A group exercise system may include: a master exercise device including a variable parameter and being operatively associated with a control system; and a servant exercise device including the variable parameter and being in communication with the control system. In some embodiments, the control system may include a exercise control program configured to control the variable parameter in both the master exercise and the servant exercise device. In some embodiments, the control system may be configured to receive communication signals from at least the master exercise device to alter control of the variable parameter in both the master exercise and the servant exercise device from the control by the exercise control program. Some embodiments may involve a group exercise method. Still further embodiments may involve a computer-readable storage medium encoded with instructions for performing a group exercise method when executed on a computer device.
Fig. 2
400 SET EXERCISE PROGRAM AT INSTRUCTOR DEVICE

410 TRANSMIT SET EXERCISE PROGRAM TO PARTICIPANT DEVICE(S)

420 SET EXERCISE LEVEL AT DEVICES

430 START EXERCISES PROGRAM AT INSTRUCTOR DEVICE

440 RECEIVE FEEDBACK FROM PARTICIPANT DEVICE(S) DURING EXERCISE PROGRAM EXECUTION

450 CONTROL PARAMETER(S) OF PARTICIPANT DEVICE(S) DURING EXERCISE PROGRAM EXECUTION

Fig. 4
GROUP FITNESS SYSTEMS AND METHODS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a non-provisional application claiming priority to co-pending U.S. Provisional Patent Application No. 60/887,506 titled “Group Fitness System,” filed Jan. 31, 2007, which is hereby incorporated by reference herein in its entirety.

[0002] This application is related to co-pending U.S. patent application Ser. No. 11/377,600 titled “Apparatus and Methods for Transmitting Programming, Receiving and Displaying Programming, Communicating With Exercise Equipment, and Accessing and Passing Data to and from Applications,” filed on Mar. 15, 2006, which is hereby incorporated by reference herein in its entirety.


BACKGROUND

[0004] This application relates to operation and control of a plurality of exercise devices. In particular, this application relates to networking a plurality of exercise devices to allow for communication between the exercise devices and/or interaction between users of the exercise devices.

[0005] Exercise equipment is typically focused on providing an individual user with some form of exercise, but is not focused on entertainment, news, network access, communication between users, etc. Occasionally, a gym will place a television or television in the work out area. However, users must share the television. Moreover, gyms like exercise equipment, are typically not focused on interaction between users, network access, user information, and other sources of data and information. It is with some of these issues in mind that various aspects described in this application have been developed.

[0006] Various classes are known to involve an instructor and one or more participants each of whom independently operates a similar exercise device. Interaction between the participants and the instructor is typically limited to instructions provided by the instructor for participants to alter their activity and/or to alter the control of their exercise device.

SUMMARY

[0007] A group exercise system may include: at least one master exercise device including a variable parameter and being operatively associated with a control system; and at least one servant exercise device including the variable parameter and being in communication with the control system. In some embodiments, the control system may include a system in which the control system may include a control system configured to control the variable parameter in both the at least one master exercise and the at least one servant exercise device.

[0008] In some embodiments, the control system may be configured to receive communication signals from at least one master exercise device to alter control of the variable parameter in both the at least one master exercise and the at least one servant exercise device from the control by the exercise control program.

[0009] Some embodiments may involve a group exercise method. Still further embodiments may involve a computer-readable storage medium encoded with instructions for performing a group exercise method when executed on a computer device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a schematic diagram illustrating an example of a layout for a group fitness system.

[0011] FIG. 2 is a schematic diagram illustrating another example of a layout for a group fitness system.

[0012] FIG. 3 is a schematic diagram illustrating an example of a layout for a group fitness system, including examples of communication/data flow within the system.

[0013] FIG. 4 is a block diagram illustrating operations that may be performed in a method for group fitness.

DETAILED DESCRIPTION

[0014] Various details described in this application relate to group fitness systems and methods in which an instructor exercise device communicates with one or more participant exercise devices, either directly or indirectly. For example, the group fitness systems and methods may provide a classroom setting in which the exercise class or session is directed by the instructor via the instructor exercise device. However, it is also contemplated that the group fitness systems and methods may be employed to provide a virtual classroom setting in which the instructor exercise device and/or participant exercise device(s) are located remote from each other.

[0015] As described herein, at least part of the operation and/or control of the participant exercise device(s) is determined or set via the instructor exercise device. For example, an exercise program may be set or selected by the instructor exercise device and applied to operate the instructor exercise device and the participant exercise device(s). During execution of the exercise program, one or more operation parameters of the participant exercise device(s) may be altered by the instructor exercise device. Alternatively or additionally, the one or more operation parameters of the participant exercise device(s) may be altered based on feedback from the respective participant exercise device(s). Alternatively or additionally, the one or more operation parameters of the participant exercise device(s) may be altered by the individual user(s) of the participant exercise device(s).

[0016] Any exercise device, such as a treadmill, a Treadclimber®, an elliptical, a stepper, an exercise bicycle, a ski machine, a skating machine, a climbing machine, a rowing machine, a strength training machine, weight stack equipment, variable-load weight equipment, or the like, may be employed for the group fitness systems and methods described herein. In general, any type of exercise device that includes an adjustable resistance component may be used. Such exercise devices may include a respective computer system or electronic circuitry that is adapted to operate the respective exercise device according to an exercise program, to allow alteration of one or more operational parameters and to provide communication for receiving control instructions and/or for transmitting feedback data.

[0017] In addition to the details described herein, it should be understood that any of the systems and/or methods
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The exercise control device 110 may determine the operation of the exercise control program for the participant exercise devices 120 during execution of the exercise control program. For example, for all of the participant exercise devices 120 that are participating, e.g., have a current user, the start, run and end of the exercise control program may be controlled at the instructor exercise device 110. In other words, the exercise control program for the participant exercise devices 120 may start, run and end based on the execution of the exercise control program at the instructor exercise device 110. Thus, the execution of the exercise control program at the participant exercise devices 120 may be synchronized with the execution of the exercise control program at the instructor exercise device 110. Thus, in addition to the same operation, the same display of data, such as time, pace, segment, etc., may be presented to the instructor exercise device 110 and all active (i.e., participating) participant exercise devices 120.

The synchronization may also exist between instructor exercise device 110 and any participant exercise devices 120 that join while the exercise control program is executing at the instructor exercise device 110. Thus, new users may join an ongoing exercise class or session seamlessly, without interrupting the operation of the instructor exercise device 110 or other active participant exercise devices 120. In some cases, the participant exercise devices 120 may be configured to include a separate "warm up" routine, either predetermined or based on the parameters of the exercise control program executing at the instructor exercise device 110, that allows the newly participating participant exercise devices 120 to provide a smooth transition into the execution of the exercise control program. This may also provide a suitable "warm up" to help prevent injury to the new participant.

During the execution of the exercise control program at the instructor exercise device 110 and the participant exercise devices 120, various operational parameters may automatically change in accordance with the exercise control program. For example, a gradient or effective "slope" expressed in a percentage of rise over run virtually traversed by the exercise devices may change. The gradient experienced by the users of the devices may be determined by a plurality of gradient segments of various duration (e.g., time and/or distance) included in the exercise control program. The gradient may be positive to simulate traversing uphill, negative to simulate traversing downhill, or zero to simulate traversing a level grade, as well as transitions between uphill, downhill and level grade. It should be understood that the gradient may represent a characteristic other than slope. For example, the gradient may represent weight, load, mass, velocity, acceleration, or any other parameter that may be changed during an exercise session to achieve beneficial fitness results.

For example, the systems and methods for controlling the exercise devices may be the same or similar to those disclosed in incorporated U.S. patent application Ser. No. 11/644,777. Such systems and methods provide a way to accurately simulate physical activity by taking into account the physics of the activity. In particular, the simulation involves generating a virtual or predictive value of a param-

FIG. 1 is a schematic diagram illustrating an example of a layout for a group fitness system 100. An instructor exercise device 10 may be configured to communicate with a plurality of participant exercise devices 20 (P1, P2, through Pn). In the example shown, the instructor exercise device 10 and the participant exercise devices 20 may be connected to a network 30 that facilitates such communication. It should be understood that the network 30 may be any known or hereafter developed network, either wired or wireless, that is suitable for communicating data and/or signals between electronic devices.

In the group fitness system 100, the instructor exercise device 110 and the participant exercise devices 120 may be substantially similar devices. For example, they may be of the same general type (capable of performing the same type of exercise) and may have similar controls and/or operational features. However, it should be understood that the instructor exercise device 110 may include additional controls and/or features that facilitate operation of the group fitness system 100 as described herein, which may not be included in the participant exercise devices 120.

The instructor exercise device 110 may be configured to communicate an exercise control program and/or an instruction to set an exercise control program for operation of the participant exercise devices 120. For example, the instructor exercise device 110 may include or otherwise have access to a plurality of predetermined exercise control programs configured to operate the instructor exercise device 110 and the participant exercise devices 120. In such case, one of the predetermined exercise control programs may be selected at the instructor exercise device 110 and communicated to the participant exercise devices 120 via the network 130. Alternatively or additionally, the instructor exercise device 110 may be configured to receive a custom exercise control program as input from the instructor, for example, by operating a control panel of the instructor exercise device 110 or by operating the instructor exercise device 110 itself to create the custom exercise control program, or as a download (e.g., from the Internet, a database or other data source) of a separately created custom exercise control program.

Alternatively or additionally, the participant exercise devices 120 may include or otherwise have access to the same plurality of predetermined exercise control programs as the instructor exercise device 110. In such case, the instructor exercise device 110 may only communicate a selection of one of the predetermined exercise control programs to the participant exercise devices 120. For example, selection of one of the predetermined exercise control programs at the instructor exercise device 10 may cause a control signal to be communicated to the participant exercise devices 120 to select the same predetermined exercise control program at the participant exercise devices 120.
eter (e.g., velocity, acceleration, force, etc.), comparing a measured value of the parameter to the virtual/predicted value, and controlling resistance forces in the exercise device to cause the user to experience forces that would be experienced from actually performing the activity.

[0027] For example, in the context of a stationary exercise bicycle, a force-generating device (e.g., an alternator, a mechanical device) of a control system may be operatively associated with, such as connected to, a crank of the bicycle to vary the resistance force experienced by the user. In such embodiments, a controller may control the force-generating device to cause the resistance force to be greater in the forward portion of the crank’s path than in the rear portion of the crank’s path. In some embodiments, a controller may control a variable resistance force that restrains movement of the crank/pedals and simulates at least some of the effects of inertia that would be experienced operating a moving bicycle. In the context of exercise devices generally, variable forces that tend to resist movement of a user interaction member may be controlled, for example, based on a value of a user’s input.

[0028] The instructor exercise device 110 may be configured to allow the instructor to change the gradient manually to override the exercise control program. Such a change at the instructor exercise device 110 may be communicated to the participant exercise devices 120 such that the same change in gradient occurs at the participant exercise devices 120. The change in gradient will change the effective “resistance level” or the amount of effort required by the user. In particular, for exercise devices that are controlled in a manner similar to those disclosed in incorporated U.S. patent application Ser. No. 11/644,777, a change in the gradient at the instructor exercise device 110 will change the gradient at the participant exercise devices 120 and the actual forces experienced by the users of the participant exercise devices 120.

[0029] For example, in the context of stationary exercise bicycles, changes in the gradient may interact with the participant exercise devices (bicycles) 120 so that the users thereof experience the sensation of inertial forces, through the pedals, for example, of riding over the crest of a hill which transitions from uphill to flat to downhill. Each user may sense the resistance to rotating the crank with the pedals becoming less during the transition based on the change in gradient and the momentum of that user. Similarly, the users may experience the inertial forces of riding through a valley bottom, with the momentum gained from the downhill portion effectively reducing the resistance experienced (amount of force/effort required) over an initial part of the uphill portion. Thus, changing the gradient at the instructor exercise device 110 may change the experiences of the users of the participant exercise devices 120 based on their individual performance.

[0030] In some embodiments, the users of the participant exercise devices 120 may be allowed to respond to changes in the gradient, either based on the exercise control program and/or made by the instructor, to alter their exercise experience. For example, the participant exercise devices 120 may be configured to include a plurality of “effective gears” that operate to render the effective “resistance level” lower (e.g., less torque) or higher (e.g., more torque). Thus, each user of one of the participant exercise devices 120 may individually select one of the “effective gears” at the respective participant exercise device 120 to control the user’s experience.

[0031] Alternatively or additionally, the users of the participant exercise devices 120 may be allowed to individually change the gradient for their respective participant exercise device 120 to override the exercise control program and/or changes made by the instructor at the instructor exercise device 110.

[0032] It should be understood that other parameters may automatically change in accordance with the exercise control program, may be changed by the instructor at the instructor exercise device 110, and/or may be changed by the individual users at the respective participant exercise devices 120. For example, changes in resistance, velocity, acceleration or other suitable parameters may be employed.

[0033] FIG. 2 is a schematic diagram illustrating an example of another layout for a group fitness system 200. As described above with respect to FIG. 1, the group fitness system 200 may include an instructor exercise device 210, a plurality of participant exercise devices 220 (P_{11}, P_{22}, through P_{m0}), and a network 230 that facilitates communication between the instructor exercise device 210 and the participant exercise devices 220.

[0034] In the group fitness system 200, the participant exercise devices 220 may be substantially similar devices, but may be configured to belong to different performance level groups, e.g., Level 1, Level 2 through Level N as indicated by the subscripts I, L2 through L.N. Alternatively, the participant exercise devices 220 themselves may be configured differently to operate at different performance levels, for example, including higher “resistance levels,” different “effective gears” and/or different structural features (e.g., different flywheel mass). As will be understood from the following description wherein the participant exercise devices 220 are substantially similar devices, but belong to different performance level groups, execution of the exercise control program and any changes made at the instructor exercise device 210 or at the participant exercise devices 220 may operate the respective participant exercise devices 220 differently in accordance with their performance level configuration.

[0035] The participant exercise devices 220 may be substantially similar devices and divided into different performance level groups. The participant exercise devices 220 may be organized as a predetermined classroom layout, such as a row of devices nearest to the instructor exercise device 210 designated as “beginner level,” followed by a row of devices designated as “intermediate level,” and a row of devices designated as “advanced level” farthest from the instructor exercise device 210. Such an organization may facilitate oral instructions and motivation from the instructor to those who need it most. Alternatively or additionally, the user of each individual participant exercise device 220 may be allowed to designate the performance level group for the respective participant exercise device 220. This may provide more flexibility for participants and/or remote participation.

[0036] As discussed above with respect to FIG. 1, the instructor exercise device 210 may be configured to communicate an exercise control program and/or an instruction to set an exercise control program for operation of the participant exercise devices 220. The exercise control program or instruction communicated to each participant exercise device 220 belonging to a particular performance level group may be the same. However, the exercise control program or instruction communicated may vary between the different performance level groups. For example, one or more parameters
within the exercise control program may be “scaled” to a higher or lower level for a particular group or a different level of a corresponding exercise control program may be set at the participant exercise devices 220 of different groups.

[0037] It should be understood that the scaling or modification of the exercise control program may be preset or may be performed automatically, either at the instructor exercise device 210, at the individual participant exercise devices 220, or at a separate device (not shown in FIG. 2) also in communication with the network 230. For example, a particular exercise control program may include versions for different performance levels with synchronized operation (e.g., similar timing of changes).

[0038] In the case where the participant exercise devices 220 are configured differently to operate at different performance levels, the same exercise control program may be communicated to or set for the respective participant exercise devices 220, but may automatically result in different performance levels for participant exercise devices 220 based on their configurations.

[0039] As discussed above with respect to FIG. 1, the instructor exercise device 210 may also determine the operation of the exercise control program for the participant exercise devices 220 during execution of the exercise control program. In the group fitness system 200, however, when the instructor exercise device 210 changes an operational parameter, such as the gradient, manually to override the exercise control program, the change at the instructor exercise device 210 may be communicated to the participant exercise devices 220 in accordance with the performance level groups such that a proportional change in the operational parameter occurs at the participant exercise devices 220. In other words, a percentage of the change may be applied to each of the participant exercise devices 220 based on the performance level group to which they belong.

[0040] For example, for all of the participant exercise devices 220 that belong to the “advanced” performance level group, one hundred percent of an increase in gradient may be applied, while only fifty percent of the increase may be applied to the participant exercise devices 220 that belong to the “beginner” performance level group and twenty-five percent of the increase may be applied to the participant exercise devices 220 that belong to the “intermediate” performance level group. It should be understood that such percentages are only examples and that the percentages may be selected as appropriate or desired.

[0041] FIG. 3 is a schematic diagram illustrating an example of a layout for a group fitness system 300, including examples of communication/data flow within the group fitness system 300. As described above with respect to FIGS. 1 and 2, the group fitness system 300 may include an instructor exercise device 310 and a plurality of participant exercise devices 320 (P1, P2, P3, through Pn). The group fitness system 300 may also include a communication server 330 or other device facilitates communication between the instructor exercise device 310 and the participant exercise devices 320. Although shown as a separate element in the group fitness system 300, it should be understood that the communication server 330 may be integral to or otherwise incorporated into the instructor exercise device 310. Further, it should be understood that the communication server 330 may provide communications via a network, such as an intranet or the internet, although not shown.

[0042] A web site 340 or other suitable database, computer system, or the like, may also be in communication with the communication server 330. The web site 340 may be configured to provide exercise control programs to the instructor exercise device 310 and the participant exercise devices 320 as appropriate or desired, such as discussed above. Additionally, the web site 340 may be configured to receive workout data from the participant exercise devices 320 and to provide data, such as a class performance profile, based on the workout data received. A class performance profile may provide, for example, an assessment of the fitness level or performance level of the current participant(s) in the class based on their performance in the current class and/or previous classes. It should be understood that workout data may be received from the instructor exercise device 310 as well, although this is not discussed in further detail for the sake of brevity and clarity.

[0043] Workout data may include, but is not limited to, time (e.g., current class time and/or total time), heart rate (e.g., current, average, and/or percentage of maximum), calories (e.g., total and/or rate), watts (e.g., actual or average), speed (e.g., actual or total average), distance traveled, distance climbed, and other parameters relevant to exercise. In general, workout data may be anything that may be used to provide a quantitative assessment of participants’ efforts and/or achievements during the exercise class or session.

[0044] Workout data may be communicated to and stored by the communication server 330, the web site 340, or any other suitable storage device. Accordingly, each participant may have an identification code with which their workout data may be associated. The participant may enter their identification code at the participant exercise device 320 being used. The workout data may thus be provided to each participant, for example, upon logging into the web site 340 and/or via a personalized e-mail to each participant. As will be understood, participants may thus be provided with their performance and progress as they participate in classes.

[0045] The workout data and/or the class performance profile may also be communicated to the instructor exercise device 310. The instructor, the instructor exercise device 310, the communication server 330 and/or the web site 340 may analyze all or certain workout data from each of the participant exercise devices 320.

[0046] In particular, any of the performance attributes described in the incorporated U.S. Pat. No. 7,966,865 and U.S. patent application Ser. No. 11/438,715 may be employed as workout data, such as intensity or exertion. The workout data may be used by the instructor and/or the instructor exercise device 310 to determine alterations to the operational parameter(s), such as the gradient, for example, to help meet exercising goals (e.g., calorie burn, target heart rate, etc.) and/or to prevent over/under exertion. Alternatively or additionally, the communication server 330 may be configured to determine alterations to be made.

[0047] It should be understood that the exercise control program may be executed on the participant exercise devices 320 from the instructor exercise device 310 and/or from the communication server 330. Thus, information regarding the exercise control program may be continually or substantially continually (e.g., periodic communications and/or communications of changes only) provided to the participant exercise devices 320. This may allow participants to join late and/or to return after a break without disturbing the class.

[0048] Further, this may allow the participant exercise devices 320 to be simpler and less costly than the instructor
exercise device 310, for example, by allowing the participant exercise devices 320 to be controlled remotely. A simpler console, computer and/or electrical circuitry may be employed.

[0049] FIG. 4 is a block diagram illustrating operations that may be performed in a method for group fitness. It should be understood that the illustrated operations are only examples at a high level, and that various details including modifications, omissions and/or deletions are contemplated other than as shown. Operation may begin by an exercise control program being set or otherwise selected at the instructor exercise device [block 400]. As discussed above, the instructor exercise device may include a plurality of exercise control programs, have access to another device including a plurality of exercise control programs, and/or be configured to generate or download custom exercise control programs.

[0050] Upon setting/selecting the exercise control program at the instructor device, the exercise program may be transmitted to the participant exercise devices [block 410]. As discussed above, the exercise control program may be stored on and run from the instructor exercise device, a communications server or other suitable device so as to control the participant exercise devices synchronously with the instructor exercise device. Alternatively, the participant exercise devices may include the exercise control program or have it downloaded. In such case, the setting/selecting of the exercise control program at the instructor device may provide a signal to the participant exercise devices to indicate which exercise control program to use.

[0051] Each of the participant exercise devices may allow an exercise or performance level to be set [block 420]. As discussed above, this may be predetermined for a classroom arrangement, for example, which may be overridden by the user, if desired. The exercise/performance level may determine particular values of parameters to apply during operation of the exercise control program and/or parameters to apply in response to changes made at the instructor exercise device.

[0052] The exercise control program may be initiated at the instructor exercise device [block 430], causing the instructor exercise device and each of the active participant exercise devices to operate accordingly in synchronized fashion. Control signals may be transmitted from the instructor exercise device, the communication server or other suitable device running the exercise control program. In the case of the exercise program running on each of the participant exercise devices, such control signals may be timing signals to ensure synchronization and any alterations, for example, generated at the instructor exercise device.

[0053] During the operation of the participant exercise devices according to the exercise control program, feedback data (e.g., workout data) may be provided from the participant exercise devices to the communications server and/or to the instructor exercise device [block 440], as discussed above. As also discussed above, one or more operational parameters of the participant exercise devices may be changed, altered, or otherwise controlled during execution of the exercise control program [block 450]. Such control may be automatic based on the feedback, may be manual via the instructor exercise device, and/or may be manual via individual participant exercise devices.

[0054] Although not illustrated, it should be understood that the operation may terminate automatically based on the end of the exercise control program, may be terminated based on input at the instructor exercise device, and/or may be terminated individually via the respective participant exercise devices.

[0055] In general, the foregoing group fitness systems and methods may allow the instructor to control changes in the exercise control program applied to the participant exercise devices by controlling the instructor exercise device. This may provide flexibility, for example, to allow the instructor to alter the operation of the exercise control program to coincide with a particular music selection or change in music selection. This may also allow the instructor to alter the operation of the exercise control program to adapt to the current performance of the participants. The changes may be applied to the participant exercise devices without regard to the exercise control program. In some cases, the exercise control program may be overridden until the instructor wishes to resume the normal preset operation caused by the exercise control program. Alternatively or additionally, the exercise control program may automatically be reestablished upon the next preset change.

[0056] Although not shown, it should be understood that the controls and/or the displays of the instructor exercise device and the participant exercise devices may be of any suitable form. Each of the participant exercise devices may be configured to display, for example, the current gradient, elapsed time and/or remaining time for the entire class and/or the current segment, and any other workout data specific to the current user. Each of the participant exercise devices may include controls that allow the user to enter data, such as their identifier, their performance level, etc., to increase/decrease the “effective gear” of the participant exercise device, to change the display of data, and/or to alter any other parameter of the operation of the participant exercise device, as appropriate or desired.

[0057] Although various details and representative embodiments are described above, it should be understood that numerous alterations to the disclosed embodiments without departing from the spirit or scope of the inventive subject matter set forth in this specification, including the claims.

We claim:

1. A group exercise system, comprising:
   a. at least one master exercise device comprising a variable gradient parameter and being operatively associated with a control system;
   b. at least one servant exercise device comprising a variable gradient parameter and being in communication with the control system;
   c. wherein the control system includes a control program configured to control the variable gradient parameter in both the at least one master exercise and the at least one servant exercise device, configured to receive communication signals from at least the at least one master exercise device to control the variable gradient parameter in both the at least one master exercise and the at least one servant exercise device from the control by the exercise control program.

2. The group exercise system of claim 1, wherein the at least one master exercise device comprises a virtual group over the Internet.

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