set of texture parameters may be defined as a set of Gabor patches at a range of spatial scales, positions, and/or orientations. The Gabor patches may be randomly selected to alter the image, *e.g.*, by adding the pixel values in the patch to the pixel values at a location in the face image. The parameters may be the weights that define the weighted combination of Gabor patches to add to the image. The new character face image may then be passed to the extended facial expression recognition/analysis system. The output of the system provides feedback as to whether the new face image receives a higher or lower response for the targeted expression (*e.g.*, "happy," "sad," "excited"). This change in response is used as a reinforcement signal to learn which texture patches, and texture patch combinations, create the greatest response for the targeted expression.

[0026] The texture parameters may be pre-defined, such as the bank of Gabor patches in the above example. They may also be learned from a set of expression images. For example, a large

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set of images containing extended facial expressions of human faces and/or cartoon faces showing a range of extended facial expressions may be collected. These faces may then be aligned for the position of specific facial feature points. The alignment can be done by marking facial feature points by hand, or by using a feature point tracking algorithm. The face images are then warped such that the feature points are aligned. The remaining texture variations are then learned. The texture is parameterized through learning algorithms such as principal component analysis (PCA) and/or independent component analysis (ICA). The PCA and ICA algorithms learn a set of basis images. A weighted combination of these basis images defines a range of image textures. The parameters are the weights on each basis image. The basis images may be holistic, spanning the whole M x M face image, or local, associated with a specific N x N window.

[0027] In selected embodiments, a computer system (which term includes smartphones, tablets, and wearable devices such as Google Glass and smart watches) is specially configured to provide feedback to a user on the quality of the user's extended facial expressions, using machine learning classifiers of extended facial expression recognition. The system is configured to prompt the user to make a targeted extended facial expression selected from a number of extended facial expressions, such as "sad," "happy," "disgusted," "excited," "surprised," "fearful," "contemptuous," "angry," "indifferent/uninterested," "empathetic," "raised eyebrow," "nodding in agreement," "shaking head in disagreement," "looking with skepticism," or another expression; the system may operate with any number of such expressions. A still picture or a video stream/graphic clip of the expression made by the user is captured and is passed to an automatic extended facial expression recognition/analysis system. Various measurements of the extended facial expression of the user are made and compared to the corresponding metrics of the targeted expression. Information regarding the quality of the expression of the user is provided to the user, for example, displayed, emailed, verbalized and spoken/sounded.

[0028] In some variants, the prompt or request may be indirect: rather than prompting the user to produce an expression of a specific emotion, a situation is presented to the user and the user is asked to produce a facial expression appropriate to the situation. For example, a video or computer animation may be shown of a person talking in a rude manner in the context of a business transaction. During this time, the person using the system would be requested to display a facial expression or combination of facial expressions appropriate for that situation.

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This may be useful, for example, in training customer service personnel to deal with angry customers.

[0029] The user of the system may be an actor in the entertainment industry; a person with an affective or neurological disorder (*e.g.*, an autism spectrum disorder, Parkinson's disease, depression) who wants to improve his or her ability to produce and understand natural looking facial expressions of emotion; a person with no particular disorder who wants to improve the appearance and dynamics of his or her non-verbal communication skills; a person who wants to learn or interpret the standard facial expressions used in different cultures for different situations; or any other individual. The system may also be used by companies to train their employees on the appropriate use of facial expressions in different business situations or transactions.

[0030] Expression quality of the expression made by the user or the animation character may be measured using the output(s) of one or more classifiers of extended facial expressions. A classifier of extended facial expression is a machine learning classifier, which may implement support vector machines ("SVMs"), boosting classifiers (such as cascaded boosting classifiers, Adaboost, and Gentleboost), multivariate logistic regression ("MLR") techniques, "deep learning" algorithms, action classification approaches from the computer vision literature, such as Bags of Words models, and other machine learning techniques, whether mentioned anywhere in this document or not.

[0031] The output of an SVM may be the margin, that is, the distance to the separating hyperplane between the classes. The margin provides a measure of expression quality. For cascaded boosting classifiers (such as Adaboost), the output may be an estimate of the likelihood ratio of the target class (*e.g.*, "sad") to a non-target class (*e.g.*, "happy" and "all other expressions"). This likelihood ratio provides a measure of expression quality. In embodiments, the system may be configured to record the temporal dynamics of the intensity, or likelihood outputs provided by the classifiers. In embodiments, the output may be an intensity measure indicating the level of contraction of different facial muscle or the level of intensity of the observed expression.

[0032] For systems based on single frame action, a model of the probability distribution of the observed outputs in the sample is developed. This can be done, for example, using standard

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density estimation methods, probabilistic graphical models, and/or discriminative machine learning methods.

[0033] For system that evaluate expression dynamics (rather than just single frame expression), a model is developed for the observed output dynamics. This can be done using probabilistic dynamical models, such as Hidden Markov Processes, Bayesian Nets, Recurrent Neural Networks, Kalman filters, and/or Stochastic Difference and Stochastic Differential equation models.

[0034] The quality measure may be obtained as follows. A collection of images (videos and/or still pictures) is selected by experts for providing high quality in the context of a target expressions. (An "expert" has expertise experts the facial action coding system or analogous ways for coding facial expressions; an "expert" may also be a person with expertise in the expressions appropriate for a particular situation, for example, people familiar with expressions appropriate in the course of conducting Japanese business transactions.) The collection of images may also include negative examples – images that have been selected by the experts for not being particularly good examples of the target expression, or not being appropriate for the particular situation in which the expression is supposed to be produced. The images are processed by an automatic expression recognition system, such as UCSD's CERT, Emotient's FACET SDK. Machine learning methods may then be used to estimate the probability density of the outputs of the system both at the single frame level and across frame sequences in videos. Example methods for single frame level include Kernel probability density estimation and probabilistic graphical models. Example methods for video sequences include Hidden Markov Models, Kalman fitlers and dynamic Bayes nets. These models can provide an estimate of the likelihood of the observed expression parameters given the correct expression group, and an output of the likelihood of the observed expression parameters given the incorrect expression group. Alternatively, the model may provide an estimate of the likelihood ratio of the observed expression parameters given the correct and incorrect expression groups. The quality score of the observed expression may be based on matching the correct group as much as possible and being as different as possible from the incorrect expression group. For example, the quality score would increase as the likelihood of the image given the correct group increases, and decreases as the likelihood of the image given the incorrect group increases.

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[0035] At the time a quality measure needs to be computed for a user-produced expression appropriate to the given situation, or for an animated character, the likelihood of the expression given the probability model for the correct expression or the correct expression dynamics is computed. The higher the computed likelihood, the higher the quality of the expression. In examples, the relationship between the likelihood and the quality is a monotonic one.

[0036] The quality measure may be displayed or otherwise rendered (verbalized and sounded) to the user in real-time, or be a delayed visual display and/or audio vocalization; it may also be emailed to the user, or otherwise provided to the user and/or another person, machine, or entity. For example, a slide-bar or a thermometer display may increase according to the integral of the quality measure over a specific time period. There may be audio feedback with or without visual feedback. For example, a tone may increase in frequency as the expression improves quality. There may be a signal when the quality reaches a pre-determined goal, such as a bell or applause in response to the quality reaching or exceeding a specified threshold. Another form of feedback is to have an animated character start to move its face when the user makes the correct facial configuration for the target emotion, and then increase the animated character's own expression as the quality of the user's expression increases (improves). The system may also provide numerical or other scores of the quality measure, such as a letter grade A-F, or a number on 1-100 scale, or another type of score or grade. In embodiments, multiple measures of expression quality are estimated and used. In embodiments, multiple means of providing the expression quality feedback to the person are used.

[0037] The system that provides the feedback to the users may be implemented on a user mobile device. The mobile device may be a smartphone, a tablet, a Google Glass device, a smart watch, or another wearable device. The system may also be implemented on a personal computer or another user device. The user device implementing the system (of whatever kind, whether mobile or not) may operate autonomously, or in conjunction with a website or another computing device with which the user device may communicate over a network. In the website version, for example, users may visit a website and receive feedback on the quality of the users' extended facial expressions. The feedback may be provided in real-time, or it may be delayed. Users may submit live video with a webcam, or they may upload recorded and stored videos or still images. The images (still, video) may be received by the server of the website, such as a cloud server, where the facial expressions are measured with an automated system such as the

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Computer Expression Recognition Toolbox ("CERT") and/or FACET technology for automated expression recognition. (CERT was developed at the machine perception laboratory of the University of California, San Diego; FACET was developed by Emotient.) The output of the automated extended facial expression recognition system may drive a feedback display on the web. The users may be provided with the option to compare their current scores to their own previous scores, and also to compare their scores (current or previous) to the scores of other people. With permission, the high scorers may be identified on the web, showing their usernames, and images or videos.

[0038] In some embodiments, a distributed sensor system may is used. For example, multiple people may be wearing wearable cameras, such as Google Glass wearable devices. The device worn by a person A captures the expressions of a person B, and the device worn by the person B captures the expressions of the person A. When the devices are networked, either person or both persons can receive quality scores of their own expressions, which have been observed using the cameras worn by the other person. That is, the person A may receive quality scores generated from expressions captured by the camera worn by B and by cameras of still other people; and the person B may receive quality scores generated from expressions captured by the camera worn by A and by cameras of other people. Figure 1A illustrates this paradigm, where users 102 wear camera devices (such as Google Glass devices) 103, which devices are coupled to a system 105 through a network 108.

[0039] The extended facial expressions for which feedback is provided may include the seven basic emotions and other emotions; states relevant to interview success, such as trustworthy, confident, competent, authoritative, compliant, and other states such as Like, Dislike, Interested, Bored, Engaged, Want to buy, Amused, Annoyed, Confused, Excited, Thinking, Disbelieving/Skeptical), Sure, Unsure, Embarrassed, Sorry, Touched, Bored, Neutral, various head poses, various gestures, Action Units, as well as other expressions falling under the rubrics of facial expression and extended facial expression defined above. In addition, feedback may be provided to train people to avoid Action Units associated with deceit.

[0040] Classifiers of these and other states may be trained using the machine learning methods described or mentioned throughout this document.

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[0041] The feedback system may also provide feedback for specific facial actions or facial action combinations from the facial action coding system, for gestures, and for head poses.

[0042] Figure 1B is a simplified block diagram representation of a computer-based system 100, configured in accordance with selected aspects of the present description to provide feedback relating to the quality of a facial expression to a user. The system 110 interacts through a communication network 190 with various users at user devices 180, such as personal computers and mobile devices (*e.g.*, PCs, tablets, smartphones, Google Glass and other wearable devices).

[0043] The systems 105/110 may be configured to perform steps of a method (such as the methods 200 and 300 described in more detail below) for training an expression classifier using feedback from extended facial expression recognition.

[0044] Figures 1A and 1B do not show many hardware and software modules, and omit various physical and logical connections. The systems 105/110 and the user devices 103/180 may be implemented as special purpose data processors, general-purpose computers, and groups of networked computers or computer systems configured to perform the steps of the methods described in this document. In some embodiments, the system is built using one or more of cloud devices, smart mobile devices, and wearable devices. In some embodiments, the system is implemented as a plurality of computers interconnected by a network.

[0045] Figure 2 illustrates selected steps of a process 200 for providing feedback relating to the quality of a facial expression or extended facial expression to a user. The method may be performed by the system 105/110 and/or the devices 103/180 shown in Figures 1A and 1B.

[0046] At flow point 201, the system and a user device are powered up and connected to the network 190.

[0047] In step 205, the system communicates with the user device, and configures the user device 180 for interacting with the system in the following steps.

[0048] In step 210, the system receives from the user a designation or selection of the targeted extended facial expression.

[0049] In step 215, the system prompts or requests the user to form an appearance corresponding to the targeted expression. As has already been mentioned, the prompt may be

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indirect, for example, a situation may be presented to the user and the user may be asked to produce an extended facial expression appropriate to the situation. The situation may be presented to the user in the form of video or animation, or a verbal description.

[0050] In step 220, the user forms the appearance of the targeted or prompted expression, the user device 180 captures and transmits the appearance of the expression to the system, and the system receives the appearance of the expression from the user device.

[0051] In step 225, the system feeds the image (still picture or video) of the appearance into a machine learning expression classifier/analyzer that is trained to recognize the targeted or prompted expression and quantify some quality measure of the targeted or prompted expression. The classifier may be trained on a collection of images of subjects exhibiting expressions corresponding to the targeted or prompted expression. The training data may be obtained, for example, as is described in U.S. Patent Application entitled COLLECTION OF MACHINE LEARNING TRAINING DATA FOR EXPRESSION RECOGNITION, by Javier R. Movellan, *et al.*, Ser. No. 14/177,174, filed on or about 10 February 2014, attorney docket reference MPT-1010-UT; and in U.S. Patent Application entitled DATA ACQUISITION FOR MACHINE PERCEPTION SYSTEMS, by Javier R. Movellan, *et al.*, Ser. No. 14/178,208, filed on or about 11 February 2014, attorney docket reference MPT-1012-UT. Each of these applications is incorporated by reference herein in its entirety. As another example, the training data may also be obtained by eliciting responses to various stimuli (such as emotion-eliciting stimuli), recording the resulting extended facial expressions of the individuals from whom the responses are elicited, and obtaining objective or subjective ground truth data regarding the emotion or other affective state elicited.

[0052] The expressions in the training data images may be measured by automatic facial expression measurement (AFEM) techniques. The collection of the measurements may be considered to be a vector of facial responses. The vector may include a set of displacements of feature points, motion flow fields, facial action intensities from the Facial Action Coding System (FACS). Probability distributions for one or more facial responses for the subject population may be calculated, and the parameters (*e.g.*, mean, variance, and/or skew) of the distributions computed.

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[0053] The machine learning techniques used here include support vector machines ("SVMs"), boosted classifiers such as Adaboost and Gentleboost, "deep learning" algorithms, action classification approaches from the computer vision literature, such as Bags of Words models, and other machine learning techniques, whether mentioned anywhere in this document or not.

[0054] After the training, the classifier may provide information about new, unlabeled data, such as the estimates of the quality of new images.

[0055] In one example, the training of the classifier and the quality measure are performed as follows:

[0056] First, a sample of images (*e.g.*, videos) of people making facial expressions appropriate for a given situation is obtained.

[0057] One or more experts confirm that, indeed, the expression morphology and/or expression dynamics observed in the images are appropriate for the given situation. For example, a Japanese expert may verify that the expression dynamics observed in a given video are an appropriate way to express grief in Japanese culture.

[0058] The images are run through the automatic expression recognition system, to obtain the frame-by-frame output of the system.

[0059] In alternative implementations, videos of expressions and expression dynamics that are not appropriate for a given situation (negative examples) are collected and also used in the training. .

[0060] In step 230, the system 105/110 sends to the user device 180 the estimate of the quality by itself or with additional information, such as predetermined suggestions for improving the quality of the facial expression to make it appear more like the target expression. Also, the system may provide specific information for why the quality measure is large or small. For example, the system may be configured to indicate that the dynamics may be correct, but the texture may need improvement. Similarly, the system may be configured to indicate that the morphology is correct, bur the dynamics need improvement.

[0061] At flow point 299, the process 299 may terminate, to be repeated as needed for the same user and/or other users, and for the same target expression or another target expression.

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[0062] The process 200 may also be performed by a single device, for example, the user device 180. In this case, the user device 180 receives from the user a designation or selection of the targeted extended facial expression, prompts or requests the user to form an appearance corresponding to the targeted expression, captures the appearance of the expression produced by the user, processes the image of the appearance with a machine learning expression classifier/analyzer trained to recognize the targeted or prompted expression and quantify a quality measure, and renders to the user the quality measure and/or additional information.

[0063] Figure 3 illustrates selected steps of a reinforcement learning process 300 for adjusting animation parameters, beginning with flow point 301 and ending with flow point 399.

[0064] In step 305, initial animation parameters are determined, for example, received from the animator or read from a memory device storing a predetermined initial parameter set.

[0065] In step 310, the character face is created in accordance with the current values of the animation parameters.

[0066] In step 315, the face is inputted into a machine learning classifier/analyzer for the targeted extended facial expression (*e.g.*, expression of the targeted emotion).

[0067] In step 320, the classifier computes a quality measure of the current extended facial expression, based on the comparison with the targeted expression training data.

[0068] Decision block 325 determines whether the reinforcement learning process should be terminated. For example, the process may be terminated if a local maxima of the parameter landscape is found or approached, or if another criterion for terminating the process has been reached. In embodiments, the process is terminated by the animator. If the decision is affirmative, process flow terminates in the flow point 399.

[0069] Otherwise, the process continues to step 330, where one or more of the animation parameters (possibly including one or more texture parameters) are varied in accordance with some (maxima) searching algorithm..

[0070] Process flow then returns to the step 310.

[0071] The system and process features described throughout this document may be present individually, or in any combination or permutation, except where presence or absence of specific

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feature(s)/element(s)/limitation(s) is inherently required, explicitly indicated, or otherwise made clear from the context.

[0072] Although the process steps and decisions (if decision blocks are present) may be described serially in this document, certain steps and/or decisions may be performed by separate elements in conjunction or in parallel, asynchronously or synchronously, in a pipelined manner, or otherwise. There is no particular requirement that the steps and decisions be performed in the same order in which this description lists them or the Figures show them, except where a specific order is inherently required, explicitly indicated, or is otherwise made clear from the context. Furthermore, not every illustrated step and decision block may be required in every embodiment in accordance with the concepts described in this document, while some steps and decision blocks that have not been specifically illustrated may be desirable or necessary in some embodiments in accordance with the concepts. It should be noted, however, that specific embodiments/variants/examples use the particular order(s) in which the steps and decisions (if applicable) are shown and/or described.

[0073] This document describes the inventive apparatus, methods, and articles of manufacture for providing feedback relating to the quality of a facial expression. This document also describes adjustment of animation parameters related to facial expression through reinforcement learning. In particular, this document describes improvement of animation through morphology, *i.e.*, the spatial distribution and shape of facial landmarks. This is controlled with traditional animation parameters like FAPS or FACS based animation. Furthermore, this document describes texture parameter manipulation (*e.g.*, wrinkles and shadows produced by the deformation of facial tissues created by facial expressions) is described. Still further, the document describes dynamics of how the different components of the facial expression evolve through time. The described technology can help people animation system get better, by scoring animations produced by the computer and allowing the animators to make changes by hand to get better. The described technology improves the animation improved automatically, using optimization methods. Here, the animation parameters are the variables that affect the optimized function. The quality of expression output provided by the described systems and methods may be the function optimized.

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[0074] The specific embodiments or their features do not necessarily limit the general principles described in this document. The specific features described herein may be used in some embodiments, but not in others, without departure from the spirit and scope of the invention(s) as set forth herein. Various physical arrangements of components and various step sequences also fall within the intended scope of the invention. Many additional modifications are intended in the foregoing disclosure, and it will be appreciated by those of ordinary skill in the pertinent art that in some instances some features will be employed in the absence of a corresponding use of other features. The illustrative examples therefore do not necessarily define the metes and bounds of the invention and the legal protection afforded the invention, which function is carried out by the claims and their equivalents.

[0075] What is claimed is:

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CLAIMS

1. A computer-implemented method comprising steps of:

capturing data representing facial expression appearance of a user;

analyzing the data representing the facial expression appearance of the user with a machine learning classifier to obtain a quality measure estimate of the facial expression appearance with respect to a predetermined prompt; and

providing to the user the quality measure estimate.

2. A computer-implemented method as in claim 1, further comprising:

providing to the user additional information, wherein the additional information comprises a suggestion for improving response of the user to the predetermined prompt.

3. A computer-implemented method as in claim 1, further comprising:

providing the predetermined prompt to the user.

4. A computer-implemented method as in claim 3, wherein:

the predetermined prompt comprises a request to display a facial expression of a predetermined emotion or affective state.

5. A computer-implemented method as in claim 3, wherein:

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the predetermined prompt comprises a presentation of a situation and a request to produce a facial expression appropriate to the situation.

6. A computer-implemented method as in claim 3, wherein:

the predetermined prompt comprises a presentation of a situation and a request to produce a facial expression appropriate to the situation, wherein the situation pertains to customer service within purview of the user.

7. A computer-implemented method as in claim 1, wherein:

the step of analyzing is performed by a first system;

the step of capturing is performed by a second system, the second system being a mobile device coupled to the first system through a wide area network.

8. A computer-implemented method as in claim 7, wherein the mobile device is a wearable device.

9. A computer-implemented method as in claim 1, wherein:

the step of analyzing is performed by a first system;

the step of capturing is performed by a first mobile wearable device coupled to the first system through a network; and

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the step of providing to the user the quality measure estimate comprises:

transmitting the quality estimate from the first system to a second wearable device coupled to the first system through the network; and

rendering the quality measure estimate to the user by the second wearable device.

10. A computer-implemented method as in claim 9, wherein the second wearable device is built into glasses.

11. A computer-implemented method as in claim 1, wherein the predetermined prompt is designed to elicit an expression corresponding to a primary emotion.

12. A computer-implemented method as in claim 1, wherein:

the user suffers from an affective or neurological disorder;

the method further comprising:

providing to the user additional information, wherein the additional information comprises at least one of a suggestion for improving expressiveness and improving expression understanding of the people with the disorder.

13. A computer-implemented method as in claim 1, wherein:

the user is of a first cultural background; and

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the quality measure estimate pertains to a second cultural background.

14. A computer-implemented method for setting animation parameters, the method comprising steps of:

obtaining data representing appearance of an animated character synthesized in accordance with current values of one or more animation parameters with respect to a predetermined facial expression;

computing a current value of quality measure of the appearance of the animated character appearance synthesized in accordance with current values of one or more animation parameters with respect to the predetermined facial expression;

varying the one or more animation parameters according to an algorithm searching for improvement in the quality measure of the appearance of the animated character; and

repeating the steps of synthesizing, computing, and varying until a predetermined criterion of the quality measure is met.

15. A computer-implemented method as in claim 14, wherein the quality measure is a measure of expressiveness of a targeted emotion or affective state.

16. A computer-implemented method as in claim 15, wherein the step of varying is performed automatically by a computer system.

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17. A computer-implemented method as in claim 14, wherein the step of obtaining comprises:

synthesizing an animated face of a character in accordance with current values of one or more animation parameters, the one or more animation parameters comprising at least one texture parameter.

18. A computer-implemented method as in claim 14, further comprising:

displaying facial expression of the character in accordance with values of the one or more animation parameters at the time the predetermined criterion is met.

19. A computer-implemented method as in claim 14, wherein the one or more animation parameters comprise at least one texture parameter.

20. A computing device comprising:

at least one processor; and

machine-readable storage, the machine-readable storage being coupled to the at least one processor, the machine-readable storage storing instructions executable by the at least one processor;

wherein:

the instructions, when executed by the at least one processor, configure the at least one processor to implement a machine learning classifier trained to compute a quality measure of

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facial expression appearance with a machine learning classifier to obtain a quality measure estimate of the facial expression appearance with respect to a predetermined prompt; and

providing to a user the quality measure estimate.

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Sheet 1/4

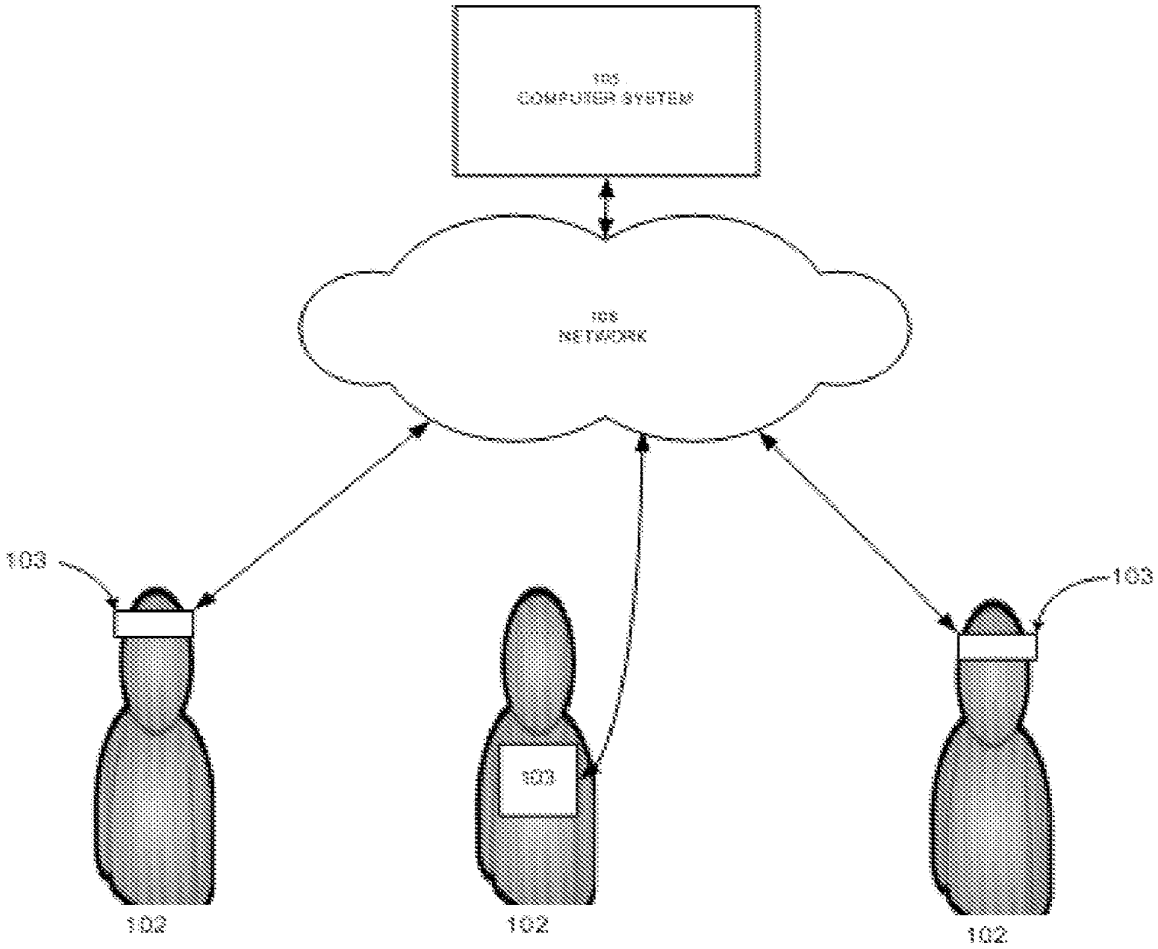


FIG. 1A

Sheet 2/4

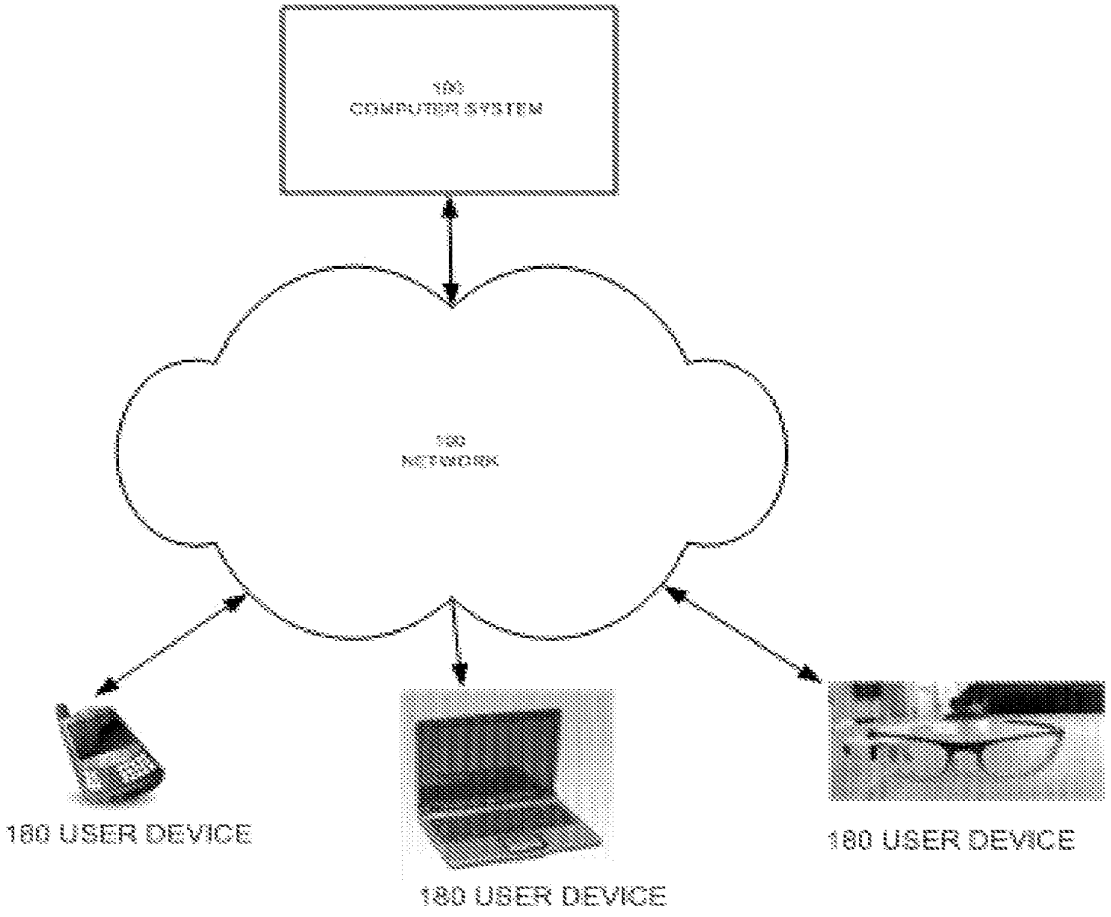


FIG. 1B

Sheet 3/4

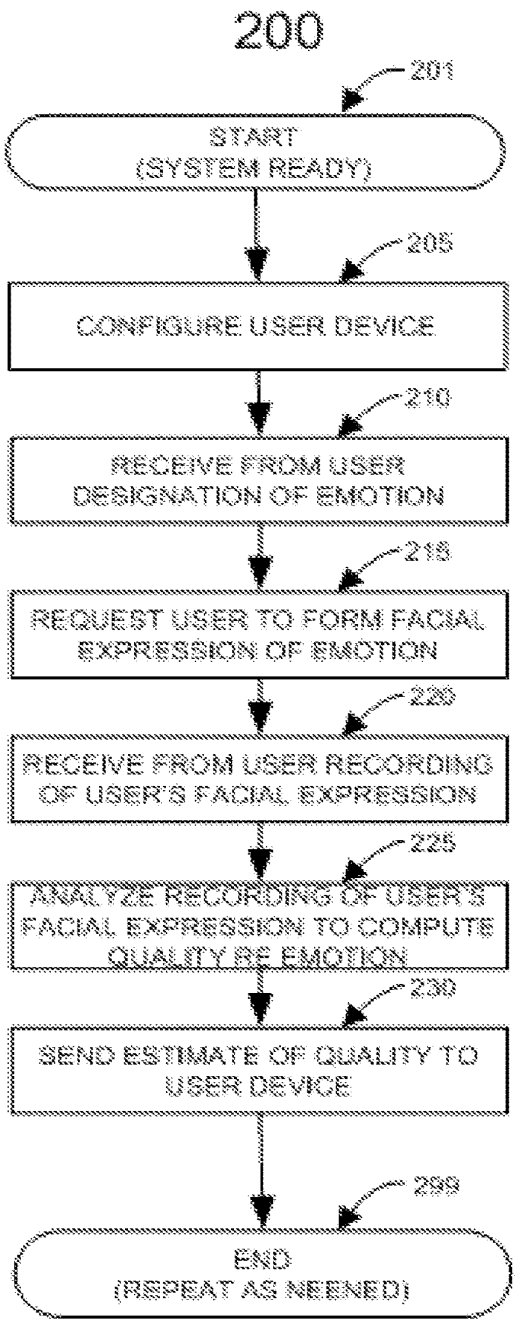


FIG. 2

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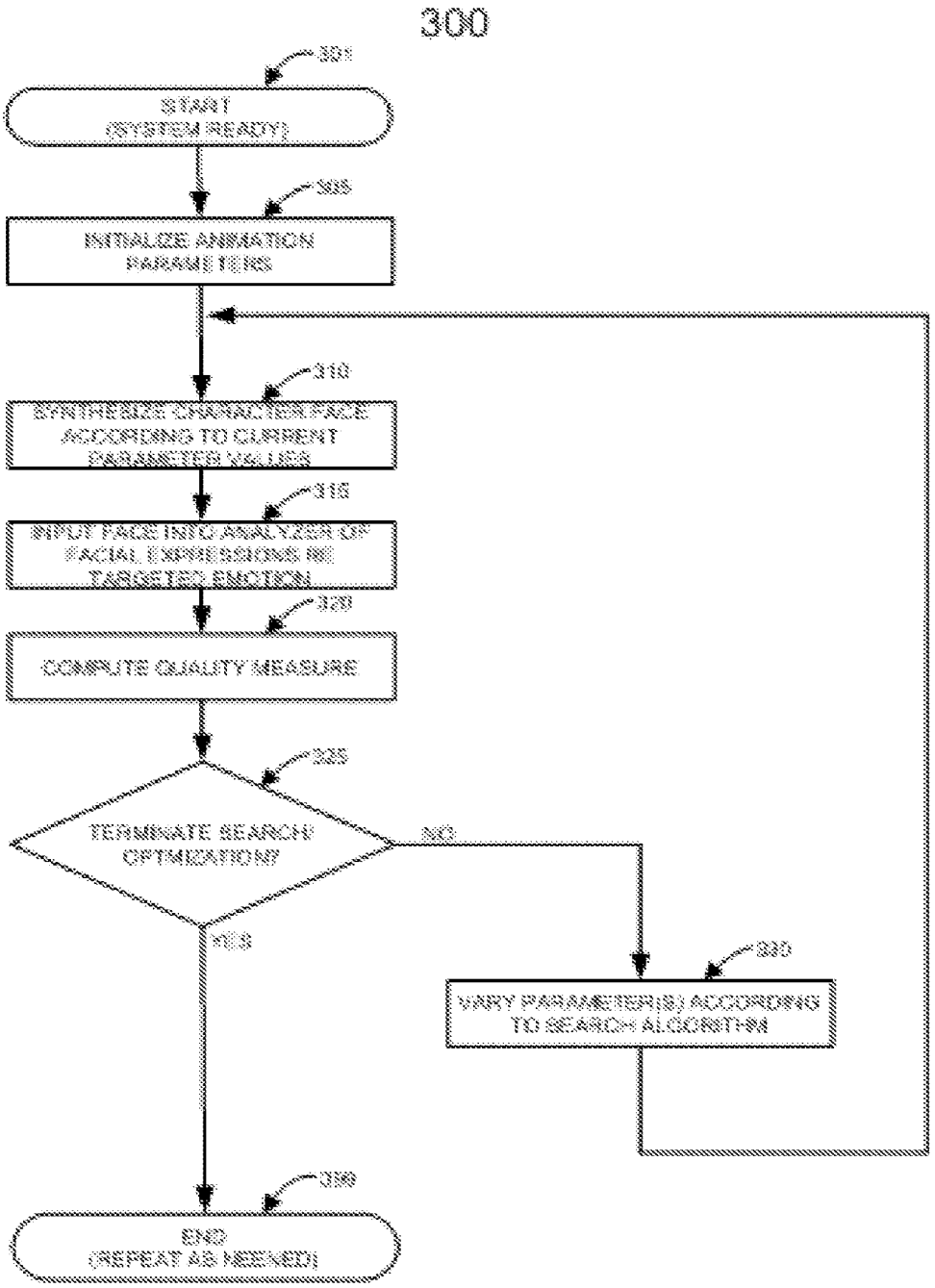


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2014/016745

A. CLASSIFICATION OF SUBJECT MATTER

G06K 9/00 *(2006.01)*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06K 9/00, G06F 15/00, G06T 13/00-13/40

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PAJ, Espacenet, USPTO DB, Information Retrieval System of FIPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2008/0037841 A1 (SONY CORPORATION) 14.02.2008, abstract, paragraphs [0010] - [0013], [0031] - [0047]	1-13, 20 14-19
A	US 2009/0285456 A1 (HANKYU MOON et al.) 19.11.2009	1-20
A	US 6154222 A (AT&T CORP) 28.11.2000	1-20
A	US 2007/0153005 A1 (ATSUSHI ASAI) 05.07.2007	1-20

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 June 2014 (25.06.2014)	03 July 2014 (03.07.2014)
Name and mailing address of the ISA/ FIPS Russia, 123995, Moscow, G-59, GSP-5, Berezhkovskaya nab., 30-1 Facsimile No. +7 (499) 243-33-37	Authorized officer A. Tokarev Telephone No. (495)531-64-81

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(74) Agent: **CHAMBERS, Daniel, M.**; Acuity Law Group, P.C., 12707 High Bluff Drive, Suite #200, San Diego, CA 92130 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Published:

— *with international search report (Art. 21(3))*

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(54) Title: FACIAL EXPRESSION MEASUREMENT FOR ASSESSMENT, MONITORING, AND TREATMENT EVALUATION OF AFFECTIVE AND NEUROLOGICAL DISORDERS

(57) Abstract: Apparatus, methods, and articles of manufacture facilitate diagnosis of affective mental and neurological disorders. Extended facial expression responses to various stimuli are evoked or spontaneously collected, and automatically evaluated using machine learning techniques and automatic facial expression measurement (AFEM) techniques. The stimuli may include pictures, videos, tasks of various emotion-eliciting paradigms, such as a reward-punishment paradigm, an anger eliciting paradigm, a fear eliciting paradigm, and a structured interview paradigm. The extended facial expression responses, which may include facial expression responses as well head pose responses and gesture responses, are analyzed using machine learning techniques to diagnose the subject, to estimate the likelihood that the subject suffers from a specific disorder, and/or to evaluate treatment efficacy.

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Patentscope, USPTO DB, Espacenet, DWPI, CIPO (Canada PO), SIPO DB, AIPN, DEPATISnet, NCBI (PubMed), VINITI.RU, SCSML.FSSI.RU

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MOVELLAN Javier R. et al. The Next Generation of Automatic Facial Expression Measurement, 2005, Oxford University Press, Inc., fig. 18.10, p. 414, paragraphs 3, 4, p. 418, paragraph 4, p. 416, paragraph 2, p. 421, paragraphs 2, 3	1
Y		2-20
Y	US 2008/0235165 A1 (JAVIER R. MOVELLAN et al.) 25.09.2008, paragraphs [0315], [0316], [0378]-[0380], [0336], [0326], [0327], [0329]	2-20
Y	MADSEN Miriam et al. Technology for Just-In-Time In-Situ Learning of Facial Affect for Persons Diagnosed with an Autism Spectrum Disorder. ASSETS'08, 2008, p. 3, right col., paragraph 1, fig. 1	4, 9

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30 July 2014 (30.07.2014)	28 August 2014 (28.08.2014)
Name and mailing address of the ISA/RU: FIPS, Russia, 123995, Moscow, G-59, GSP-5, Berezhkovskaya nab., 30-1 Facsimile No. +7 (499) 243-33-37	Authorized officer O. Stelmakh Telephone No. 8(495)531-65-15

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(71) **Applicant**: **EMOTIENT** [US/US]; 4435 Eastgate Mall, Suite 320, San Diego, CA 92121 (US).

(72) **Inventors**: **MOVELLAN, Javier**; 8707 Caminito Abrazo, La Jolla, CA 92037 (US). **BARTLETT, Marian, Steward**; 13056 Candela Place, San Diego, CA 92130 (US). **FASEL, Ian**; 3066 Ivy Street, San Diego, CA 92104 (US). **LITTLEWORT, Gwen, Ford**; 145 Cliff Street, Solana Beach, CA 92075 (US). **SUSSKIND, Joshua**; 8433 Via Mallorca, #97, La Jolla, CA 92037 (US). **WHITEHILL, Jacob**; 27 Wheeler Street, Unit 217, Cambridge, MA 02138 (US).

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(54) **Title**: FACIAL EXPRESSION MEASUREMENT FOR ASSESSMENT, MONITORING, AND TREATMENT EVALUATION OF AFFECTIVE AND NEUROLOGICAL DISORDERS

(57) **Abstract**: Apparatus, methods, and articles of manufacture facilitate diagnosis of affective mental and neurological disorders. Extended facial expression responses to various stimuli are evoked or spontaneously collected, and automatically evaluated using machine learning techniques and automatic facial expression measurement (AFEM) techniques. The stimuli may include pictures, videos, tasks of various emotion-eliciting paradigms, such as a reward-punishment paradigm, an anger eliciting paradigm, a fear eliciting paradigm, and a structured interview paradigm. The extended facial expression responses, which may include facial expression responses as well head pose responses and gesture responses, are analyzed using machine learning techniques to diagnose the subject, to estimate the likelihood that the subject suffers from a specific disorder, and/or to evaluate treatment efficacy.

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FACIAL EXPRESSION MEASUREMENT FOR ASSESSMENT, MONITORING, AND TREATMENT EVALUATION OF AFFECTIVE AND NEUROLOGICAL DISORDERS

Inventor(s):

Javier Movellan,

Marian Steward Bartlett,

Ian Fasel,

Gwen Ford Littlewort,

Joshua Susskind,

and

Jacob Whitehill

CROSS-REFERENCE TO RELATED APLICATION

This application claims priority from United States provisional patent application Serial Number 61/763,694, entitled AUTOMATIC FACIAL EXPRESSION MEASUREMENT AND MACHINE LEARNING FOR ASSESSMENT OF MENTAL ILLNESS AND EVALUATION OF TREATMENT, filed on February 12, 2013, Atty Dkt Ref MPT-1014-PV, which is hereby incorporated by reference in its entirety as if fully set forth herein, including text, figures, claims, tables, and computer program listing appendices (if present), and all other matter in the United States provisional patent application.

FIELD OF THE INVENTION

This document relates generally to apparatus, methods, and articles of manufacture for assessment, monitoring and treatment evaluation of affective and neurological disorders.

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BACKGROUND

Diagnosing affective and neurological disorders typically involves physical examinations, laboratory tests, and, most important, psychological evaluation. In the course of a psychological evaluation, a doctor or another mental health practitioner may talk to the patient about the patient's thoughts and feelings, behavioral patterns, and symptoms. Psychological evaluation may be quite time-consuming, expensive, and may not be available on a short notice. Many people are reluctant to see a mental health professional, and even when they do see one, it may take them many sessions to open up sufficiently for proper diagnosis. Moreover, affective and neurological disorder diagnosis is inherently subjective.

A need exists in the art to facilitate affective and neurological disorder diagnosis. Another need exists in the art to reduce the cost and time typically needed for diagnosing of affective and neurological disorders. Still another need exists in the art to inject a measure of objectivity in the diagnosis of affective and neurological disorders. Yet another need exists in the art for techniques for increasing the temporal resolution in monitoring, that is, more frequent monitoring of patients, such as on a daily rather than monthly basis.

SUMMARY

Embodiments described in this document are directed to methods, apparatus, and articles of manufacture that may satisfy one or more of the above described and other needs.

In an embodiment, a computer-implemented method includes obtaining a first image comprising extended facial expression of a user responding to a first stimulus rendered through a user computing device, the first stimulus being evocative of a predetermined emotion or affective state; analyzing the first image with a machine learning classifier trained to differentiate between (1) features of extended facial expressions of the predetermined emotion or affective state in images of healthy subjects responding to stimuli evocative of the predetermined emotion or affective state, and (2) features of extended facial expressions of the predetermined emotion or affective state in images of subjects suffering from a predetermined disorder responding to the stimuli evocative of the predetermined emotion or affective state, thereby obtaining one or more analysis results; and using the one or more analysis results.

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In an embodiment, a computing device includes at least one processor; machine-readable storage, the machine-readable storage being coupled to the at least one processor, the machine-readable storage storing instructions executable by the at least one processor; and means for allowing the at least one processor to obtain an image comprising extended facial expression of a user responding to a first stimulus evocative of a predetermined emotion or affective state. The instructions, when executed by the at least one processor, configure the at least one processor to analyze the first image with a machine learning classifier trained to differentiate between (1) features of extended facial expressions of the predetermined emotion or affective state in images of healthy subjects responding to stimuli evocative of the predetermined emotion or affective state, and (2) features of extended facial expressions of the predetermined emotion or affective state in images of subjects suffering from a predetermined disorder responding to the stimuli evocative of the predetermined emotion or affective state, thereby obtaining one or more analysis results, the one or more analysis results comprising an indication of whether the user suffers from the predetermined disorder.

The computing device may be or include a user device, such as a personal computer, a tablet, a smartphone, a wearable device such as Google Glass, in which case the means for allowing the at least one processor to cause the at least one stimulus to be rendered to the user may include a display of the user device, and the means for allowing the at least one processor to obtain an image may include a camera if the user device.

The computing device may also be a server-type computer, in which case the two means may include a network interface for coupling the computing device to a user device, and causing the user device to display the stimulus to the user, and to capture the user's extended facial expressions evoked by the stimulus.

The computing device may also render the first stimulus to the user.

In an embodiment, an article of manufacture includes one or more machine-readable memory devices storing computer code to configure at least one processor to: cause a first stimulus to be rendered to a user through a user computing device, wherein the first stimulus is evocative of a predetermined emotion or affective state; obtain a first image comprising extended facial expression of the user responding to the first stimulus rendered through the user computing device; analyze the first image with a machine learning classifier trained to differentiate between

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(1) features of extended facial expressions of the predetermined emotion or affective state in images of healthy subjects responding to stimuli evocative of the predetermined emotion or affective state, and (2) features of extended facial expressions of the predetermined emotion or affective state in images of subjects suffering from a predetermined disorder responding to the stimuli evocative of the predetermined emotion or affective state, thereby obtaining one or more analysis results; and use the one or more analysis results.

These and other features and aspects of the present invention will be better understood with reference to the following description, drawings, and appended claims.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 is a simplified block diagram representation of a computer-based system configured in accordance with selected aspects of the present description; and

Figure 2 illustrates selected steps of a process for evoking responses to sensory stimuli, receiving facial expressions evoked by the stimuli, analyzing the facial expressions to evaluate the responses to the stimuli, and storing, transmitting, displaying, and/or otherwise using the results of the evaluations.

DETAILED DESCRIPTION

In this document, the words "embodiment," "variant," "example," and similar expressions refer to a particular apparatus, process, or article of manufacture, and not necessarily to the same apparatus, process, or article of manufacture. Thus, "one embodiment" (or a similar expression) used in one place or context may refer to a particular apparatus, process, or article of manufacture; the same or a similar expression in a different place or context may refer to a different apparatus, process, or article of manufacture. The expression "alternative embodiment" and similar expressions and phrases may be used to indicate one of a number of different possible embodiments. The number of possible embodiments/variants/examples is not necessarily limited to two or any other quantity. Characterization of an item as "exemplary" means that the item is used as an example. Such characterization of an embodiment/variant/example does not necessarily mean that the embodiment/variant/example is a preferred one; the embodiment/variant/example may but need not be a currently preferred one.

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All embodiments/variants/examples are described for illustration purposes and are not necessarily strictly limiting.

The words "couple," "connect," and similar expressions with their inflectional morphemes do not necessarily import an immediate or direct connection, but include within their meaning connections through mediate elements.

"Affective" information associated with an image or video includes various types of psychological reactions, such as affective (as this term is generally understood), cognitive, physiological, and/or behavioral responses, including both recorded raw signals and their interpretations. Relevant information that represents or describes a particular person's reaction(s) toward a stimulus in terms of the person's affective (as this term is generally understood), cognitive, physiological, or behavioral responses is referred to in the present description as affective information. The affective information can be attributable to psychological and physiological reactions such as memories, associations, and the like.

"Affective disorder" includes within its meaning mental disorders and neurological disorders, such as depression, bipolar disorders, autism, anxiety disorders, Parkinson's disease, and schizophrenia.

In the context of emotion eliciting paradigms, a "task" here means that a person is directed to perform, to do something, generally using a computing device. The computing device may be a mobile device (a smartphone, a tablet, a wearable device, such as Google Glass).

"Stimulus" and its plural form "stimuli" refer to actions, agents, or conditions that elicit or accelerate a physiological or psychological activity or response, such as an emotional response. Specifically, stimuli discussed in this document include still pictures and video clips. Stimuli also include tasks of the emotion eliciting paradigms.

"Causing to be displayed" and analogous expressions refer to taking one or more actions that result in displaying. A computer or a mobile device (such as a smart phone, tablet, Google Glass and other wearable devices), under control of program code, may cause to be displayed a picture and/or text, for example, to the user of the computer. Additionally, a server computer under control of program code may cause a web page or other information to be displayed by making the web page or other information available for access by a client computer or mobile device,

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over a network, such as the Internet, which web page the client computer or mobile device may then display to a user of the computer or the mobile device.

"Causing to be rendered" and analogous expressions refer to taking one or more actions that result in displaying and/or creating and emitting sounds. These expressions include within their meaning the expression "causing to be displayed," as defined above. Additionally, the expressions include within their meaning causing emission of sound.

The word "image" refers to still images, videos, and both still images and videos. A "picture" is a still image. "Video" refers to motion graphics.

"Facial expression" as used in this document signifies the facial expressions of primary emotion (such as Anger, Contempt, Disgust, Fear, Happiness, Sadness, Surprise, Neutral); expressions of affective state of interest (such as boredom, interest, engagement); so-called "action units" (movements of a subset of facial muscles, including movement of individual muscles); changes in low level features (*e.g.*, Gabor wavelets, integral image features, Haar wavelets, local binary patterns (LBP), Scale-Invariant Feature Transform (SIFT) features, histograms of gradients (HOG), Histograms of flow fields (HOFF), and spatio-temporal texture features such as spatiotemporal Gabors, and spatiotemporal variants of LBP such as LBP-TOP); and other concepts commonly understood as falling within the lay understanding of the term.

"Extended facial expression" means "facial expression" (as defined above), head pose, and/or gesture.

"Mental state" as used in this document means emotion, affective state, or similar psychological state; "expression of emotion, affective state, and similar psychological state" means expression of emotion, affective state, or similar psychological state.

Other and further explicit and implicit definitions and clarifications of definitions may be found throughout this document.

Reference will be made in detail to several embodiments that are illustrated in the accompanying drawings. Same reference numerals may be used in the drawings and the description to refer to the same apparatus elements and method steps. The drawings are in a simplified form, not to scale, and omit apparatus elements, method steps, and other features that can be added to the described systems and methods, while possibly including certain optional elements and steps.

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Entire human brain systems are dedicated to recognition, classification, differentiation, and response to extended facial expressions. Disorders of these systems and other brain and nervous systems may be diagnosed with the help of assessment of extended facial expression responses to various stimuli. Additionally, the efficacy of various treatments of such disorders may be assessed by comparing a patient's before-treatment and after-treatment responses to various stimuli. Described herein are techniques for facilitating diagnosis of disorders and assessing efficacy of treatments of the disorders, based on automated extended facial expression analysis.

Automated facial expression measurement ("AFEM") techniques can be used for relatively accurate and discriminative quantification of emotions in the healthy population, versus those of patient populations with affective and neurological disorders. AFEM techniques provide tools for clinical evaluations, as well as tools for objective quantification of the response to treatment. These tools can be used to assess the efficacy of both new and existing treatments, such as drugs.

In selected embodiments, models that describe the ways in which extended facial expression responses of patients with affective and neurological disorders differ from those of the mentally healthy population are constructed using AFEM and machine learning, and then employed for diagnostic and treatment assessment purposes. The mental illness or disorder models may include different models for affective and neurological disorders, such as depression, anxiety, manias, bipolar disorder (generally, depression alternating with mania); for neurological diseases such as Parkinsonism, schizophrenia, and psychoses in general. For example, extended facial expression responses of high-trait anxious subjects tend to be exaggerated for stimuli that elicit negative emotions, and extended facial expression responses of subjects with depression tend to be blunted for stimuli that elicit positive emotions. Here, machine learning methods are employed to develop models of how extended facial expressions, as measured by automatic methods (AFEM techniques), differ between (1) healthy subjects and (2) populations of patients suffering from a predetermined disorder. (The word "disorder" in this document signifies the mental and psychiatric disorders/illnesses, and neurological disorders mentioned above.)

For a model of a specific disorder, extended facial expression measurements of two populations may be obtained. Subjects of one population will have received a diagnosis of the specific disorder for which the model is constructed, and subjects of the second population will be a reference population of healthy human subjects, that is, subjects that do not suffer from the

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specific disorder. The same healthy subjects and their extended facial expressions may be used for models of different disorders. For the purpose of providing context, we may consider two specific mental illnesses: (1) depression, and (2) anxiety disorder; but by using this example (or any other example) we do not necessarily intend to limit the application of general principles described in this document.

Anxiety disorders include of a number of subtypes, but they generally focus on excessive irrational fear and dread. These include panic disorder, obsessive-compulsive disorder, post-traumatic stress disorder, social anxiety disorder, generalized anxiety disorder, and specific phobias. In embodiments, the same disorder model is used for all or some subset of two or more of the types of affective disorder. In other embodiments, the model used is specific to the specific disorder. In embodiments, the same anxiety disorder model is used for all or some subset of two or more of the types of anxiety disorder. In other embodiments, the model used is specific to the subtype of the anxiety disorder.

Ground truth data on disorder severity of each subject may be employed for construction of the models. Ground truth may include objective and subjective measures of a disorder, such as categorical information from psychiatric diagnosis, continuous (non-categorical) measures derived from self-rating scales, and objective rating scales provided by a clinician. A clinician may be a medical doctor (*e.g.*, a psychiatrist), psychologist, therapist, or another type of mental health practitioner. The rating scales may include objective data such as weight loss and sleep patterns. Ground truth may be derived from self-reports; behavioral responses; involuntary physiological responses (such as heart rate, heart rate variability, breathing rate, pupil dilation, blushing, imaging data from MRI and/or functional MRI of the entire brain or portions of the brain such as amygdala); and third-party evaluations such as evaluations by clinicians and other trained personnel.

For depression, these scales may include (but are not limited to) the Beck Depression Inventory (BDI), the Hamilton Rating Scale, Montgomery-Åsberg Depression Rating Scale (MADRS), the Zung Self-Rating Depression Scale, the Wechsler Depression Rating Scale, the Raskin Depression Rating Scale, the Inventory of Depressive Symptomatology (IDS), and the Quick Inventory of Depressive Symptomatology (QIDS). For anxiety, these scales may include (but are not limited to) the Stait Trait Anxiety Inventory (STAI), the Hamilton Anxiety Rating scale,

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the Panic Disorder Severity Scale, the Fear of Negative Evaluation Scale, the Post Traumatic Stress Disorder (PTSD) scale, the Yale Brown Obsessive Compulsive Scale, and the Dimensional Obsessive Compulsive scale.

Subjects may be presented with emotion eliciting paradigms, for example, presentation of an emotion eliciting stimulus. Such emotion eliciting stimuli may include (but are not limited to) pictures of spiders, snakes, comics, and cartoons; and pictures from the International Affective Picture set (IAPS). IAPS is described in Lang *et al.*, The International Affective Picture System (University of Florida, Centre for Research in Psychophysiology, 1988), which publication is hereby incorporated by reference in its entirety. The emotion eliciting stimuli may also include film clips, such as clips of spiders/snakes/comedies; and the normed set from Gross & Levenson, Emotion Elicitation Using Films, Cognition and Emotion, 9, 87-108 (1995), which publication is hereby incorporated by reference in its entirety. Stimuli may also include a startle probe, which may be given in conjunction with emotion eliciting paradigms, or separately. Stimuli may also include neutral (baseline) stimuli.

Another example of emotion eliciting paradigms is a reward-punishment paradigm. For example, a set (one or more) of trials is presented a subject. On a particular trial, the subject is instructed to guess whether the number presented to the subject in the near future (such as on the immediately following screen) is higher or lower than a predetermined threshold number. The threshold number may be 5, and the presented numbers may lie between 1 and 9. If the subject guesses correctly, the subject gets a monetary or other reward; if the subject guesses incorrectly, the subject loses some money, or is otherwise made to suffer a "punishment." An analogous trial involves hypothetical money or "points," which may be good for some purpose, or simply be a means of keeping score. On each trial, there is a moment when the subject realizes that he or she got "rewarded" or "punished," to some degree. Depressed patients will typically exhibit a reduced response to reward/win, and an exaggerated response to punishment/loss, relative to a non-depressed or healthy population without depression and/or other disorders. The extended facial expression responses of the subject may be recorded, summarized in a statistical manner, and/or otherwise analyzed.

It should be noted that the presentation of the stimulus, of whatever paradigm or nature, is not necessarily a requirement in any of the embodiments described in this document.

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The degree of risk may vary from subject to subject, and from trial to trial involving the same subject, and it may be selectable by the subject and/or a clinician; the degree of risk selected by the subject for himself or herself may be part of the ground truth, and may be indicative of a particular disorder. People with depression, for example, tend to be more risk averse than healthy people; people with a mania tend to be more risk accepting.

Still other examples of emotion eliciting paradigms include an anger eliciting paradigm, and a fear eliciting paradigm. To elicit anger from a subject, the subject may be presented with a form to fill out. After the subject fills out the form, the subject may be informed that some field was incorrectly answered or was omitted. When the subject returns to remedy this purported deficiency, all or some of the fields may be deleted so that the subject needs to start over and consequently may be expected to become annoyed and angry. (The subject may not be aware that this is part of the paradigm, *i.e.*, that the information in the fields is deleted intentionally to elicit an emotion.) Depressed people, however, may blame themselves, becoming less angry than healthy subjects.

Another paradigm is a structural interview. The subject may be asked questions, such as about plans for the future, and the automated extended facial expression recognition system may look for specific things, such as a lack of brow movement (which indicates non-engagement), a lack of action or reduced action of crow's feet muscles (the smiling with the eyes muscles), less smiling with the eyes, more contempt, more disgust, reduced joy, increased sadness and negativity, contempt, disgust, mouth smile. Those are the kind of responses that can be expected to present more often in depressed subjects than in non-depressed subjects. Here and elsewhere, the automated (machine-learned) expression classifier/recognizer may recognize the expressions using the Computer Expression Recognition Toolbox (CERT) and/or FACET technology for automated expression recognition. CERT was developed at the machine perception laboratory of the University of California, San Diego; FACET was developed by Emotient, the assignee of this application.

A number of tasks for eliciting fear may be employed as stimuli. In one, a subject is instructed to follow a maze on a screen with a mouse; the subject needs to focus on the screen to stay within the boundaries of the maze, highly focused. Close to the completion, when the subject is

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not expecting anything unusual, and suddenly, a loud sound and a zombie face are caused to be rendered. This tends to startle the subject and evoke a strong fear response.

Subjects suffering from schizophrenia, manias, and possibly other disorders may have different responses to fear. In particular, subjects suffering from schizophrenia and manias tend to exhibit increased reactivity (animation, uninhibitedness, as reflected in their intensity variability dynamics) to fear and anger, particularly in the lower face, and head pose (both static and dynamic), as compared to the healthy population. These features may advantageously be used to detect these disorders (schizophrenia in particular) automatically, through automatic examination of the extended facial expression responses elicited by the emotion eliciting paradigms and/or other stimuli.

The presentation of the emotion eliciting paradigms (reward-punishment, anger, fear, structured interview, similar paradigms), the recordation of the extended facial expression responses of the subject elicited in these paradigms, and the subsequent analysis of the responses, may be automated using one or more computers. As will be discussed below, all or some of the steps may be performed by one computer, such as a personal or other computer, or a mobile computing device, either autonomously or in conjunction with a remote computer system connected through a network.

The extended facial expression responses of the subjects may be recorded, for example, video recorded or recorded as one or more still pictures, and the expressions may then be measured by AFEM. The collection of the measurements may be considered to be a vector of extended facial expression responses. The vector (a one dimensional array of elements in a predetermined order) may include a set of displacements of feature points, motion flow fields, facial action intensities from the Facial Action Coding System (FACS), and/or responses of a set of automatic expression detectors or classifiers. Probability distributions for one or more extended facial expression responses for the patient population and the healthy population may be calculated for one or more of the stimuli or one or more types of stimuli, and the parameters (*e.g.*, mean, variance, and/or skew) of the distributions computed.

Machine learning techniques and statistical models may be employed to characterize the relationships between facial responses from AFEM and ground truth measures for a particular disorder (*e.g.*, anxiety ratings, depression ratings, etc.). Machine learning methods include but

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are not limited to support vector machines (SVMs), Adaboost, Gentleboost, relevance vector machines, and regression methods that include logistic regression and multinomial logistic regression. Once these relationships are learned based on sample populations with the disorders and a healthy population, the models can then predict depression ratings, anxiety ratings, or ratings of other disorders, for new subjects for whom ground truth is not yet available.

Direct training is another approach to machine learning of extended facial expression response differences between the healthy population and patient populations. The direct training approach works as follows. Videos of subjects with a specific disorder and videos of healthy subjects (without a specific disorder or any disorder) are collected, as is described above. Ground truths are also collected, as described above. Here, however, machine learning may be applied directly to the low-level image descriptors (instead of extracting facial expression measurements). The image descriptors may include (but are not limited to) Gabor wavelets, integral image features, Haar wavelets, local binary patterns (LBP), SIFT features, histograms of gradients (HOG), Histograms of flow fields (HOFF), and spatio-temporal texture features such as spatiotemporal Gabors, and spatiotemporal variants of LBP such as LBP on three orthogonal planes (LBP-TOP). These image features are then passed to a classifier trained with machine learning techniques to discriminate the patient group from the healthy group. Machine learning techniques used here include support vector machines (SVM), boosted classifiers such as Adaboost and Gentleboost, and action classification approaches from the computer vision literature, such as Bags of Words models.

The Bags of Words is a computer vision approach known in the text recognition literature, which involves clustering the training data, and then "histogramming" the occurrences of the clusters for a given example. The histograms are then passed to standard classifiers such as SVM. The Bags of Words model is described in Sikka *et al.*, Exploring Bag of Words Architectures in the Facial Expression Domain (UCSD 2012) (available at http://mplab.ucsd.edu/~marni/pubs/Sikka_LNCS_2012.pdf).

After training, the classifier may provide information about new, unlabeled data, such as the likelihood ratio that the new subject is from the healthy population versus patient population with a particular disorder. Boosted classifiers such as Adaboost provide an estimate of this likelihood

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ratio. For SVMs, a measure of the likelihood may be provided by the distance to the separating hyperplane, called "the margin."

The patient and healthy models and their comparisons are not limited to static variables. The dynamics of facial behavior (and, more generally, of extended facial expression responses) in the patient and healthy subjects may also be characterized, and the differences in the respective dynamic behaviors may also be modeled and used in subsequent assessments. Parameters may include onset latencies, peaks of deviations in facial measurement of predetermined facial points or facial parameters, durations of movements of predetermined facial points or facial parameters, accelerations (rates of change in the movements of predetermined facial points or facial parameters), overall correlations (*e.g.*, correlations in the movements of predetermined facial points or facial parameters), and the differences between the areas under the curves plotting the movements of predetermined facial points or facial parameters. The full distributions of response trajectories may be characterized through dynamical models such as hidden Markov Models (HMMs), Kalman filters, diffusion networks, and/or others. The dynamical models may be trained directly on the sequences of low-level image features, or on sequences of AFEM outputs. Separate models may be trained for each patient population (that is, for the patient population with the specific disorder) and for the healthy population (population without the specific disorder or without any known disorder). After training, the models as applied by the trained machine learning classifier, may provide a measure of the likelihood that the subjects' extended facial expression data came from the healthy population or from a population with the specific disorder; that is, the classifier may provide some indication (*e.g.*, a probability or another estimate) of whether a particular subject has the disorder or does not have the disorder.

As has already been mentioned, the diagnostic techniques based on the extended facial expression responses to emotion eliciting paradigms (and/or startle) may be extended to assessment of efficacy of various treatments. Multiple sets of stimuli are defined so that the patient-subject may be presented with a different stimulus each time. The stimuli sets may be counter-balanced, in order to remove the effects of stimulus differences and the differences in the order of presentation of stimuli due to the patients or healthy subjects becoming inured to the stimuli.

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Extended facial expression responses post-treatment may be compared to extended facial expression responses pre-treatment, to assess the degree to which the responses have become more similar to those of healthy subjects. Standard pattern similarity measures from the pattern recognition literature may be employed to assess response similarity. These measures include (but are not limited to) distance measures (Euclidean distance, Mahalanobis distance, L1) to the healthy probability distribution, template matching methods, and angles between the pattern vectors. Improvement may be measured as the increase in similarity of the extended facial expression response vector to that of the healthy population. The comparison of pre- and post-treatment extended facial expression responses to stimuli may be performed on statistical measures of aggregated responses of a plurality of patients, for example, to assess the efficacy of a certain treatment (*e.g.*, a new experimental drug or treatment) in general. The comparison of pre- and post-treatment extended facial responses to stimuli may also be performed for a given patient, to assess the efficacy of the treatment for that particular patient. Similarly, the statistical and individual comparisons may be performed for a population of healthy subjects, for investigation or other purposes.

Improvement may also be measured by changes in the likelihood that the extended facial expression response came from the healthy population, compared to each patient population. Likelihood ratios may be computed or estimated. These are ratios of the likelihood of the patient class relative to the healthy class, given the observed facial data (or extended facial data, which includes the facial data and data describing head poses and gestures). An increase in the likelihood that the extended facial data came from the healthy population may be considered to be a measure of improvement due to the treatment and/or other factors.

Post-treatment responses may be measured multiple times following treatment(s). Post-treatment responses may also be measured for multiple dose levels of pharmaceutical agents and for multiple intensities of other treatments.

The monitoring of the patient's responses may be continual and frequent. For example, rather than visiting a psychiatry once a month or once a week, daily or even hourly data about the affective state of the patient may be obtained.

In embodiments, the automated system for comparing facial expression responses to stimuli may be implemented using a user device, functioning either autonomously or in conjunction with a

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remote server to which the user device is coupled through a network. The user device may be, for example, a laptop or a desktop computer, a smartphone, a tablet, a wearable device such as Google Glass, or another portable or stationary device. User devices, and especially mobile devices, may enable more frequent patient assessments than office visits.

The user device can take expression measures, for example, daily, or at multiple time points during each day; the times of the assessments may be preset or randomized, or both. The times may be set by the user of the device, a health practitioner or clinician, or otherwise. Probes may be presented to the patient through the user device, such as an emotion eliciting stimulus, which may include a question, an instruction, such as "think about your plans for today," a sound, an image. The user device may also take expression measures during spontaneous behavior, for example, extended facial expressions while the user is driving or doing work on a laptop, smartphone, or another device. Extended facial expression responses may be determined by taking images (pictures/videos) through the portable device's camera, and evaluating the pictures/videos as is described above, using, for example, AFEM techniques. Reports and summaries of assessments may be automatically generated and sent to a physician or another clinician or care provider. This method has an additional advantage that the identity of the patient evaluated remotely can be verified because of the availability of the pictures or videos of the patient's face.

Figure 1 is a simplified block diagram representation of a computer-based system 100 and portable user devices 180, configured for patient assessment through the user devices, in accordance with selected aspects of the present description. The system 100 may interact through a communication network 190 with users at the user devices 180, such as personal computers and mobile devices (*e.g.*, PCs, tablets, smartphones, wearable devices such as Google Glass). The system 100 may be configured to perform steps of methods (such as the method 200 described in more detail below) for evoking user responses to stimuli presented through the user devices 180, receiving the extended facial expressions of the users, analyzing the extended facial expression responses to evaluate the users' mental, neurological, or other conditions/disorders, and storing/transmitting/displaying or otherwise using the results of the evaluations. In embodiments, the analysis and/or other steps may be performed by a user device 180, autonomously or semi-autonomously, and then the results may be transmitted through the network 190 to the system 100 or to another computer system.

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Figure 1 does not show many hardware and software modules of the system 100 and of the user devices 180, and omits various physical and logical connections. The system 100 may be implemented as a special purpose data processor, a general-purpose computer, a computer system, or a group of networked computers or computer systems configured to perform the steps of the methods described in this document. In some embodiments, the system 100 is built using one or more of cloud devices, smart mobile devices, wearable devices. In some embodiments, the system 100 is implemented as a plurality of computers interconnected by a network, such as the network 190, or another network.

As shown in Figure 1, the system 100 includes a processor 110, read only memory (ROM) module 120, random access memory (RAM) module 130, network interface 140, a mass storage device 150, and a database 160. These components are coupled together by a bus 115. In the illustrated embodiment, the processor 110 may be a microprocessor, and the mass storage device 150 may be a magnetic disk drive. The mass storage device 150 and each of the memory modules 120 and 130 are connected to the processor 110 to allow the processor 110 to write data into and read data from these storage and memory devices. The network interface 140 couples the processor 110 to the network 190, for example, the Internet. The nature of the network 190 and of the devices that may be interposed between the system 100 and the network 190 determine the kind of network interface 140 used in the system 100. In some embodiments, for example, the network interface 140 is an Ethernet interface that connects the system 100 to a local area network, which, in turn, connects to the Internet. The network 190 may therefore be a combination of several networks.

The database 160 may be used for organizing and storing data that may be needed or desired in performing the method steps described in this document. The database 160 may be a physically separate system coupled to the processor 110. In alternative embodiments, the processor 110 and the mass storage device 150 may be configured to perform the functions of the database 160.

The processor 110 may read and execute program code instructions stored in the ROM module 120, the RAM module 130, and/or the storage device 150. Under control of the program code, the processor 110 may configure the system 100 to perform the steps of the methods described or mentioned in this document. In addition to the ROM/RAM modules 120/130 and the storage device 150, the program code instructions may be stored in other machine-readable storage

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media, such as additional hard drives, floppy diskettes, CD-ROMs, DVDs, Flash memories, and similar devices. The program code may also be transmitted over a transmission medium, for example, over electrical wiring or cabling, through optical fiber, wirelessly, or by any other form of physical transmission. The transmission can take place over a dedicated link between telecommunication devices, or through a wide area or a local area network, such as the Internet, an intranet, extranet, or any other kind of public or private network. The program code may also be downloaded into the system 100 through the network interface 140 or another network interface.

Figure 2 illustrates selected steps of a process 200 for evoking user responses to sensory stimuli; receiving extended facial expressions of the users; analyzing the extended facial expressions to evaluate the users' responses to the stimuli; and storing, transmitting, displaying, and/or otherwise using the results of the analyses or evaluations. The method may be performed, for example, by the system 100 in combination with a user device 180. Analogous methods may be performed, for example, by the user devices 180, by a combination of the system 100 and user devices 180, or by other distributed or localized computer-based systems.

At flow point 201, the system 100 and a user device 180 of one of the users are powered up, connected to the network 190, and otherwise ready to perform the following steps.

In step 205, the system 100 communicates with the user device 180, and configures the user device 180 to present some preselected stimulus or stimuli to the user and simultaneously to record extended facial expressions of the user evoked by the stimulus or stimuli. As discussed above, the stimulus or stimuli may be or include an image or video of spiders, snakes, comedies, IAPS pictures, film clips such as those of the normed set of Gross & Levenson, various sounds, tasks of emotion eliciting paradigms, and still other stimuli. The presented stimulus or stimuli may be designed to evoke a strong psychological reaction in healthy subjects and/or in subjects with some disorders.

In step 210, the system 100 causes the user device 180 to present to the user at the user device the stimulus/stimuli from the step 205, and to record the user's extended facial expression(s) evoked by the stimulus/stimuli.

In step 215, the system 100 obtains the record of the user's extended facial expressions recorded by the user device in the step 210. In embodiments, the system 100 obtains the user's extended

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facial expressions, substantially in real time. In other embodiments, the system 100 obtains the record of facial expressions of the user at a later time.

In step 220, the system 100 (and/or the user device 180) measures the extended facial response(s) evoked in the user by the stimulus or stimuli, using, for example, AFEM, and generating a vector of extended facial response(s). In generating the vector, the system 100 may also (or instead) compute a set of displacements of feature points, motion flow fields, facial action intensities from the Facial Action Coding System (FACS), and/or responses of a set of automatic classifiers or detectors of extended facial expressions.

In step 225, the system 100 stores the vector from the step 220.

In step 230, the system 100 analyzes the vector, and in step 235, summarizes the result of the comparison test and displays, stores, and/or transmits it for the use of a physician, clinician, other mental health personnel, and/or the user. For example, the system 100 may compare the current vector to one or more previous vectors of the same user, to estimate progression or regression of a predetermined disorder, perhaps in response to some treatment administered to the user between the times corresponding to the two vectors. The system 100 may also compare the current vector to one or more previous vectors of the same user to determine whether significantly different disorders are manifested at different times. Note that manifestations of depression alternating over time with manifestations of a mania may indicate a bipolar disorder. The time differences may be, for example, in the order of minutes, hours, days, weeks, months, years. In specific variants, the process is performed daily.

As another example, the system 100 may compare the current vector (1) to the corresponding vector whose elements are statistics of the corresponding data of a healthy population and/or (2) the corresponding vector whose elements are statistics of the corresponding data of a population of subjects with a predetermined disorder; thereby obtaining a measure/estimate of the probability that the user suffers from the predetermined disorder. The system 100 may compute a first inner product of the user's vector with the vector of statistics from the healthy population, and a second inner product of the user's vector with the vector of statistics from the population with the predetermined disorder. An estimate of the probability may be based on the relative sizes of the two inner products. In embodiments, the ratio and/or the two inner products is/are displayed to a health practitioner, together with the statistics relating the ratio and/or the inner

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products to the probability of the user having the predetermined disorder, and the expected degree of the disorder in the user.

In embodiments, in the step 235 the system may generate an automated diagnosis or a preliminary diagnosis. The diagnosis may be determined by reference to a multi-dimensional mapping of the ratio and/or the two inner products and differential diagnoses (*e.g.*, some values being mapped to "healthy" diagnosis, others to "depression" diagnoses. Based on the diagnosis, which may be performed without necessitating an office visit or another face-to-face interaction between the user and a medical practitioner, an actual office visit may be suggested and a referral provided. Also, a practitioner may review the data underlying the vector, possibly including the actual recording of the user's responses, and confirm the diagnosis, make another diagnosis, or otherwise act on the data provided.

At flow point 299, the process 200 may terminate, to be repeated as needed for the same user and/or other users.

The user device 180 may perform all or some of the steps autonomously, that is, without reliance on the system 100 and/or the communication network 190. Thus, in embodiments, the user device (1) presents the stimulus to the user at the device, (2) records the user's extended facial expression(s) evoked by the stimulus, (3) measures the extended facial response(s) using, for example, AFEM, and/or computing a set of displacements of feature points, motion flow fields, facial action intensities from the Facial Action Coding System (FACS), and/or responses of a set of automatic expression classifiers, thereby obtaining a vector corresponding to the expression evoked by the stimulus, (4) performs analysis of the vector, and (5) stores, transmits, and/or displays the result of the analysis.

The system and process features described throughout this document may be present individually, or in any combination or permutation, except where presence or absence of specific feature(s)/element(s)/limitation(s) is inherently required, explicitly indicated, or otherwise made clear from the context.

Although the process steps and decisions (if decision blocks are present) may be described serially in this document, certain steps and/or decisions may be performed by separate elements in conjunction or in parallel, asynchronously or synchronously, in a pipelined manner, or otherwise. There is no particular requirement that the steps and decisions be performed in the same order in which this description lists them or the Figures show them, except where a specific

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order is inherently required, explicitly indicated, or is otherwise made clear from the context. Furthermore, not every illustrated step and decision block may be required in every embodiment in accordance with the concepts described in this document, while some steps and decision blocks that have not been specifically illustrated may be desirable or necessary in some embodiments in accordance with the concepts. It should be noted, however, that specific embodiments/variants/examples use the particular order(s) in which the steps and decisions (if applicable) are shown and/or described.

The instructions (machine executable code) corresponding to the method steps of the embodiments, variants, and examples disclosed in this document may be embodied directly in hardware, in software, in firmware, or in combinations thereof. A software module may be stored in volatile memory, flash memory, Read Only Memory (ROM), Electrically Programmable ROM (EPROM), Electrically Erasable Programmable ROM (EEPROM), hard disk, a CD-ROM, a DVD-ROM, or other forms of non-transitory storage medium known in the art, whether volatile or non-volatile. Exemplary storage medium or media may be coupled to one or more processors so that the one or more processors can read information from, and write information to, the storage medium or media. In an alternative, the storage medium or media may be integral to one or more processors.

This document describes in considerable detail the inventive apparatus, methods, and articles of manufacture for assessing mental and neurological disorders, and evaluating treatments of such disorders, using automatic extended facial expression measurements. This was done for illustration purposes. The specific embodiments or their features do not necessarily limit the general principles underlying the invention. The specific features described herein may be used in some embodiments, but not in others, without departure from the spirit and scope of the invention as set forth herein. Various physical arrangements of components and various step sequences also fall within the intended scope of the invention. Many additional modifications are intended in the foregoing disclosure, and it will be appreciated by those of ordinary skill in the pertinent art that in some instances some features will be employed in the absence of a corresponding use of other features. The illustrative examples therefore do not necessarily define the metes and bounds of the invention and the legal protection afforded the invention, which function is carried out by the claims and their equivalents.

What is claimed is:

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CLAIMS

1. A computer-implemented method comprising steps of:

obtaining a first image comprising extended facial expression of a user responding to a first stimulus rendered through a user computing device, the first stimulus being evocative of a predetermined emotion or affective state;

analyzing the first image with a machine learning classifier trained to differentiate between (1) features of extended facial expressions of the predetermined emotion or affective state in images of healthy subjects responding to stimuli evocative of the predetermined emotion or affective state, and (2) features of extended facial expressions of the predetermined emotion or affective state in images of subjects suffering from a predetermined disorder responding to the stimuli evocative of the predetermined emotion or affective state, thereby obtaining one or more analysis results; and

using the one or more analysis results.

2. A computer-implemented method as in claim 1, further comprising:

causing the first stimulus to be rendered to the user through the user computing device;

wherein:

the step of using the one or more analysis results comprises a step selected from the group consisting of storing the one or more analysis results in a machine memory device, transmitting the one or more analysis results over a network, and causing the one or more analysis results to be rendered.

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3. A computer-implemented method as in claim 2, wherein the one or more analysis results comprise an indication of whether the user suffers from the predetermined disorder.

4. A computer-implemented method as in claim 2, wherein the one or more analysis results comprise a quantification of likelihood of the user suffering from the predetermined disorder.

5. A computer-implemented method as in claim 2, wherein the step of using the one or more analysis results comprises causing the one or more analysis results to be displayed to the user.

6. A computer-implemented method as in claim 2, wherein the step of using the one or more analysis results comprises causing the one or more analysis results to be displayed to one or more medical personnel.

7. A computer-implemented method as in claim 2, wherein the step of analyzing is performed at a computing device communicating with the user device over a wide area network.

8. A computer-implemented method as in claim 2, wherein the steps of causing the stimulus to be rendered, obtaining the first image, and analyzing the first image are performed by the user device.

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9. A computer-implemented method as in claim 8, wherein the user device is a mobile device.

10. A computer-implemented method as in claim 2, wherein the first stimulus comprises a stimulating image.

11. A computer-implemented method as in claim 2, wherein the first stimulus comprises a sound.

12. A computer-implemented method as in claim 2, wherein the first stimulus comprises a task from an emotion-eliciting paradigm.

13. A computer-implemented method as in claim 2, wherein the first stimulus comprises a task from a reward-punishment paradigm.

14. A computer-implemented method as in claim 2, wherein the first stimulus comprises a task selected from the group consisting of a fear-eliciting paradigm, an anger-eliciting paradigm, and a structured interview.

15. A computer implemented method as in claim 2, further comprising:

causing a second stimulus to be rendered to the user through the user computing device, wherein the second stimulus is evocative of the predetermined emotion or affective state; and

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obtaining a second image comprising extended facial expression of the user responding to the second stimulus rendered through the user computing device;

wherein:

the step of analyzing the first image comprises analyzing the first image and the second image with the machine learning classifier, thereby obtaining the one or more analysis results associated with the first image and with the second image; and

the stimuli used in training the classifier include at least one of the first stimulus and the second stimulus.

16. A computer-implemented method of claim 2, wherein the step of analyzing comprises:

applying to the first image automated facial expression measurement (AFEM) to obtain discriminative quantification of emotions evoked by the first stimulus;

generating a facial response vector from the first image;

comparing the facial response vector from the first image with (1) a facial response vector based on statistics of a healthy population, and (2) a facial response vector based on statistics of a patient population suffering from the predetermined disorder.

17. A computing device comprising:

at least one processor;

machine-readable storage, the machine-readable storage being coupled to the at least one processor, the machine-readable storage storing instructions executable by the at least one

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processor; and

means for allowing the at least one processor to obtain an image comprising extended facial expression of a user responding to a first stimulus evocative of a predetermined emotion or affective state;

wherein:

the instructions, when executed by the at least one processor, configure the at least one processor to analyze the first image with a machine learning classifier trained to differentiate between (1) features of extended facial expressions of the predetermined emotion or affective state in images of healthy subjects responding to stimuli evocative of the predetermined emotion or affective state, and (2) features of extended facial expressions of the predetermined emotion or affective state in images of subjects suffering from a predetermined disorder responding to the stimuli evocative of the predetermined emotion or affective state, thereby obtaining one or more analysis results, the one or more analysis results comprising an indication of whether the user suffers from the predetermined disorder.

18. A computing device as in claim 17, wherein:

the machine-readable storage further stores data, the data comprising the first stimulus evocative of the predetermined emotion or affective state; and

the means for allowing the at least one processor to obtain the first image comprises a camera;

the computing device further comprising:

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a display coupled to the at least one processor to allow the at least one processor to cause the at least one stimulus to be rendered to the user.

19. A computing device as in claim 17, further comprising:

a network interface coupling the computing device to a user device;

wherein:

the machine-readable storage further stores data, the data comprising the first stimulus evocative of the predetermined emotion or affective state; and

the means for allowing the at least one processor to obtain the first image comprises the network interface.

20. An article of manufacture comprising one or more machine-readable memory devices storing computer code to configure at least one processor to:

cause a first stimulus to be rendered to a user through a user computing device, wherein the first stimulus is evocative of a predetermined emotion or affective state;

obtain a first image comprising extended facial expression of the user responding to the first stimulus rendered through the user computing device;

analyze the first image with a machine learning classifier trained to differentiate between (1) features of extended facial expressions of the predetermined emotion or affective state in images of healthy subjects responding to stimuli evocative of the predetermined emotion or affective state, and (2) features of extended facial expressions of the predetermined emotion or affective

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state in images of subjects suffering from a predetermined disorder responding to the stimuli evocative of the predetermined emotion or affective state, thereby obtaining one or more analysis results; and

use the one or more analysis results.

5

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Apple EX1002 Page 263

Sheet 1/2

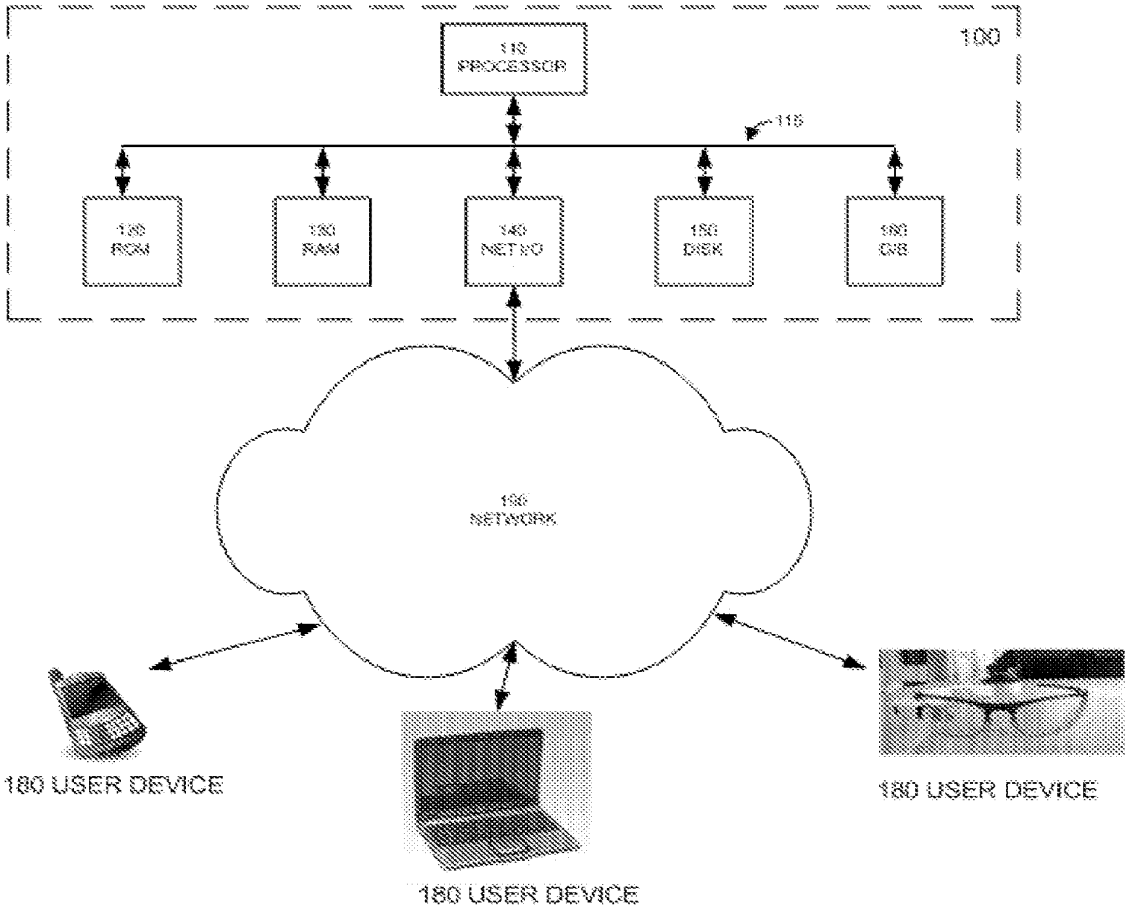


FIG. 1

Sheet 2/2

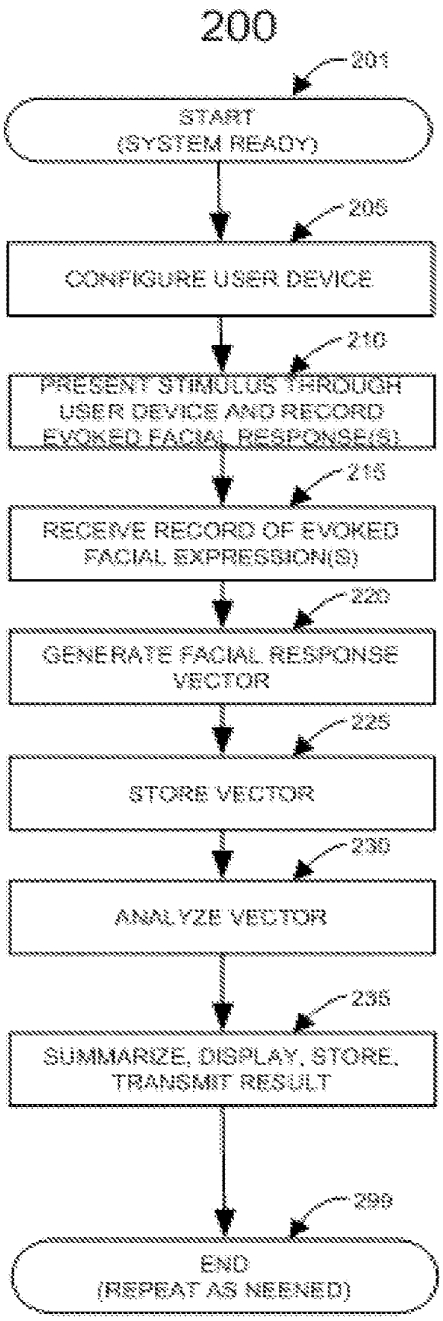


FIG. 2

Electronic Patent Application Fee Transmittal

Application Number:	16831432
Filing Date:	26-Mar-2020
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Filer:	Lucas M Amodio/Gwendolyn Menz
Attorney Docket Number:	36893-7

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($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	130	130
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt

EFS ID:	41196670
Application Number:	16831432
International Application Number:	
Confirmation Number:	9096
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Customer Number:	76656
Filer:	Lucas M Amodio/Gwendolyn Menz
Filer Authorized By:	Lucas M Amodio
Attorney Docket Number:	36893-7
Receipt Date:	23-NOV-2020
Filing Date:	26-MAR-2020
Time Stamp:	16:17:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$130
RAM confirmation Number	E2020AMG18234046
Deposit Account	012384
Authorized User	Gwendolyn Menz

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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	Information Disclosure Statement (IDS) Form (SB08)	36893-7_Supplemental_IDS_23NOV2020-38478583.pdf	1006722 a278fc0b4c043d12e278f12c073690529528 2a97	no	6
Warnings:					
Information:					
2	Foreign Reference	WO2014127333A1-38478633.pdf	1268109 cad8fbf7951ec72a5b580c87304f43019c43f 4d5	no	30
Warnings:					
Information:					
3	Foreign Reference	WO2014127065A3-38478622.pdf	129758 dd0c3b924ab77afa3d2ca281bb52f754278 8e101	no	2
Warnings:					
Information:					
4	Foreign Reference	WO2014127065A2-38478609.pdf	1429545 53e581daf596c5787464531167b59019380 9d492	no	30
Warnings:					
Information:					
5	Non Patent Literature	Mislove-NPL-38478594.pdf	7453255 7ab0a555da5ede3e8362c7c1e038c319b83 529ef	no	6
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30342 ba0ce0d5bd1f4d25529702ff96b238c4d7b 45ed1	no	2
Warnings:					
Information:					

Total Files Size (in bytes):	11317731

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

76656 7590 12/07/2020

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	
ANDERSON, SCOTT C	

ART UNIT	PAPER NUMBER
3694	

NOTIFICATION DATE	DELIVERY MODE
12/07/2020	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):

USpatents@armstrongteasdale.com

Office Action Summary	Application No. 16/831,432	Applicant(s) Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	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 23 September 2020.

☐ 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) 1-14,16-17 and 20-23 is/are pending in the application.

5a) Of the above claim(s) 21 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-14,16-17,20 and 22-23 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 20201123.

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

4) ☐ Other: _____.

DETAILED ACTION

This Office action is in reply to correspondence filed 23 September 2020 in regard to application no. 16/831,432. Claims 15, 18 and 19 have been cancelled. Claims 1-14, 16, 17 and 20-23 are pending and are considered below.

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 23 September 2020 has been entered.

Election/Restrictions

3. Newly submitted claim 21 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: unlike the claims that have been examined, which modify an emoticon based on a detected facial expression, this claim determines and stores a contextual tag based on similar information. This is a related but distinct invention which, if presented at the time the

application was filed, would have been restricted as it has a different classification and a different mode of operation, function and effect as the invention already examined.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, **claim 21 is withdrawn from consideration** as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Objections

4. **Claim 1 is objected to** because of the following informalities: the phrase "that simulates the detected that simulates plurality of human facial expressions" is garbled. The Examiner suggests striking out the second instance of "that simulates". Appropriate correction is required.

5. **Claims 22 and 23 are objected to** because of the following informalities: they do not end with a period. Appropriate correction is required.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have

been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

7. **Claims 1, 8, 9, 16 and 17 are rejected on the ground of nonstatutory double patenting** as being unpatentable over claim 1 of U.S. Patent No. 10,275,583. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims of the present invention are broader (and, as will be set forth below, the amendment does not create any patentable distinction) but are sufficiently similar that anyone practicing the invention disclosed by the patent would literally infringe the claims at issue in the present invention.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. **Claims 1-14, 16, 17, 20, 22 and 23 are rejected under 35 U.S.C. 112(a)** or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed

invention. Each claim now includes a limitation similar to that of claim 1 in which a sensor detects "a plurality of human facial expressions" and simulates the "plurality of human facial expressions". Claim 17 further includes a "selected emoticon changing to the detected human facial expression". Claim 23 further includes detecting a facial expression "on a periodic basis based on a predetermined period of time". There is no support for these in the originally filed application and they therefore represent impermissible new matter.

Claim Rejections - 35 USC § 103

10. 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.

11. **Claims 1, 4, 5, 9, 12, 13, 17 and 20 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. (U.S. Publication No. 2015/0015690, with priority to Korea patent application no. 10-2013-0081220, filed 10 July 2013) in view of Kim (U.S. Publication No. 2013/0185648) further in view of Breen et al. (U.S. Publication No. 2008/0218472).

In-line citations are to Roh.

With regard to Claim 1:

Roh teaches: **A computer device comprising at least one processor** [0088; "processors"] **in communication with at least one memory device,** [0089; "software codes may be stored in the memory 160 and executed by the controller 180" which comprises the processors] **wherein the at least one processor is programmed to...**

detect a plurality of human facial expressions using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"; 0201; "multiple reactions are detected during the recognition of facial expressions"] **automatically... the selected emoticon... to generate a... emoticon... and route a message with the modified emoticon to a second computer device.** [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receive a selection of an emoticon**, to use a **selected emoticon**, or to **modify an emoticon**, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon" which may be used in "sending an e-mail communication or a text message". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

Roh comes close to, but does not explicitly, teach **simulat**[ing] **the detected… plurality of human facial expressions on the selected emoticon**, though he does detect a facial expression as cited above, but it is known in the art. Breen teaches an interface to convert facial expressions to application input. [title] His system can "generate emoticons" in a "chat session". [0026] A "mental state or a facial expression of a subject can be detected and classified". [0018] His invention includes a "simulator". [0057] When "a user begins to smile, the detection result will change from absence of smile to presence of smile. This can trigger the converter application to generate an input event, e.g., keyboard input of a smile emoticon [0035] Again, "if the detection algorithm 14 detects either the facial expression of a smile or the emotional state of happiness, the converter application 40 could generate a smile text emoticon [0037] It is not limited to keyboard emoticons, as if an "application 32 supports graphic emoticons, then a

code for the graphic emoticon could be used rather than the text". [0041] The title of the invention indicates that he deals with plural "facial expressions".

Breen and Roh are analogous art as each is directed to electronic means for displaying images symbolic of a user's facial expression. It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Breen with that of Roh and Kim in order to simulate a facial expression with an emoticon once detected, as taught by Breen; further, it is simply a substitution of one known part for another with predictable results, simply using Breen's technique to produce an emoticon, such as the modification of a selected emoticon of Kim, in place of Roh or Kim's own method; the substitution produces no new and unexpected result.

In this and the subsequent claims, that two expressions are detected and simulated rather than one consists entirely of a mere duplication of parts, of no patentable significance as no new and unexpected result is inherent or disclosed. See MPEP § 2144.04(VI)(B). The reference is provided for the purpose of compact prosecution.

With regard to Claim 4:

The computer device of Claim 1, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

With regard to Claim 5:

The computer device of Claim 1, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof. [*id.*; either of a surprised look or smile reads on an expression corresponding to a mood or emotion]

With regard to Claim 9:

Roh teaches: **A computer-implemented method** [0087; the steps are performed using a "computer"] **of operating a messaging application, the method comprising...**

detecting a first human facial expression and a second subsequent human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user" ; 0201; "multiple reactions are detected during the recognition of facial expressions"]

automatically... the selected emoticon... to generate a... emoticon... and route a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach **receiving a selection of an emoticon**, to use a **selected emoticon**, or **modifying an emoticon**, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon" which may be used in "sending an e-mail communication or a text message". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

Roh comes close to, but does not explicitly, teach **simulating the detected first human facial expression and then the subsequent second human facial expression on the selected emoticon**, though he does detect a facial expression as cited above, but it is known in the art. Breen teaches an interface to convert facial expressions to application input. [title] His system can "generate emoticons" in a "chat session". [0026] A "mental state or a facial expression of a

subject can be detected and classified". [0018] His invention includes a "simulator". [0057] When "a user begins to smile, the detection result will change from absence of smile to presence of smile. This can trigger the converter application to generate an input event, e.g., keyboard input of a smile emoticon [0035] Again, "if the detection algorithm 14 detects either the facial expression of a smile or the emotional state of happiness, the converter application 40 could generate a smile text emoticon [0037] It is not limited to keyboard emoticons, as if an "application 32 supports graphic emoticons, then a code for the graphic emoticon could be used rather than the text". [0041] The title of the invention indicates that he deals with plural "facial expressions".

Breen and Roh are analogous art as each is directed to electronic means for displaying images symbolic of a user's facial expression. It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Breen with that of Roh and Kim in order to simulate a facial expression with an emoticon once detected, as taught by Breen; further, it is simply a substitution of one known part for another with predictable results, simply using Breen's technique to produce an emoticon, such as the modification of a selected emoticon of Kim, in place of Roh or Kim's own method; the substitution produces no new and unexpected result.

With regard to Claim 12:

The computer-implemented method of Claim 9, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

With regard to Claim 13:

The computer-implemented method of Claim 9, wherein the detected human facial expression includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof. [*id.*; either of a surprised look or smile reads on an expression corresponding to a mood or emotion]

With regard to Claim 17:

Roh teaches: **At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device,** [0088; "processors"; 0089; "software codes may be stored in the memory 160 and executed by the controller 180" which comprises the processors] **the computer-executable instructions cause the processor to...**

detect a human facial expression using one or more sensors of the computer device; [0207; "capturing a video or still image of the user through the camera"; 0231; "detecting a facial expression" of "the user"]

automatically... the selected emoticon... to generate a... emoticon... and route a message with the modified emoticon to a second computer device. [0233; "display" images "on the execution screen 80 of the SNS" (Social Networking Service)]

Roh does not explicitly teach receive a **selection of an emoticon**, to use a **selected emoticon**, or the **selected emoticon changing to the detected human facial expression** to create a **modified emoticon**, but it is known in the art. Kim teaches a user interface [title] in which a user may "select an emoticon" which may be used in "sending an e-mail communication or a text message". [0057] The system is further able to "chang[e] an emoticon", [0033] which is done "dynamically". [0031] Kim and Roh are analogous art as each is directed to electronic means for manipulating emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Kim with that of Roh in order to allow a user to choose an emoticon to start with and then dynamically change it, as taught by Kim; further, it is simply a substitution of one known part for another with predictable results, simply allowing the user to select the emoticon as taught by Kim rather than automatically choosing it as in Roh, and then changing it as taught by Kim to match Roh's facial expression of the user; the substitution produces no new and unexpected result.

Roh comes close to, but does not explicitly, teach simulating the detected human facial expression on the selected emoticon, though he does detect a facial expression as cited above, but it is known in the art. Breen teaches an interface to convert facial expressions to application input. [title] His system can "generate emoticons" in a "chat session". [0026] A "mental state or a facial expression of a subject can be detected and classified". [0018] His invention includes a "simulator". [0057] When "a user begins to smile, the detection result will change from absence of smile to presence of smile. This can trigger the converter application to generate an input event, e.g., keyboard input of a smile emoticon [0035] Again, "if the detection algorithm 14 detects either the facial expression of a smile or the emotional state of happiness, the converter application 40 could generate a smile text emoticon [0037] It is not limited to keyboard emoticons, as if an "application 32 supports graphic emoticons, then a code for the graphic emoticon could be used rather than the text". [0041]

Breen and Roh are analogous art as each is directed to electronic means for displaying images symbolic of a user's facial expression. It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Breen with that of Roh and Kim in order to simulate a facial expression with an emoticon once detected, as taught by Breen; further, it is simply a substitution of one known part for another with predictable results, simply using Breen's technique to produce an emoticon, such as the

modification of a selected emoticon of Kim, in place of Roh or Kim's own method; the substitution produces no new and unexpected result.

With regard to Claim 20:

The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected human facial expression includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof. [0152; "a surprised look or smile"]

12. **Claims 2, 7 and 10 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Goossens et al. (U.S. Publication No. 2011/0296324).

Claims 2 and 10 are similar so are analyzed together.

With regard to Claim 2:

The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

With regard to Claim 10:

The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the modified emoticon is embedded as part of the message.

Roh, Kim and Breen teach the device of claim 1 and method of claim 9, but do not explicitly teach adding their emoticon to a message which has been composed using an interface, but it is known in the art. Goossens teaches a system for creating and using avatars to reflect user states. [abstract] Users can "insert emoticons in their messages". [0063] This can be done via a "user interface" used to send a "text message" to "another user". [0063] Goossens and Roh are analogous art as each is directed to electronic means for managing emoticons.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Goossens with that of Roh, Kim and Breen in order to be able to use emoticons to represent a user's state within a message, as taught by Goossens; further, it is simply a combination of known parts with predictable results, simply taking the emoticon of Roh, Kim, Breen or Goossens and inserting it into a message composed using an interface such as that of Goossens; each part works independently of the other, and each

With regard to Claim 7:

The computer device of Claim 1, wherein the modified emoticon is embedded at a displayable portion of the message. [Goossens, 0063; "when the user inserts an emoticon in a text message sent to another user, the user's avatar appearing in the chat session between the two users can be updated to

show the avatar instance associated with the 'Happiness' user state"; Sheet 7, Fig. 6B]

It would have been obvious to one then of ordinary skill in the art to combine this feature of Goossens with the teaching of Roe and Kim in order to display an emoticon on the same screen as the message, as taught by Goossens.

13. **Claims 3 and 11 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Wong (U.S. Publication No. 2013/0322705).

These claims are similar so are analyzed together.

With regard to Claim 3:

The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

With regard to Claim 11:

The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

Roh, Kim and Breen teach the device of claim 1 and method of claim 9, including "detecting a facial expression", [0231] which reads on a facial profile, but do not explicitly teach using a picture of a face in this way, but it is known in the art. Wong teaches facial and fingerprint identification. [title] The system may "unlock a device when the captured facial image matches [a] reference facial image", [abstract] The reference facial image is a "stored reference facial image", [0021] and the captured facial image is captured "utilizing a first camera". [0004] Wong and Roh are analogous art as each is directed to electronic processing of facial images captured by cameras.

It would have been obvious to one of ordinary skill in the art to combine the teaching of Wong with that of Roh, Kim and Breen in order to be able to use a facial image in a comparison, as taught by Wong; further, it is simply a combination of known parts with predictable results, simply performing Wong's step after all others; each part works independently of the other, and each works in combination identically to how it works when not combined, with no new and unexpected result inherent or disclosed.

14. **Claims 6 and 14 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Pfister et al. (U.S. Publication No. 2013/0300900).

These claims are similar so are analyzed together.

With regard to Claim 6:

The computer device of Claim 1, where the at least one processor is further programmed to analyze the human facial expression using an expression recognition process to detect the human facial expression.

With regard to Claim 14:

The computer-implemented method of Claim 9, further comprising analyzing the human facial expression using an expression recognition process to detect the human facial expression.

Roh, Kim and Breen teach the device of claim 1 and method of claim 9, including detecting a human facial expression as cited above, and though it seems inherent that any computer that can detect a facial expression is using some sort of "expression recognition process" and performing analysis, as Roh, Kim and Breen are not explicit about it, it is, nonetheless, known in the art. Pfister teaches an automated recognition algorithm for detecting facial expressions [title] which uses "video analysis" [0017] to analyze "feature points of a model face and a face contained in video frames"; [0012] the actual analysis using the feature points is then described in elaborate detail [0030] in order to "detect facial microexpressions". [0032] Pfister and Roh are analogous art as each is directed to electronic means for detecting facial expressions.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Pfister with that of Roh, Kim and Breen in order to provide for a particular process for detecting a facial expression such as that of Pfister; further, it is simply a substitution of one known part for another with predictable results, simply using Pfister's recognition process in place of, or in addition to, that of Roh; the substitution produces no new and unexpected result.

15. **Claims 8 and 16 are rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Winchester (U.S. Publication No. 2011/0304629).

These claims are similar so are analyzed together.

With regard to Claim 8:

The computer device of Claim 1, wherein the human facial expression is captured in real-time from the one or more sensors.

With regard to Claim 16:

The computer-implemented method of Claim 9, wherein the human facial expression is captured in real-time from the one or more sensors.

Roh, Kim and Breen teach the device of claim 1 and method of claim 9 but do not explicitly teach that the facial expression is captured in real time, though there is

no hint of any delay or batch processing; but in any event, it is known in the art. Winchester teaches real-time animation of facial expressions [title] which includes "capturing facial expressions of an individual and causing such facial expressions to be reflected in real-time on an animated avatar". [0006] The facial expressions are within an image captured by "an image sensor 108 such as a RGB video camera that can capture images and/or motion of the individual". [0021] Winchester and Roh are analogous art as each is directed to electronic means for depicting animated images based on a human facial expression.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Winchester with that of Roh, Kim and Breen in order to perform processing explicitly in real time, as taught by Winchester; further, it is simply and at most a substitution of one known part for another, simply capturing images in real time as explicitly taught by Winchester rather than as only implied by the lack of any alternative in Roh; the substitution produces no new and unexpected result.

16. **Claim 22 is rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Ogawa (U.S. Publication No. 2012/0162495).

With regard to Claim 22:

The computer-implemented method of Claim 9, further comprising continuously detecting human facial expressions using one or more sensors of the computer device after detecting the first human facial expression

Roh, Kim and Breen teach the method of claim 9 including detecting facial expressions with sensors as cited above, but do not explicitly teach that it is done continuously, but it is known in the art. Ogawa teaches an image-capturing apparatus [title] which can detect "facial expressions of a person", [0004] and which "continuously performs" the "detection". [Claim 3] Ogawa and Roh are analogous art as each is directed to electronic means for detecting facial expressions.

It would have been obvious to one of ordinary skill in the art to combine the teaching of Ogawa with that of Roh, Kim and Breen in order to capture an expression as soon as it is available to be captured, as taught by Ogawa; further, it is simply a substitution of one known part for another with predictable results, simply performing the detection continuously in the manner of Ogawa rather than sequentially as in Roh; the substitution produces no new and unexpected result.

17. **Claim 23 is rejected under 35 U.S.C. 103** as being unpatentable over Roh et al. in view of Kim further in view of Breen et al. further in view of Herdy (U.S. Publication No. 2013/0242064).

With regard to Claim 23:

The computer device of Claim 1, wherein the at least one processor is further programmed to detect a human facial expression on a periodic basis based on a predetermined period of time

Roh, Kim and Breen teach the device of claim 1 but do not explicitly teach including detecting facial expressions with sensors as cited above, but do not explicitly teach that it is done over a time interval, but this is known in the art. Herdy teaches a system for providing social content. [title] He uses "facial expression" which may be "detected by" an "expression detection module". [0035; 0097] This is done repeatedly such as when a person is watching a "movie" such that changes in expression may be detected, and is done over a "period of time", [0097] after which an image may be resized. Herdy and Roh are analogous art as each is directed to electronic means for detecting facial expressions.

It would have been obvious to one of ordinary skill in the art just prior to the filing of the claimed invention to combine the teaching of Herdy with that of Roh, Kim and Breen in order to detect changes in expression as they occur, as taught by Herdy; further, it is simply a substitution of one known part for another with predictable results, simply performing a task during a time period as taught by

Herdy rather than for an unspecified amount of time as in Roh; the substitution produces no new and unexpected result.

Response to Arguments

18. Applicant's arguments with respect to claim(s) 1-14, 16, 17, 20, 22 and 23 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument. In particular, the applicant argues in regard to language added by amendment and for which additional citations to the prior art previously made of record have been incorporated herein. The Examiner reminds the applicant that, as stated above, some of the amended language is impermissible new matter, and provides the additional citations and explanations for the purpose of compact prosecution.

The applicant has chosen not to timely traverse, in detail, the bases of rejection of the various dependent claims so there is no need for further discussion of those claims here.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT C ANDERSON whose telephone number is (571)270-7442. The examiner can normally be reached on M-F 9:00 to 5:30.

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, Bennett Sigmond can be reached on (303) 297-4411. 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.

/SCOTT C ANDERSON/
Primary Examiner, Art Unit 3694

Notice of References Cited	Application/Control No. 16/831,432	Applicant(s)/Patent Under Reexamination Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20120162495-A1	06-2012	Ogawa; Shigeo	H04N5/232123	348/345
*	B	US-20130242064-A1	09-2013	Herdy; Ronaldo Luiz Lisboa	H04N7/147	348/51
	C					
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FOREIGN PATENT DOCUMENTS

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	N					
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

CPC - Searched*		
Symbol	**Date**	**Examiner**
G06F3/00, 011, 0304	04/21/2020	sca
G06Q30/0271, G06F21/629, G06F2203/011	04/21/2020	sca
H04W4/12, 21, H04W12/06, H04W12/00504	04/21/2020	sca
G06Q30/0271	06/17/2020	sca
G06F3/00, 011, 0304 limited by text see history	12/01/2020	sca

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

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

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Search Notes		
Search Notes	**Date**	**Examiner**
PLUS search	04/21/2020	sca
Inventor search	04/21/2020	sca
EAST search including EPO	04/21/2020	sca
EAST search including EPO	06/17/2020	sca
EAST search including EPO	12/01/2020	sca

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

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

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

✓	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	04/21/2020	06/17/2020	12/01/2020						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9	✓	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	✓	✓						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	✓	✓	-						
	16	✓	✓	✓						
	17	✓	✓	✓						
	18	✓	✓	-						
	19	✓	✓	-						
	20	✓	✓	✓						
	21			N						
	22			✓						
	23			✓						

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16831432
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	3694
Examiner Name	Scott C. Anderson
Attorney Docket Number	36893-7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8203530	B2	2012-06-19	CHIANG	
	2	9104907	B2	2015-08-11	WHITEHILL et al.	
	3	9105119	B2	2015-08-11	WHITEHILL et al.	
	4	9189797	B2	2015-11-17	GHOSH et al.	
	5	9008416	B2	2015-04-14	MOVELLAN et al.	
	6	8922480	B1	2014-12-30	FREED et al.	
	7	9104905	B2	2015-08-11	WHITEHILL et al.	
	8	9450957	B1	2016-09-20	DANIEL	

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	First Named Inventor	Eric Leuthardt
	Art Unit	3694
	Examiner Name	Scott C. Anderson
	Attorney Docket Number	36893-7

	9	9443167	B2	2016-09-13	MOVELLAN et al.	

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	1	20120054039	A1	2012-03-01	PATWA et al.	
	2	20070208610	A1	2007-09-06	PISARIS HENDERSON et al.	
	3	20100141662	A1	2010-06-10	STOREY et al.	
	4	20150049953	A1	2015-02-19	MOVELLAN et al.	
	5	20150046996	A1	2015-02-12	SLABY et al.	
	6	20140316881	A1	2014-10-23	MOVELLAN et al.	
	7	20120011120	A1	2012-01-12	BURNAND et al.	
	8	20120054311	A1	2012-03-01	MIZUNO et al.	

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	First Named Inventor	Eric Leuthardt
	Art Unit	3694
	Examiner Name	Scott C. Anderson
	Attorney Docket Number	36893-7

	9	20090016617	A1	2009-01-15	BREGMAN-AMITAI et al.	
	10	20140366158	A1	2014-12-11	HAN et al.	
	11	20140314284	A1	2014-10-23	MOVELLAN et al.	
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	14	20150381575	A1	2015-12-31	BHARGAV-SPANTZEL et al.	
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	16	20090141895	A1	2009-06-04	ANDERSON et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16831432
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	3694
Examiner Name	Scott C. Anderson
Attorney Docket Number	36893-7

	1	2014127065	WO	A2	2014-08-21	EMOTIENT		
	2	2014127065	WO	A3	2014-10-16	EMOTIENT		
	3	2014127333	WO	A1	2014-08-21	EMOTIENT		

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Alan Mislove; A secure, resilient, cooperative messaging system; researchgate.net: 2003; page: 1-6	

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Examiner Signature	/SCOTT C ANDERSON/	Date Considered	12/01/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16831432
Filing Date	2020-03-26
First Named Inventor	Eric Leuthardt
Art Unit	3694
Examiner Name	Scott C. Anderson
Attorney Docket Number	36893-7

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).

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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.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Lucas M. Amodio/	Date (YYYY-MM-DD)	2020-11-23
Name/Print	Lucas M. Amodio	Registration Number	70239

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.C./

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	57,595	(g06f3/00 or g06f3/011 or g06f3/0304).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/01 16:45
S2	2	"20150015690".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/01 17:13
S3	597	S1 and (detect$3 near3 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/01 17:13
S4	1	"20080218472".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/01 17:28
S5	314	(detect$3 near3 expression) with (continual$2 or continuous$2 or repeatedly)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 08:59
S6	9	S5 and emoticon	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:00
S7	172	S5 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:01
S8	105	(detect$3 near3 expression) with (periodic$4 or repeatedly)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:02
S9	66	S8 and (time near2 (period or interval))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:02
S10	13	S7 and (facial near2 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:03
S11	0	S9 and g06q30/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:16
S12	0	S9 and g06q20/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:16
S13	0	S9 and g06q40/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:16

S14	1,249	(detect$3 near3 expression) same (time near2 (period or interval))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:16
S15	202	S14 and (facial near2 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:16
S16	50	S15 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2020/12/02 09:17

EAST Search History (Interference)

<This search history is empty>

12/2/2020 11:41:46 AM
C:\Users\sanderson2\Documents\EAST\Workspaces\16831432b.wsp

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/831,432	Filing Date 03/26/2020	☐ 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 $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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	03/08/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0		x $240 =	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".	/DANTE SMITH/
*** 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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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Eric Leuthardt	:	
	:	Art Unit: 3694
Serial No.: 16/831,432	:	
	:	Examiner: Anderson, Scott C.
Filed: March 26, 2020	:	
	:	Confirmation No: 9096
For: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	:	

AMENDMENT

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

In response to the Office Action dated December 7, 2021, please amend the above-identified patent application and consider the following remarks.

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IN THE CLAIMS:

1. (Currently amended) A computer device comprising at least one processor in communication with at least one memory device, wherein the at least one processor is programmed to:

receive a selection of an emoticon;

monitor a sensor feed provided by one or more sensors of the computer device to detect a plurality of human facial ~~expressions using one or more sensors of the computer device~~ expression states;

automatically ~~modify the selected emoticon to~~ generate a ~~modified~~ dynamic emoticon that simulates the detected ~~that simulates~~ plurality of human facial ~~expressions~~ expression states on the selected emoticon based on the sensor feed of the plurality of human facial expression states; and

route a message with the ~~modified~~ dynamic emoticon to a second computer device.

2. (Currently amended) The computer device of Claim 1, wherein a messaging interface is used to compose the message, and wherein the ~~modified~~ dynamic emoticon is embedded as part of the message.

3. (Original) The computer device of Claim 1, wherein the at least one processor is further programmed to detect a facial profile and to match the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

4. (Currently amended) The computer device of Claim 1, wherein the detected plurality of human facial expression states includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

5. (Currently amended) The computer device of Claim 1, wherein the detected plurality of human facial expression states includes an expression corresponding to a

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mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

6. (Currently amended) The computer device of Claim 1, where the at least one processor is further programmed to analyze [[the]] a human facial expression using an expression recognition process to detect the human facial expression state.

7. (Currently amended) The computer device of Claim 1, wherein the ~~modified~~ dynamic emoticon is embedded at a displayable portion of the message.

8. (Currently amended) The computer device of Claim 1, wherein [[the]] a human facial expression is captured in real-time from the one or more sensors.

9. (Currently amended) A computer-implemented method of operating a messaging application, the method comprising:

receiving a selection of an emoticon;

~~detecting~~ monitoring a sensor feed provided by one or more sensors of a computer device to detect a ~~first~~ plurality of human facial expression ~~and a second subsequent human facial expression using one or more sensors of the computer device~~ states;

automatically ~~modify the selected emoticon to generate~~ generating a ~~modified~~ dynamic emoticon that simulates the detected ~~first~~ plurality of human facial expression states ~~and then the subsequent second human facial expression~~ on the selected emoticon based on the sensor feed of the plurality of human facial expression states; and

route a message with the ~~modified~~ dynamic emoticon to a second computer device.

10. (Currently amended) The computer-implemented method of Claim 9, wherein a messaging interface is used to compose the message, and wherein the ~~modified~~ dynamic emoticon is embedded as part of the message.

11. (Original) The computer-implemented method of Claim 9, further comprising detecting a facial profile and matching the facial profile against a known facial profile utilizing a facial recognition process to authenticate an operating user.

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12. (Currently amended) The computer-implemented method of Claim 9, wherein the detected plurality of human facial expression states includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

13. (Currently amended) The computer-implemented method of Claim 9, wherein the detected plurality of human facial expression states includes an expression corresponding to a mood or an emotion, a micro expression, a stimulated expression, a neutralized expression, a masked expression, or any combination thereof.

14. (Currently amended) The computer-implemented method of Claim 9, further comprising analyzing [[the]] a human facial expression using an expression recognition process to detect the human facial expression state.

15. (Cancelled)

16. (Currently amended) The computer-implemented method of Claim 9, wherein [[the]] a human facial expression is captured in real-time from the one or more sensors.

17. (Currently amended) At least one non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by a computer device having at least one processor in communication with at least one memory device, the computer-executable instructions cause the processor to:

receive a selection of an emoticon;

monitor a sensor feed provided by one or more sensors of the computer device to detect a plurality of human facial expression ~~using one or more sensors of the computer device~~ state;

automatically ~~modify the selected emoticon to~~ generate a ~~modified~~ dynamic emoticon that displays the selected emoticon changing to the plurality of detected human facial expression states based on the sensor feed of the plurality of human facial expression states; and

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route a message with the ~~modified~~ dynamic emoticon to a second computer device, wherein the second computer device displays the selected emoticon changing to the detected plurality of human facial expression states.

18. (Cancelled)

19. (Cancelled)

20. (Currently amended) The at least one non-transitory computer-readable storage media of Claim 17, wherein the detected plurality of human facial expression states includes a smile, a laugh, a grimace, a frown, a pout, or any combination thereof.

21. (Cancelled)

22. (Currently amended) The computer-implemented method of Claim 9, further comprising continuously detecting human facial ~~expressions~~ expression states using one or more sensors of the computer device after detecting [[the]] a first human facial expression state.

23. (Currently amended) The computer device of Claim 1, wherein the at least one processor is further programmed to detect a plurality of human facial expression states on a periodic basis based on a predetermined period of time.

24. (New) The computer device of Claim 1, wherein the sensor feed is analyzed for an expression recognition process and a biometric recognition process.

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REMARKS

The Office Action dated December 7, 2021, has been carefully reviewed and the foregoing amendments and following remarks have been made in consequence thereof.

Claims 1-14, 16, 17, and 20-23 are pending in this application. Claims 1-14, 16, 17, and 20-23 stand rejected. Claims 1, 2, 4-10, 12, 14, 16, 17, 20, 22, and 23 have been amended. Claim 24 is herein added. Claim 21 has been herein cancelled. No new matter is added. Support for these amendments can at least be found in Paragraphs [0021] and [0048].

Claim Objections

The objections to Claims 1, 22, and 23 are respectfully traversed. Claims 1, 22, and 23 have been amended. Applicant respectfully requests that the objections to Claims 1, 22, and 23 be withdrawn.

Double Patenting

Claims 1, 8, 9, 16, and 17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claim 1 of U.S. Patent No. 10,275,583. Applicant will consider filing a terminal disclaimer to obviate the rejection when it is the last remaining rejection in the application and the presently pending claims have been indicated as allowable, but for the rejection.

35 U.S.C. 112 Rejection

The rejection of Claims 1-14, 16, 17, 20, 22, and 23 under 35 U.S.C. § 112, first paragraph, is respectfully traversed. To expedite prosecution, Claims 1, 2, 4-10, 12, 14, 16, 17, 20, 22, and 23 have been amended to include the a plurality of human facial expression states as used in paragraphs [0043]-[0045]. Accordingly, Applicant request that the §112, first paragraph, rejection of Claims 1-14, 16, 17, 20, 22, and 23 be withdrawn.

35 U.S.C. 103 Rejection

The rejection of Claims 1, 4, 5, 9, 12, 13, 17, and 20 under 35 U.S.C. § 103 as being allegedly unpatentable over U.S. Patent Application Publication No. 2015/0015690 to Roh et al. (hereinafter referred to as "Roh") in view of U.S. Patent Application Publication No.

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2013/0185648 to Kim and further in view of U.S. Patent Application Publication No. 2008/0218472 to Breen et al. (hereinafter referred to as "Breen") is respectfully traversed.

Roh describes an electronic device 100. The electronic device 100 includes a touch screen; a camera 121; a microphone 122; and a controller 180 configured to display the execution screen of a predetermined application on the touch screen, control the camera 121 and the microphone 122 to operate upon entering reaction capture mode, acquire a reaction image by capturing a video or still image of a user through the camera 121 upon detecting the user making a facial expression or gesture through the camera 121 or the user's voice through the microphone 122, and display the acquired reaction image on the touch screen. (See Abstract). Roh does not describe or suggest a computer device programmed to a) monitor a sensor feed provided by one or more sensors of the computer device to detect a plurality of human facial expression states, b) automatically generate a dynamic emoticon that simulates the detected plurality of human facial expression states on the selected emoticon based on the sensor feed of the plurality of human facial expression states, and c) route a message with the dynamic emoticon to a second computer device, as is recited in amended Claim 1.

Kim does not rectify the deficiencies of Roh. Kim is cited to describe "a user may 'select an emoticon'". Accordingly, Kim does not describe or suggest a computer device programmed to a) monitor a sensor feed provided by one or more sensors of the computer device to detect a plurality of human facial expression states, b) automatically generate a dynamic emoticon that simulates the detected plurality of human facial expression states on the selected emoticon based on the sensor feed of the plurality of human facial expression states, and c) route a message with the dynamic emoticon to a second computer device, as is recited in amended Claim 1.

Breen does not rectify the deficiencies of Roh. Breen describes a method of interacting with an application 32. The method includes receiving data generated based on signals from one or more bio-signal detectors 12 on a user, the data representing a mental state or facial expression of the user. The method also includes generating an input event based on the data representing the mental state or facial expression of the user. The method further includes passing the input event to an application 32. Breen describes using the input event to generate a keyboard event for generate an emoticon in a chat session. Breen does not describe display changing the emoticon to a detected human facial expression.

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Accordingly, Breen does not describe or suggest a computer device programmed to a) monitor a sensor feed provided by one or more sensors of the computer device to detect a plurality of human facial expression states, b) automatically generate a dynamic emoticon that simulates the detected plurality of human facial expression states on the selected emoticon based on the sensor feed of the plurality of human facial expression states, and c) route a message with the dynamic emoticon to a second computer device, as is recited in amended Claim 1

No combination of Roh, Kim, and Breen describes or suggests a computer device as is recited in Claim 1. More specifically, no combination of Roh, Kim, and Breen describes or suggests a computer device programmed to a) monitor a sensor feed provided by one or more sensors of the computer device to detect a plurality of human facial expression states, b) automatically generate a dynamic emoticon that simulates the detected plurality of human facial expression states on the selected emoticon based on the sensor feed of the plurality of human facial expression states, and c) route a message with the dynamic emoticon to a second computer device, as is recited in amended Claim 1. Accordingly, Applicant submits that Claim 1 is patentable over Roh in view of Kim and further in view of Breen.

Claims 4 and 5 depend from independent Claim 1. When the recitations of Claims 4 and 5 are considered in combination with the recitations of independent Claim 1, Applicant submits that Claims 4 and 5 likewise are patentable over Roh in view of Kim and further in view of Breen.

To the extent claims 9 and 17 recite limitations similar to those in Claim 1, Claims 9 and 17 are also patentable over Roh in view of Kim and further in view of Breen.

Claims 12 and 13 depend from independent Claim 9. Claim 20 depends from independent Claim 17. When the recitations of Claims 12, 13, and 20 are considered in combination with the recitations of their respective independent claims, Applicant respectfully submits that dependent Claims 12, 13, and 20 likewise are patentable over Roh in view of Kim and further in view of Breen.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 1, 4, 5, 9, 12, 13, 17, and 20 be withdrawn.

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The rejection of Claims 2, 7, and 10 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2011/0296324 to Goossens et al. (hereinafter referred to as "Goossens") is respectfully traversed.

Claims 2 and 7 depend from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Goossens does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claims 2 and 7 are patentable over Roh in view of Kim and Breen and further in view of Goossens.

Claim 10 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Goossens does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 10 is patentable over Roh in view of Kim and Breen and further in view of Goossens.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 2, 7, and 10 be withdrawn.

The rejection of Claims 3 and 11 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2013/0322705 to Wong is respectfully traversed.

Claim 3 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Wong does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 3 is patentable over Roh in view of Kim and Breen and further in view of Wong.

Claim 11 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Wong does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that

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dependent Claim 11 is patentable over Roh in view of Kim and Breen and further in view of Wong.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 3 and 11 be withdrawn.

The rejection of Claims 6 and 14 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2013/0300900 to Pfister et al. (hereinafter referred to as "Pfister") is respectfully traversed.

Claim 6 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Pfister does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 6 is patentable over Roh in view of Kim and Breen and further in view of Pfister.

Claim 14 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Pfister does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 14 is patentable over Roh in view of Kim and Breen and further in view of Pfister.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 6 and 14 be withdrawn.

The rejection of Claims 8 and 16 under 35 U.S.C. § 103 as being allegedly unpatentable over Roh in view of Kim and Breen and further in view of U.S. Patent Application Publication No. 2011/0304629 to Winchester is respectfully traversed.

Claim 8 depends from Claim 1, which is recited above.

As explained above Claim 1 is patentable over Roh, Kim, and Breen. Winchester does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that

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dependent Claim 8 is patentable over Roh in view of Kim and Breen and further in view of Winchester.

Claim 16 depends from Claim 9, which is recited above.

As explained above Claim 9 is patentable over Roh, Kim, and Breen. Winchester does not cure the deficiencies of Roh, Kim, and Breen. Accordingly, Applicant submits that dependent Claim 16 is patentable over Roh in view of Kim and Breen and further in view of Winchester.

For at least the reasons set forth above, Applicant respectfully requests that the §103 rejection of Claims 8 and 16 be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully requested.

Respectfully submitted,

/Lucas M. Amodio/

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Electronic Acknowledgement Receipt

EFS ID:	42113812
Application Number:	16831432
International Application Number:	
Confirmation Number:	9096
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Customer Number:	76656
Filer:	Lucas M Amodio/Gwendolyn Menz
Filer Authorized By:	Lucas M Amodio
Attorney Docket Number:	36893-7
Receipt Date:	08-MAR-2021
Filing Date:	26-MAR-2020
Time Stamp:	13:28:31
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		36893-7_Amendment_08MAR2021-39940227.pdf	115665 29ad9be7793c5dbcc6613f462f41cc7630ab99e4	yes	11

	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	11
Warnings:			
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	Total Files Size (in bytes):	115665	

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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.

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.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

76656 7590 04/14/2021

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER
ANDERSON, SCOTT C

ART UNIT	PAPER NUMBER
3694	

DATE MAILED: 04/14/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

TITLE OF INVENTION: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	07/14/2021

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)

76656 7590 04/14/2021

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

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.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

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nonprovisional	SMALL	$600	$0.00	$0.00	$600	07/14/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
ANDERSON, SCOTT C	3694	705-014670

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. _____

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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3694	

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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.

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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.

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Notice of Allowability	Application No. 16/831,432	Applicant(s) Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	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 correspondence filed 8 March 2021.
   ☐ 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 See Continuation Sheet . 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 _____.

/SCOTT C ANDERSON/
Primary Examiner, Art Unit 3694

Continuation of 3. The allowed claim(s) is/are: 1-14,16-17,20 and 22-24

DETAILED ACTION

This Office action is in reply to correspondence filed 8 March 2021 in regard to application no. 16/831,432. Claims 15, 18, 19 and 21 have been cancelled. Claims 1-14, 16, 17, 20 and 22-24 are pending and are considered below.

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.

Allowable Subject Matter

2. **Claims 1-14, 16, 17, 20 and 22-24 are allowed.**

3. The following is an examiner's statement of reasons for allowance: in the previous Office action, claims were rejected on the basis of nonstatutory double patenting, under 35 U.S.C. § 112(a) for want of written description, and under § 103 based on at least the references of Roh et al., Kim, and Breen et al.

The present amendment renders the claims sufficiently different from those of U.S. Patent No. 10,275,583 to render moot the grounds of nonstatutory double patenting, and that rejection is therefore withdrawn. Similarly, the language which gave the Examiner concern so as to reject under § 112(a) has been removed, and that rejection is also therefore withdrawn.

Because of the amended claims, further search and consideration were conducted. Roberts et al. (U.S. Publication No. 2010/0125799) disclose a physical-virtual environment interface [title] that can "change" an "avatar's mask"; the avatar is

"generally human shaped" and is "facing" a particular direction. [0008] A "face-tracker" can recognize "facial expressions" of a person, the "avatar controller", and based on this can send "an appropriate expression piloting command", [0056] which would, presumably, alter the facial expression of the avatar, though Roberts does not go so far as to explicitly say so.

But neither Roberts nor the prior art previously made of record, alone or in ordered combination, teach all of the features of the claims of the present invention, such as monitoring a sensor feed to detect a plurality of human facial expression states and generating a dynamic emoticon that simulates the plurality of facial expressions and attaching it to a message sent to a second computer, in combination with the other limitations of the claims of the present invention.

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

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT C ANDERSON whose telephone number is (571)270-7442. The examiner can normally be reached on M-F 9:00 to 5:30.

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, Bennett Sigmond can be reached on (303) 297-4411. 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.

/SCOTT C ANDERSON/
Primary Examiner, Art Unit 3694

Notice of References Cited	Application/Control No. 16/831,432	Applicant(s)/Patent Under Reexamination Leuthardt et al.	
	Examiner SCOTT C ANDERSON	Art Unit 3694	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20100125799-A1	05-2010	Roberts; Michael	G06F3/011	715/757
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	**Art Unit**
	SCOTT C ANDERSON	3694

CPC						
Symbol					**Type**	**Version**
G06F	/	21	/	32	F	2013-01-01
G06Q	/	30	/	0271	I	2013-01-01
H04W	/	4	/	21	I	2018-02-01
G06F	/	21	/	629	I	2013-01-01
H04L	/	63	/	0861	I	2013-01-01
H04W	/	12	/	06	I	2013-01-01
G06F	/	3	/	011	I	2013-01-01
G06F	/	3	/	0304	I	2013-01-01
G06F	/	3	/	00	I	2013-01-01
H04W	/	4	/	12	A	2013-01-01
G06K	/	9	/	00302	A	2013-01-01
G06F	/	2203	/	011	A	2013-01-01
H04W	/	12	/	65	A	2021-01-01

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/SCOTT C ANDERSON/ Primary Examiner, Art Unit 3694	08 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1A

U.S. Patent and Trademark Office

Part of Paper No.: 20210408

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

INTERNATIONAL CLASSIFICATION					
CLAIMED					
G06F	/	21	/	32	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/SCOTT C ANDERSON/ Primary Examiner, Art Unit 3694	08 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1A

U.S. Patent and Trademark Office

Part of Paper No.: 20210408

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

☐ 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	10	24	19	17										
2	2	11	9	20	20										
3	3	12	10												
4	4	13	11												
5	5	14	12												
6	6	15	13												
7	7	16	14												
8	8	17	16												
9	23	18	22												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/SCOTT C ANDERSON/ Primary Examiner, Art Unit 3694	08 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1A

U.S. Patent and Trademark Office

Part of Paper No.: 20210408

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

CPC - Searched*		
Symbol	**Date**	**Examiner**
G06F3/00, 011, 0304	04/21/2020	sca
G06Q30/0271, G06F21/629, G06F2203/011	04/21/2020	sca
H04W4/12, 21, H04W12/06, H04W12/00504	04/21/2020	sca
G06Q30/0271	06/17/2020	sca
G06F3/00, 011, 0304 limited by text see history	12/01/2020	sca
G06F21/32, 629, G06F3/011, 0304, H04W4/21, G06Q30/0271	04/08/2021	sca

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.

/SCOTT C ANDERSON/ Primary Examiner, Art Unit 3694	

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

Search Notes		
Search Notes	**Date**	**Examiner**
PLUS search	04/21/2020	sca
Inventor search	04/21/2020	sca
EAST search including EPO	04/21/2020	sca
EAST search including EPO	06/17/2020	sca
EAST search including EPO	12/01/2020	sca
NPL search (Google scholar)	04/08/2021	sca
EAST search including EPO	04/08/2021	sca

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
G06F	21/32, 21/629, 3/011, 3/0304	04/08/2021	sca
H04W	4/21	04/08/2021	sca
G06Q	30/0271	04/08/2021	sca

/SCOTT C ANDERSON/ Primary Examiner, Art Unit 3694	

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Apple EX1002 Page 338

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/831,432	Leuthardt et al.
	Examiner	Art Unit
	SCOTT C ANDERSON	3694

✓	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	04/21/2020	06/17/2020	12/01/2020	04/08/2021					
1	1	✓	✓	✓	=					
2	2	✓	✓	✓	=					
3	3	✓	✓	✓	=					
4	4	✓	✓	✓	=					
5	5	✓	✓	✓	=					
6	6	✓	✓	✓	=					
7	7	✓	✓	✓	=					
8	8	✓	✓	✓	=					
11	9	✓	✓	✓	=					
12	10	✓	✓	✓	=					
13	11	✓	✓	✓	=					
14	12	✓	✓	✓	=					
15	13	✓	✓	✓	=					
16	14	✓	✓	✓	=					
	15	✓	✓	-	-					
17	16	✓	✓	✓	=					
19	17	✓	✓	✓	=					
	18	✓	✓	-	-					
	19	✓	✓	-	-					
20	20	✓	✓	✓	=					
	21			N	-					
18	22			✓	=					
9	23			✓	=					
10	24				=					

AffectiveWear: Toward recognizing **facial expression**

K Masai, Y Sugiura, M Ogata, K Suzuki… - ACM SIGGRAPH 2015 …, 2015 - dl.acm.org

… However, most works focus on camera-**based** systems installed in the environment … With our device, user can put **emoticon** or **change** their typography of text messages according to **facial expression** while they are texting …

☆ 99 Cited by 14 Related articles All 9 versions »

Driver **facial expression** analysis using LFA-CRNN-**based** feature extraction for health-risk decisions

CM Kim, EJ Hong, K Chung, RC Park - Applied Sciences, 2020 - mdpi.com

… in **face** recognition, center-symmetric LBP (CS-LBP) [24] was used in a **modified** form that … The difficulty in **detection** differs **depending** on the set value of the feature point of the … Figure 2 shows the LFA-CRNN-**based** driving **facial expression** analysis for assessing driver health …

☆ 99 Cited by 9 Related articles All 3 versions »

HEMOS: A novel deep learning-**based** fine-grained humor **detecting** method for sentiment analysis of social media

D Li, R Rzepka, M Ptaszynski, K Araki - Information Processing & …, 2020 - Elsevier

… Although there are many unknown factors in continually **changing** moods of human beings, **expressing** feelings is one of the most basic functions of our … Moreover, according to our previous observations, the meaning of certain **emojis** might **change** over time, and it is often …

☆ 99 Cited by 7 Related articles All 2 versions

Emotion **detection** from text

SN Shivhare, S Khethawat - arXiv preprint arXiv:1205.4944, 2012 - arxiv.org

… meanings of keywords could be multiple and vague, as most words could **change** their meanings … The most intuitive features may be **emoticons** which can be seen as author"s emotion … Methods described in section II are **modified** and integrated to extend their capabilities and …

☆ 99 Cited by 95 Related articles All 8 versions »

Face2emoji: Using **facial** emotional **expressions** to filter **emojis**

A El Ali, T Wallbaum, M Wasmann, W Heuten… - Proceedings of the …, 2017 - dl.acm.org

… [17] on **emoticon** sticker usage … Since currently as of Unicode 9.0, there are 1,394 **emojis** (not including **modified emojis**, or sequences)7, we decided to test only a subset … Figure 7: Early Android-**based** Face2Emoji prototype showing **emojis** (with Apple's© unicode rendering) …

☆ 99 Cited by 14 Related articles »

Smile **detection** for user interfaces

O Déniz, M Castrillon, J Lorenzo, L Anton… - … Symposium on Visual …, 2008 - Springer

… Nevertheless, the user has to specifically type the keystroke sequence of the **emoticon** to show … Status **change** can be typically achieved with strings such as "¡ALT¿ade" that navigate through … The application can also automatically insert smile/big smile **emoticons** in the IM client …

☆ 99 Cited by 47 Related articles All 5 versions »

The Simulation of Smiles (SIMS) model: Embodied simulation and the meaning of **facial expression**

PM Niedenthal, M Mermillod, M Maringer… - Behavioral and brain …, 2010 - core.ac.uk

… may be largely superceded by another more useful distinction, namely, distinctions **based** on smile … the perceiver does not necessarily have to experience a conscious **change** in emotional … for example, observed effects of mimicry when participants had to **detect** the boundary of …

☆ 99 Cited by 550 Related articles All 38 versions »

Cross-cultural comparison of nonverbal cues in **emoticons** on twitter: Evidence from big data analysis

J Park, YM Baek, M Cha - Journal of Communication, 2014 - academic.oup.com

… If the use of **emoticons** as nonverbal cues is influenced by the social conventions and communication … In short, **emoticon** use must be influenced by the national culture where users reside … meaning that a **change** in mouth shape is more easily noticeable than a **change** in eye …

☆ 99 Cited by 138 Related articles All 10 versions »

IPR2023-00833
Apple EX1002 Page 340

Influence of Color on Emotion Recognition Is Not Bidirectional: An Investigation of the Association Between Color and Emotion Using a Stroop-Like Task

S Ikeda - Psychological reports, 2020 - journals.sagepub.com

… With my free profile I can: Set up favourite journals and register for email alerts; List saved searches; **Edit** account details; …

☆ 99 Cited by 2 Related articles All 5 versions

AffectiveWear: towards recognizing affect in real life

K Masai, Y Sugiura, K Suzuki, S Shimamura… - Adjunct Proceedings of …, 2015 - dl.acm.org

… Text messages do not always convey enough information. In order to convey the nuance or the context behind the messages, we use **emoticons** and symbols such as question mark and exclamation mark … With our device, user can put **emoticon** or **change** their typography of …

☆ 99 Cited by 15 Related articles All 2 versions

IPR2023-00833
Apple EX1002 Page 341

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	8,696	(monitor$3 or track$3) with (fac$3 near2 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 13:34
L2	484	1 same2 (emoticon or avatar)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 13:35
L3	10,957	(avatar or emoticon) with (text or sms or email or (e adj mail) or (electronic adj mail) or im or (instant adj messag$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 13:35
L4	135	L3 and l2	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 13:35
S1	7,942	(choos$3 or choice or select$3) near3 (avatar or emoticon)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:27
S2	5,910	(modify$3 or modification or chang$3 or adjust$3 or alter$3) near3 (avatar or emoticon)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:28
S3	19,272	(detect$3 or recogniz$5 or recognition or recognis$5) with (fac$3 near2 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:29
S4	137	S2 same ((based or due or because or respons$3) near5 expression)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:30
S5	1,528	S2 same2 (sms or text or email or ((e or electronic) adj mail))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:30
S6	876	S1 same2 simulat$3	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:33
S7	14	(emoticon or avatar) with simulacrum	US-PGPUB; USPAT;	OR	ON	2021/04/08 10:33

			USOCR; FPRS; EPO			
S8	2	S3 and S7	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:33
S9	115,045	(g06F21/32 or G06F21/629 or G06F3/011 or G06F3/0304 or H04W4/21 or G06Q30/0271).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:34
S10	10,957	(avatar or emoticon) with (text or sms or email or (e adj mail) or (electronic adj mail) or im or (instant adj messag$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:38
S11	916	S2 same2 S10	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:39
S12	112	S9 and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:39
S13	40	S12 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:40
S14	75	S3 and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:40
S15	12	S14 and @pd<"20140310"	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:40
S16	2	S13 and S15	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 10:41
S17	11,223	S3 same2 (camera or sensor)	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 11:10
S18	1,366	S9 and S17	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 11:11

S19	10	S11 and S18	US-PGPUB; USPAT; USOCR; FPRS; EPO	OR	ON	2021/04/08 11:11

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S20	52,171	(g06F21/32 or G06F21/629 or G06F3/011 or G06F3/0304 or H04W4/21 or G06Q30/0271).cpc.	US-PGPUB; USPAT	OR	ON	2021/04/08 10:34
S21	177	S20 and ((detect$3 or recogniz$5 or recognition or recognis$5) with (fac$3 near2 expression)).clm.	US-PGPUB; USPAT	OR	ON	2021/04/08 10:34
S22	164	S20 and ((modify$3 or modification or chang$3 or adjust$3 or alter$3) near3 (avatar or emoticon)).clm.	US-PGPUB; USPAT	OR	ON	2021/04/08 10:35
S23	6	S21 and S22	US-PGPUB; USPAT	OR	ON	2021/04/08 10:35

4/8/2021 2:04:29 PM
C:\Users\sanderson2\Documents\EAST\Workspaces\16831432c.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Eric Leuthardt	:	
	:	Art Unit: 3694
Serial No.: 16/831,432	:	
	:	Examiner: Anderson, Scott C.
Filed: March 26, 2020	:	
	:	Confirmation No: 9096
For: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS	:	

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

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

The following comments are in response to the Examiner's Statement of Reasons for Allowance in the Notice of Allowability dated April 14, 2021.

Applicant respectfully disagrees with the Examiner's Statement of Reasons for Allowance because such statements may have unintentionally introduced some ambiguities in what was otherwise a very concise and thorough examination of the claims of this patent application. While Applicant believes that the claims are allowable, Applicant does not acquiesce that patentability resides in the features paraphrased in the Examiner's Statement of Reasons for Allowance.

Also, reasons for allowance are only warranted in instances in which the record of the prosecution as a whole does not make clear the Examiner's reasons for allowing a claim or claims (see 37 CFR §1.104(e)). In the present patent application, Applicant believes the record as a whole makes the reasons for allowance clear and therefore no statement by the Examiner is necessary or warranted.

Respectfully submitted,

/Lucas M. Amodio/

Lucas M. Amodio
Registration No.: 70,239
ARMSTRONG TEASDALE LLP
7700 Forsyth Boulevard, Suite 1800
St. Louis, Missouri 63105
(314) 621-5070

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)

76656 7590 04/14/2021

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

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.
16/831,432	03/26/2020	Eric Leuthardt	36893-7	9096

TITLE OF INVENTION: EXPRESSION RECOGNITION IN MESSAGING SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	07/14/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
ANDERSON, SCOTT C	3694	705-014670

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 Armstrong Teasdale LLP
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: FaceToFace Biometrics, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): St. Louis, Missouri

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. 012384

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 /Lucas M. Amodio/ Date 05/19/2021

Typed or printed name Lucas M. Amodio Registration No. 70239

IPR2023-00833
Apple EX1002 Page 346

Electronic Patent Application Fee Transmittal

Application Number:	16831432
Filing Date:	26-Mar-2020
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Filer:	Lucas M Amodio/Gwendolyn Menz
Attorney Docket Number:	36893-7

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:				
UTILITY APPL ISSUE FEE	2501	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**600**

Electronic Acknowledgement Receipt

EFS ID:	42762912
Application Number:	16831432
International Application Number:	
Confirmation Number:	9096
Title of Invention:	EXPRESSION RECOGNITION IN MESSAGING SYSTEMS
First Named Inventor/Applicant Name:	Eric Leuthardt
Customer Number:	76656
Filer:	Lucas M Amodio/Gwendolyn Menz
Filer Authorized By:	Lucas M Amodio
Attorney Docket Number:	36893-7
Receipt Date:	19-MAY-2021
Filing Date:	26-MAR-2020
Time Stamp:	13:01:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$600
RAM confirmation Number	E20215ID01374431
Deposit Account	012384
Authorized User	Gwendolyn Menz

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.20 (Post Issuance fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Post Allowance Communication - Incoming	Comments_statement_reasons_Allowance-41007581.pdf	101649 553ce405b26847136cc1974bbf5fc81f52b69ae9	no	1
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	36893-7_Issue_Fee_Transmittal_19MAY2021-41009726.pdf	197043 972daa0b37b3c8f16eaadb00c5c815a15f1f9144	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30338 53dc9c8897e8f577c7c003b5614c04291426caf3	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	329030		

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 NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/831,432	06/22/2021	11042623	36893-7	9096

76656 7590 06/02/2021

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

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 0 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):

Eric Leuthardt, St. Louis, MO;
FaceToFace Biometrics, Inc., St. Louis, MO;
Scott Stern, St. Louis, MO;

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.

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Missouri on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22cv429 NCC	4/13/2022	Eastern District of Missouri

PLAINTIFF	DEFENDANT
FaceToFace Biometrics, Inc.	Apple, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	11,042,623	6/22/2021	FaceToFace Biometrics, Inc.
2			
3			
4			
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy