



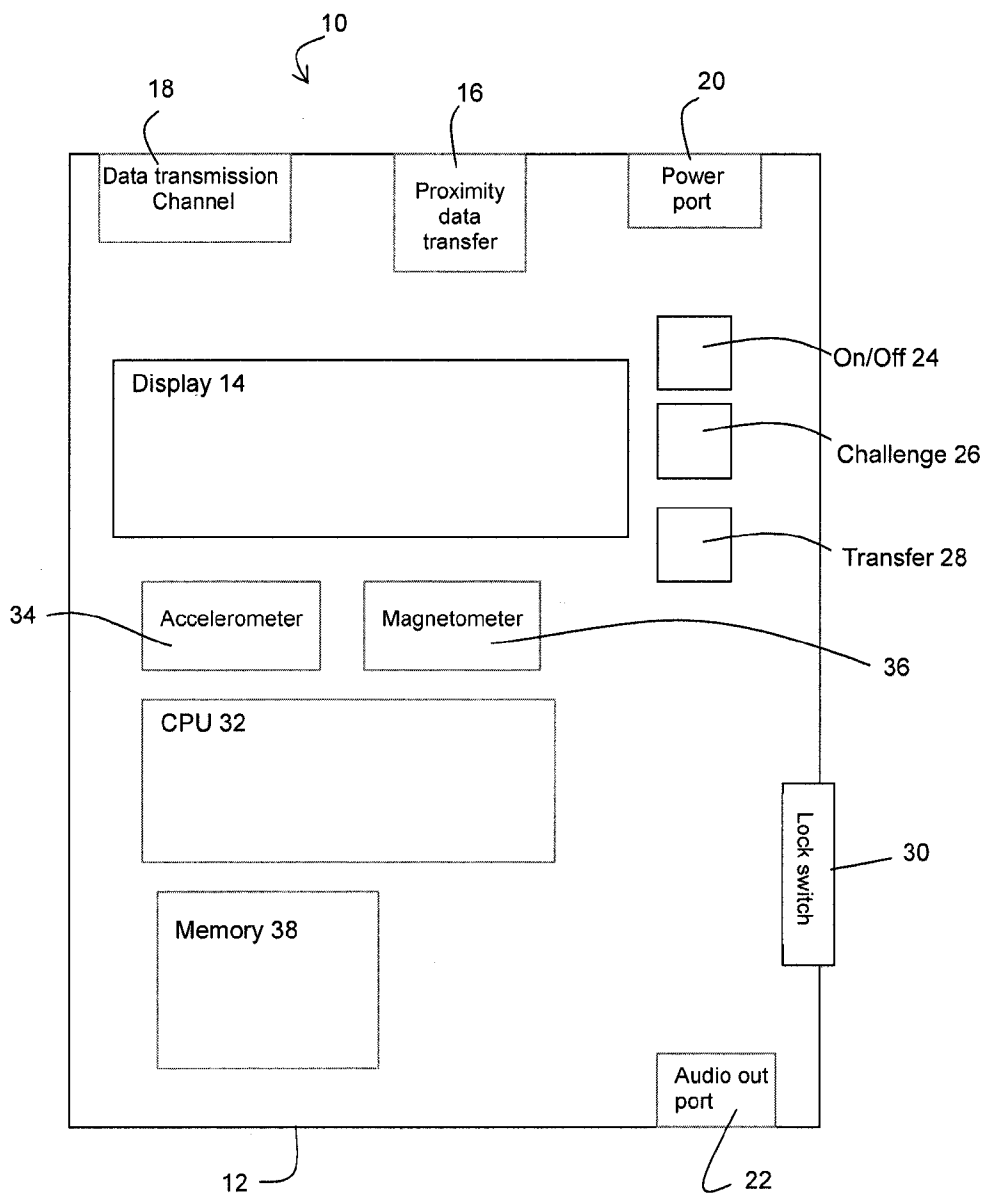
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(19) **United States**(12) **Patent Application Publication**
Guthrie(10) **Pub. No.: US 2008/0182724 A1**(43) **Pub. Date: Jul. 31, 2008**(54) **ACTIVITY MONITOR WITH INCENTIVE FEATURES**(76) Inventor: **Nicole Lee Guthrie**, San Francisco, CA (US)Correspondence Address:
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SAN MATEO, CA 94403(21) Appl. No.: **12/019,597**(22) Filed: **Jan. 24, 2008****Related U.S. Application Data**

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A63B 71/00 (2006.01)(52) **U.S. Cl.** **482/8**(57) **ABSTRACT**

A method of monitoring a user's activity and rewarding the monitored activity. In some embodiments, the method includes the steps of detecting motion of a user supported device; summing the motion; transmitting summed device motion to a reward center; and providing a reward to the user based on the summed device motion without comparing the device motion to a predefined kind of motion stored within the device.



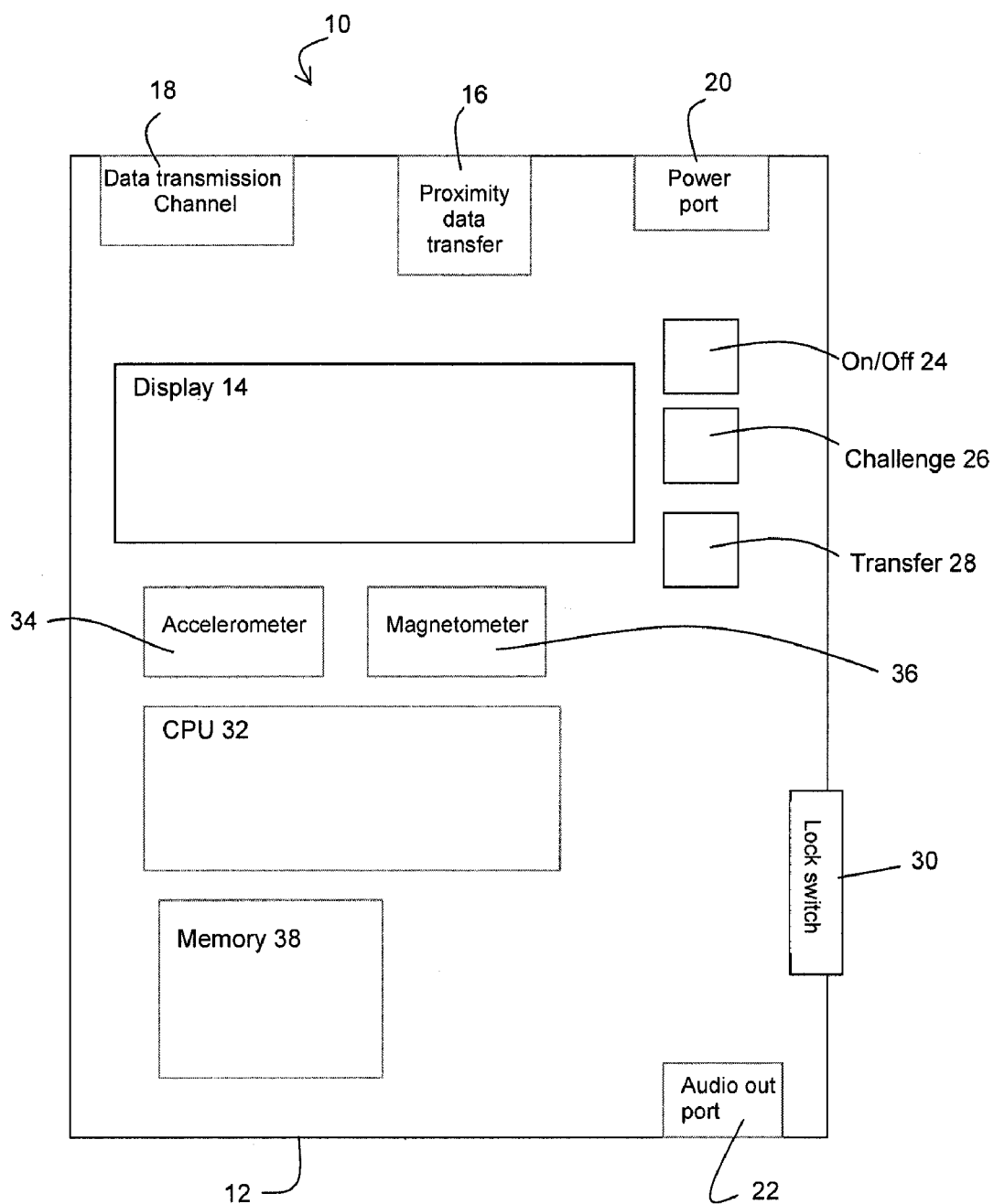


Figure 1

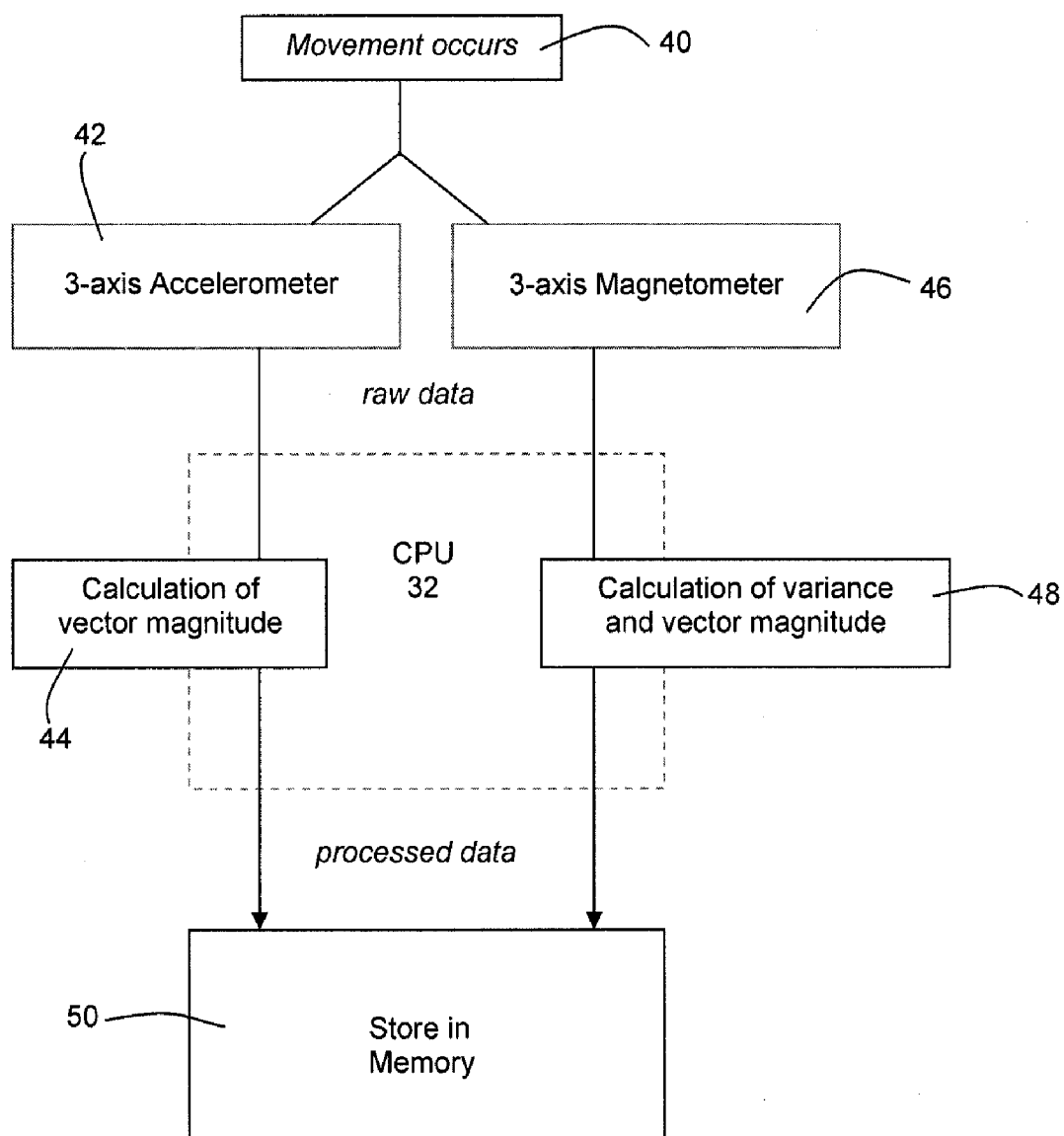


Figure 2

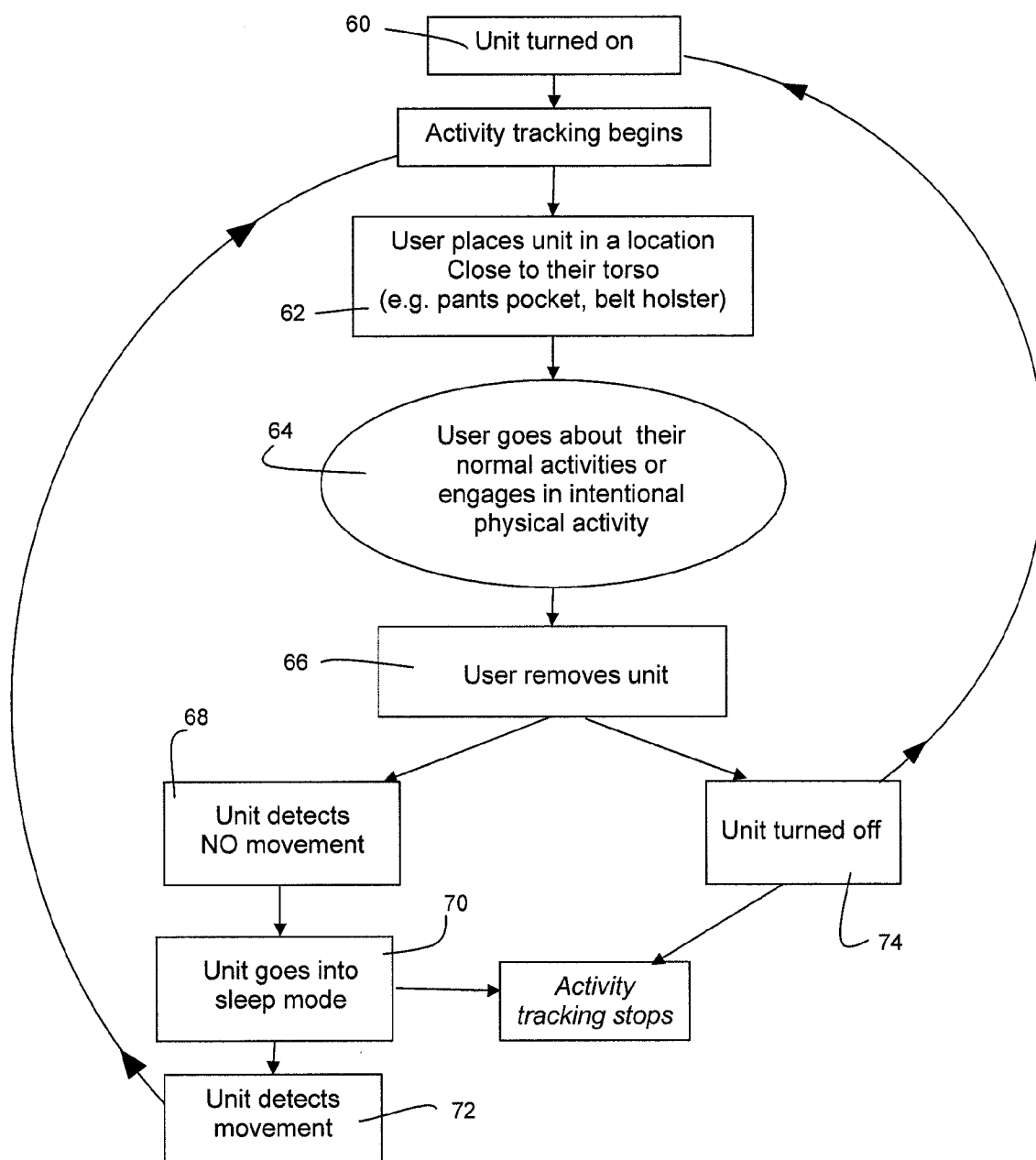


Figure 3

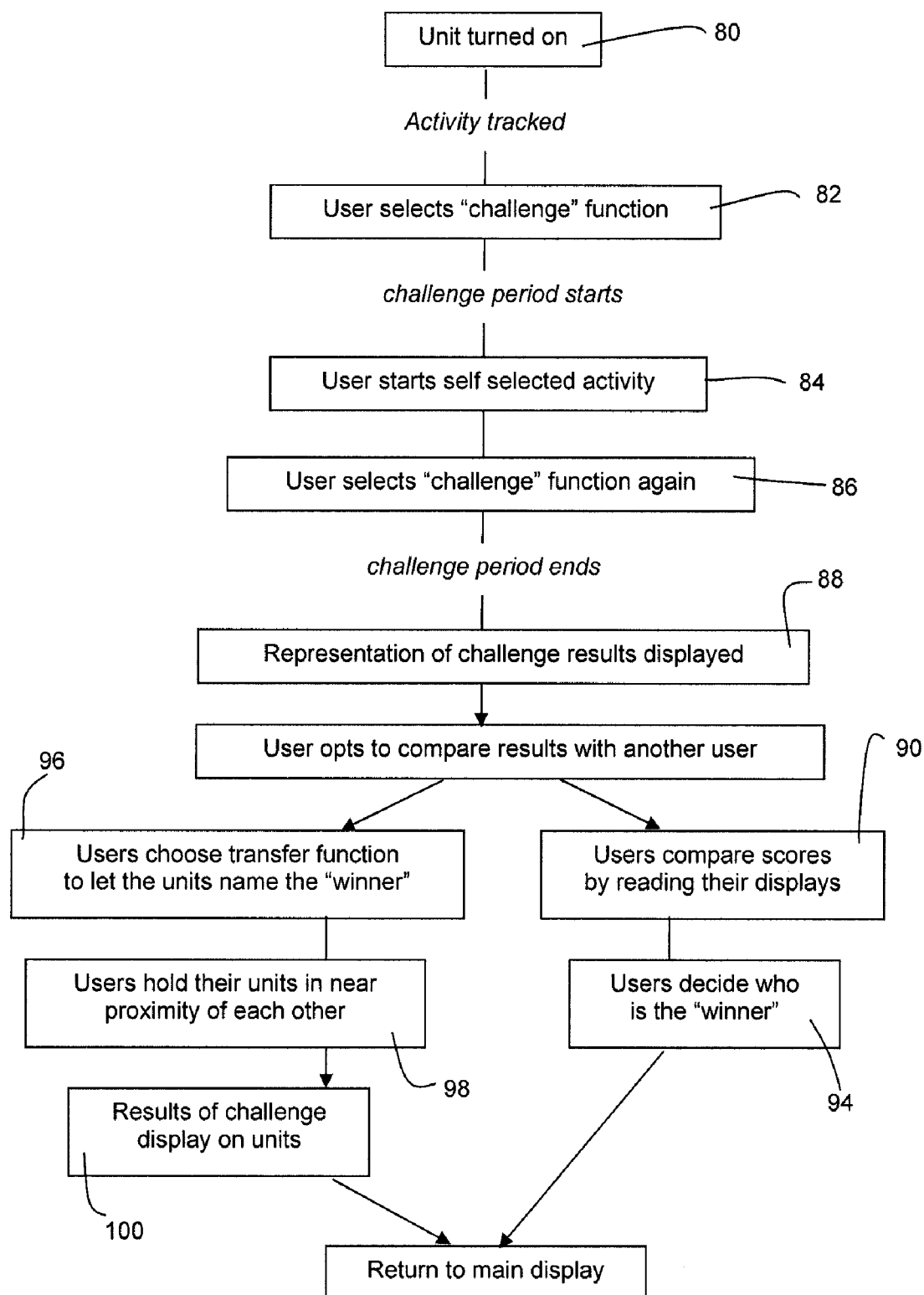


Figure 4

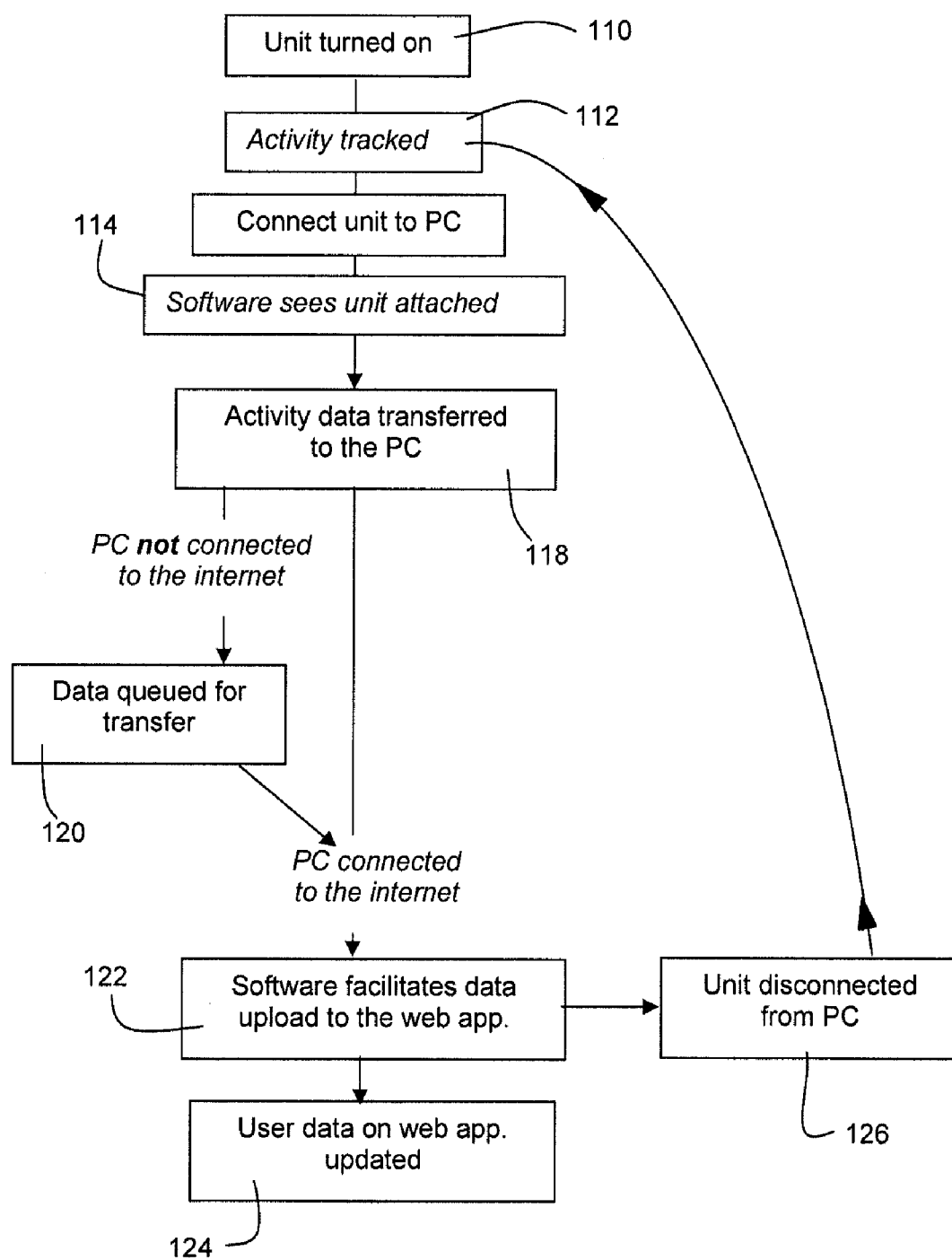
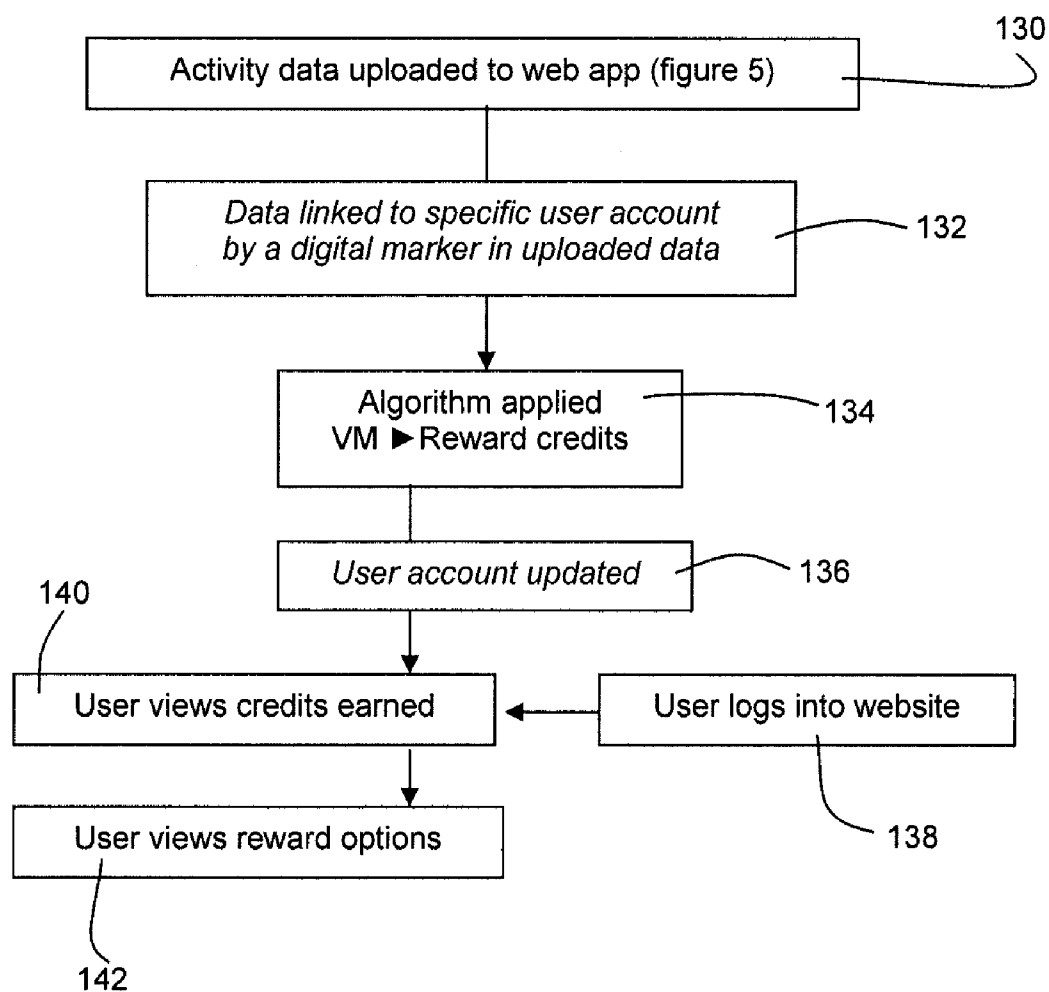


Figure 5

**Figure 6**

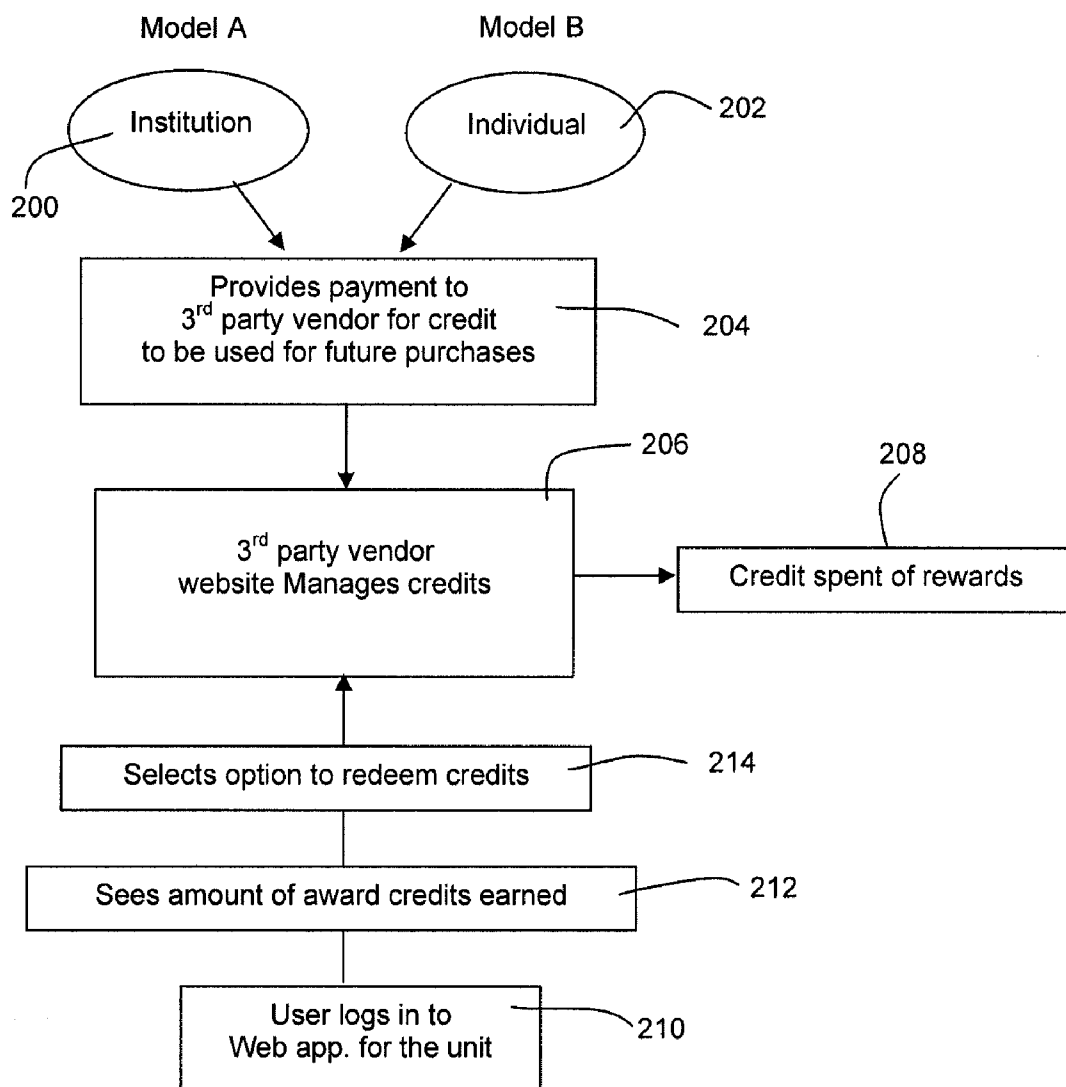


Figure 7

ACTIVITY MONITOR WITH INCENTIVE FEATURES

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit under 35 U.S.C. § 119 of U.S. Application No. 60/897,550, filed Jan. 25, 2007, which is incorporated by reference as if fully set forth herein.

INCORPORATION BY REFERENCE

[0002] All publications and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication or patent application was specifically and individually indicated to be incorporated by reference.

FIELD OF THE INVENTION

[0003] This invention relates to the tracking of physical activity using methods of accelerometry and providing digital rewards as an incentive for engaging in physical activity.

BACKGROUND OF THE INVENTION

[0004] The positive effects of regular physical activity are well documented, but motivation to maintain adequate levels of activity over the long term is often lacking. The use of digital rewards, such as music files, cell phone minutes, access to online games or virtual rewards or 'collectibles', provides an incentive for participation in physical activity that is desirable over the long term.

[0005] Tools for measuring physical activity are often designed for tracking specific movements such as running or walking. In addition there are products that act as a personal coach for the user and encourage them to perform specific tasks over distinct time periods. While these tools may be useful in motivated adults, tweens and teens do not generally engage in physically demanding activities for the purpose of exercise and health promotion but rather for the fun of the activity and to socialize with others. In order to get tweens and teens to be physically active the activity must be fun and provide social interaction. In order to keep tweens and teens active you need to provide incentives that are fun and social as well as being attractive over time.

[0006] The Centers for Disease Control and Prevention recommend that young people engage in at least 1 hour of moderate to vigorous physical activity each day to maintain good health. Metabolic equivalents (METs) are a standard measurement of activity intensity based on the amount of oxygen the body uses during a specific activity. A moderate level of activity, 3-6 METs, can be reached by participating in everyday activities such as walking, mowing the lawn or bathing a dog.

[0007] U.S. Pat. No. 6,213,872 describes a pedometer for use by a child that monitors the user's walking or running steps with a vibration detector. The display state of a character shown on the device's screen changes based on the number of steps detected. Walking and running are the only motions detected, however, and no user-selected awards are provided based on the user's activity level.

[0008] US 2006/0025282 describes a child's exercise computer that compares the user's movement to a preset exercise routine. Successful performance of the exercise routine enables the child to obtain rewards such as music files or video games. Rather than detect and record all motion, how-

ever, this device monitors and rewards only activity that complies with preset exercise routines.

[0009] US 2006/0293041 describes a rewards-based system that relies on a pedometer interfacing with a cell phone.

SUMMARY OF THE INVENTION

[0010] A product that can measure a user's physical activity throughout the day and then provide incentives for engaging in activity would be a great motivator for young people. A user could earn credits for incentives while performing every day activities, such as walking, and would not have to be an athlete in order to earn rewards. In order to maintain the interest of young people the product may have a social component to it. For instance, the website supporting the product may provide users the ability to post their activity accomplishments, acknowledge the accomplishments of friends by sending them a digital graphical representation or list high earners for the day. In addition, the product may have the ability for proximity based interaction with other products. A user could engage in a friendly competition and compare their accomplishments in real time.

[0011] In some embodiments, the present invention continually tracks a user's duration and intensity of physical activity while in use, awards credits for activity reaching a specific level of activity, provides tools for the user to interact and share their activity credit status and provides a method for the redemption of activity credits for actual rewards. Another embodiment of the present invention includes all functions listed previously but also has an audio file player and the related software functions for the management of digital music files. A web based application will manage the assignment of credits and the dispensation of rewards in a manner that is engaging to the target users. The web application may also provide a method (e.g., widget) for the user to post information about their use of the present invention, including credit earned or rewards received, on a social networking site on the internet.

[0012] One aspect of the invention provides a method of monitoring a user's activity and rewarding the monitored activity. In some embodiments, the method includes the steps of detecting motion of a user supported device; summing the motion; transmitting summed device motion to a reward center, possibly over the internet; and providing a reward (such as a music file) to the user based on the summed device motion without comparing the device motion to a predefined kind of motion stored within the device. In some embodiments, the music file reward may be played by the device.

[0013] Some embodiments include the step of determining whether device motion is the user's activity, wherein the device sums the device motion only if the device motion is the user's activity. In some embodiments, the device may display activity information. Some embodiments also include the step of setting a monitoring period and displaying summed device motion at the end of the monitoring period.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The novel features of the invention are set forth with particularity in the claims that follow. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

[0015] FIG. 1 is schematic diagram of an activity monitor according to this invention.

[0016] FIG. 2 is a flow chart illustrating measurement of user movement.

[0017] FIG. 3 is a flow chart showing activity tracking according to one embodiment of the invention.

[0018] FIG. 4 is a flow chart showing use of a challenge function in one embodiment of the invention.

[0019] FIG. 5 is a flow chart showing activity data upload.

[0020] FIG. 6 is a flow chart showing calculation and display of reward credits.

[0021] FIG. 7 is a flow chart showing reward funding schemes.

DETAILED DESCRIPTION OF THE INVENTION

[0022] FIG. 1 shows one embodiment of an activity monitor 10 according to this invention. Activity monitor 10 has a housing 12 of a size, shape and weight that permits it to be held, carried or otherwise supported by a child. For example, housing 12 may be similar in size, shape and weight to an MP3 music player. Visible from the exterior of housing 12 are a display 14 and a variety of other input/output devices, such as a wireless transmitter 16 for proximity data transfer, a wired transmission connector for a data transmission channel 18, a power port or connector 20, an audio output port 22, and one or more buttons or keys serving as, e.g., an on/off switch 24, a use mode selector 26, a data transfer activator 28 and an input lock 30.

[0023] Housing 12 contains the circuitry and other components of the activity monitor. A processor or CPU 32 communicates with an accelerometer or other motion detector 34 and an optional magnetometer 36 to obtain information about the user's physical activity. (Power and communication channels are omitted from FIG. 1 for clarity of illustration.) In one embodiment, as illustrated in FIG. 2, the measurement of real time movement 40 of the activity monitor on the x, y and z axis from the accelerometer (as shown in block 42) is converted by CPU 32 to a single measurement of intensity (e.g., vector magnitude, as shown in block 44) using methods common in the art. The 3-axis magnetometer data (block 46) is also processed by CPU 32 and stored as descriptor of variance and/or vector magnitude (block 48) also using methods common in the art. A flash based memory (or other suitable memory device) stores the activity data (accelerometer and magnetometer) (block 50) until it can be uploaded to the related web application by way of, e.g., a wired output port 18 (for example, USB-2 cord) or wireless output port 16 (for example, wireless transmission using the Bluetooth protocol). Transfer of the data can be initiated using one of the device's buttons or keys 28.

[0024] The 3-axis accelerometer 34 is able to track a wide range of human movements that occur over time periods as short as a fraction of a second. In one embodiment, the activity intensity stored in the on board memory will be compressed by summing the vector magnitude over a specified duration of time.

[0025] An on-board 3-axis magnetometer 36 is able to track change in orientation of the unit that would indicate that the unit is not being worn as intended. If the unit is removed from the body and subjected to conditions intended to be perceived as exercise activity, in most cases, the patterns of data output from the magnetometer will differ from normal use patterns. When the unit is used as intended, large variance in orientation is measured by the 3-axis magnetometer even if a person

is participating in repeated motions (e.g., throwing a ball, spinning in circles, swinging a racket). In contrast, very low variance is seen in artificially created movement (e.g., a fan blade), and this information can be used to signal that the movement seen was not generated by the user's physical movement. An algorithm detecting the variance in the magnetometer readings will be used to identify instances where the user may be trying to earn credits for rewards with out participating in physical activity.

[0026] The activity monitor 10 is powered by a rechargeable battery (e.g., lithium battery) (not shown). The user will be informed of the status of the battery charge by an iconic, numeric and/or other visual cue (e.g., change in color of a light) (not shown) on the unit. The battery will draw power from the user's personal computer when connected for data transfer and will continue to charge as long as the computer is powered on. The battery can also be charged by plugging an AC adaptor cord to the power outlet on the unit.

[0027] FIG. 3 illustrates activity monitoring using the devices and methods of the invention. The measurement of physical activity starts when the user turns on the activity monitor (block 60). Physical activity is then measured continuously until the unit is actively turned off (block 74) or goes into sleep mode (block 70). The unit will go into sleep mode after a significant amount of time is detected where the vector magnitude for both the accelerometer and/or magnetometer equals zero (block 68), indicating the unit is not being carried by the user. The device comes out of sleep mode when movement is detected (block 72) and resumes tracking activity.

[0028] In an embodiment of the invention, activity monitor 10 includes a digital music player, and CPU 32 (or another processor) converts digital music files stored, e.g., in MP3 format in memory 38 to an audio output at audio output port 22. In such an embodiment, the user will have the option of turning on the unit and starting activity tracking but then lock other features from being activated accidentally. For example, a sliding lock switch 30 may be moved to a position that prevents other input devices (such as buttons or keys 24, 26, and 28) from being used. There is also the option of starting activity tracking while using the audio file player function of the device, so the user can listen to digital audio files while engaging in physical activity. The present invention is carried by user in a fashion that keeps the unit close to the trunk of their body (e.g., in pants pocket, in a belt holster) in any orientation that is convenient.

[0029] The user can receive real time feedback on the intensity of their movement by information displayed on the unit. Real time feedback can include the display of a graphical representation of different activity intensities or a numerical representation of the intensity, shown on display 14.

[0030] In some embodiments, the user will also have the option of challenging themselves or friends to reach a specific intensity of activity, as illustrated in FIG. 4. To use the challenge function the user selects the challenge option (block 82), performs their self selected activity (block 84), selects the challenge option again to end the challenge period (block 86), and then the mean intensity for that period of time is displayed (block 88). Different users could compare their respective intensities (block 90) by simply reading the display (blocks 92 and 94), or they can transfer the information to the other user's unit by a wireless proximity based data transfer

interaction (block 16) and have an audio and/or visual representation of the results of the challenge (blocks 96, 98 and 100).

[0031] In some embodiments, a software application will need to be installed on the user's personal computer to facilitate the transfer of data from the activity monitor to the related web application, as illustrated in FIG. 5. The software application may run in the background of the user's operating system and therefore not require specific interaction between the user and the program. The primary functions of the software application include the updating of the clock and the facilitation of the transfer of activity data from the present invention to the web application. After tracking user activity (block 112), the user can connect to the PC (wirelessly or through a wired connection) to transfer activity data to the PC (blocks 114-118). If the user's personal computer is not connected to the internet when the present invention is connected the data could be queued for transfer at a time when an internet connection is established (block 120). Otherwise, if the PC is already connected to the internet, then activity data is uploaded to the web application to update the user's information within the web application (blocks 122 and 124). The activity monitor is then disconnected from the PC to permit it to resume tracking activity (block 126).

[0032] FIG. 6 shows one embodiment of the activity reward method of this invention. After activity data is transferred to the web application (block 130) via the local software application, the data is linked to a specific user account by using, e.g., a digital marker within the uploaded data (block 132). Using methods and algorithms common in the art, activity intensity is converted to metabolic equivalents per unit of time. The amount of time where the metabolic equivalents is at least equal to moderately intense activity (as measured, e.g., via vector magnitude) will earn the user reward credits (block 134). The ratio of time spent in moderately intense activity to reward credits earned is determined by the amount of physical activity one would like to promote. The user's account is thereafter updated with the appropriate number of activity credits (block 136). Users can track their credits and view potential rewards for their credits by logging on to the website (blocks 138, 140 and 142).

[0033] FIG. 7 shows two models for funding and redeeming awards. In the first model (Model A) the distributor and manager of the web application is an institution (block 200) (e.g. nonprofit foundation, government entity) that funds the reward credits directly (block 204). The second model (Model B) requires an individual (block 202), such as a parent or guardian of the device user, to pay for a desired number of reward credits which are then spent by the user on available rewards via the distributor managed web application when enough activity is completed (block 204).

[0034] The administration of reward dispensation is overseen by a third party vendor (e.g., PayPal) (block 206). Alternatively this administration can also be accomplished within the web application specific for the present invention. Credits may then be spent by the user to obtain rewards (block 208), such as digital music files that may be downloaded to the user's PC and/or activity monitor.

[0035] The web application will be automatically updated whenever the user connects their unit to an internet connected personal computer. The user will use their preferred internet browser to navigate to the web application for the present invention in order to view their activity/credit status. The home page of the web application will have content engaging

to the target population and provide a place for the user to login in to their private account with a user generated login and password. Once in their account the user will see information related to their current status, such as credits earned and rewards accumulated (blocks 210, 212 and 214).

[0036] Available rewards can include audio music files, access to online games, ring tones, donations to nonprofit institutions, mobile phone minutes, digital graphical representations and digital acknowledgments. Users would also have the option of donating credits to another user's account.

[0037] The downloading, management and uploading of audio file rewards will be facilitated by a music manager software client, such as Songbird. The transfer of audio files to the embodiment of the unit with an audio file player will be conducted over the same transmission channel that is used for data transfer.

[0038] The invention also relates to the way in which rewards are achieved. A young person does not need to be a skilled athlete to receive the health benefits of physical activity. Providing an incentive for physical activity that reaches at least a moderate level can be motivating to young people of a wide range of fitness levels. It is important to young people to feel like the dispensation of rewards are fair and that all users have an equal chance to earn rewards. A user should not earn credits at a higher rate because they are able to participate in activities at a higher level.

[0039] Therefore, in some embodiments credits are awarded to users once the intensity of physical activity reaches a level that is known to be moderate for persons of a wide range of sizes and fitness levels. If users who participated in activities at extremely high intensities earned more credits or earned them at a faster rate the incentive model would not be fair to users unable to perform at the intense level. A reward credit should be awarded once a user's activity reaches the intensity threshold determined to be moderate for persons of wide range sizes and fitness levels for a distinct amount of time. A user would need to have accrued specified amount of minutes of activity in the credit earning range in order to have enough credits for a reward but would be able to take as much time as needed to earn these credits. A limit may be placed on the rate that credits can be earned in order to prevent the temptation to overly exert oneself.

What is claimed is:

1. A method of monitoring a user's activity and rewarding the monitored activity, the method comprising:
 - detecting motion of a user supported device;
 - summing the motion;
 - transmitting summed device motion to a reward center; and
 - providing a reward to the user based on the summed device motion without comparing the device motion to a pre-defined kind of motion stored within the device.
2. The method of claim 1 wherein the reward comprises an audio file.
3. The method of claim 2 wherein the detecting and summing steps are performed by the user supported device, the method further comprising playing the music file with the user supported device.
4. The method of claim 1 further comprising determining whether device motion is the user's activity, the summing step comprising summing the device motion only if the device motion is the user's activity.
5. The method of claim 1 wherein the transmitting step comprises transmitting summed device motion over the internet.

6. The method of claim 1 further comprising displaying activity information on the device.

7. The method of claim 1 further comprising setting a monitoring period and displaying summed device motion at the end of the monitoring period.

8. The method of claim 1 wherein the reward comprises cell phone minutes.

9. The method of claim 1 wherein the reward comprises access to online games.

10. The method of claim 1 wherein the reward comprises virtual rewards.

11. The method of claim 1 wherein the reward comprises a collectible item.

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