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(54) **SYSTEM FOR SIMULATING A TOUR OF OR BEING IN A REMOTE LOCATION WHILE EXERCISING**

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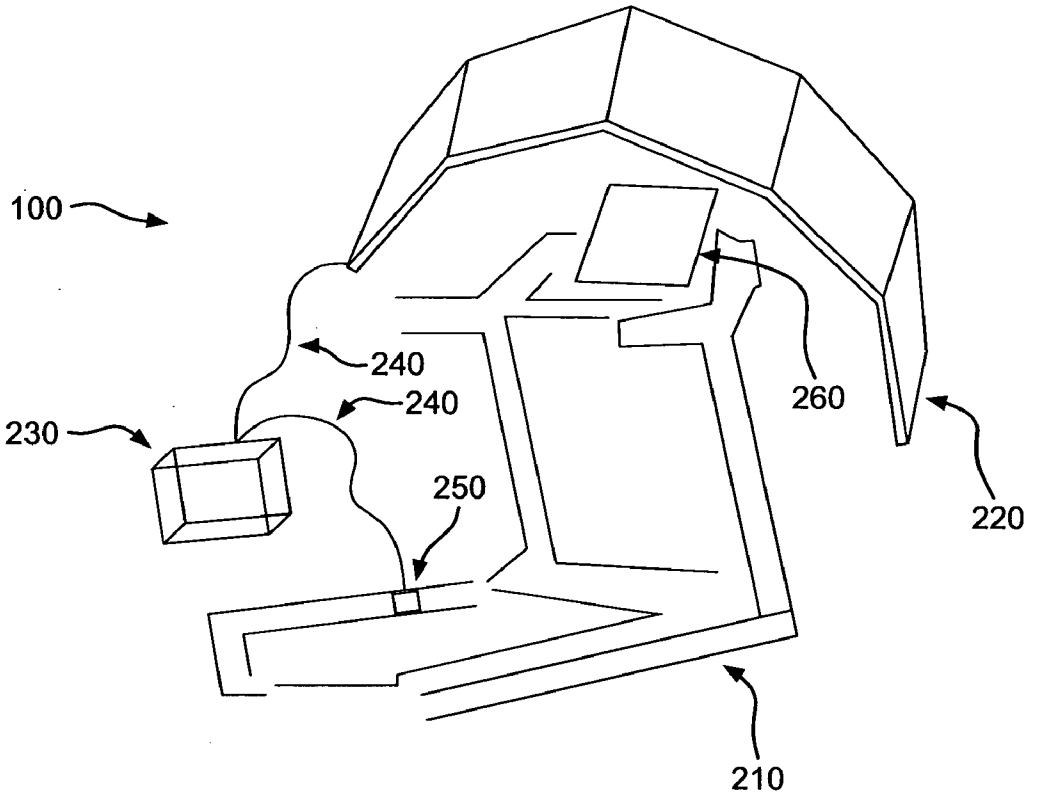
(52) **U.S. Cl.** ..... **482/4**

(57) **ABSTRACT**

A system and device for simulating being in or traveling through a remote location during exercise. The system may include a data output device configured to present the remote location for consumption by a user. The system may include a storage device configured to store remote location data representing the remote location. The system may include sensors configured to generate exercise data. The system may include a controller communicatively coupled to the sensors, the storage device, and the data output device, the controller configured to receive the generated exercise data and generate processed remote location data for the data output device based on the generated exercise data and the stored remote location data. The system may include a stationary exercise equipment operable by the user, the stationary exercise equipment including a sensor to generate exercise data.



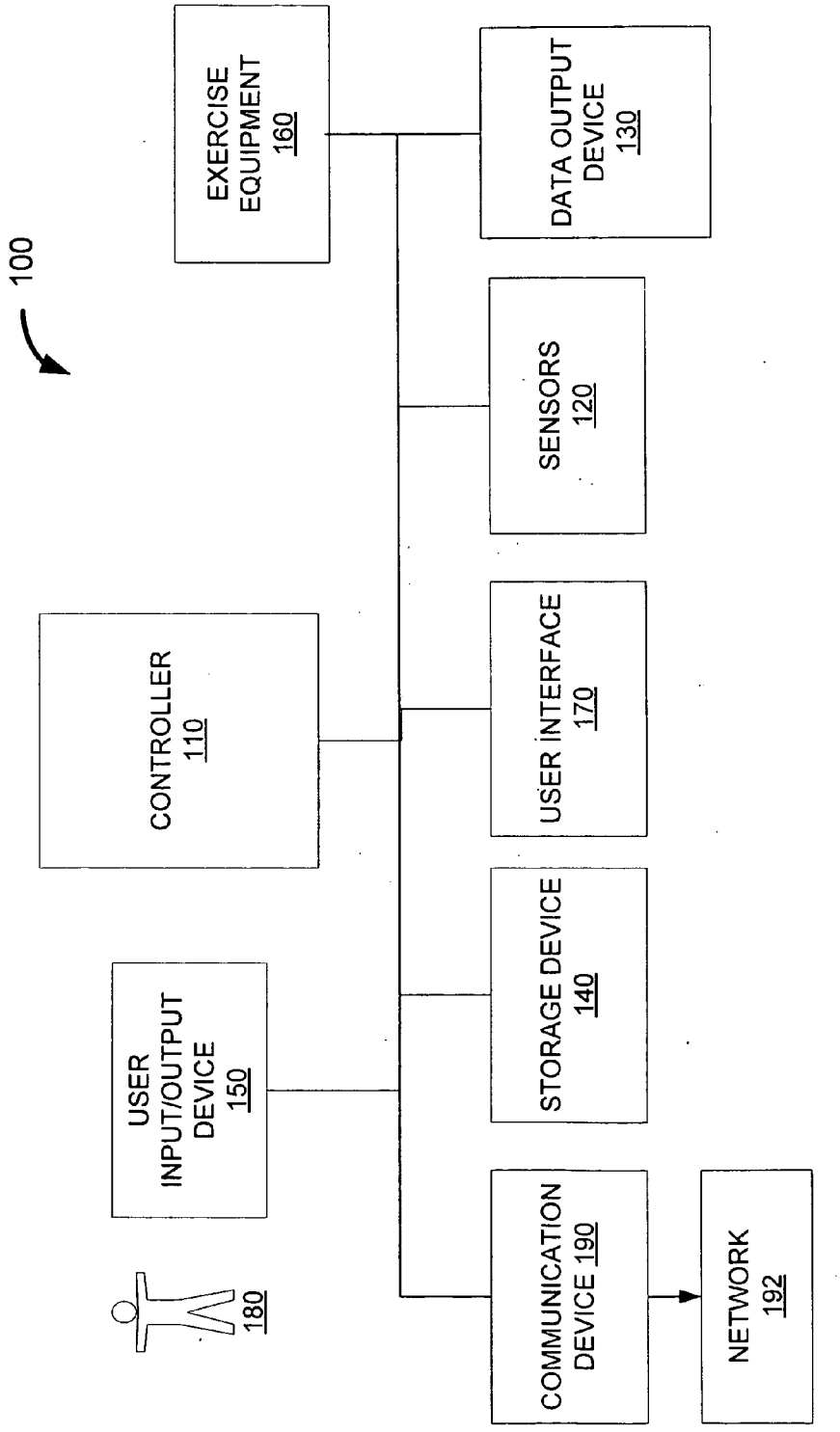

100
EXERCISE EQUIPMENT 160
DATA OUTPUT DEVICE 130
SENSORS 120
CONTROLLER 110
USER INTERFACE 170
USER INPUT/OUTPUT DEVICE 150
STORAGE DEVICE 140
180
COMMUNICATION DEVICE 190
NETWORK 192

FIG. 1

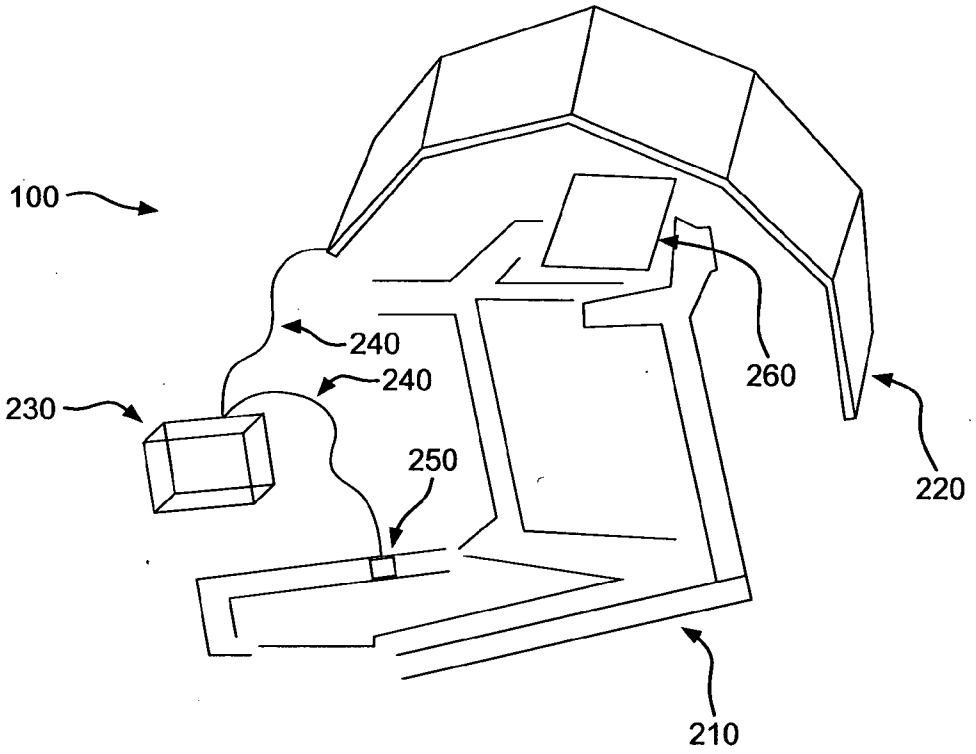



FIG. 2

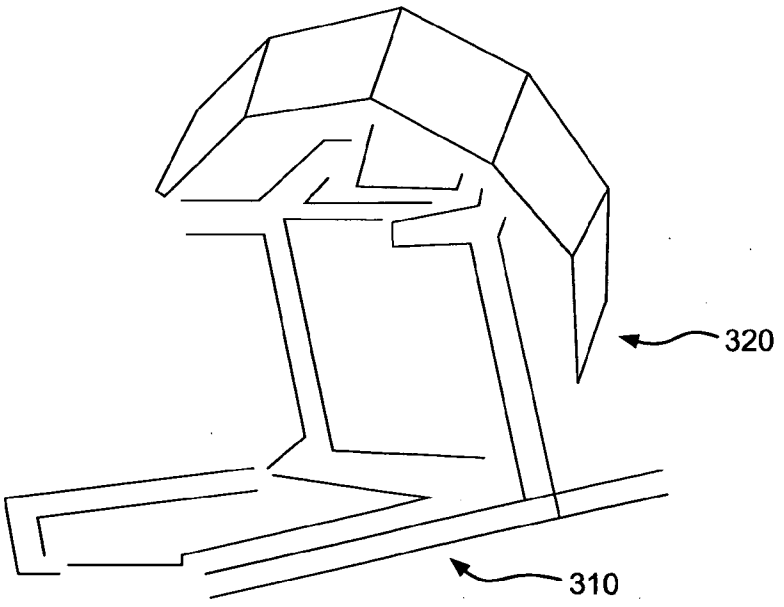



FIG. 3

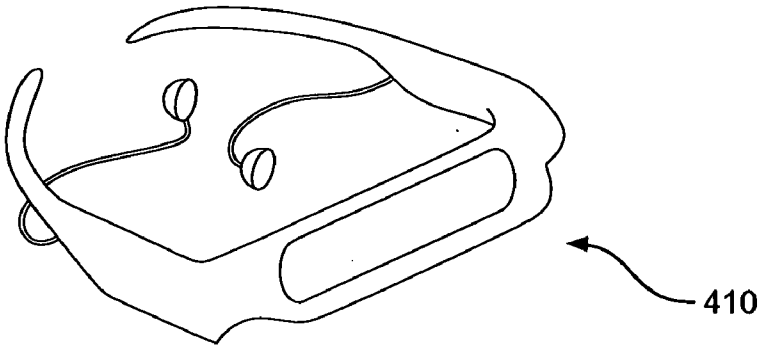



FIG. 4

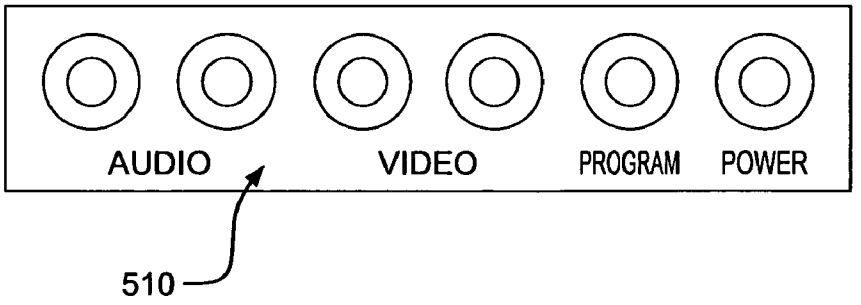



FIG. 5

# SYSTEM FOR SIMULATING A TOUR OF OR BEING IN A REMOTE LOCATION WHILE EXERCISING

## CROSS REFERENCE TO RELATED PATENT APPLICATION

**[0001]** This application claims the benefit of U.S. provisional application 61/133,372, with title, "System for Simulating a Tour of a Remote Location While Exercising", filed on Jun. 26, 2008, the entire contents of which are incorporated herein by reference.

**[0002]** The disclosed system relates to exercise equipment, and more particularly to systems that simulate the experience of touring a remote location while exercising.

## BACKGROUND

**[0003]** Exercise is the key to optimal physical and mental health and to longevity. Simple activities such as walking, stair climbing, or bike riding can turn the clock back on aging and add years to one's life. Exercise also increases bone density and improves balance, both of which are crucial in order to avoid falls as one ages.

**[0004]** The National Institutes of Health reports one in two woman and one in four men over 50 will have an osteoporosis-related fracture from low bone density in their lifetime.

**[0005]** According to the Centers for Disease Control and Prevention, the United States is on the brink of a longevity revolution. By 2030, the proportion of the U.S. population aged 65 and older will double to one in every five Americans. The implications of the increasing number of older Americans will include unprecedented demands on public health and the nation's health care system. Chronic diseases exact a particularly heavy health and financial burden on older adults due to long-term illness, diminished quality of life, and escalating health care costs. But while the risk of disease and disability increases with advancing age, poor health is not necessarily an inevitable consequence of aging. Much of the illness, disability, and death associated with chronic disease is avoidable through simple prevention measures. Key measures include practicing a healthy lifestyle and regular physical activity.

**[0006]** The CDC also reports that the problem of falls has become a healthcare crisis. The number of people falling each year is growing; and the high cost of falls is growing at an even greater pace. More than one in three adults 65 and older fall each year. One in two adults who fall will never regain their prior mobility or independence. One in four adults who suffer a hip fracture from the fall will die within 6 months. Falls are the leading cause of death for individuals 65 and older. The mortality rate for falls increased almost 40% between 1995 and 2005. In 2000, the cost of fall injuries for people 65 and older was $20 billion. Within 10 years, that amount will be over $43 billion.

**[0007]** Additionally, one of the biggest regrets of older adults is the lost opportunity to travel to places dreamed of and perhaps planned, but postponed until it was too late. Perhaps they had always planned to take a mule ride into the Grand Canyon or visit Florence or embark on a safari through East Africa. The system described herein "transports" the individual so he can experience the fun, freedom and fascination of traveling to exotic ports of call and feel as if he is experiencing each destination first hand.

**[0008]** Exercise equipment such as stationary bicycles, ellipticals and treadmills provide a good and safe workout for beginners as well as for experienced exercisers. But the routine can be boring causing the beginner to spend little time, if any, exercising on them. Many machines come equipped with monitors for measuring speed, distance and calories burned which may provide at least of modicum of entertainment or at least distraction from the routine.

**[0009]** Some gyms or fitness centers have a series of television monitors situated some distance from and above the rows of exercise equipment, with optional audio available by tuning into the television channel. These televisions can diminish some of the boredom of exercising, provided the program on is of interest to the user, the television is within viewing range of the user, and optional audio is available to the user.

**[0010]** Some gyms and fitness centers provide exercise equipment with individual monitors attached to the equipment. These televisions can also serve to diminish somewhat the boredom and monotony of repeated stepping, biking, walking, and exercising.

**[0011]** While exercise is the key to prolonging and enhancing the quality of life, getting started in a disciplined exercise program can be challenging, tedious, or boring for individuals not accustomed to exercise, particularly older individuals.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0012]** Exemplary embodiments of the system described herein are shown in the attached drawings. It is understood, however, that the invention is not limited to the precise arrangements and constructions particularly shown. In the drawings:

**[0013]** FIG. **1** illustrates an example of a system for simulating being in or traveling through a remote location during exercise.

**[0014]** FIG. **2** is an example of a system for simulating being in a or traveling through a remote location during exercise.

**[0015]** FIG. **3** illustrates an example of a data output device **320**.

**[0016]** FIG. **4** illustrates an example of a data output device.

**[0017]** FIG. **5** is an example of a user interface for the system of FIG. **1**.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0018]** There exists a need in the art for a system for simulating being in or traveling through a remote location during exercise. The system including a data output device configured to present the remote location for consumption by a user; a storage device configured to store remote location data representing the remote location; sensors configured to generate exercise data; a controller communicatively coupled to the sensors, the storage device, and the data output device, the controller configured to receive the generated exercise data and generate processed remote location data for the data output device based on the generated exercise data and the stored remote location data.

**[0019]** FIG. **1** illustrates an example of a system for simulating being in or traveling through a remote location during exercise **100**. The system **100** includes a controller **110**, sensors **120**, a data output device **130**, a storage device **140**, and optionally may include a user input/output device **150**, exer-

cise equipment **160**, a user interface **170**, and a communication device **190**. The system **100** presents a remote location to a user **180** on the data output device **130** based on generated exercise data from the sensors **120** and remote location data stored in the storage device **140**.

**[0020]** Embodiments of the controller **110** include, but are not limited by, a general purpose computer, a special purpose computer, and a digital personal assistant. The controller **110** may be integrated with the exercise equipment **160** and/or data output device **130**, or the controller **110** may be a separate device.

**[0021]** Embodiments of the sensors **120** include, but are not limited by, sensors **120** attached to the user **180** and sensors **120** attached to the exercise equipment **160**. Examples of sensors **120** attached to the user **180** include a heart rate monitor, a breathing monitor, and sensors **120** attached the exercise equipment include a rate monitor to indicate a rate that the exercise equipment is being used. For example, in an embodiment, the sensors **120** include a heart monitor for a user **180** and rate monitor for how fast a user is pedaling a stationary bicycle.

**[0022]** Embodiments of the data output device **130** include, but are not limited by, a screen, a wearable headset, a screen curved so as to extend at least partially around the front and sides of the user **180** visual field, a screen adapted to allow the user to see images located to the side of an apparent direction of a virtual travel relative to the user, a screen encompassing a complete field of vision of the user **180**, multiple screens, head mounted display, portable video glasses, and screens with a concave arrangement of screens which encompass the user's field of vision. The data output device **130** may be affixed to the top of the exercise equipment **160**.

**[0023]** The data output device **130** may include visual data, audio data, and tactile data. For example, in an embodiment the data output **130** may present images and sounds of a remote location, and may move the exercise equipment **160** in accordance with the presented images and sounds.

**[0024]** Embodiments of the storage device **140** include, but are not limited by, a computer hard disk, a DVD, a MP3 player, a MP4 player, a VCR, a computer readable non-volatile storage, an external flash drive, a mobile telephone, a personal digital assistant, a game console, and a plug-and-play converter system.

**[0025]** Embodiments of the user input/output device **150** include an LCD display, and a touch screen display.

**[0026]** Embodiments of the exercise equipment **160** include a stationary bicycle, a rowing machine, cross country ski machine, a stair climbing machine, and an elliptical machine.

**[0027]** Embodiments of the user interface **170** include a remote control for sending commands to the controller **110**, a touch screen, and a knobs and buttons.

**[0028]** Embodiments of the communication device **190** include a network adapter configured to communicate with the Internet, a modem, Bluetooth technology, and a wireless communication device.

**[0029]** Any of the controller **110**, sensors **120**, the data output device **130**, the storage device **140**, the user input/output device **150**, the exercise equipment **160**, the user interface **170**, and the communication device **190** may be in communication with each other by various cables and or wireless devices for communicating. For example, the output device **130** may be a screen and there may be a cable connecting the controller **110** to the output device **130**. In an embodiment, communication may be facilitated by cable tethering and/or high definition multimedia interface cables. As another example, the storage device **140** may be a computer hard disk in communication with the controller **110** via an electronic data bus. As still another example, the sensors **120** may include wireless communication devices in communication with the controller **110**.

**[0030]** In operation the controller **110** is configured to receive the generated exercise data from the sensors **120** and access the storage device **140** to access remote location data, and based on the generated exercise data and the remote location data, generate processed remote location data for the data output device **130** to present to the user **180**. Thus the user **180** is presented with an environment to engender a sense of immersion in the remote location. The user **180** may envision traveling through the Alps or being in a fantasy world with orcs and dwarfs.

**[0031]** The controller **110** may be configured to synchronize the user's movements through the remote location based on the data generated by the sensors **120** and values of usable settable parameters. For example, the controller **110** may be configured to generate the processed remote location data to simulate a tour of a remote location. The controller **110** may adjust a rate of moving through the generated remote location based on a rate the user **180** is exercising based on the exercise data. For example, the rate of moving through the generated remote location may depend on how quickly the user **180** pedals a stationary bicycle **160**. Additionally, the controller **110** may adjust movement through the remote location based on exercise data indicating directional or navigational moves the user **180** has made. For example, the user **180** may have turned a stationary bicycle **160** to turn left, so the controller **110** may simulate the movement of the user **180** through the remote location to left. In addition and/or alternatively, the controller **110** may determine the orientation of the user **180** and determine that the user has turned left and simulate the movement of the user **180** through the remote location to the left. The remote controller **110** may track the motion of the head of the user **180** and adjust the generated remote location data to the movements of the head of the user **180**.

**[0032]** The controller **110** may synchronize the presentation of the remote location with the pace of the user to simulate an immersive audio/video multimedia real-time tour through cities and landscapes worldwide. The controller **110** may synchronize the playing of the presentation of the remote location with the actual real-time pace of the user. The controller **110** may simulate the movement, pace and direction of the user "touring" a remote location. The controller **110** may generate an avatar of the user **180** based on the movements of the user **180** so that the user **180** may see the avatar travelling in the remote location.

**[0033]** The controller **110** may be configured to generate the processed remote location data based on generating 3D graphic scenes from remote location data.

**[0034]** The controller **110** may be configured to include 3D hardware and software for processing and generating 3D video. The video may be for a complete field of vision of the user **180**. The controller **110** may be configured to synchronized the angle of view of the user **180** with the generated processed remote location data.

**[0035]** The controller **110** may determine the orientation of the user **180**. The controller **110** may determine the orientation of the user **180** based on data generated by the sensors **120**. For example sensors **120** may be attached to the user **180**

that enable the controller **110** to determine the orientation of the user. As another example, the input/output device **150** may include a camera and the controller **110** may be configured to determine the orientation and/or the pace of the user **180** based on received images of the user **180**. As another example, the exercise equipment **160** may include sensors **120** that generate data that the controller **110** can use to determine the orientation of the user **180**.

**[0036]** The controller **110** may generate control signals to control settings of the exercise equipment **160** based on the position of the user **180** in the remote location and/or based on the data generated by the sensors **120**. For example, in a bicycle tour the controller **110** is generating for the user **180**, the controller **110** may generate control signals to adjust how hard it is for the user **180** to pedal a stationary bicycle based on the terrain of the remote location. In the example, the controller **110** may generate control signals to make it difficult to pedal when the user **180** is going up a hill in the remote location and may generate control signals to make it easier to pedal when the user **180** is going down the hill. As another example, for a treadmill the controller **110** may generate control signals to adjust the angle of the treadmill according to the location of the user in the remote location.

**[0037]** The controller **110** may be configured to connect to an Internet tour. The controller **110** may be configured to communicate with remote devices using the communication device **190** and synchronize a tour and/or other remote location simulations with other users. The controller **110** may be configured to share audio data and/or video data and may be configured to for multi-way communication between the user and other users, so that a group tour may be simulated in the remote location. In an embodiment, some of the users may be in the actual remote location with other user(s) participating via a simulated remote location.

**[0038]** The controller **110** may be configured to adjust a speed of playing the movements through the remote location so that the user can "travel" through the remote location faster or slower than the exercise data indicates the user is actually going. For example, the user **180** could select to travel at a rate of three times as fast on a bicycle tour of Europe.

**[0039]** The controller **110** may be configured to generate the processed remote location data based on a user settable direction of travel through the remote location, enabling the user to "travel" through the remote location in a user set direction.

**[0040]** The controller **110** may be configured to download via the communication device **190** remote location data.

**[0041]** The controller **110** may be configured to receive the remote location data via GPS data from an actual real-time remote location. For example, another person may have a GPS which generates data according to the person's position. The controller **110** may be configured to move the user **180** through the remote location based on the position of the person with the GPS.

**[0042]** The controller **110** may be configured to access remote location data via an electronic communication network such as the Internet. The controller **110** may access the electronic communication network via the communication device **190**.

**[0043]** The generated processed remote location data may include video data, audio data, and tactile data for consumption by the user **180**. The video data may include high definition digital video data, 180 degree high definition digital video data, 360 degree panoramic imaging video data, or 3D virtual reality digital immersive video technology. The audio data may include high definition digital audio data, binaural digital audio data, or stereoscopic high definition digital audio data. The audio data may include actual ambient sounds generated by the actual landscape and objects depicted in the generated processed remote location data. The audio data may include narration describing the remote location. The tactile data may include generating a control signal to the exercise equipment. For example, in the case of the remote location being a bicycle tour the remote location data may include rocking the a stationary bicycle to simulate bumps in a road.

**[0044]** The storage device **140** may store remote location data. The remote location data may include location data such as global positioning data, or location data relative to some position. The remote location data may be data representing imaginary or real remote locations. The remote location data may be in DVD format or other common video formats. The remote location data may include tour data with a prescribed route. The remote location data may include mapping data enabling a user **180** to select a route. The remote location data may include data for any number of places, such as famous cities, national parks, tropical beaches or other desired locations. The remote location data may include binaural audio technology recorded in the remote location. The remote location data may include a touring landscape recorded using 360-degree panoramic video technology so that the user may feel immersed within and experience first hand the remote location in real time while exercising.

**[0045]** The user interface **170** may enable a user to make selections for user settable parameters. For example, the user **180** may be able to select a route from the remote location data. The user interface **170** may be a physical device with buttons or may be software displayed on the input/output device **150**. Alternatively, the user interface may be displayed on the data output device **130**.

**[0046]** FIG. **2** illustrates an example of a system for simulating being in or traveling through a remote location during exercise. FIG. **2** illustrates an exercise equipment **210**, screens **220** as an embodiment of the data output device, a controller **230**, a sensor **250**. A user (not illustrated) may exercise on the exercise equipment **210**. The controller **230** may generate processed remote location data for the screens **220** to present to the user while the user exercises. The controller **230** may generate the processed remote location data based on the exercise data generated by the sensor **250**. For example, the controller **230** may generate processed remote location data so that the user appears to be travelling through the remote location at a rate in proportion to the rate the user is exercising based on the exercise data generated by the sensor **250**. The controller **230** may include a storage device (not illustrated) for storing the remote location data. The controller **230** may be communicatively coupled **240** to the screens and the sensors **250** by cables **240**. The exercise equipment **210** may include a user input output device **260** in communication with the controller **230** and configured so that the user can set user settable parameters. For example, the user may be able to select the remote location to travel through.

**[0047]** FIG. **3** illustrates an example of a data output device **320**. The data output device **320** is a series of screens **320** so that the user may have a panoramic view of the remote location to engender an immersive experience.

**[0048]** FIG. **4** illustrates an example of a data output device. Illustrated in FIG. **4** is a wearable headset **410**. The headset **410** may be a head mounted display or portable video glasses. The headset **410** may be worn by a user during exercise and may include audio and video data delivery devices. The headset **410** allows use of the system **100** (see FIG. **1**) in a smaller space, such as an apartment, as well as in a public location, such as a fitness club. In the embodiment illustrated, the system **100** (see FIG. **1**) including the controller may be integrated with the headset **410** and/or portions of the system **100** may be integrated with the headset **410**. For example, a sensor to determine the orientation of the user head may be integrated with the headset **410**. The headset **410** may communicate with a portable device that include the system **100** of FIG. **1**. Alternatively, the headgear may be wirelessly connected to the controller, or the controller may be integrated into the headset.

**[0049]** FIG. **5** is an example of a user interface **510** for the system of FIG. **1**. The user interface **510** may be embodiment in either hardware or software. The user interface **510** may include buttons for adjusting the audio and video. The user interface **510** may include buttons for selecting which remote location to travel in and for turning on and off the system.

**[0050]** The various illustrative logics, logical blocks, modules, and circuits described in connection with the embodiments disclosed herein may be implemented or performed with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but, in the alternative, the processor may be any conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

**[0051]** A software module to implement the functionality described above may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, a hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium may be coupled to the processor, such that the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. Further, in some aspects, the processor and the storage medium may reside in an ASIC. Additionally, the ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components in a user terminal. Additionally, in some aspects, the steps and/or actions of a method or algorithm may reside as one or any combination or set of instructions on a machine readable medium and/or computer readable medium.

**[0052]** It will be apparent to those skilled in the art that various modifications and variations can be made in the configuration of the illustrated system without departing from the spirit or scope of the invention. It is intended that the present disclosure cover such modifications and variations provided they come within the scope of the appended claims or their equivalents.

What is claimed is:

**1**. A system for simulating being in or traveling through a remote location during exercise, the system comprising:

a storage device configured to store remote location data representing the remote location;

sensors configured to generate exercise data;

a controller communicatively coupled to the sensors, the storage device, and the data output device, the controller configured to receive the generated exercise data and generate processed remote location data based on the generated exercise data and the stored remote location data; and

a data output device responsive to the processed remote location data and configured to present the remote location for consumption by a user.

**2**. The system of claim **1**, further comprising:

a stationary exercise equipment operable by the user, the stationary exercise equipment including a sensor to generate exercise data.

**3**. The system of claim **1**, wherein the data output device is configured to present the remote location including video and audio data, and the controller is configured to generate processed remote location data including both video and audio data representative of the remote location.

**4**. The system of claim **1**, wherein the data output device includes a screen for presenting the remote location.

**5**. The system of claim **1**, wherein the controller includes an interface operable by the user while the user exercises, the interface configured to enable the user to set user settable parameters.

**6**. The system of claim **1**, wherein the processed remote location data is at least one of: high definition digital video data, 180 degree high definition digital video data, 360 degree panoramic imaging video data, or 3D virtual reality digital immersive video technology.

**7**. The system of claim **1**, wherein the remote location data includes at least one of: high definition digital audio data, binaural digital audio data, or stereoscopic high definition digital audio data, narration describing the remote location, and actual ambient sounds generated by an actual landscape and objects depicted in the remote location data.

**8**. The system of claim **1**, wherein the data output device includes a screen configured in at least one of the following ways: curved so as to extend at least partially around the front and sides of a user's visual field; shaped to allow the user to see images located to the side of an apparent direction of a virtual travel relative to the user; shaped to encompasses a complete field of vision of the user; shaped in a concave arrangement of contiguous screens which encompass the user's field of vision and wherein the screen is affixed to the top of the exercise equipment; and a headset adapted to be worn by the user, wherein the headset is one of: a head mounted display, or portable video glasses.

**9**. The system of claim **1**, wherein the controller is configured to communicate with a remote system and to provide two-way audio communication between the user and a second user, so that a group tour of the remote location may be simulated.

**10**. The system of claim **2**, wherein the controller is at least one of the following: built in to the exercise equipment and a separate device which is communicatively connected to the exercise equipment.

**11**. The system of claim **1**, wherein the controller is configured to synchronize traveling through the remote location with the user based on the exercise data.

**12**. The system of claim **1**, wherein the data output device is a headset and the controller is integrated into the headset.

**13**. The system of claim **1**, wherein the controller is configured to enable a user to connect to an Internet "tour," wherein the remote location data of the Internet "tour" is accessed from a remote server via the Internet.

**14**. The system of claim **1**, wherein the remote location data includes positional data, and wherein the controller is configured to account for the positional data in generating the processed remote location data.

**15**. The system of claim **1**, wherein the remote location data includes global positioning data.

**16**. The system of claim **1**, wherein the remote location data includes a prescribed route.

**17**. The system of claim **1**, wherein the remote location data includes mapping data, allowing a user to select a route.

**18**. The system of claim **1**, wherein the controller is configured to synchronize the processed remote location data based on a speed of the user and navigation choices made by the user to provide an immersive audio visual tour, enabling a user to tour a remote location over the course of several exercise sessions.

**19**. The system of claim **1**, wherein the controller is configured to generate processed remote location data so that the simulated travel through the remote location is selectively faster or slower than the exercise data indicates as an actual pace of the user.

**20**. The system of claim **1**, wherein the controller is configured to generate processed remote location based on a user settable parameter of direction of travel through the remote location, enabling simulated travel through the remote location in a user set direction.

**21**. The system of claim **1**, wherein the storage device is at least one of: a MP3 players, MP4 players, a DVD player, a VCR, a computer readable non-volatile storage, an external flash drive, a mobile telephone, a personal digital assistant, a game console, or a plug-and-play converter system.

**23**. The system of claim **1**, wherein the controller is configured to download from a remote computer the remote location data.

**24**. The system of claim **1**, wherein the controller is configured to receive the remote location data via GPS signal from an actual real-time remote location.

**25**. The system of claim **2**, wherein the stationary exercise equipment is one of a treadmill, a stationary bicycle, a stair climbing machine, a rowing machine, a skiing machine, and an elliptical machine.

**26**. The system of claim **1**, wherein the processed remote location data is transmitted from one of: a MP3 player, a MP4 player, a mobile phone, a personal digital assistant, a video i Pod, a digital media device, and a game console, to a data output device selected from one of a headset and video glasses, wherein the user exercises by running in place or walking.

**27**. The system of claim **1**, wherein the controller is configured to generate computer graphics and animation as the processed remote location data.

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