CONFIRM PERFORMANCE OF A PREDETERMINED ACTION 110

BROADCAST CONFIRMATION OF PERFORMANCE OF ACTION 120

PROVIDE INCENTIVE BASED UPON BROADCAST 130
Confirm performance of a predetermined action 110

Broadcast confirmation of performance of action 120

Provide incentive based upon broadcast 130

FIGURE 1
Confirm performance of consuming a consumable item 210

Broadcast confirmation of consuming the consumable item to social networking site 220

Include upload of video of consuming of consumable item 225

Provide incentive based upon broadcast 235

Provide notification to all friends 230

FIGURE 2
Confirm performance of consuming a consumable item 310

Broadcast confirmation of consuming the consumable item to immediate location 320

Provide incentive based upon broadcast 330

Include broadcast of video of consuming of consumable item 325

FIGURE 3
Manufacturer advertises benefits if direct observation of consumables program 410

Participant consumes the consumable 420

Transmit consumption information 430

Participant benefit 440

FIGURE 4
METHOD AND APPARATUS FOR SOCIAL NETWORK UPDATES

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application of U.S. patent application Ser. No. 13/216,099 filed Aug. 23, 2011 to Adam Hanina, titled “Method and Apparatus for Social Network Updates by Activity Recognition”, currently pending, the contents thereof being incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention relates generally to the monitoring of individuals performing one or more predetermined activities, and more particularly to automated monitoring of one or more individuals performing one or more actions related to one or more items. The results of such monitoring may be employed to update status in a social networking context, such as updating social network status in accordance with the one or more actions, to update a status in a live social or other situation, or to otherwise broadcast the results of the monitoring. Incentives may also be provided in accordance with the updating social network or live social status in accordance with the one or more actions.

BACKGROUND OF THE INVENTION

[0003] Advertising of products has generally been a passive endeavor. The manufacturer or salesperson advertises goods for sale, and the consumer purchases. More recently, viral marketing has allowed for the distribution of advertising material to a vast network of individuals. In the case of social networking sites, peers of a particular user may be targeted as being associated with a particular user. However, in any of these scenarios, the participant and peers are still uninformed viewers of advertising content.

[0004] Therefore, it would be desirable to provide a method and apparatus that overcome the drawbacks of the prior art and provides more active participation of users in advertising.

SUMMARY OF THE INVENTION

[0005] In accordance with the invention, direct observation of activity of a subject, such as the watching of a consumer consuming a consumable item, may be provided. Such direct observation may be provided through activity recognition of other machine and computer vision techniques. Upon such visual confirmation of such an action, a broadcast or other action indicating that the subject has performed the action, such as consuming of a consumable item may be provided. Other actions may include drinking, eating, wearing playing, purchasing or the like. Such broadcasting may be provided as an automatic or other update to a profile on a social networking site, email or direct text messages to one or more indicated individuals, announcement in a particular location, such as through the user of a publicly-viewable display or electronic billboard or the like. Such broadcasting may further include broadcasting a video recording of the subject performing the confirmed action, and may further comprise posting such video to a social networking site. Upon confirmation of such activity, such broadcast, or such posting, some benefit or other incentive or reward may be provided to the subject. Such benefits may include points, monetary rewards, product rewards or the like.

[0006] In accordance with one or more particular embodiments of the present invention, a participant may employ an activity recognition algorithm employing machine vision on a mobile communication device for determining the performance of one or more predetermined actions. Upon recognition of performance of such an action, one or more social media network statuses may be updated, and a video file including a sequence of images showing performance of the action may be provided. Upon update of the social media network status, one or more incentives related to the action may be provided to the participant.

[0007] In accordance with one or more additional embodiments of the present invention, a participant may employ an activity recognition algorithm employing computer vision for determining the performance of one or more predetermined actions. Upon recognition of performance of such an action, a broadcast of a video clip of the action being performed may be shown in any desired location. The location may comprise a display in a public location, over television or the like broadcast to multiple sites, or through contact with one or more predetermined individuals. The broadcast may comprise one or more information displays, such as through the use of animations representative of one or more users or actions, and may further include information about the consumable item, or action taken in relation thereto. Further information may be provided, including statistics related to consumption of the consumable item, or action taken in relation thereto. Further information may be provided, including statistics related to consumption of the consumable for the particular individual, or across groups of individuals. Furthermore, users may selectively opt in to allow for various facial recognition techniques to be used, thus allowing one or more images to be captured of the individual user, of a group of individuals in which the individual user is the primary actor, or in which the individual is one of a group of participants, thus automatically detecting and logging activity. Upon such broadcast, one or more incentives related to the action may be provided to the participant, such as or more promotional items related to the performed action.

[0008] In a more particular embodiment of the invention, the participant may be encouraged to consume an item in view of a camera on their mobile device, or other appropriate computing device. The device may employ an activity recognition algorithm employing computer vision for determining that the participant has consumed the item. Upon recognition of the consuming of the item, one or more social media network statuses may be updated, and a video file including a sequence of images depicting consumption of the item may be provided. One or more trends of consumption may be tracked, as in the number of times a particular item has been consumed. Upon update of the social media network status, one or more incentives related to the consumption of the item may be provided to the participant.

[0009] In U.S. patent application Ser. No. 12/620,686 filed Nov. 18, 2009 titled Method and Apparatus for Verification of Medication Administration Adherence; Ser. No. 12/646,383 filed Dec. 23, 2009 titled Method and Apparatus for Verification of Clinical Trial Adherence; Ser. No. 12/646,601 filed Dec. 23, 2009 titled Method and Apparatus for Management of Clinical Trials; and Ser. No. 12/728,721 filed Mar. 22, 2010 titled Apparatus and Method for Collection of Protocol Adherence Data, the entire contents of each of these applications being incorporated herein by reference, a system and method have been proposed that allow for complete control and verification of adherence to a prescribed medication protocol or machine or apparatus use in a clinical trial or other
setting, whether in a health care provider’s care, or when self administered in a homecare situation by a patient. The present invention suggests extension of this activity recognition sequence to various social and other settings, providing a system for publicizing recognition of the activity sequence, and for providing one or more incentives to the participant upon confirmation of performance of such activity.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification and drawings.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and the apparatus embodying features of construction, combinations of elements and arrangement of parts that are adapted to affect such steps, all as exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the invention, reference is made to the following description and accompanying drawings, in which:

FIG. 1 is a flowchart diagram depicting an embodiment of the invention;
FIG. 2 is a flowchart diagram depicting an alternative embodiment of the invention in a social media environment;
FIG. 3 is a flowchart diagram depicting yet another embodiment of the invention in a live participation environment; and
FIG. 4 is an overall process flow according to an embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention will now be described making reference to the following drawings in which like reference numbers denote like structure or steps.

Referring first to FIG. 1, a flowchart diagram depicting first embodiment of the present invention is shown. At step 110, a predetermined action of a participant is confirmed. In accordance with various embodiments of the present invention such confirmation is preferably determined in accordance with one or more computer vision or activity recognition techniques, and may employ an application on a mobile device using a web camera with a display, a more general web camera and a public display, or the like. After such recognition, at step 120, a confirmation of the performance of the predetermined action is broadcast. It is anticipated that such broadcast may take any form, such as electronic dissemination, location based notifications, video presentations, text messaging or images, audio descriptions or other audio information and the like. Finally, after confirmation of such broadcast, the participant may be provided with an incentive. The incentive may be monetary or otherwise, and may act to encourage the participant or others to perform similar actions. Thus, the incentive may also be provided to others viewing the broadcast. Such incentives may be provided directly to one or more individuals, or may comprise a lottery system, thus allowing for multiple individuals to potentially win a larger incentive prize.

Referring next to FIG. 2, a more particular embodiment of the invention will be described. In FIG. 2, at step 210, performance of consuming of a consumable item by a participant is confirmed. In accordance with various embodiments of the present invention such confirmation is preferably determined in accordance with one or more machine vision or activity recognition techniques. Analysis may be employed in order to determine a confidence of the system that the user has actually consumed the consumable item. This confidence level may be determined based upon various information, such as time on task, movements by the user, shadows, poor lighting, or any other environmental or other factor that may decrease the confidence with which an automated computer vision system may confirm consuming of the consumable item. For example, if an individual is drinking a cup of liquid, reactions to the tilting of the individual’s head or movement of the cup relative to the individual’s head or mouth may give clues as to whether the individual is actually consuming the consumable liquid.

In particular, many factors may come into play regarding the confidence with which a determination of consumable item consumption may be made. Thus, the detection of certain actions or circumstances of administration by the inventive system may be considered in determining a confidence of consumption. Various of these factors may be tracked, and comprise a time sequence of behavioral markers by the user that may be used in aiding determination of consumption of the consumable item. Furthermore, machine learning of trends may be provided to understanding one or more variables that may aid in proper determination of consumption. Various decision fusion learning systems may be employed in order to aid in making determinations regarding the various characteristics that may be reviewed and used to make such consumption determination decisions.

Additionally, in order to further aid in consumption determination, audio information may further be employed. Thus, in addition to visual information being used to determine action, signature sounds corresponding to one or more particular actions may be employed to either determine action, or aid in improving a confidence that an action was taken that was observed visually. Thus, for example, if opening and drinking a soda is the desired action, the sound of the opening can or bottle may be used in addition to the visual captured action in order to determine opening the bottle. Similar audio signatures may be employed to determine opening of a wrapper, ripping of a paper cover, or any other desired trackable action that includes a distinctive audio counterpart. Further, depending on environmental factors, sounds such as a swallowing sound, breathing, talking or other audible information may be used to supplement a determination originally made based upon visual confirmation.

After such recognition, at step 220, confirmation of the consuming of the consumable item by the participant is broadcast to one or more social networking sites. In accordance with an embodiment of the invention, this broadcasting may include uploading a video clip of the participant consuming the consumable item at step 225. Such video may comprise actual images of the participant, animation or roto-scoping based thereupon, or otherwise serving images or audio associated with the participant. Additionally, a notification may be provided to one or more friends of the participant on the social networking site that such consuming of the consumable item has taken place at step 230. Finally, at step 235 an incentive may be provided to the participant based upon confirmation of the broadcast. Additional incentives may be provided upon various friends responding to the noti-
fication of the broadcast, viewing of the video by a friend, or the like. Such incentives may also be provided to those friends. These friends may also be requested or offered to use the system via an invitation to download a particular app, or link to a website. Such consuming may further comprise one or more drinking of a beverage, eating a food, or even wearing a particular clothing type, brand, style, etc. Thus, a user trying on a particular clothing at a store, for example, may result in a broadcast of the wearing event, and perhaps distribution of a discount coupon to the individual and to the individual’s friend or other recipients of the broadcast. Such consuming may additionally comprise one or more individuals watching, for example a movie or the like. Facial recognition techniques known to those of ordinary skill in the art may be used to determine individuals watching a show or movie, while time stamping, etc. may be employed with additional timing and channel information to confirm watching of a particular program.

[0023] Referring next to FIG. 3, an embodiment of the invention is described to be employed in a live location. First, at step 310, performance of consuming of a consumable item by a participant is confirmed. In accordance with various embodiments of the present invention such confirmation is preferably determined in accordance with one or more machine vision or activity recognition techniques. After such recognition, at step 320, confirmation of the consuming of the consumable item by the participant is broadcast to the immediate location about the participant. Such immediate location may be at a home, public location, restaurant bar, or other place where people congregate. Such broadcasting is preferably employed presentation of a video of the participant consuming the consumable item at step 325, and may be accompanied by audio, messaging, or the like to further advertise the broadcast. If video is not available, these other methods of broadcasting may be employed alone. Finally, at step 330, an incentive is provided based upon the broadcast. The incentive may be directed to the participant or others in the location of the broadcast.

[0024] In accordance with one or more embodiments of the present invention, and as set forth in each of the above scenarios, the direct observation of a consumable includes an automated visual confirmation that a consumer has consumed a product or service. This consuming may be performed in return for some benefit. Further, evidence of this consuming may be broadcast to others via a number of methods, such as through a live video at a particular location, broadcasting via a social networking site, or the like. Incentives and rewards may be provided to the participant, or others viewing the participant. On each of these scenarios, behavior shaping (i.e. influencing the behavior) of the user and other friends or viewers of the participant is accomplished. First, the peer network of the participant is made aware of the actions of the participant on a one-to-many basis. Second, a monetary or other desirable incentive may be provided to the participant or others related to the product, such as a coupon, discount on a next purchase, free products, or even an incentive via the social network for the user, or perhaps one or more friends of the user. Finally, a gaming aspect of the situation is presented in which the steps of observation may be integrated into a game or the like, accumulating points or other desirable scoring markers, thus providing an incentive to consume additional consumable items, and to provide positive reinforce-

[0025] In each of the above-described scenarios, it is contemplated that consumption of a consumable is determined. In accordance with an embodiment of the invention, a three step process may be employed in order to make such a determination. Thus, the task of determining consumption may be broken down to a small number of easy to determine tasks. The sum sequential performance of these tasks will then be determined to be evidence of completion of the task. If the case of drinking a soda, for example, a first step may be identification of the user, a second step may be identification of the consumable, and a third step may be identification of consuming the consumable. Of course, any number of steps may be employed. This third (or any other) step may be further broken down into one or more sub-steps based upon the type of consumable. For example, drinking from a bottle may be broken into the steps of determining that the bottle is against the lips of the user, determining that the bottle has been lifted up to a position where liquid may pour from it, and determining that the liquid level in the bottle is lowering. For a consumable such as a pill, candy, or other edible object, these sub-steps may comprise confirming the consumable in the mouth of the user, confirming closing of the mouth, and then confirming an empty mouth. In the case of visual confirmation of wearing of one or more clothing items, a participant may be asked to stand in front of a screen with an integrated camera or the like. Additional steps may be described or required, such as asking the participant to hold up their hand for up to four seconds, for example, to indicate a desire to opt-in to an application, or to log this particular activity. Further, voice or other activation of the system may be employed to allow for logging of a current activity. Any such steps may be employed as appropriate given the type of consumption to be determined.

[0026] As is noted above, one important step may be the identification of a product to be consumed by the user. Such identification may take place using any known identification system, but may also employ an inventive system for making a determination of the object in accordance with a web camera on a mobile device of a user, a camera covering a large area of a public or private space, or other desired location. Thus, the system is able to be provided with an object to be matched, and then search through a particular location to find and identify such an object. Once discovered, when one or more images or video of the consumable, the object may be highlighted or otherwise given prominence in the display so that one or more users viewing the display will be made immediately aware of the product in question. Thus a can of desired beverage or the like may be highlighted or otherwise emphasized in a display, or a logo or other identifying feature of the can (or other consumable item) may be highlighted or magnified to give prominence during a broadcast. Furthermore, one or more overlaid statements or advertising images may be employed to further highlight the item of logo, or to otherwise provide additional exposure and advertising to be viewed or heard in accordance with such a broadcast.

[0027] Referring next to FIG. 4, a flowchart diagram depicting process flow in an overall system employing one of the scenarios noted in FIGS. 1-3 is described. As is shown in FIG. 4, first a manufacturer or other interested party may advertise the benefits of the direct observation of consum-
ables program at step 410. Such advertising may take place online or offline media. Incentives to join and participate in the program may be described as points for discounts on future purchases, or redemption for free merchandise, a lottery system for free merchandise from among those reaching a certain point threshold, a general points/credit system based upon the number of friends or others who see you consuming the consumable, and incentives for your network, such as coupons for an online network, or free consumables for a live network, or the like. Then, at step 420, a participant initiates the process of consuming the consumable in a manner that is trackable by a system provided for such tracking at step 420. Thus, the user may be asked to perform a short number of steps in view of a web camera included with a video phone or other mobile device, or other apparatus available for recording and analyzing participant actions. The user may first be asked to log into the system, such as by facial recognition, or by password or other identifying system, such as, for example, a biometric recognition system, or a log in via an existing network, such as a social network account or the like. Such identification system may be employed in order to avoid any malicious intent on the part of the user, and indeed any other identification verification may be employed. Next, the participant may be asked to hold up the consumable to the camera so that the consumable may be identified. Finally, the participant may be asked to consume the consumable (or wear a wearable item, etc.). Such consumption may be requested according to a particular format so that the system is able to confirm that the participant has performed the desired action. After such consumption, at step 430, data related to such consumption is transmitted to a remote location, or stored locally, in accordance with the desired network. In addition to processing and sending a video, mini-video, series of thumbnail images, animation or the like, and preferably highlighting or otherwise identifying the consumable product to make it stand out and differentiate it from other objects and backgrounds in the image, time and date of the action may be recorded and transmitted, along with participant identification, and an indication of consumption logged. Once transmitted, this information may further be provided to one or more social networks, friends who have performed similar tasks, or who have been entered in a game to track such consumption, and the like. Finally, at step 440, the participant may receive one or more benefits upon confirmation of consumption and transmission of the consumption information. Thus, points may be added to the participant’s account, peers in either an online or offline network may be notified of receipt of the incentive and be shown the consumption, via video or other messaging, such as texting, email, audio or the like. The participant may receive monetary incentives, such as cash back, or discounts on future purchases. Additionally, peers of the participant may receive one or more incentives in order to encourage similar consumption, or simply for viewing the broadcast of consumption by the participant. Additional features such as encouragement upon completion of tasks or watching of broadcasts may be provided, including automated applause, or other visual identifiers related to completion of a task. Thus, for example, upon consumption of an item, indications may be provided adjacent the mouth of the participant related to the consumed item. Any other type of reinforcement may be provided.

[0028] In accordance with an alternative embodiment of the present invention, a dashboard may be provided to a program manager to review one or more accounts for one or more participants, thus determining a number of times the user has consumed the consumable, and may allow for determinations of whether various marketing or other incentives increase such consumption. Additionally, it may be possible to determine whether the action of consumption by an individual influences consumption by other individuals in the user’s social network, immediate physical location, or anyone otherwise knowledgeable of such consumption in accordance with any of the methods described above. Thus, “peer tracking” may be employed in order to test the viral expansion of a particular campaign, or the like. By seeing who clicks through a particular broadcast, movement of the campaign through one or more peer networks may be determined. Various additional diagnostics may be provided as appropriate, and including one or more features allowing for adjustment of various marketing or incentive programs in accordance with one or more reported statistics, and may allow for the review of changes in behavior for one or more users based upon changes in incentive. Changes in such incentives may be based upon any desirable statistic, and may be applied to one, many or classes of individuals based upon demographic, location, or other classification metrics. Thus, for example, various aged individuals in certain locations may be provided with an incentive, while others in different locations may receive another. Further heavy consumers may receive further incentive, or the like. In addition to reviewing such changes in user behavior, monitoring may be provided to determine whether recurring consumption is taking place in a position in which it should not. For example, such a system may determine that a particular individual has consumed more than a predetermined number of drinks, thus notifying to stop such activity, or provide other information to the user that may be appropriate given the determined action. Further such a system may also initiate further actions automatically, such as requesting a taxi, thus allowing for encouragement of safe driving. Various other actions may be preprogrammed by the participant form one or more situations, such as calling or otherwise alerting a friend or family member or the like.

[0029] It is therefore anticipated that upon incurring participants to consume consumable items in such a manner, peers in their network will know about this consumption, and will similarly be inducted to consume the consumable in a similar manner. Cross-selling of related consumables or other products may also be provided. As noted above, the ability to broadcast such consumption via one or more well known social networking sites has the potential to allow for a limitless number of peers to be reached, each becoming a participant and reaching out to their network as well. It is this network effect that is anticipated to greatly increase consumption of such a consumable product.

[0030] It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, because certain changes may be made in carrying out the above method and in the construction(s) set forth without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

[0031] It is also to be understood that this description is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall there between.
What is claimed:
1. A method for social network notification of performance of an action by a social network site, comprising the steps of:
   determining a sequence of steps to be performed by a performer indicative of proper performance of an action;
   capturing by an image capture device one or more video sequences of the performer performing the sequence of steps;
   determining performance of the sequence of steps by the performer by confirming each step in the one or more video sequences captured by the image capture device by a computer processor in accordance with machine vision activity recognition;
   posting to a social network site confirmation of performance of the predetermined action; and
   providing incentive to the performer based upon the broadcasting.
2. The method of claim 1, wherein the predetermined action comprises consuming a consumable item.
3. The method of claim 1, wherein the determining of performance of the predetermined action is determined in accordance with machine vision activity recognition algorithm on a mobile device.
4. The method of claim 1, wherein the posting is performed via a plurality of social networking sites.
5. The method of claim 4, wherein the posting further comprises transmitting a video of the performance of the predetermined action.
6. The method of claim 1, wherein the posting is performed via a publicly-viewable display.
7. The method of claim 1, wherein the incentive comprises a monetary incentive to the performer of the action.
8. The method of claim 1, wherein the incentive comprises an incentive to one or more peers of the performer of the action viewing the posting.
9. The method of claim 1, wherein the incentive comprises an incentive to one or more peers of the performer of the action upon performance of the predetermined action by the one or more peers.
10. A computer program stored on a non-volatile computer readable medium, the computer program causing a computer including an image capture device camera, a display, and a machine vision activity recognition system to perform the steps of:
    determining a sequence of steps to be performed by a performer indicative of proper performance of an action;
    capturing by the image capture device one or more images of the performer performing the sequence of steps;
    determining performance of the sequence of steps by the performer by confirming each step in the one or more images in accordance with the machine vision activity recognition system;
    posting to a social networking site confirmation of performance of the predetermined action; and
    providing incentive to the performer based upon the broadcasting.
11. The computer program of claim 10, wherein the predetermined action comprises consuming a consumable item.
12. The method of claim 10, wherein the computer is a mobile device.
13. The computer program of claim 10, wherein the posting is performed via a plurality of social networking sites.
14. The computer program of claim 13, wherein the posting further comprises transmitting a video of the performance of the predetermined action.
15. The computer program of claim 10, wherein the posting is performed on a publicly-viewable display.
16. The computer program of claim 10, wherein the incentive comprises a monetary incentive to the performer of the action.
17. The computer program of claim 10, wherein the incentive comprises an incentive to one or more peers of the performer of the action viewing the posting on the social network site.
18. The computer program of claim 10, wherein the incentive comprises an incentive to one or more peers of the performer of the action upon performance of the predetermined action by the one or more peers.
19. A system for social network notification of performance of an action by a performer to a social network site, comprising:
    an image acquisition system acquiring one or more images of a performer performing a predetermined sequence of steps indicative of proper performance of the action by the performer;
    a processor analyzing the acquired one or more images to determine whether the performer has performed the predetermined sequence of steps by confirming each step in the sequence of steps from the one or more images indicative of proper performance of the action in accordance with machine vision activity recognition; and
    a transmission system posting to a social networking site confirmation of performance of the predetermined action;
    the processor providing to the performer an incentive based upon the posting.
20. The system of claim 19, wherein the predetermined action comprises consuming a consumable item.
21. The system of claim 19, wherein the posting is performed via a plurality of social networking sites.
22. The system of claim 21, wherein the posting further comprises transmitting a video of the performance of the predetermined sequence of steps.
23. The system of claim 19, further comprising a publicly-viewable display for displaying the posting of the confirmation of performance of the predetermined action.
24. The system of claim 19, wherein the incentive comprises a monetary incentive to the performer of the action.
25. The system of claim 19, wherein the processor further determines one or more peers of the performer of the predetermined action viewing the posting via the social network site, and provides an incentive comprises thereto.
26. The system of claim 19, wherein the processor further determines performance of the predetermined sequence of steps by one or more peers of the performer of the action, and upon confirmation of performance of the predetermined sequence of steps, provide an incentive incentive to the one or more peers.