US 20170112431A1

(54) **SYSTEM AND METHOD FOR GATHERING AND ANALYZING BIOMETRIC USER FEEDBACK FOR USE IN SOCIAL MEDIA AND ADVERTISING APPLICATIONS**

(71) Applicant: **The Nielsen Company (US), LLC,** New York, NY (US)

(72) Inventors: **Brian Levine**, Needham, MA (US); **Carl Marci**, Boston, MA (US); **Ravi Kanth V. Kothuri**, Nashua, NH (US)

(57) **ABSTRACT**

Systems and methods for measuring biologically and behaviorally based responses to social media, locations, or experiences and providing instant and continuous feedback in response thereto are disclosed. An example system includes a first sensor to determine an emotional response of a user exposed to a social media application, a second sensor to determine a current activity of the user, and a third sensor to determine an environment of the user. The example system also establishes a priority schedule based on the emotional response, the current activity, and the environment. The system also correlates, based on the priority schedule, an advertisement with at least one of the emotional response, activity, or the environment. In addition, the example system presents the advertisement based on the priority schedule and the correlation of the advertisement with the at least one of the activity, the environment, or the emotional response.
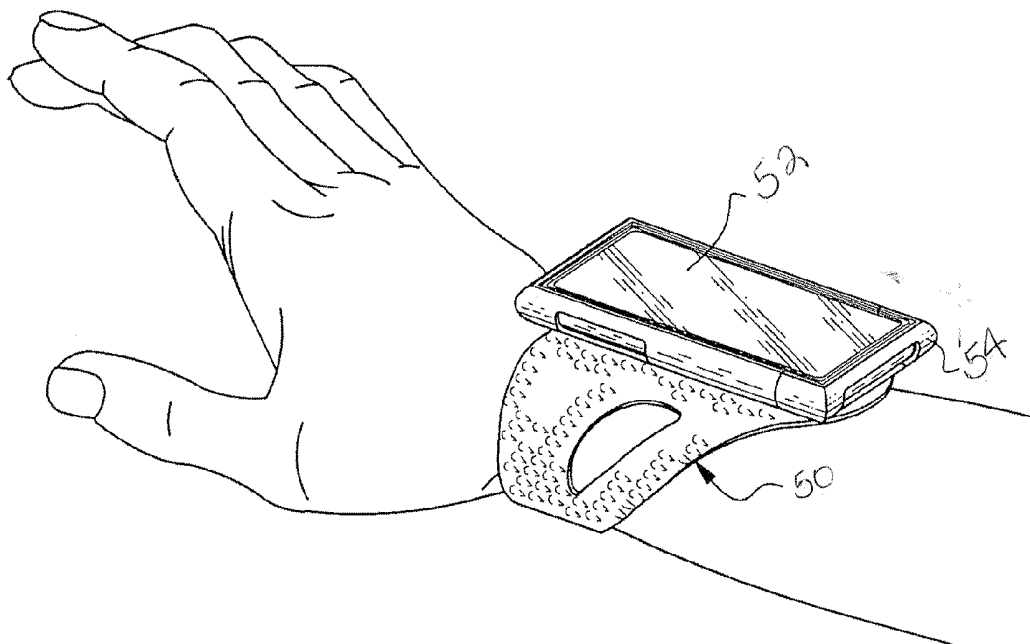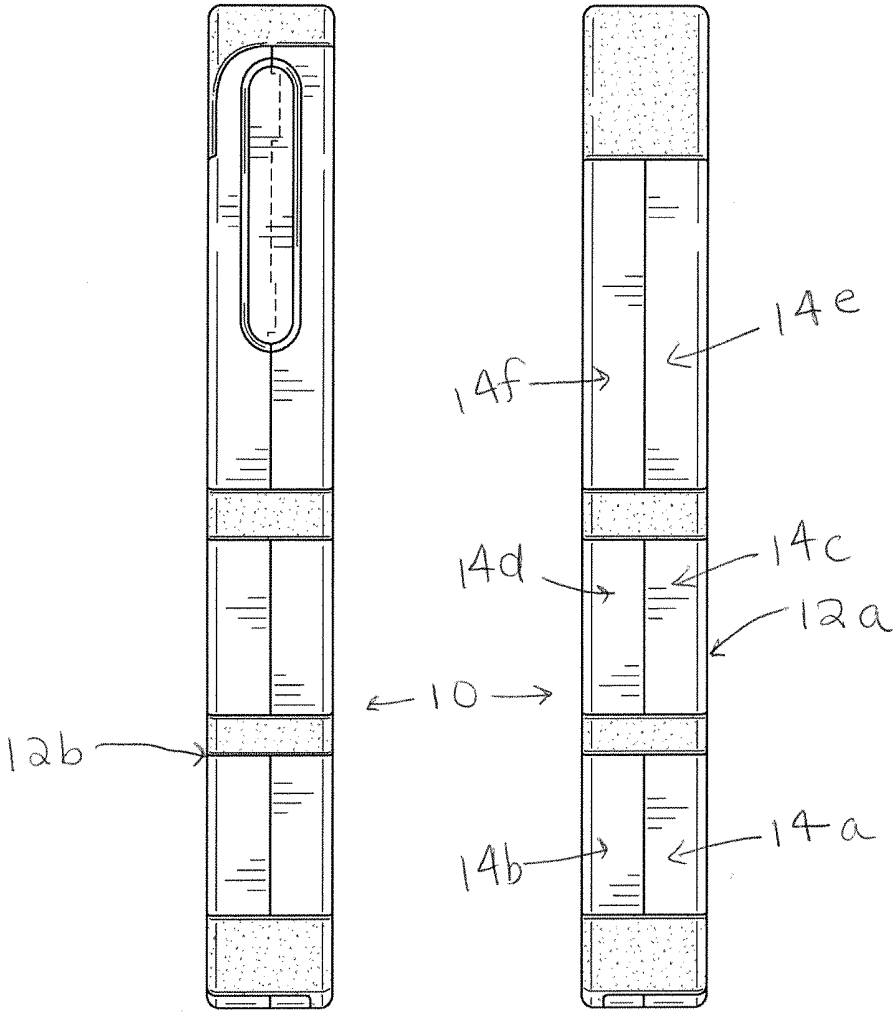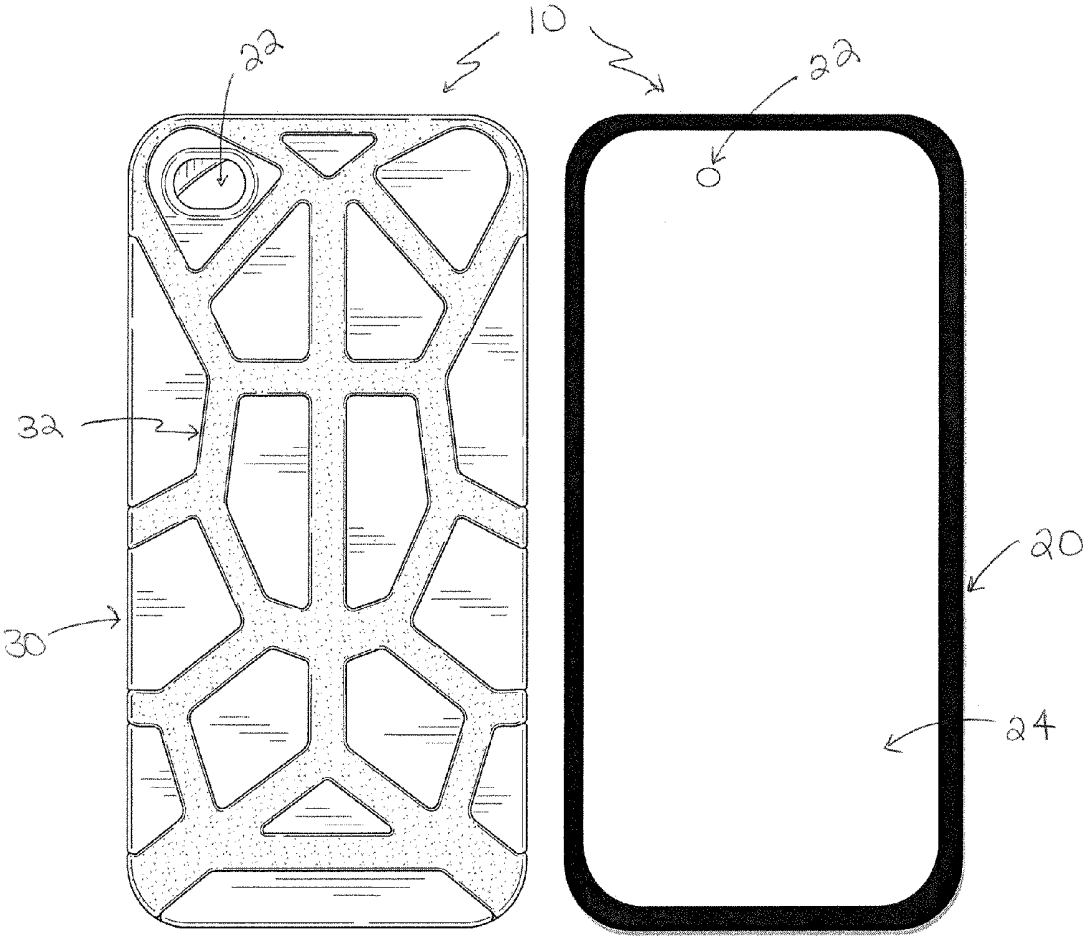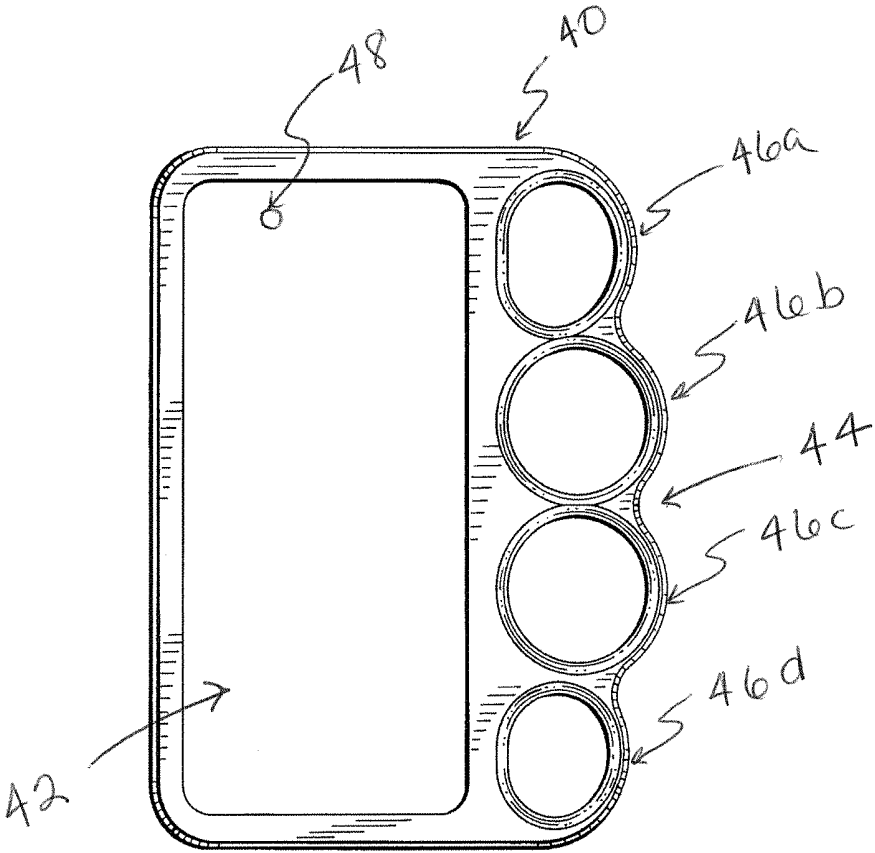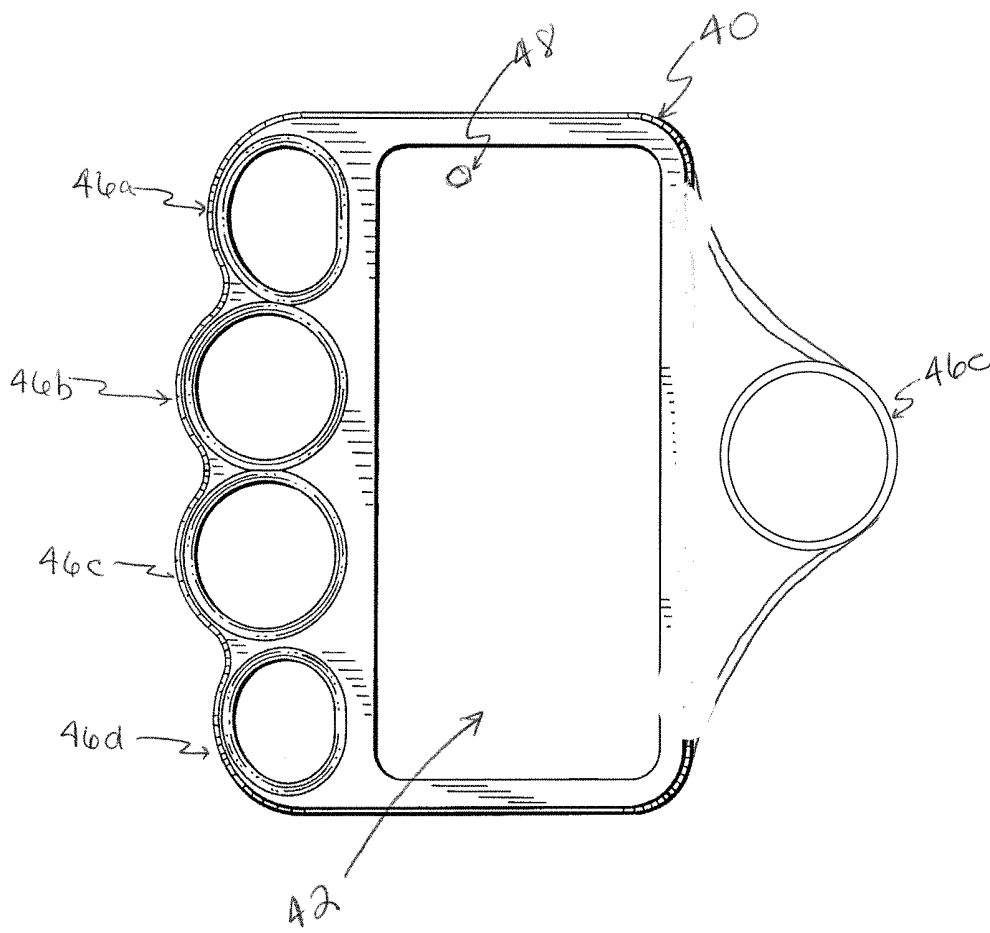
FIG. 1

FIG. 2

FIG. 3A

FIG. 3B

FIG. 4A

FIG. 4B

FIG. 5

FIG. 6

90

94

96

104

92

102

100

FIG. 7
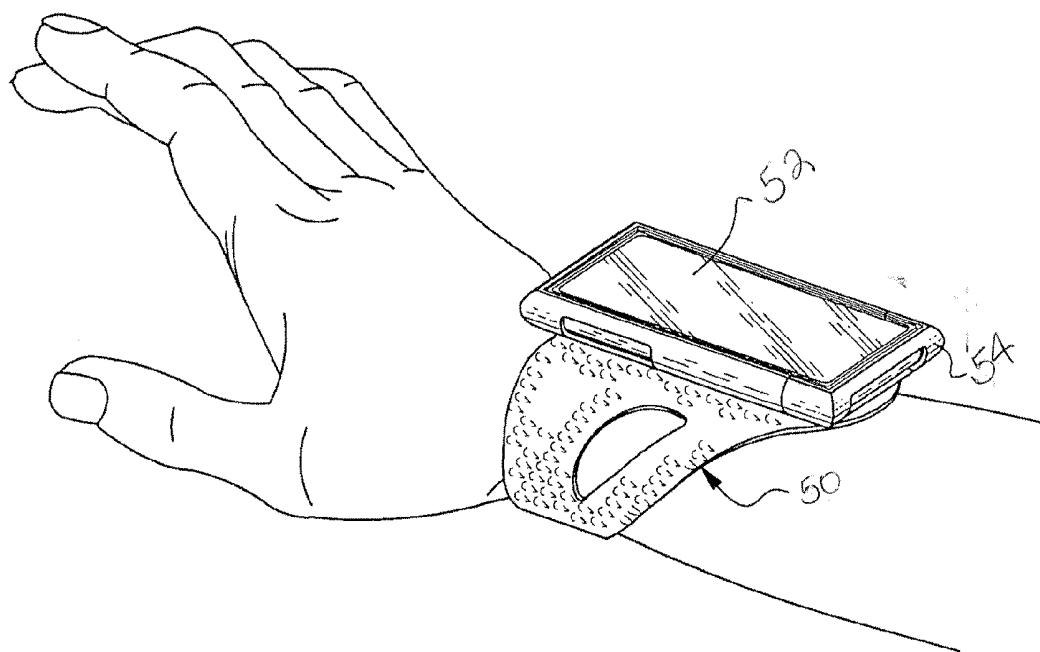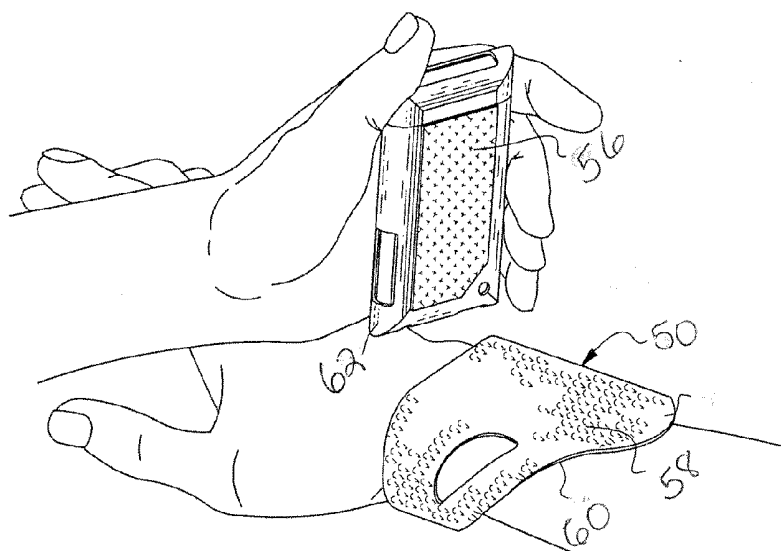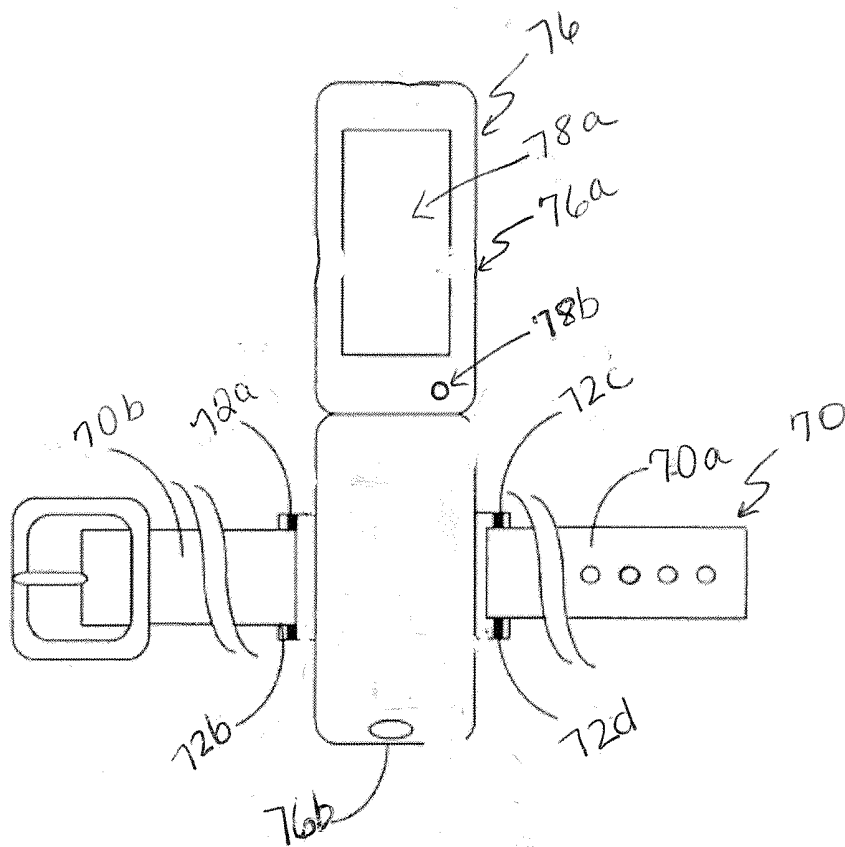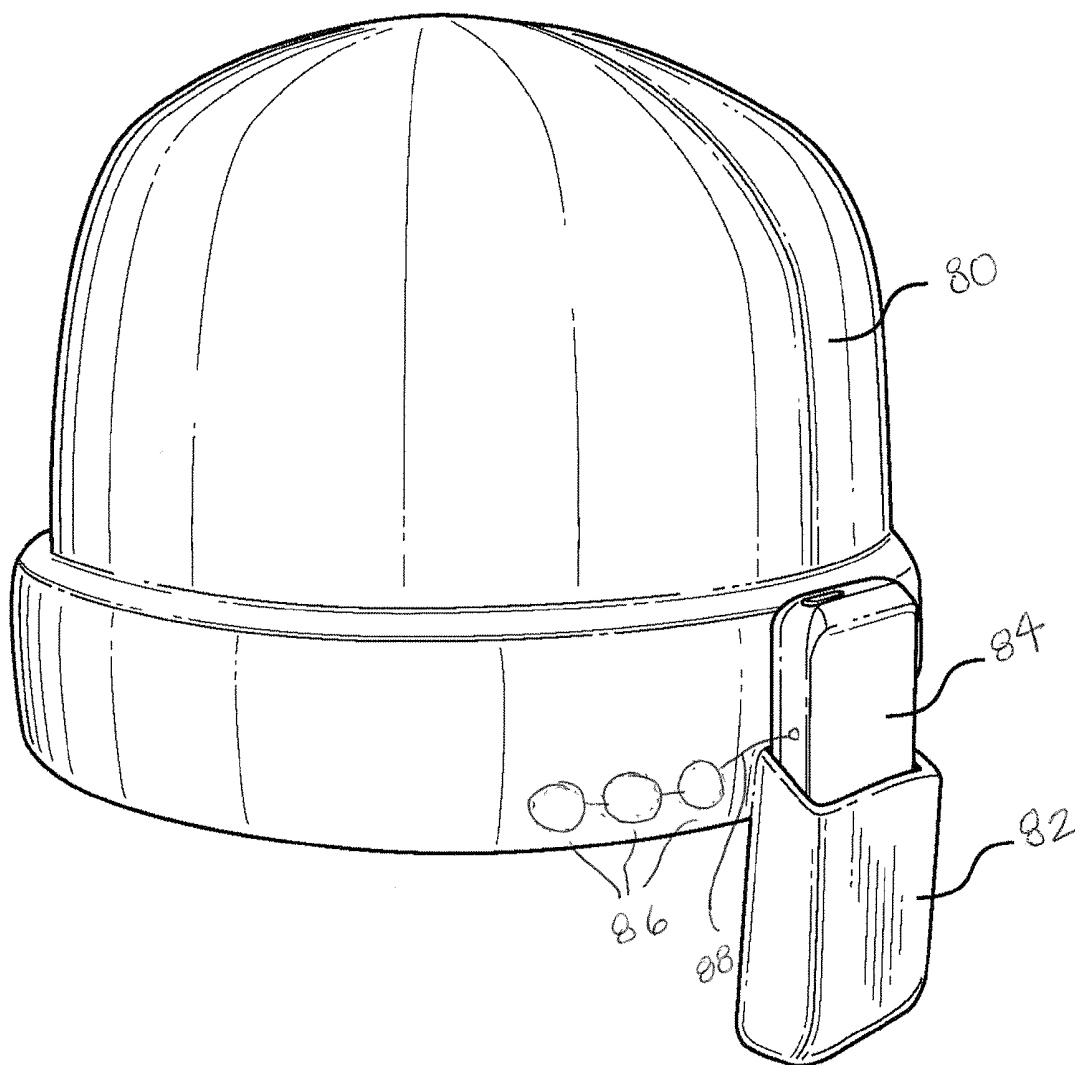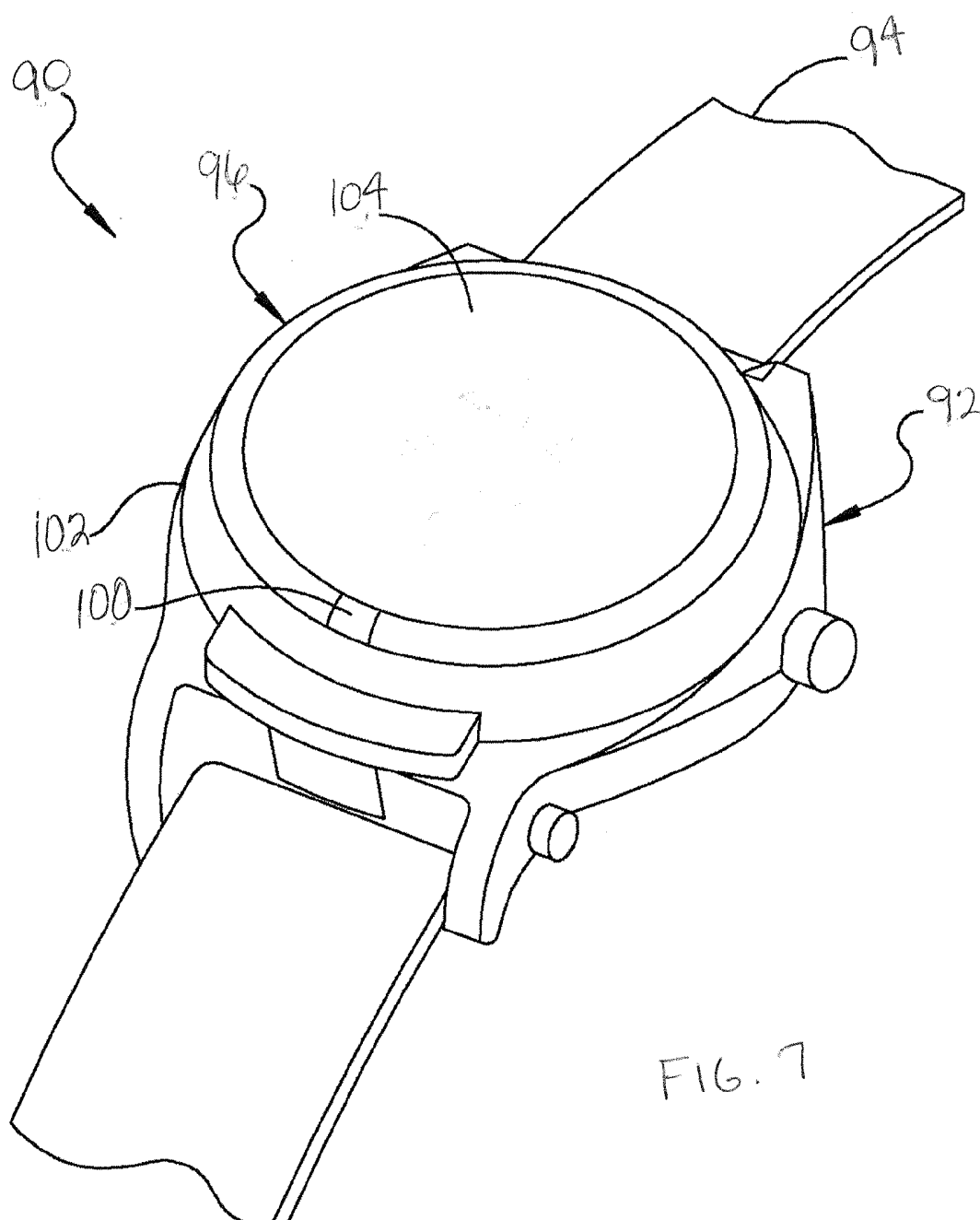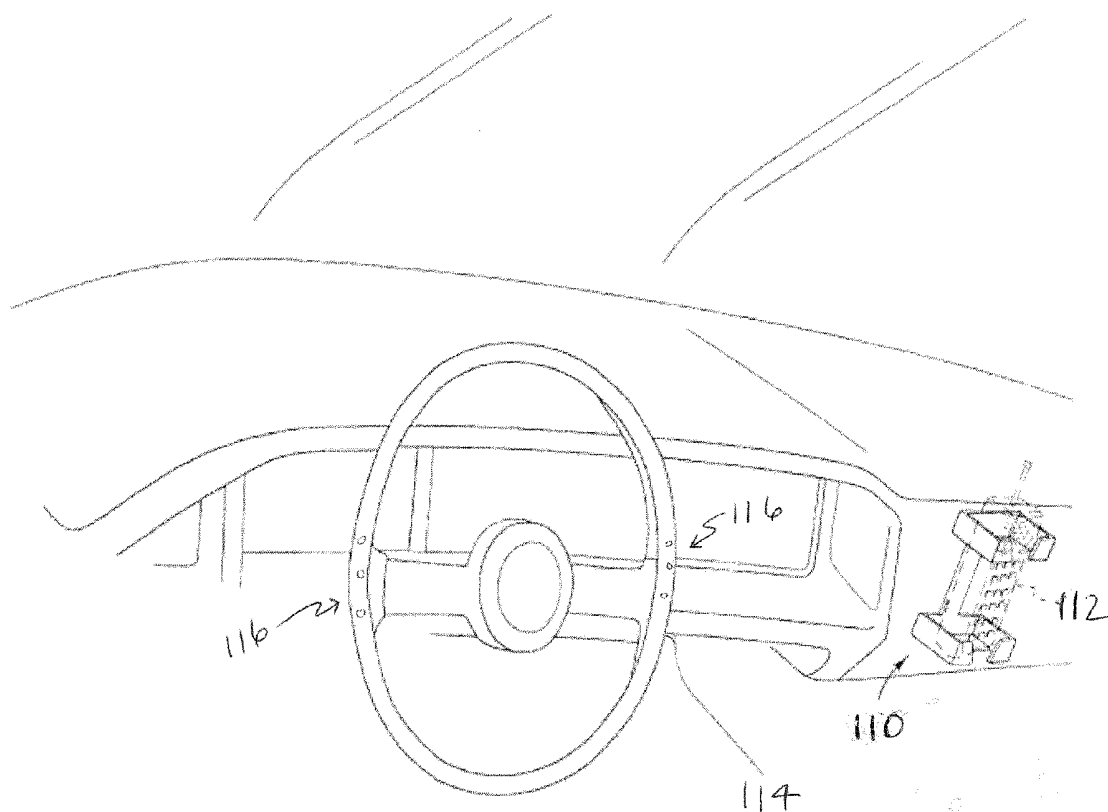
FIG. 8

SYSTEM AND METHOD FOR GATHERING AND ANALYZING BIOMETRIC USER FEEDBACK FOR USE IN SOCIAL MEDIA AND ADVERTISING APPLICATIONS

RELATED APPLICATIONS

[0001] This patent arises from a continuation of U.S. patent application Ser. No. 13/779,497, (now U.S. Patent) which was filed on Feb. 27, 2013, which further claims priority to U.S. Provisional Patent Application No. 61/603,528 filed Feb. 27, 2012, both of which are hereby incorporated herein by reference in their entireties.

FIELD OF THE DISCLOSURE

[0002] The present invention relates to systems and methods for measuring biologically and behaviorally based responses to social media, locations, or experiences and providing instant and continuous feedback in response thereto. In addition, the system and methods of the invention are capable of monitoring stress levels and well-being. The system and methods of the invention may be implemented using a cloud-based infrastructure for remote monitoring.

BACKGROUND

[0003] There are many different kinds of audio, visual and audio-visual presentations and activities that people are exposed to every day. These presentations serve as sensory experiences that stimulate our senses and are known to result in biologically based responses that can be measured electronically and mechanically (for example, heart rate, respiration rate, blood pressure, and skin conductance).

[0004] Likewise, people now have the ability to provide instant and continuous feedback in response to various social media such as pictures, websites, and the like. Such feedback can be provided on computers, tablets, smart phones, and other devices that access the internet. For example, "like" is a way to give positive feedback or to connect with things a person is interested in on the popular social media site Facebook®. In particular, the "like" button on Facebook® is a button a user may click on after looking at most content on Facebook®, which is then reported in newsfeeds to "friends". Websites unrelated to Facebook® may also use a "like" button that enables a website visitor to click on the button to let his/her friends know that they like the site. For example, after clicking on the website's "like" button, a pop-up will request login to Facebook® (or sign-up if not already a member) and a post on the user's Facebook® page will let his/her friends know that he/she likes the site. When used on a mobile device, such as a smart phone, the "like" button is merely an integrated hardware "Facebook®" button on the phone that does nothing more than take the user to Facebook® when the button is pressed.

[0005] Similarly, the "Pin It" button on a computer or mobile device allows users to grab images and videos from around the web and add them to an on-line pinboards created by the users. Other users can view the pinboards, comment, and "re-pin".

[0006] Capabilities have also been introduced to allow people to use mobile devices to interact with their environment. For example, location-based social networking websites allow users to "check-in" at venues using a mobile website, text messaging, or a device-specific application by selecting from a list of venues the application locates nearby.

The location is based on GPS hardware in the mobile device or the network location provided by the application. Each check-in awards the user points or other types of rewards.

[0007] Even with these advances in technology, the ability to measure and evaluate the user experience, effectiveness, and the usability of social media, locations, or experiences has been limited. In fact, current methodologies for measuring or evaluating user experience, effectiveness, and usability of websites and other interactive interne and software media has thus far been limited to traditional self-report, i.e., relying on the user to use the "like" button and to accurately reflect his/her actual response to the social media, which may be subject to error, bias, or low compliance.

[0008] Thus, a need in the art exists for a system and method that integrates passive biometric sensors into smart phones or other portable devices to collaborate with or eliminate the "like" button and replace it with a continuous stream of emotional responses across all experiences. A need also exists in the art for a biometrically enabled suite of applications that are built into smart phones, tablets, and other social media enabled devices to determine when a user unconsciously likes (or dislikes) their current experience, e.g., a web page, "app", song, video, location, or other experience, and also to remotely monitor the user's stress levels and well-being.

SUMMARY OF THE INVENTION

[0009] The present invention is related to a system and method that integrates passive biometric sensors into smart phones or other portable devices to collaborate with or eliminate the "like" button and replace it with a continuous stream of emotional responses across all experiences. In one embodiment of the invention, biometric responses may be automatically detected using physiological signal measurement, via an explicit button on the mobile device, or via a continuous biometric data collector. In one embodiment, the biometric data collector is associated with the mobile device, such as a case that incorporates sensors to collect data from the hands of the user.

[0010] In another embodiment of the invention, the response may be automatically associated with specific content stimuli, not only in the mobile phone, but also in the surrounding environment of the consumer using a specialized content-associating system (predicting/associating by "proximity" of the response to the variety of content/activities).

[0011] In yet another embodiment, the system and method of the invention provides content recommendations by transforming emotional responses to music, video, and other content into more effective and pervasive recommendations. In still another embodiment, the system and method of the invention enhances advertisement targeting by combining biometric sensing and location-based data based on anticipated emotional responses. In yet another embodiment, the system and method of the invention add emotional intelligence to social networks by generating a complex dataset of interests from which users can share and connect with friends. In still another embodiment, the system and method of the invention continually performs background searches based on emotional reactions to any activity in order to push more relevant information to consumers.

[0012] The present invention is also directed to a system for determining the emotional response of a user to social

media including: a plurality of biometric sensors in a first device operable to measure a plurality of biometric parameters for a user of the first device when exposed to a social media application, marketing or advertising applications, or a combination thereof; a computer system operable to receive data representative of the plurality of biometric parameters, wherein the computer system further includes a memory capable of storing the data, wherein the system is capable of determining an emotional response of the user, identifying the causation of the emotional response, and delivering the emotional response and the causation to a listening application for appropriate action.

[0013] In one embodiment, the plurality of biometric parameters include at least two of galvanic skin response, heart response, motion, skin temperature, breathing, EEG, EMG, pupil dilation, eye tracking, facial expressions, or a combination thereof. In another embodiment, the first device includes a device capable of accessing a social media application, a marketing or advertising application, or a combination thereof. For example, the first device may be selected from the group consisting of mobile devices, tablets, laptops, desktops, goggles, watches, and combinations thereof.

[0014] In another embodiment, the first device further includes image acquisition functionality, and wherein the image acquisition functionality includes static photographs, videos, or a combination thereof. For example, the image acquisition functionality may include at least one camera, and wherein the at least one camera is capable of acquiring a plurality of images including images in the user's view, images of the user, or a combination thereof. The system may also be capable of image recognition of the images in the user's view. In yet another embodiment, the system may be capable of processing facial recognition using the images, videos, or a combination thereof of the user.

[0015] The present invention is also directed to a system for determining the emotional state of a user to social media including: a first device capable of accessing a social media application marketing or advertising applications, or a combination thereof; a second device including at least one biometric sensor operatively connected to the first device, wherein the at least one biometric sensor is operable to measure at least one biometric parameter for a user of the first device when exposed to social media; a computer system operable to receive data representative of the at least one biometric parameter, wherein the computer system further includes a memory capable of storing the data, wherein the system is capable of determining an emotional response of the user to the social media, and wherein the system is capable of delivering the emotional response to a targeted application for appropriate action.

[0016] In one embodiment, the at least one biometric parameter includes galvanic skin response, heart response, motion, skin temperature, breathing, EEG, EMG, pupil dilation, eye tracking, facial recognition, or a combination thereof. In another embodiment, the second device includes at least two biometric sensors. In still another embodiment, the at least two biometric sensors are operable to measure at least two biometric parameters selected from the group consisting of galvanic skin response, heart response, motion, skin temperature, breathing, EEG, EMG, pupil dilation, eye tracking, facial recognition, and combinations thereof.

[0017] The first device may further include image acquisition functionality. In one embodiment, the image acquisition functionality includes at least one camera, and wherein the at least one camera is capable of acquiring a plurality of images including at least one image in the user's view, at least one image of the user, or a combination thereof. The system may be capable of image recognition of the at least one image in the user's view, facial recognition of the at least one images of the user, or a combination thereof.

[0018] In another embodiment, the system may be capable of collecting motion data to determine activity level, direction, or a combination thereof. In yet another embodiment, the system is capable of determining a current activity of the user. In still another embodiment, the system may be capable of feeding the current activity and the emotional state to listening applications, wherein the listening applications reside on the device or on a central server. The listening application may be capable of providing tailored content to the user based on the emotional state and current activity. The listening application may also be capable of processing feeds of the emotional state and current activity for social media.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Further features and advantages of the invention can be ascertained from the following detailed description that is provided in connection with the drawing(s) described below:

[0020] FIG. 1 is a side view of a suitable biometric data collector for mobile devices according to an embodiment of the invention;

[0021] FIG. 2 is a front and rear view of the suitable biometric data collector for mobile devices shown in FIG. 1;

[0022] FIGS. 3A and 3B are front views of a suitable biometric data collector for mobile devices according to another embodiment of the invention;

[0023] FIGS. 4A and 4B are a perspective views illustrating a suitable biometric data collector in position on a mobile device user's wrist according to an embodiment of the invention;

[0024] FIG. 5 is a front view illustrating a suitable biometric data collector according to an embodiment of the invention;

[0025] FIG. 6 is a perspective view of a biometric data collector with a mobile device in place according to an embodiment of the invention;

[0026] FIG. 7 is a perspective view of a suitable biometric data collector according to an embodiment of the invention; and

[0027] FIG. 8 is a perspective view of a suitable biometric data collector according to an embodiment of the invention.

DETAILED DESCRIPTION

[0028] The present invention is directed to a social media interface that will execute social media functions when pressed, rather than simply open a social media application. In particular, the system and method of the invention will accomplish at least one of the following:

[0029] (a) determine a user's current activities;

[0030] (b) among the current activities, select the one that is the most likely activity that the user wants to take action on;

[0031] (c) undertake a specific defined social media action; and/or

[0032] (d) serve related information to the user based on the social media action taken.

[0033] The result of the system and method of the invention is the creation of a continuous stream of social media data that provides a richer and more usable experience than active and discreet "liking" in existing social media applications.

[0034] In addition to measuring relevant emotional responses, the system and method of the invention is also capable of computing overall stress and other vital signals of the user to establish the general stress levels and well-being of the user. In one embodiment of the invention, the system and method of the invention is implemented at least in part with a cloud-based infrastructure that allows remote monitoring of the user's vital signs and biological signatures for well-being and derived parameters thereof. This information can then be combined with the user's location and activities over time to further define the drivers of well-being (and the opposite thereof (i.e., stress)). In this aspect of the invention, the system may also include the creation of web/mobile interfaces for sharing the user's well-being and derived parameters thereof with the user's specified social network, specified contacts or groups, as well as with designated family or designated health care providers.

[0035] In one embodiment, the system and method of the invention incorporates at least one affinity button or software application on a mobile device, such as a smart phone, a tablet, or other device that is capable of accessing a social media application. For example, to determine the user's current activities, when the affinity button is pressed or the application is started, the device will use some or all software and sensors available to determine the possible set of activities the user may be engaged in. This includes, but is not limited to, all or a subset of the following:

[0036] (1) The current application being used;

[0037] (2) The user's current location to determine what is located at that location;

[0038] (3) Images and/or video within the user's view and/or images of the user;

[0039] (4) Neighboring devices; and/or

[0040] (5) Motion data.

[0041] In particular, with regard to (1), a software layer may determine if the mobile device is currently running any applications and which application is in the foreground. For example, in one embodiment, the process/application using the most central processing unit (cpu) in the current time (e.g., past 15 seconds, past 60 seconds, or another predetermined time interval) may be the application in the foreground. In this aspect, the following steps may be performed:

[0042] (a) Determination of the application currently running (to the degree the OS allows);

[0043] (b) If the foreground application is a web browser, determining at least (i) the current URL, (ii) text characters and image tags on the current page, and (iii) text characters and images in view (accounting for any scroll in the pages, and the like);

[0044] (c) If the foreground activity is a photo viewer (either native or embedded in another app), determining the subject, time, date, and the like by gathering and analyzing the metadata in the photo and leveraging image recognition capabilities (either developed specifically for this application or commercially available);

[0045] (d) If music, videos, or eBooks are being played or viewed on the mobile device, return all accessible information about the content;

[0046] (e) If the audio/video is external to the mobile device, allowing the user to record a "snapshot" and capture an affinity to the snapshot such that the system may then go back to the internet to extract metadata for the audio/video content (using tools/apps that already exist for audio/video);

[0047] (f) If a map or navigation application, determine which location is being researched; and/or

[0048] (g) If other applications, gather and analyze any data the application allows the operating system to access. For example, application vendors will likely be encouraged to use software hooks which the social media button can use to determine the exact activity within an application is being accessed.

[0049] With regard to (2), the mobile device may use the cellular networks, accessible Wi-Fi and/or GPS to (a) determine the user's current location and (b) search to determine what activities may be available at that location. In particular, the determination of the available activities may favor businesses, parks, addresses in the users' address book, tourist spots, or other activities identifiable through the internet. For example, in one embodiment, locations at the GPS coordinates that have the most details online or in point-of-interest databases will be favored.

[0050] With regard to (3), the mobile device may acquire a plurality of snapshots and/or video upon a button press or, if programmed, automatically. The plurality of snapshots and/or video may include images in view of the user and images of the user. In one embodiment, the plurality of images/videos may then be run through image recognition software created for the application to determine the image in view (e.g., a product, location, logo, person, etc.). In another embodiment, the plurality of images/videos may then be run through existing software (such as Google Goggles or the like) to determine the image in view (e.g., a product, location, logo, person, etc.). Facial detection software may also be used to determine which specific facial-emotion is being expressed for the activity.

[0051] With regard to (4), the mobile device may use Bluetooth to determine whether there are any known devices in the area. In one embodiment, pressing the affinity button near a second user with the same capability on his/her mobile device will identify that device and add it to the identifiable device list as well as the second user's information to the primary user's phone's contact database.

[0052] With regard to (5), motion data may be obtained to determine whether the mobile device is manipulated in such a way to indicate that the user is attempting to capture an image. If such action is determined, the image recognition process described with respect to (3) will be given preference in the activity determination. Motion data may also be used to determine whether the mobile device is in "heavy" motion or "light" motion. In particular, if the mobile device is determined to be in "heavy" motion, i.e., walking briskly, running, and the like, preference will be given to activities requiring more action. Conversely, "light" movement or no movement may indicate less active current activities, such as web browsing or movie watching. Accordingly, preference will be given to less active activities. Motion data may also be used to determine the direction of the mobile device such that, in conjunction with (2) above, an appropriate landmark may be identified. In one embodiment, the motion data may

be obtained using at least one of an accelerometer, a magnometer, a gyroscope, or a combination thereof.

[0053] With regard to (1)-(5), the system and method of the invention then predict the current activity using a set of likely rules. In particular, the system may use a set of likely rules to determine the most likely relevant activity in the mobile device and/or surrounding environment by monitoring the increases in "recent" time window in the (1) the cpu usage, (2) the memory usage, (3) the decibel (volume) usage, (3) the images being viewed, (4) the online social activity, (5) the online web page interactions, (6) the online or web game interactions, and other similar categories.

[0054] More specifically, in one embodiment of the invention, the system and method of the invention will also be capable of selecting a likely activity from the collected set. In particular, machine learning will be employed to determine which potential activity is the activity meant to be tagged via social media. Examples of machine learning in accordance with the present invention include, but are not limited to, the following:

[0055] (a) A training period. When the user initiates the affinity button push, a list of possible primary activities is provided. The user will then select the intended activity. Over time, this trains the system to prioritize the selected activity based on prior use. For example, if the user tends to select the song being played, the system will prioritize music as the likely item of interest. Alternatively, a more passive training model may be followed. In this aspect, the system would suggest a single likely activity and the user would respond whether this was correct or for the system to try again. The system would then suggest an alternative (or an open field for the user to suggest an alternative) and the process would continue. Through machine learning, the system would create appropriate weighting to possible activities of interest to hone its suggestions.

[0056] (b) Background service. In another embodiment, the software may run as a background service, regularly querying the device to determine the current activity through all of, or a subset of, the activities covered in the previous section. When the user then expressly activates this software, it will first compare the current state to the previous state(s) to determine what has changed and then determine the desired activity of focus by combining the state change information with (1) any previous training, if it exists (2) compare to previous items the user has taken action on to determine if it fits with the user profile and (3) prioritize actions taken on the cell phone (browser, apps, new music, video or other content being played) over environmental processes like Bluetooth and GPS.

[0057] (c) Recent items. Instead of querying multiple sensors, in one embodiment, the machine training involves a determination of the most recently opened item on the mobile device and acts upon it. If no suitable application has been opened or changed, it will then look to the other sensors and activities.

[0058] (d) Prioritization. Machine training may involve the prioritization of activities. For example, in one embodiment, activities taken on the mobile device over any environmental activities (GPS, Bluetooth, external audio) have first priority, camera action has second priority, GPS and audio recordings have third priority, and Bluetooth and other sensors have fourth priority. As would be understood by one of ordinary skill in the art, these priorities may be appropriately altered based on any additional information on the

activity of the user to create a prioritization system for "guesstimating" the activity of a user. The "guesstimation" may then be associated with extracted biological/emotional/facial responses based on all and sundry information available on the usage of the background/foreground apps, inview objects and current events pertaining to the user (at his/her location).

[0059] The above-described forms of machine learning may be used independently or together.

[0060] Once an activity is determined, the system will then take the desired social media action(s). Suitable social media actions include, but are not limited to:

[0061] (a) Execution of a function defined in the system that may or may not be editable by the user. For example, the function may be a Facebook® "like", a Twitter post, a Facebook® update, a Pinterest® addition, a Foursquare check-in, a Google +, or any other standard action within social media interfaces (whether it be directly actions in current platforms, future platforms, or a separate platform specifically created for this functionality);

[0062] (b) Execution of a custom action such as a "dislike", a "yum" for food related items, or other actions directly related to the current activity; and/or

[0063] (c) Execution of more standard functions like a bookmark, a favorite, a pin, or a web search.

[0064] In one embodiment, (c) may include a web search based on any or all of the current possible activities. For example, a user is at a sports bar in Location A watching a Soda 1 commercial featuring Singer X with a couple of friends on his/her mobile device. During the commercial, the user holds up the phone to a Picture Z on the wall and presses the affinity button. The system will go through its normal process of determining the liked action, but will also (i) perform a web search on each item returning a search results page split into sections showing information on Location A, Picture Z, the sports bar, their friends, Singer Z and Soda 1 and (ii) flag all of these items in a social media list stored on the mobile device for future search and reference. In other words, (c) may be a form of social media in a natural environment bookmark.

[0065] Once these actions are taken, the information can be stored in a form of customer relationship management (CRM) database enabling advertisers to target messages to these users based on items they have flagged using this application. Over time, advertising within the app or across the operating system will become increasingly more directed at the user.

[0066] Biometrics may also be integrated into or associated with the device in order to ascertain the emotional state of the phone user. Biometrics include, but are not limited to galvanic skin response (GSR) to measure emotional arousal, heart response (approach/avoid), motion to determine activity level), skin temperature, breathing, EEG, EMG, pupil dilation, eye tracking, and facial recognition. The sensor(s) used to collect the biometrics may be integrated into the hardware platform through additional sensors.

[0067] In one embodiment, the biometric data collection is performed through a sensor-array case on the back, sides, and/or front of the existing mobile device. For example, as shown in FIGS. 1 and 2, the case 10 has sides 12a and 12b, a front 30, a back 20, and a top and bottom (not shown). The case 10 does not cover the display of the mobile device, as indicated by void 24. The biometrics discussed above may be captured via a plurality of sensors 14 and/or 32. A subset

of the biometrics, i.e., heart response, breathing, pupil dilation, eye tracking, and facial recognition, may be captured via sensors **14**, built-in camera **22**, and/or sensors **32**. While FIG. **1** shows sensors **14** only on one side, i.e., side **12***a*, side **12***b* may also be equipped with one or more sensors.

[0068] FIG. **3A** shows another embodiment of a biometric data collector for use with a mobile device. In particular, the case **40** has an opening for the mobile device **42** and the built-in camera **48**. At least one sensor for biometric data collection is incorporated into at least one of the finger holes **46***a-d*. While FIG. **3A** shows four finger holes **46***a-d*, one of ordinary skill in the art would appreciate that more or less finger holes may be used in the case design so as to facilitate biometric data collection. For example, as shown the case **40** may incorporate five finger holes **46***a-e* such that the thumb hole **46***e* is on an opposite side of case **40** than finger holes **46***a-d*. In addition, as with the case shown and described in FIGS. **1-2**, a subset of the biometrics, i.e., heart response, breathing, pupil dilation, eye tracking, and facial recognition, may be captured via the sensors in finger holes **46**, the built-in camera **42**, and/or sensors built into the back of case **40** (not shown). Similarly, one of ordinary skill in the art would appreciate that, while FIGS. **3A-B** illustrate a case **40** intended for right-handed users, the case could be modified to accommodate left-handed users by changing the side(s) on which the finger holes **46***a-d* (and optionally **46***e*) reside.

[0069] In another embodiment, the biometric data collector is incorporated into a wrist or arm band, such as those shown in FIGS. **4A-B** and FIG. **5**. In particular, a wrist band **50** may utilize a hook and loop fastener system **58**, **56** to attach the mobile device **52** or its case **54**. At least one sensor **60** may be incorporated into the wrist band **50**. In one embodiment, a plurality of sensors may be incorporated into the wrist band. The wrist band **50** may also include an emitter that transmits the data to a wireless or wired receiver in the mobile device **52**. Similarly, arm band **70** with straps **70***a* and **70***b* include at least one sensor **72** for biometric data collection (four sensors **72***a-d* are shown here as a non-limiting example of the plurality of sensors that may be used in accordance with the invention). The front **76***a* and back **76***b* of case **76** may house the mobile device. The case **76** may have an opening **78***a* for the mobile device display and an opening **78***b* for a camera built in to the mobile device. As with the previous embodiments, the arm band may include an emitter to transmit the biometric data to a wired or wireless receiver in the mobile device.

[0070] In yet another embodiment, the biometric data collector is incorporated into headgear, such as the hat illustrated in FIG. **6**. Headgear of any style may be incorporated into this embodiment of the present invention. In this instance, a winter hat is used with a pocket portion **82** attached such that in use at least one sensor (shown here as **86**) in the hat **80** will properly be aligned with the user's temple. The sensor(s) is in direct communication with the mobile device **84** via a wired connection **88**. However, as one of ordinary skill in the art would appreciate, the wired connection may be substituted for a wireless connection such that the biometric data collected via the one or more sensors **86** will be received by the mobile device **84**.

[0071] In still another embodiment, the biometric data collector may be incorporated into a smart watch, as generally shown in FIG. **7**. For example, a smart watch **90** may include a base **92**, a wristband **94** coupled to the base **92**, a

flip up portion **96**, a hinge **98** coupled to the base **92** and the flip up portion **96**, and a camera **100**. The base **92** may include at least one housing **102** that includes a processor, a wireless transceiver, and at least one sensor (not shown) coupled to the housing **102**. The sensors and wireless transceiver may be coupled to the housing and in communication with the processor. In one embodiment, a tactile user interface in communication with the processor and coupled to the housing is accessible via flip up portion **96** but viewable through display **104**. The wireless transceiver can provide a connection to a wireless network. As with the previous embodiments, the at least one sensor in the housing **102** is capable of collecting biometric data.

[0072] In another embodiment, the biometric data collector may be incorporated into a steering wheel of a vehicle. For example, as shown in FIG. **8**, a mobile device **112** may be housed in holder **110**. Holder **110** may be connected to sensors **116** via a wired or wireless connection such that biometric data may be collected.

[0073] Furthermore, while additional sensors may be added directly through integrated hardware, a subset of the sensors may require an external monitoring device (due to sensor needs on other parts of the body). In this aspect of the invention, suitable sensors for collecting EEG and EMG include, but are not limited to, an armband, a pair of glasses, a watch, and similar sensors. In one embodiment, all of the remaining sensors are built into a secondary device. Some, such as a breathing sensor, may work more effectively in a secondary device that communicates with the device of the invention.

[0074] In an alternative embodiment, the system of the invention incorporates a device that is not a handheld device. In other words, instead of incorporating the sensors into a mobile phone, the device used is a pair of glasses with attached sensors to the scalp, the forehead, or the like, which are designed with all of the required sensors and equipment as most handheld technology devices. In one aspect, the glasses include a visible screen and sensors (e.g., sensors to the central-parietal regions of the head for EEG, to the forehead, chin or neck for the skin-conductance and to the neck for heart-rate, or other optimal locations on the face/neck of a person for these biological signals), that may have otherwise required a secondary device. The collection of biometric data distinguishes the glasses described in this embodiment from conventional eye tracking goggles.

[0075] The biometric data thus collected is intended to determine the emotional state of the user. This emotional state may then be used to activate the social media function with limited button presses. Thus, in one aspect of the invention, the affinity button or application may be used in conjunction with the biometric data. In this aspect, the mobile device (via sensors incorporated directly into the mobile device, into the biometric data collector holding the mobile device, and/or other external secondary devices) is capable of gathering biometric data to determine current physical and emotional state. Affinity buttons may be selected to perform the following steps:

[0076] 1) ascertain the current activity the user is engaged in as described in the previous section;

[0077] 2) determine the degree of acceptance of the current activity (i.e., whether the current activity is liked or disliked); and/or

[0078] 3) execute the actions described in the previous section.

[0079] The affinity buttons exist on the mobile device solely for training the system on the user's biometric profile. In particular, as a particular affinity button is pressed, a biometric snapshot is taken of the user to determine the emotional state. The snapshot may then be stored as a biometric fingerprint associated with both the self-described state (positive or negative) and the current activity. As the user builds this dataset, the system begins to suggest content (e.g., music, video, books), products, locations, and the like for future biometric states (without actual button presses. Indeed, at a predetermined stage, the button presses may be completely removed. For example, if every time a user presses the positive affinity button when their heart rate and GSR spike above a threshold while listening to Elvis music, when the user has similar future spikes, the system may recommend listening to similar music.

[0080] In addition, the affinity buttons assist in training the system/device. For example, the user presses the particular affinity buttons to train the system that biometric patterns are associated with liking and disliking. In one embodiment of the invention, the system will be able to continuously monitor the user's biometrics. When the system senses a biometric profile/signature pattern matching "like" or "dislike", the system automatically takes the associated social media action, which would then execute the series of steps listed in the previous function on a continuous basis without the user ever having to press a button. The buttons or applications may be removed or disabled after the system is adequately trained.

[0081] In an alternate embodiment of the system, the training algorithm occurs completely outside the biometric device (using a simulated environment), or through predictions of valence and arousal, such as through the methods described in U.S. Pat. No. 8,296,172 and U.S. Patent Publication Nos. 2010/0211439 and 2010/0004977, the entire disclosures of which are incorporated herein by reference.

[0082] Alternatively, the system may be a device that has no affinity buttons and only relies on the biometric sensors to accomplish the end goal. In this aspect, no additional training is necessary (existing techniques as described in U.S. Pat. No. 8,296,172 and U.S. Patent Publication Nos. 2010/0211439 and 2010/0004977 for predicting valence, arousal, and engagement, and resonance may be used). In this embodiment, the system continuously determines emotional/biometric state such that whenever a specific emotional state of interest, such as an approach or avoid response, is identified, the series of activities previously described are followed, i.e., determining current activity and taking desired social media actions.

[0083] Other embodiments are within the scope and spirit of the invention. For example, functions described above can be implemented and/or automated using software, hardware, firmware, hardwiring, or combinations of any of these. Features implementing functions may also be physically located at various positions, including being distributed such that portions of functions are implemented at different physical locations.

[0084] Further, while the description above refers to the invention, the description may include more than one invention.

What is claimed is:

1. A system comprising:

a first sensor to determine an emotional response of a user exposed to a social media application;

a second sensor to determine a current activity of the user;

a third sensor to determine an environment of the user;

memory including instructions; and

a processor executing the instructions to perform operations including:

establishing a priority schedule based on the emotional response, the current activity, and the environment;

correlating, based on the priority schedule, an advertisement with at least one of the emotional response, activity, or the environment; and

presenting the advertisement based on the priority schedule and the correlation of the advertisement with the at least one of the activity, the environment, or the emotional response.

2. The system as defined in claim 1, wherein the user is exposed to the social media application via a mobile device and the processor is to further determine motion data of the mobile device and present the advertisement based on the motion data.

3. The system of as defined in claim 1, wherein the first sensor is a biometric sensor operative to measure at least one of a galvanic skin response, a heart rate response, a motion, a skin temperature, a breathing pattern, electroencephalographic activity, electromyographic activity, a pupil dilation, an eye movement or position, or a facial detail.

4. The system as defined in claim 1, further including an image capturing device to capture an image or a video, wherein the processor further includes instructions to perform image recognition on the image or video to determine at least one of the current activity or the environment of the user.

5. The system as defined in claim 1, further including a GPS receiver to determine a location of the user.

6. The system as defined in claim 1, further including an affinity button operable by the user to initiate a training period in which the processor is to present a list of activities and the user is to enter an intended activity.

7. The system as defined in claim 6, wherein the processor is to further establish the priority schedule based on the entered intended activity.

8. A method comprising:

determining, via a first sensor, an activity of a user;

determining, via a second sensor, an environment of the user;

determining, via a third sensor, an emotional response of the user exposed to a social media application;

establishing, via a processor, a priority schedule based on the activity, the environment, and the emotional response;

correlating, via a processor and based on the priority schedule, an advertisement with at least one of the activity, the environment, or the emotional response; and

presenting, via a processor, the advertisement based on the priority schedule and the correlation of the advertisement with the at least one of the activity, the environment, or the emotional response.

9. The method defined in claim 8, further including:

determining motion data of a mobile device through which the user is exposed to the social media application; and

presenting the advertisement based on the motion data.

10. The method as defined in claim 8, wherein the third sensor is a biometric sensor operative to measure at least one

of a galvanic skin response, a heart rate response, a motion, a skin temperature, a breathing pattern, electroencephalographic activity, electromyographic activity, a pupil dilation, an eye movement or position, or a facial detail.

11. The method as defined in claim **8**, further including capturing an image or a video representing a view of the user, the user, or a combination thereof, wherein the image or video is used to determine the environment or the activity of the user.

12. The method as defined in claim **11**, further including performing image recognition on the image or the video.

13. The method as defined in claim **12**, wherein performing image recognition on the image or the video includes performing facial recognition.

14. The method as defined in claim **8**, further including:
  sensing operation of an affinity button by the by the user;
  initiating a training period in which the processor is to present a list of activities and the user is to enter an intended activity; and
  establishing the priority schedule based on the entered intended activity.

15. A tangible computer readable storage medium comprising instructions that, when executed, causes a processor of a content presentation device to at least:
  determine, via a first sensor, an emotional response of a user exposed to a social media application;
  determine, via a second sensor, a current activity of the user;
  determine, via a third sensor, an environment of the user;
  establish a priority schedule based on the emotional response, the current activity, and the environment;
  correlate, based on the priority schedule, an advertisement with at least one of the activity, the environment, or the emotional response; and
  present, via a processor, the advertisement based on the priority schedule and the correlation of the advertise-

ment with the at least one of the activity, the environment, or the emotional response.

16. The machine-readable instructions of claim **15**, wherein the instructions, when executed, further cause the processor to:
  determine motion data of a mobile device through which the user is exposed to the social media application; and
  present the advertisement based on the motion data.

17. The machine-readable instruction of claim **15**, wherein the instructions, when executed, further cause the processor to capture, via an image capturing device, an image or a video, wherein the processor further includes instructions to perform image recognition on the image or video to determine at least one of the activity or the environment of the user.

18. The machine-readable instruction of claim **17**, wherein the instructions, when executed, further cause the processor to perform facial recognition of the image or video.

19. The machine-readable instructions of claim **15**, the first sensor is a biometric sensor operative to measure at least one of a galvanic skin response, a heart rate response, a motion, a skin temperature, a breathing pattern, electroencephalographic activity, electromyographic activity, a pupil dilation, an eye movement or position, or a facial detail.

20. The machine-readable instruction of claim **15**, wherein the instructions, when executed, further cause the device to:
  sense operation of an affinity button by the by the user;
  initiate a training period in which the processor is to present a list of activities and the user is to enter an intended activity; and
  establish the priority schedule based on the entered intended activity.

* * * * *

专利名称(译)	用于收集和分析生物识别用户反馈以在社交媒体和广告应用中使用的系统和方法		
公开(公告)号	US20170112431A1	公开(公告)日	2017-04-27
申请号	US15/400287	申请日	2017-01-06
[标]申请(专利权)人(译)	尼尔森(美国)有限公司		
申请(专利权)人(译)	尼尔森公司（美国）有限责任公司		
当前申请(专利权)人(译)	尼尔森公司（美国）有限责任公司		
[标]发明人	LEVINE BRIAN MARCI CARL KOTHURI RAVI KANTH V		
发明人	LEVINE, BRIAN MARCI, CARL KOTHURI, RAVI KANTH V.		
IPC分类号	A61B5/00 A61B3/11 A61B3/113 G06Q50/00 A61B5/0476 A61B5/0488 A61B5/16 G06N99/00 G09B19/00 A61B5/0205		
CPC分类号	A61B5/486 A61B2503/12 A61B3/112 A61B3/113 A61B5/0077 A61B5/02055 A61B5/0476 A61B5/0488 A61B5/165 G06N99/005 G06Q50/01 A61B5/02405 A61B5/0533 A61B5/0816 A61B5/11 G09B19/00 G06N20/00 G09B25/00		
优先权	61/603528 2012-02-27 US		
外部链接	Espacenet USPTO		

摘要(译)

公开了用于测量对社交媒体，位置或体验的基于生物学和行为的响应并且响应于此提供即时和连续反馈的系统和方法。示例系统包括：第一传感器，用于确定暴露于社交媒体应用的用户的情绪响应;第二传感器，用于确定用户的当前活动;以及第三传感器，用于确定用户的环境。示例系统还基于情绪响应，当前活动和环境建立优先级安排。该系统还基于优先级时间表将具有情绪响应，活动或环境中的至少一个的广告相关联。另外，示例系统基于优先级安排以及广告与活动，环境或情绪响应中的至少一个的相关性来呈现广告。