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(54) **Method of generating an audio program on a portable device**

(57) The invention pertains to a method of generating an electronic audio program tailored to the preferences and/or the environment of a particular user. The method involves electronically obtaining two or more parameters from or concerning the user and/or the environment of the user, selecting two or more audio layers in accordance with the said parameters, obtaining or providing each of the selected audio layers and combining two or more of the said audio layers into an electronic audio program.
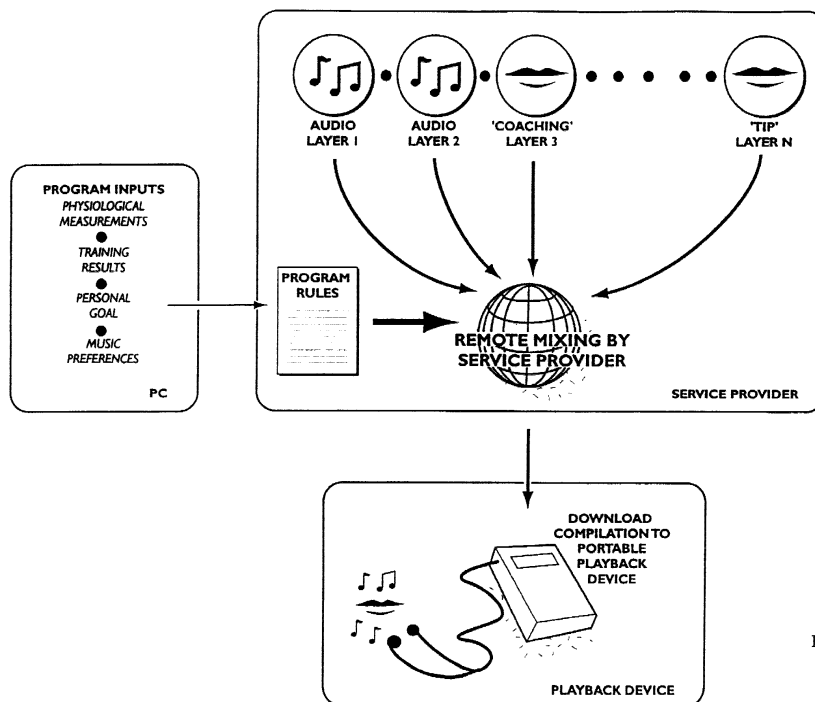
FIG. 1

Description

[0001] A method of generating an audio program, a computer program product, optionally stored on a computer readable storage medium, a portable device, and a server system.

[0002] The invention relates to a method of generating an audio program comprising two or more audio layers. The invention further relates to a computer program product, which is optionally stored on a computer readable storage medium, to a portable device, and to a server system.

[0003] In every day life sounds and noises from different sources reach the human ear. For example, a fitness trainer of an aerobics class provides his or her pupils with a sports program (i.e. exercises), individual feedback (e.g. "keep your back straight, John") and general coaching (e.g. "OK folks, this is the last exercise of the day, focus on form). In addition, music is often used to set the tempo of exercises and/or to create the right ambience. Thus, at least four audio layers reach the pupils, viz. a complete sports program, individual feedback, general coaching, and music.

[0004] It is known to electronically combine a plurality of audio layers into an audio program. Such programs, for example, can be found in a wide variety of multimedia applications, such as (interactive) presentations, auditive museum guides, computer games, and movies (e. g., DVD speech synchronization of multiple languages leaving the soundtracks untouched to save memory space).

[0005] However, as soon as such products and services become personalized (often also referred to as "tailor made") to individual users and adaptive to changing situations, a dynamic management and integration of multiple audio layers will be needed. In a sports context, for example, each individual user has a different exercise level, follows a different training program to reach personal goals, prefers a particular coaching style, does exercises at his/her personal tempo, and has his or her personal favorite music.

[0006] Personalization on a large scale implies that manual configuration of audio programs will be too labor intensive, time consuming and expensive. Another problem is that audio programs are not able to be adaptive to changing circumstances during use.

[0007] It is an object of the present invention to provide a method of the above-mentioned type, wherein these disadvantages are obviated or at least reduced.

[0008] To this end, the invention provides a method of generating an electronic audio program tailored to the preferences and/or the environment of a particular user, which method involves electronically obtaining two or more parameters directly from the user and/or the environment of the user, selecting two or more audio layers in accordance with the said parameters, obtaining or providing each of the selected audio layers and combining two or more of the said audio layers into an electronic audio program.

[0009] Thus, different (digital) audio layers based upon individual data can be combined automatically into a personalized audio-program. The said parameters may be provided by the user him or herself, for example by answering a number of questions, or they may be generated automatically, for example randomly to surprise each user with a unique experience. Subsequently, a number of audio layers is selected and e.g. extracted from a customized database or existing media, such as a Compact Disc player or the Internet. Upon obtaining the audio layers, a personalized electronic audio program is generated that can be played on a computer or other digital device capable of playing (digital) audio files.

[0010] In a preferred embodiment, at least one of the parameters is obtained while running the audio program and used to configure and adapt the audio program virtually instantaneously. Thus, the audio program is rendered adaptive to e.g. the user and/or the environment of the user, preferably by obtaining at least one parameter by means of a sensor that monitors at least one aspect of the user and/or the environment of the user.

[0011] It is further preferred that at least one of the audio layers contains instructions for the user and/or that at least one further audio layer contains rhythmic information, e.g. through music or a metronome.

[0012] The audio layers and the said audio program can, for instance, be configured and personalized on a personal computer environment or on a remote service system. In the latter case, the obtained parameters can be uploaded, e.g. by means of a mobile telephone using a Wireless Application Protocol or via the Internet, to a remote service system maintained by e.g. a service provider, which subsequently selects two or more audio layers, which will be combined and, optionally, compiled into a single personalized audio program. The thus generated electronic audio program can conveniently be downloaded on a computer or other device capable of playing digital sound files.

[0013] The invention also relates to a computer program product which carries out the method steps of any one of the methods described above and to a computer program product stored on a computer readable storage medium comprising code means adapted to carry out the method steps of the methods described above. The said computer program product may of course comprise both modules intended for implementation on a remote service system, e.g. located at a service provider, and modules intended for implementation on a local processing unit, such as a personal and/or portable computer of some sort.

[0014] The invention further relates to a portable device comprising a first storage medium, e.g. a Random Access Memory or a Read Only Memory of some sort, for instance a CD-ROM of EPROM, suitable for storing the computer program product mentioned above, optionally a second storage medium suitable for storing a

plurality of audio layers or a means, such as a mobile transceiver using a Wireless Application Protocol, for communicating wirelessly with such a second storage medium, preferably an earphone or a headset, and at least one sensor for obtaining at least one parameter from or concerning the user and/or the environment of the user.

[0015] The invention also relates to s server system for generating an electronic audio program tailored to the preferences and/or the environment of a particular user, which system includes a storage medium storing a plurality of audio layers, a component for obtaining two or more parameters directly from the user and/or the environment of the user, a component for selecting two or more audio layers in accordance with the said parameters, and a component for obtaining the selected audio layers from the storage medium.

[0016] The invention will be further explained by reference to the drawings in which two preferred embodiments of the method of the invention are schematically shown. It will be understood that the method of the invention is not in any way restricted to these specific and preferred embodiments.

[0017] Figure 1 shows a system in which a method according to the invention involving remote mixing of audio layers is implemented.

[0018] Figure 2 shows a system in which a method according to the invention involving local mixing of audio layers is implemented.

[0019] Figure 1 schematically shows the various steps and procedures necessary for generating an audio program for a runner or biker, who, in this particular case, wants to maintain a certain level of fitness. The runner or biker enters certain parameters into e.g. a personal computer (not shown). These parameters comprise, for instance, 1) the results of physiological measurements, e.g. height, weight, and heart rate upon completion of ten knee bends; 2) training results so far, e.g. average duration and frequency of earlier exercises; 3) his of her personal goal, e.g. the ability to run ten kilometers in less than thirty minutes; 4) music preference, e. g. a particular band or composer; and 5) information as to whether he or she desires in situ coaching layers and/ or requires general advice.

[0020] The parameters are subsequently uploaded to a service system, e.g. via the Internet to the homepage of the service provider. The service provider uses a set of program rules to select electronically two or more audio layers on the basis of the said parameters. In this particular case, the program rules select at least a music layer 1, a layer 2 containing, for instance, spoken information concerning the time that has lapsed since the audio program has started, a coaching layer 3 and a tip layer N.

[0021] The audio layers are obtained, for instance, from a storage medium, such as a hard disk or a CD, storing a large digital database containing a vast number of digital sound files in a format such as MP3, MIDI or the like. The thus obtained audio layers are then compiled into a single electronic audio program, which, in this particular example, is downloaded directly by a portable playback device, which the runner or biker can take along during his or her exercises.

[0022] Figure 2 schematically shows a second embodiment of the method according to the present invention, wherein the audio program is capable of mixing several sound layers in real time based upon external inputs.

[0023] A portable playback device contains a database of several audio layers, e.g. a first music layer 1, a second music layer 2, a coaching layer 3 and, optionally, several further coaching layers at various skill and/ or fitness levels, and a tip layer N.

[0024] Two or more of these audio layers are selected by the program rules in accordance with several parameters that are obtained from the user and by means of one or more sensors. Such a sensor can, for example, monitor the heart rate of the user. If the measured heart rate exceeds a specified value during a certain training session, the audio program will include auditive feedback from the coaching layer, e.g.: "Slow down your heart rate is above the target zone" or "Your heartbeat exceeds 160 Beats Per Minute, slow down your speed". It might also change the beats per minute rate of the music layer so the user is coached to slow down by decreasing his/her running pace.

[0025] As the portable playback device uses independent audio layers, the user is free to change the auditive stimuli (choosing a different song, a different tempo or turn the music or pulse generator on and of) without interfering the other sound layers. It is also possible to generate one or more of the audio layers in situ, e.g. using a synthesizer or the like.

[0026] With the invention, it is possible to generate a large number of personalized audio programs from relatively few audio layers.

[0027] Furthermore, existing music that people have bought can be used to create a personalized audio program. Someone preparing for a marathon for example, may load a music CD in his personal computer. The program will search for music with the appropriate beats per minute and use these to construct a unique training schedule that can be downloaded by the portable playback device.

[0028] The invention is not in any way restricted to the above described embodiments and can be varied in many ways within the scope of the claims. The invention, for example, can also be used to facilitate training for a marathon or to learn a new language.

Claims

1. A method of generating an electronic audio program tailored to the preferences and/or the environment of a particular user, which method involves

electronically obtaining two or more parameters from or concerning the user and/or the environment of the user, selecting two or more audio layers in accordance with the said parameters, obtaining or providing each of the selected audio layers and combining two or more of the said audio layers into an electronic audio program.

2. The method according to claim 1, wherein at least one of the parameters is obtained while running the audio program.

3. The method according to claim 2, wherein the at least one parameter is obtained by means of a sensor that monitors at least one parameter from or concerning the user and/or the environment of the user.

4. The method according to claim any one of the preceding claims, wherein at least one of the audio layers contains instructions for the user.

5. The method according to claim 4, wherein at least one further audio layer contains rhythmic information.

6. The method according to any one of the preceding claims, wherein the said parameters are uploaded to a remote service system, which selects and obtains two or more audio layers in accordance with the said parameters, and wherein the audio layers are subsequently downloaded.

7. The method according to claim 6, wherein two or more of the audio layers are compiled at a remote service system into an audio program.

8. A computer program product which carries out the method steps of any one of the preceding claims.

9. A computer program product stored on a computer readable storage medium comprising code means adapted to carry out the method steps of any one of the claims 1 to 7.

10. A portable device comprising a first storage medium suitable for storing a computer program product according to claim 8, optionally a second storage medium suitable for storing a plurality of audio layers or a means for communicating wirelessly with such a second storage medium, and at least one sensor for obtaining at least one parameter from or concerning the user and/or the environment of the user.

11. A server system for generating an electronic audio program tailored to the preferences and/or the environment of a particular user, which includes a storage medium storing a plurality of audio layers, a
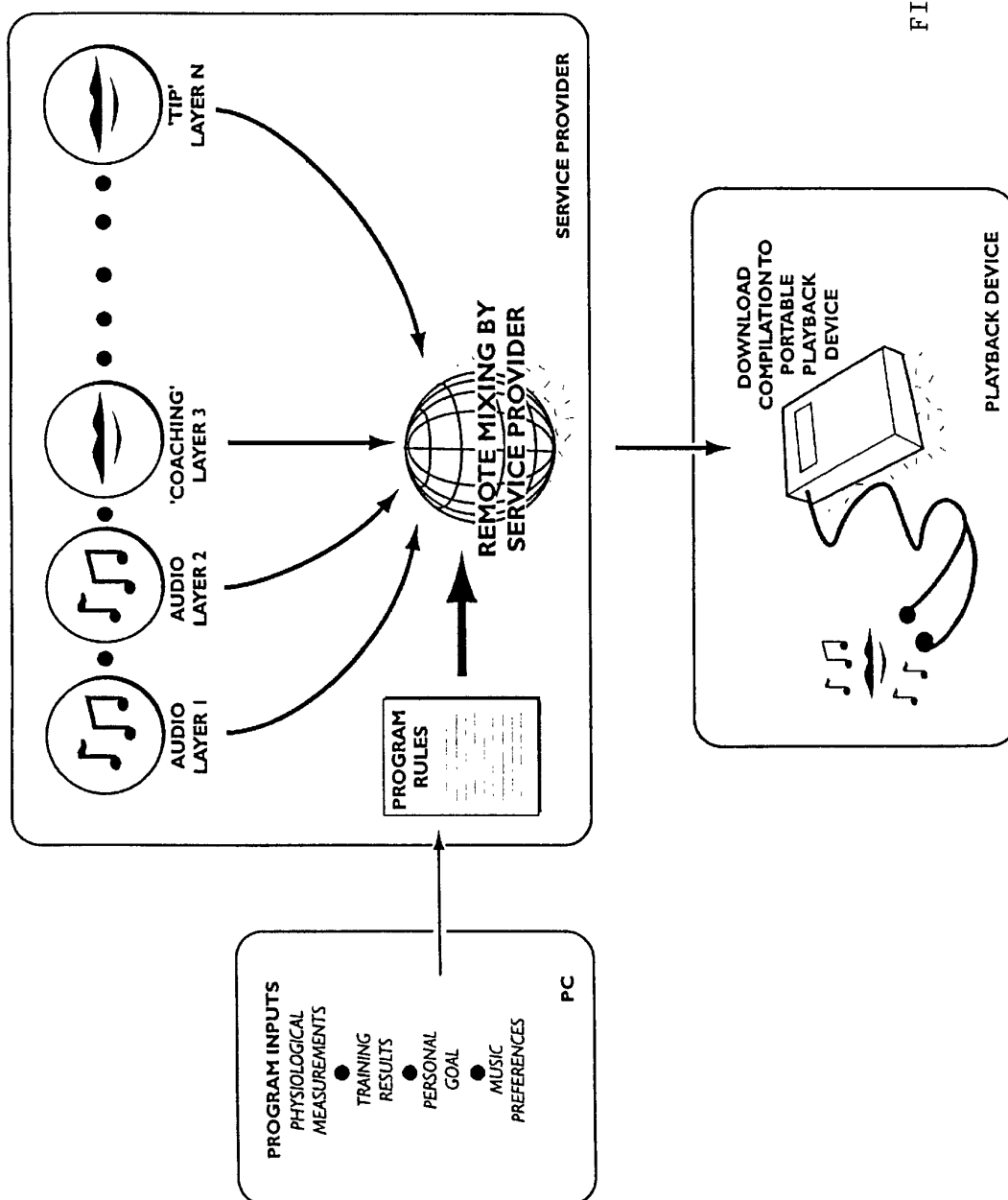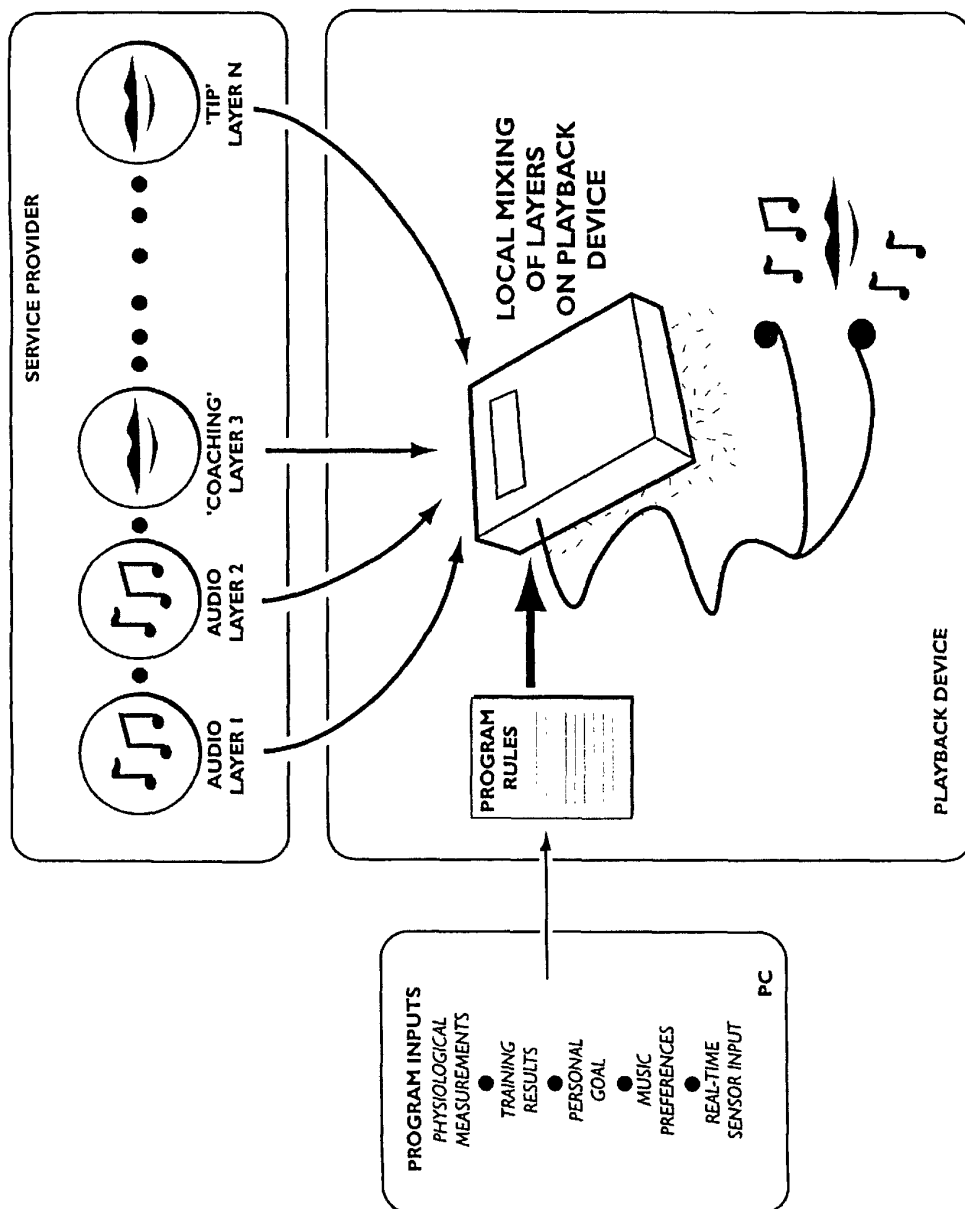
component for obtaining two or more parameters directly from the user and/or the environment of the user, a component for selecting two or more audio layers in accordance with the said parameters, and a component for obtaining the selected audio layers from the storage medium.

FIG. 1

FIG. 2

European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 00 20 0581

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 301 790 A (UNIV LELAND STANFORD JUNIOR) 1 February 1989 (1989-02-01) * column 3, line 53 - column 4, line 10 * * column 6, line 44 - line 57 * * column 18, line 36 - line 45 * * column 20, line 40 - line 58 * ---	1-5	G10H1/26
A	US 5 633 985 A (QUINN PATRICK A ET AL) 27 May 1997 (1997-05-27) * column 1, line 20 - line 28 * * column 8, line 63 - column 9, line 16 * * column 12, line 27 - line 66; figure 4 * ---	1-3,8,9	
A	US 5 471 009 A (NAGAHARA JUNNICHI ET AL) 28 November 1995 (1995-11-28) * column 2, line 59 - column 3, line 45 * * column 15, line 62 - column 16, line 13 * * column 16, line 35 - line 65; figures 1,14,16,18 * ---	1-3	
A	US 4 883 067 A (KNISPEL JOEL ET AL) 28 November 1989 (1989-11-28) * column 4, line 34 - column 5, line 22 * * column 12, line 8 - line 40 * ------	1-3	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G10H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 August 2000	Pulluard, R

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 0581

This annex lists the patent family members relating to the patent documents cited in the above—mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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29-08-2000

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