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(54) **SYSTEM AND METHOD OF CONTROLLING  
SENSORS AND ACTUATORS IN GAMING  
ENVIRONMENT**

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(57) **ABSTRACT**

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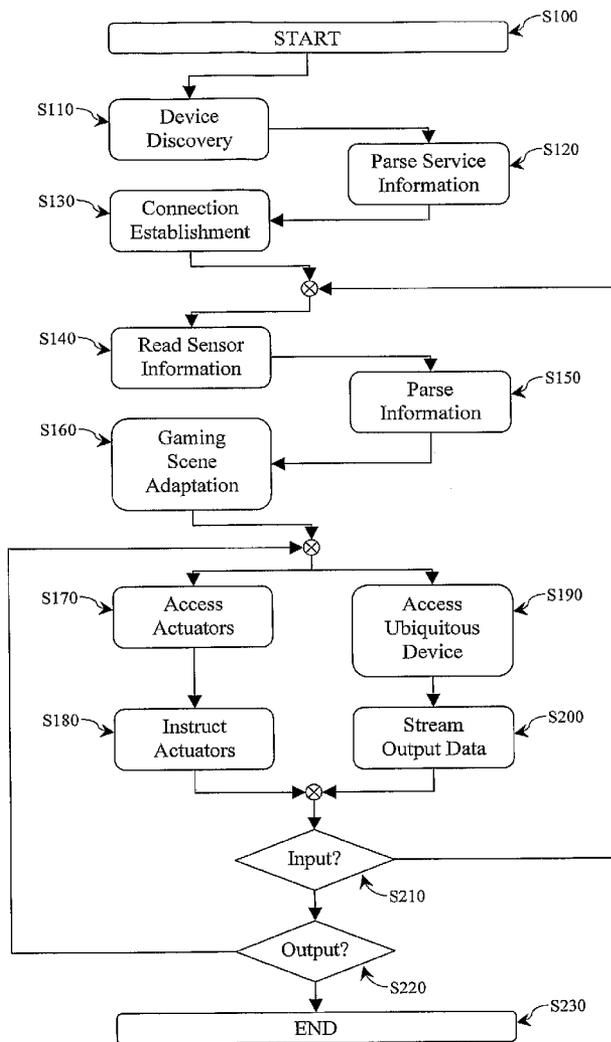
Life effects for enhancing gaming experience are provided. Upon initiation of a gaming application, peripheral devices providing services are identified, where the services include provision of sensor information and access to one or more actuators and/or ubiquitous devices. Communication connections are established to the peripheral devices to enable access to their services and a gaming environment (or one or more gaming scenes) is (are) adapted on the basis of sensor information, which is received from the peripheral devices providing the sensor information. The peripheral devices, which provide access to one or more actuators and/or ubiquitous devices, are accessed to generate life effects matching with current gaming environment or gaming scene.

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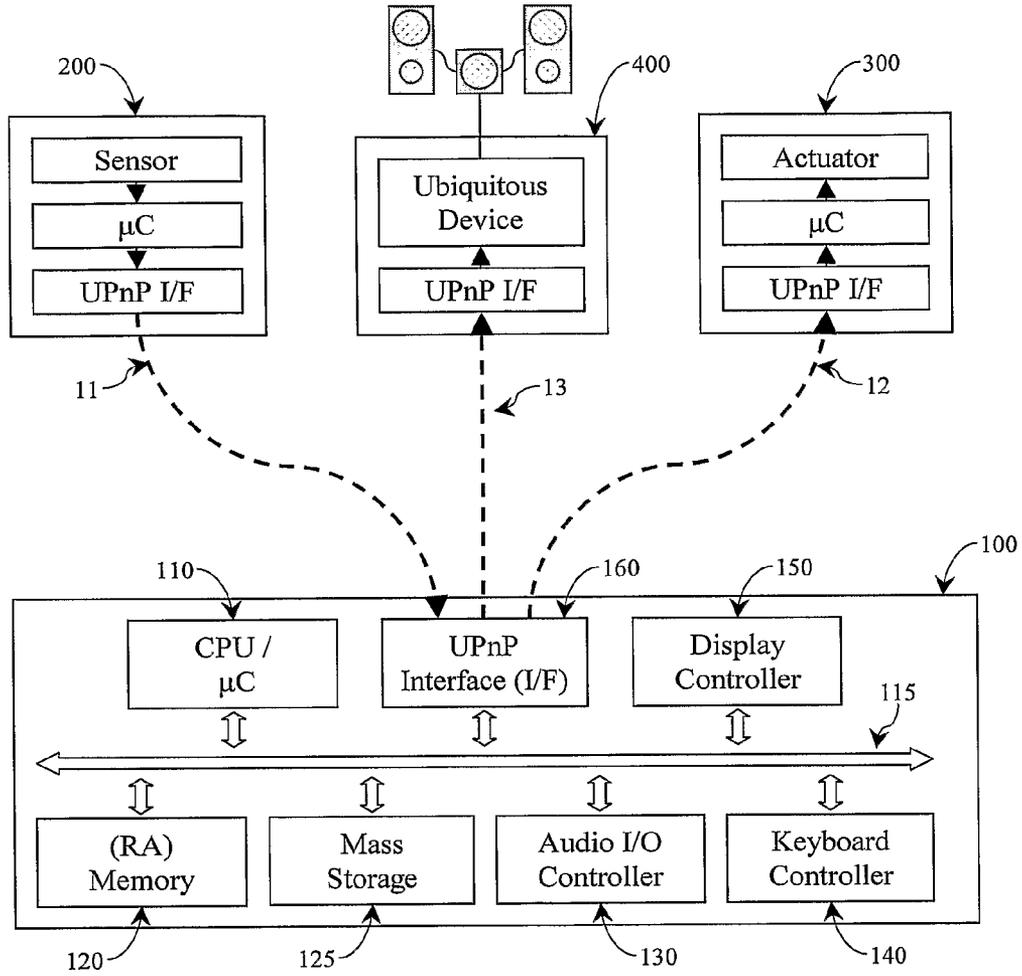


Fig. 1

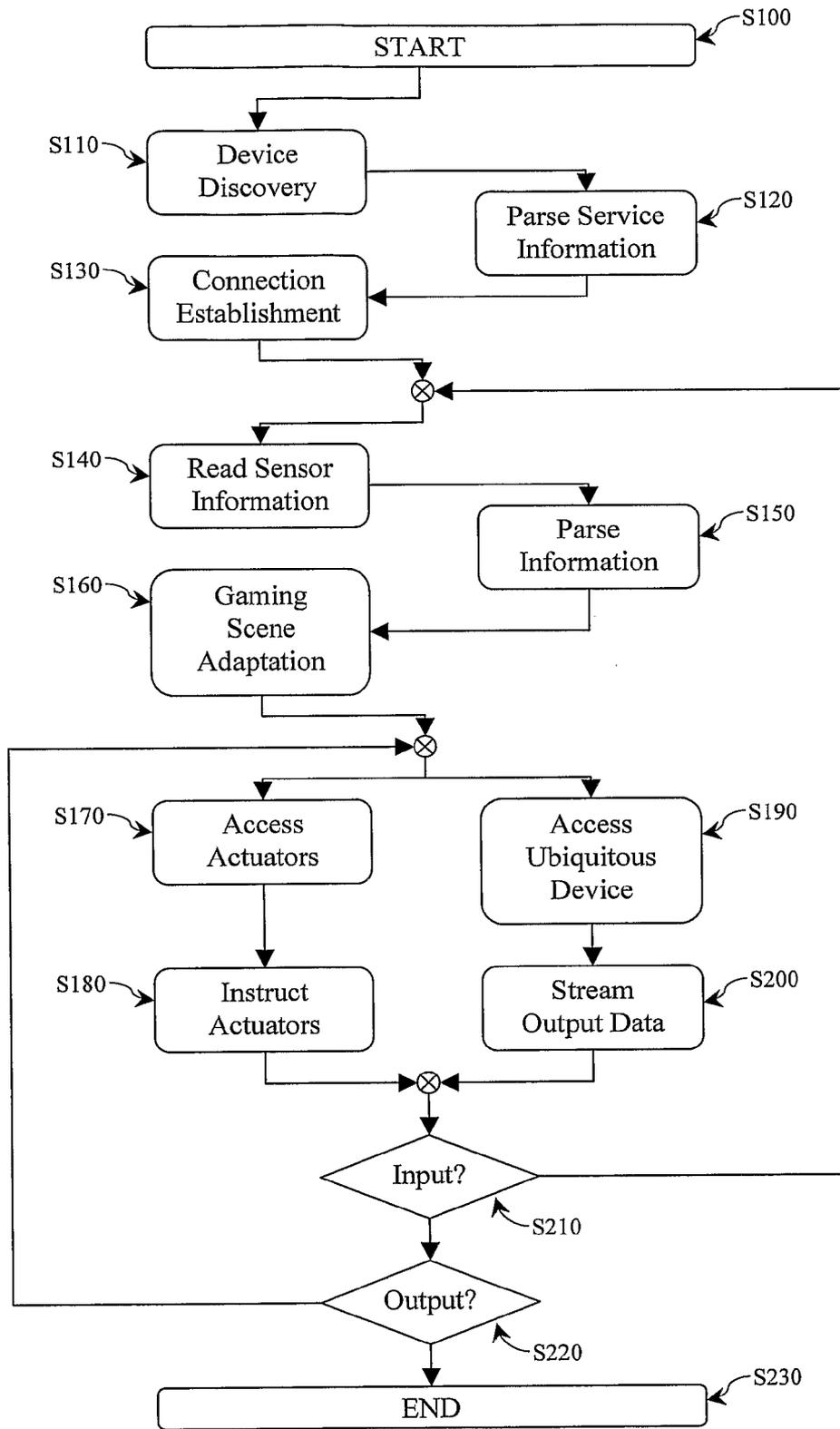


Fig. 2

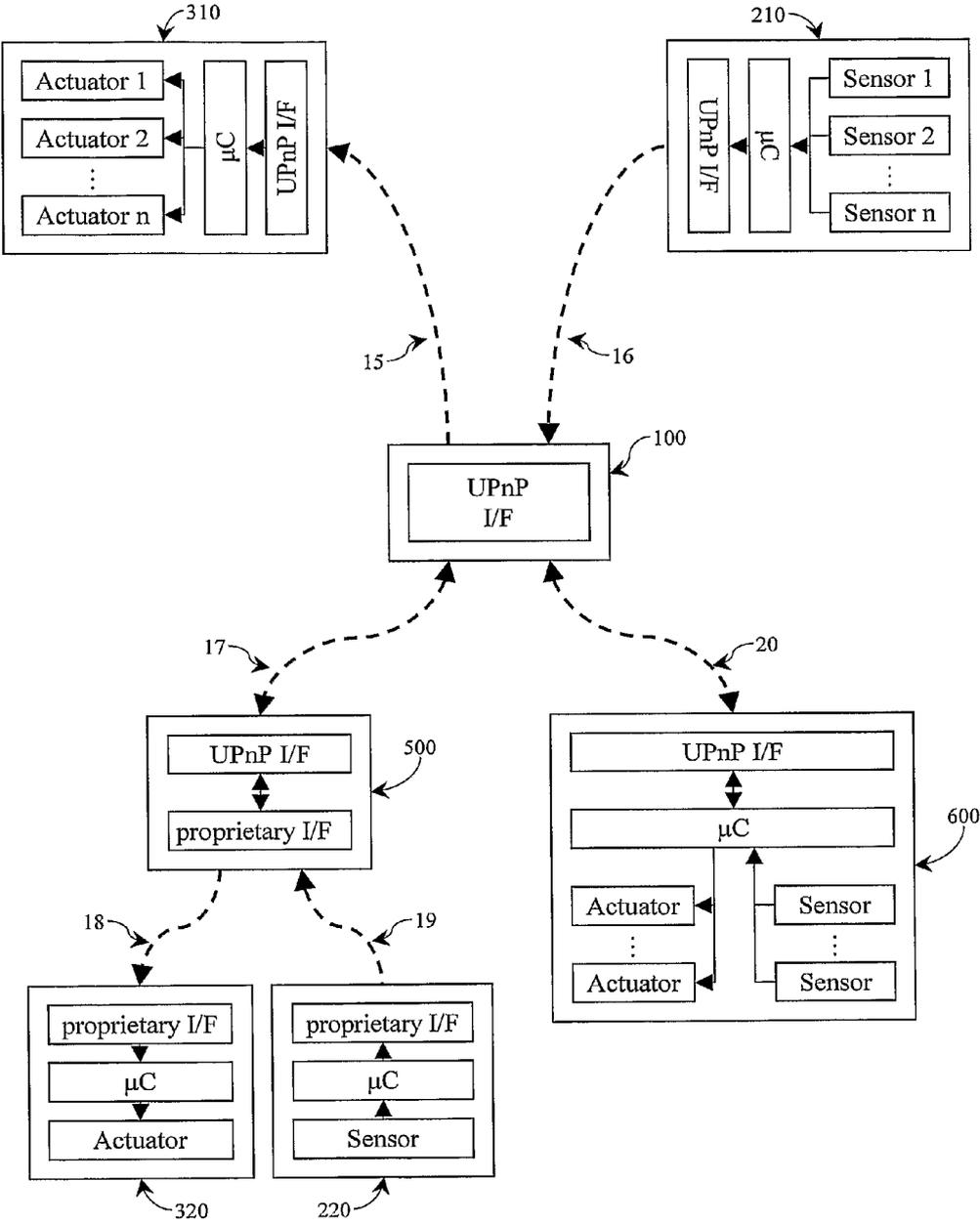


Fig. 3

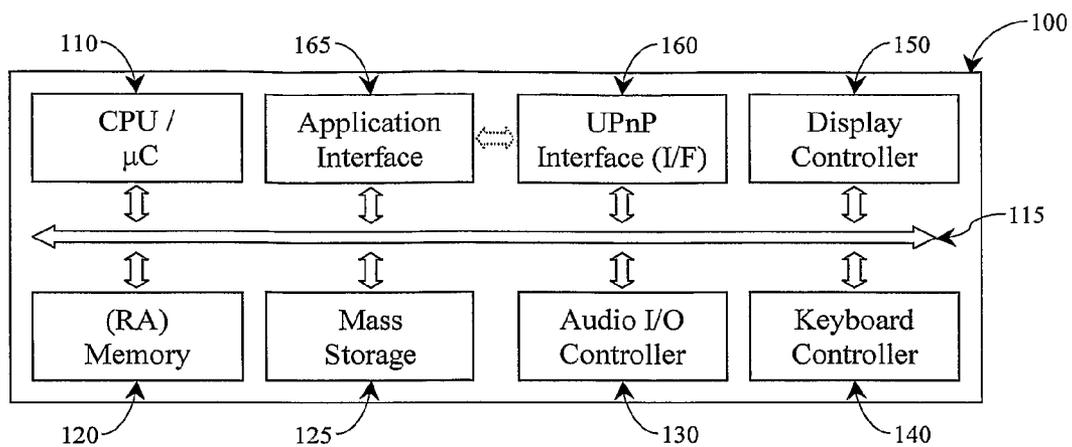


Fig. 4

**SYSTEM AND METHOD OF CONTROLLING  
SENSORS AND ACTUATORS IN GAMING  
ENVIRONMENT**

[0001] The present invention relates generally to home networks providing peripheral devices

[0002] The development of software gaming applications has been focused over the last years in creating natural-like gaming scenes and environments driven by the magnificent rise in computational power provided by microprocessors and specialized graphic processors.

[0003] Present network developments have targeted the provision of wireless networks for interconnecting processor-based devices especially personal computers, notebooks, personal digital assistants, cellular phones, smart phones, and the like. In addition, wireless connectivity also addresses typical peripheral devices like printers, network access points, keyboards, audio/video streaming clients, etc. Future home networks will not only interconnect today's typical processing devices but will also comprise ubiquitous devices such as including audio/video entertainment equipment, lighting, home automation, kitchen appliances, printing and imaging equipment. In future, all these devices, equipment and appliances will be connected by the means of one and more networks, which may be any combination of wire-based networks and wireless networks interconnected by the means of gateways, such that the services and functionalities of the connected devices, equipment and appliances is available to any device within the home network. Such home networks enable especially remote control of the connected appliances, devices, and equipment.

[0004] Whereas the development of software gaming applications has been driven by hardware capabilities of gaming devices, especially gaming consoles, portable gaming consoles, personal computers, etc., connectivity over home networks to appliances, devices, and equipment available therein has not been considered up to now.

[0005] The object of the present invention is to provide a method, a device, and a system which enables to provide a user with a gaming application enhanced augmented gaming experience. Moreover, the enhanced augmented gaming experience includes especially effects such as life effects supporting gaming scenes currently displayed to the user of the gaming application to intensify the sensual impressions of the user by creating an overall 3D scene impression.

[0006] The object of the present invention is solved by the accompanying claims.

[0007] According to a first aspect of the present invention, a method for generating effects in a gaming environment is provided. A gaming application is initiated. Peripheral devices providing services and the devices which offer such services are identified, where the services include preferably provision of sensor information and access to one or more actuators and/or ubiquitous devices. Communication connections are established to the peripheral devices to enable access to their services, and a gaming environment (or one or more gaming scenes) is (are) adapted on the basis of sensor information, which is received from the peripheral devices providing the sensor information. The peripheral devices, which provide access to one or more actuators, and/or ubiquitous devices are accessed to generate effects preferably life effects matching with current gaming environment or gaming scene.

[0008] The present invention equally not only applies to games and gaming environment but also to other media such as movies, movie environment, music, music environment, which could be complemented by auxiliary data which are used by e.g. the media player to invoke actions on proximity devices. Typical applications for Music would be light effects for discotheques.

[0009] According to a second aspect of the present invention, a computer program product is provided. The computer program product comprises code sections for carrying out the operations of an embodiment of the aforementioned method of the present invention, when the program is run on a computer, a terminal, a network device, a mobile terminal, a portable consumer electronic device, or a mobile communication enabled terminal. Alternatively, an application specific integrated circuit (ASIC) may implement one or more operations that are adapted to realize the aforementioned operations of the method according to an embodiment of the present invention.

[0010] According to a third aspect of the present invention, a computer program product is provided, which comprises code sections stored on a machine-readable medium for carrying out the operations of the aforementioned method according to an embodiment of the present invention, when the computer program product is run on a computer, a terminal, a network device, a mobile terminal, a portable consumer electronic device, or a mobile communication enabled terminal.

[0011] According to a fourth aspect of the present invention, software tool is provided, which comprises program sections for carrying out the operations of the aforementioned method according to an embodiment of the present invention when the software tool is implemented in a processing device and/or executed thereon.

[0012] According to a fifth aspect of the present invention, a computer data signal embodied in a carrier wave and representing instructions is provided, which when executed by a processor cause the operations of the aforementioned method according to an embodiment of the present invention to be carried out.

[0013] According to a sixth aspect of the present invention, a processor based consumer electronic (CE) device applicable with gaming application enabled for generating life effects for enhancing gaming experience is provided. The device comprises the gaming application, an (data communication) interface, and an application program interface component. The interface allows for connecting peripheral devices providing services and permits establishing communication connections to at least one of the peripheral devices providing the services. The services include provision of sensor information, access to one or more actuators and/or ubiquitous devices. The application program interface component enables identifying the peripheral devices providing the services and is applicable for adapting a gaming environment (or one or more gaming scenes) on the basis of sensor information received from the peripheral devices providing sensor information. The application program interface component permits further to access the peripheral devices, which provide access to one or more actuators and/or ubiquitous devices to generate life effects matching with current gaming environment or gaming scene.

[0014] According to a seventh aspect of the present invention, a gaming system is provided. The gaming system comprises a processor based consumer electronic (CE) device, which is applicable with a gaming application enabled for generating life effects for enhancing gaming experience, and peripheral devices providing services. The services include provision of sensor information, access to one or more actuators and/or ubiquitous devices. The processor based CE device corresponds to the aforementioned CE device according to an embodiment of the present invention.

[0015] The foregoing and other aspects of various embodiments of the present invention will be apparent through examination of the following detailed description thereof in conjunction with the accompanying drawings:

[0016] FIG. 1 schematically illustrates an exemplary arrangement of accessible peripheral devices in the proximity of a CE device according to an embodiment of the present invention;

[0017] FIG. 2 schematically depicts an operational sequence carried out by the CE device to gain advantages of the functionalities of the accessible devices according to an embodiment of the present invention;

[0018] FIG. 3 schematically illustrates further accessible peripheral devices according to an embodiment of the present invention; and

[0019] FIG. 4 schematically illustrates an implementation of the CE device of FIG. 1 according to an embodiment of the present invention.

[0020] Turning now to the drawings, FIG. 1 shows schematically a plurality of accessible devices arranged in the proximity of a CE device according to an embodiment of the present invention. The CE device 100 represents any kind of microprocessor-based or microcontroller-based device, which is typically capable to carry out one or more software program applications including code sections on a microprocessor (central processing unit 110) or a microcontroller ( $\mu$ C 110). For instance, the CE device 100 may be a personal computer (PC), a micro-processor based gaming console, a cellular phone with application processing capabilities, a smart phone, PDA and the like. It should be understood that the list of exemplary devices is not limited.

[0021] The CE device 100 depicted in FIG. 1 is composed of a CPU 110, a memory component (random access memory) 120, a mass storage component 125, an audio input/output (I/O) controller (Ctrl) 130, a keyboard controller 140, a display controller 150 and a communication interface 160. The components of the CE device 100 are interconnected by the means of at least one (internal) data bus 115, which is adapted for internal data communication between the aforementioned components. The central processing unit/microprocessor 110 is implemented for processing instructions and data provided by an operating system (OS) and software program applications each comprising one or more code sections including the instructions and data. The operating system (OS) provides for application program libraries, which in conjunction with hardware drivers enable the software program applications for utilizing functions of the operating system including at least a (graphical) user interface on the basis of libraries of the operating system and hardware components of the CE

device 100 by the means of software interface libraries of the operating system. The CPU 110 may randomly access the memory component 120 for storage locations, which data is to be read out and/or which are written with new data.

[0022] The memory component 120 may be a volatile memory such as an arrangement of one or more conventional DRAM modules, non-volatile memory such as an arrangement of one or more conventional Flash RAM (MRAM, FRAM etc.) modules, or any combination of one or more volatile memory components and non-volatile memory components. Moreover, the mass storage component 125 provides for high storage capacity. The mass storage component 125 represents one or more mass storage components, which may be based on various mass storage technologies including for instance magnetic mass storage technology (e.g. magnetic hard disk drives (HDD), floppy drives, etc.), optical disc mass storage technology (e.g. compact disk (CD), digital versatile disk (DVD), high density (HD) DVD, ultra density optical (UDO) disk, etc), random access memory (RAM) storage technology (e.g. flash RAM, magnetic RAM (MRAM) or ferromagnetic RAM (FRAM), etc.) and/or any future mass storage technologies. The mass storage component 125 enables for persistent storing data including data representing code section of one or more software program applications and data relating to those software program applications and for being processed therewith. The audio I/O controller 130, keyboard controller 140, and display controller 150 serve for interfacing between CE device 100 and user of the CE device. The keyboard controller or a manually operated input device (e.g. a joystick) 140 is connected to a keyboard, a keypad or any key arrangement (not shown), by means of which the user is permitted to enter instructions and data, wherein the keyboard controller 140 generates signals in accordance with key actuations by the user, which signals are fed to the CPU 110 effecting predefined operations thereof.

[0023] The display controller 150 is connected to for instance a display, a monitor, video projector and the like and enables the CE device and the CPU 110 to display information to the user, respectively, which information to be displayed is preferably provided by one or more software applications and operating system carried out on the CE device 100. The audio I/O controller 130 serves for outputting audio signals including conventionally digital-to-analog conversion means converting digital representations of audio signals into analog signals thereof and eventually for inputting audio signals including conventionally analog-to-digital conversion means converting analog audio signals into digital representations thereof.

[0024] The CE device 100 comprises an interface (I/F) component 160 for exchanging data with one or more peripheral devices and/or devices in the proximity of the CE device 100 and/or further data communication enabled devices comprising a compatible interface for data communications. The interface component 160 can be implemented on the basis of various data communication technologies available today and in future.

[0025] In particular, the interface component 160 is implemented on the basis of a data communications interface and more particularly on the basis of a network interface including especially wire-based network interfaces such as power

line interface, universal serial bus (USB), Firewire (IEEE 1394), local area network (LAN) interfaces, Tokenizing interfaces, etc. and wireless network interfaces such as wireless local area network (WLAN) interfaces, Bluetooth interfaces, wireless universal serial bus (wireless USB), etc. Depending on kind of interface components implemented, the data communication is operated by the use of a correspondingly adequate data communication protocol including especially standard communication protocols such as TCP/IP (transmission collision protocol/internet protocol), UDP (user datagram protocol) and HTTP (hypertext transmission protocol) and data coding such as extensible markup language (XML).

[0026] It should be noted that the present invention is not limited to any distinct protocol and coding; different protocols and codings including proprietary ones may be utilized.

[0027] It should be noted that the schematic illustration of the CE device **100** as shown in FIG. **1** is not complete; i.e. the CE device **100** may comprise further components. For example, the CE device **100** may comprise one or more internal or external extensible bus systems, which allow for (detachable) connecting further hardware modules. Such extensible bus systems may include a PCI (peripheral component interconnect) bus, an ePCI (express PCI) bus, a USB (universal serial bus), a Firewire bus (corresponding to the IEEE 1394 standard), ATA (advanced technology attachment) or sATA (serial ATA) bus and the like. The aforementioned bus systems represent a selection of possible bus systems. The enumeration is not complete and the invention should not be limited to any of the aforementioned embodiments of the bus systems.

[0028] The interface (I/F) component **160** of the CE device **100** enables communication with peripheral devices, which comprise with reference to FIG. **1** for the way of illustration a sensor device **200**, an actuator device **300** and a ubiquitous device **400**. The sensor device **200** includes a sensor, a microcontroller ( $\mu$ C) and a data communication interface (I/F) suitable for data communication with the interface (I/F) component **160**. The sensor device **200** is implemented for communicating the (measurement) values obtained by the sensor, i.e. the sensor may detect typically an analog sensor signal, which is converted to a digital representation suitable to be communicated via the interface (I/F) of the sensor device **200** to another device, herein the CE device **100**. Analogously, the actuator device **300** includes an actuator, a microcontroller (IC) and a data communication interface (I/F) suitable for data communication with the interface (I/F) component **160**.

[0029] Without limitation of the present invention, the sensor device **200** may be an interior temperature sensor, an exterior temperature sensor, an ambient light sensor, a wind sensor, a rain sensor, a humidity sensor etc. The actuator device **300** is implemented for communicating data with the CE device **100**, wherein the data represents one or more digital signals for operating the actuator. The digital signals may be converted into analog signals or may be used directly for operating the actuator. Without limitation of the present invention, the actuator device **300** may comprise a light switch, a dimmer light switch, an AC power switch, an air-conditioning system controller especially allowing for setting a target temperature, etc. The ubiquitous device **400** is likewise provided with an interface communicating data

with the CE device **100**. Without limitation of the present invention, typical ubiquitous devices include high-fidelity (Hi-Fi) equipment such as a CD player, a DVD player, a stereo system, a television set, video projector, etc. With reference to the exemplary high-fidelity (Hi-Fi) equipment, the ability for data communication with the CE device **100** permits streaming of data, especially audio and/or video data, for being reproduced by the high-fidelity (Hi-Fi) equipment.

[0030] The data communication connections between the peripheral devices, i.e. sensor device **200**, actuator device **300** and ubiquitous device **400**, are illustrated schematically as connections **11**, **12**, and **13**. Those skilled in the art will appreciate that the sensor device **200** represents one or more sensor devices each of which including one or more sensors and the actuator device **300** represents one or more actuator devices each of which including one or more actuators. Further exemplary implementations of such devices and mixed devices will be presented below in more detail.

[0031] Turning now to FIG. **2**, an operational sequence to be carried out on the CE device according to an embodiment of the invention is presented. In operation **S100**, the operational sequence starts. In operation **S110**, a device discovery is operated in order to obtain information about peripheral devices connectable via the interface (I/F) component **160** of the CE device **100**. The device discovery is typically initiated by a broadcast message directed to all devices capable for processing the broadcast. The broadcast message includes one or more instructions instructing the receiving devices to report information about their devices types, services and/or functionalities such that the CE device **100** is able to identify the accessible peripheral devices and their services available over the communication connection via the interface (I/F) component **160**. In response to the device discovery (e.g. the broadcast message), the CE device receives the information about the peripheral devices discovered.

[0032] The received information includes preferably the aforementioned report information, which is parsed in the following operation **S120** by the CE device **100**. On the basis of the parsing results, the CE device **100** establishes in operation **S130** communication connections to those discovered peripheral devices, which are suitable for further use. The types of peripheral devices suitable for further use is defined by the software application program processing the information obtained from the peripheral devices and controlling the peripheral devices by communication data and/or streams of data thereto.

[0033] In a next operation **S140**, the sensor information available from the connected sensors is obtained. In particular, the sensor information comprises one or more information comprising exterior temperature information (from an exterior temperature sensor), time information (from a digital (RF) clock), exterior light condition information (twilight detector), and the like. The information is parsed in operation **S150** and supplied to the software program application processing the information. The software program application is particularly a gaming software application. At an initial start or at setup of the gaming software application, the results of the discovery operation may be presented to the user. The results may be pre-selected such that a pre-selection of peripheral devices is presented to the user,

which pre-selection includes peripheral devices accessible and/or utilizable by the software program application. The user can then further select one or more peripheral devices from the pre-selection to determine which kind of life effects generated with the help of the one or more (user-) selected peripheral devices he wishes to experience.

[0034] In operation S160, the gaming software application, which simulates a gaming environment in which the gaming scenes are embedded, utilizes the sensor information to adapt the simulated gaming environment to the detected information. This means that the gaming environment, which represents preferably a natural environment or natural-like environment, is created on the basis of the sensor information including exterior temperature, current time, exterior light conditions, further sensed weather conditions and the like. Refer for example to a car racing gaming application, a personal shooter gaming application, or a flight simulator gaming application, which represent typically gaming applications being played within a simulated natural or natural-like environment, the gaming scenes may show a sunny enlightened scenes in summer, gloomy winter scenes with or without snow fall, autumnal rainy scenes and the like depending on the sensor information.

[0035] For example, the gaming software application utilizes (on user pre-selection) an "outside thermometer", "hi-fi device" and "light/living room" (as part of the home automation) for life effects.

[0036] In the following operations S170 and 180, one or more actuator(s) connected to the CE device 100 for being controlled thereby are accessed. Data for controlling the actuator(s) is transmitted via the established data communication connection to the actuator device(s) for operating the actuator(s) accordingly. In case of a light switch or a dimmer light switch the light conditions of the room, in which the user of the CE device 100 plays the gaming application in question is adapted to the currently simulated gaming environment. In case of for instance a car racing game, the light may be dimmed accordingly in case the simulated car drives into a tunnel. This means in case of a night scene the room may be brightly-lit or in case of a day scene the room may be darkened by operating actuator device(s) allowing operation of automated blinds. Analogously, the interior temperature may be adapted by the means of an air-conditioning system controller.

[0037] Analogously, in the operations S1190 and S200, one or more ubiquitous devices connected to the CE device 100 for being controlled thereby are accessed. Data for controlling the ubiquitous device(s) is forwarded via the established data communication connection to the ubiquitous device(s) for operating the ubiquitous device(s) accordingly. In case of a hi-fi system, the data stream comprises audio data, which is converted to audio signals and reproduced by the hi-fi system. With reference to the aforementioned exemplary car racing gaming application, the audio data comprises the typical driving sound, which may depend on the (simulated) velocity of the car, the kind of (simulated) driving surface, etc.

[0038] In operation S210, the sequence returns back to operation S140 in case new sensor information is to be obtained. Otherwise, the operational sequence continues with operation S220. The obtaining of new sensor information may be operable to enable adapting of the gaming

environment to changing conditions sensed by the sensor device connected to the CE device 100. For instance, the sensed temperature, the light conditions etc. may have changed and an adaptation of the gaming environment to the changing conditions should be performed. The gaming device in an alternative embodiment can simply subscribe to events instead of actively reading the sensors.

[0039] In operation S220, the sequence branches back to operation S170 and S190, respectively in case new data is to be forwarded to the actuator(s) and/or ubiquitous device(s). Otherwise, the operational sequence continues with operation S230.

[0040] In operation S230, the operational sequence is completed.

[0041] With reference to FIG. 3, different sensor/actuator devices should be presented. The illustration of FIG. 3 depicts a number of possible peripheral devices in the sense of the present invention. It should be noted that the illustrated peripheral devices represent only a selection of possible peripheral devices. Moreover, it should be understood that the present invention is not limited to anyone of the illustrated peripheral devices.

[0042] Actuator device 310 illustrates an actuator device implementation comprising an interface (I/F), a microcontroller, and a plurality of actuators 1 to n connected to the microcontroller. Each actuator may be independently accessible via the interface (I/F) (and the communication connection 15, respectively) or a selection of the actuators may be accessible in common. Analogously, sensor device 210 illustrates a sensor device implementation comprising an interface (I/F), a microcontroller, and a plurality of sensors 1 to n connected to the microcontroller. Each sensor may be independently accessible via the interface (I/F) (and the communication connection 16, respectively) or a selection of the sensors may be accessible in common.

[0043] Actuator device 320 illustrates an actuator device implementation comprising a proprietary interface (I/F), a microcontroller, and an actuator (representing one or more actuators). Analogously, sensor device 220 illustrates a sensor device implementation comprising a proprietary interface (I/F), a microcontroller, and a sensor (representing one or more sensors). The gateway device 500 serves for connectivity of the actuator device 320 and the sensor device 220 to the CE device 100 in that a communication connection 17 is established between CE device 100 and the gateway device 500, which enables establishment of a communication connection 18 between actuator device 320 and gateway device 500 as well as establishment of a communication connection 19 between sensor device 220 and a gateway device 500. The gateway device 500 comprises correspondingly, at least one proprietary interface for communication with the actuator device 320 and the sensor device 220, respectively, and an interface (I/F) compatible with the interface (I/F) component 160 of the CE device 100. The gateway device 500 mediates the data communication between the CE device 100 and the actuator device 320 as well as the sensor device 220. The mediation may comprise translation of the transmission protocol, the data coding protocol, etc.

[0044] With reference to sensor/actuator device 600 connected via communication connection 20 to the CE device

**100**, the sensor/actuator device **600** illustrates a combined sensor and actuator device comprising an interface (I/F), a microcontroller, a plurality of sensors and a plurality of actuators. The communication connection **20** enables the CE device **100** both to obtain the sensor information (each independently and/or group wise) sensed by the sensors and control the actuators (also each independently and/or group wise).

[0045] It should be noted that the implementation of the sensor and/or the actuator devices illustrated on the basis of various embodiments of the present invention comprise microcontrollers to enable their operations for the sake of simplicity. The implementation of the sensor and/or the actuator devices is out of the scope of the present invention and other implementations are also applicable for realizing such sensor and/or the actuator devices.

[0046] It should be also noted that the communication connection between CE device **100** and the peripheral devices described above may be established by the means of any network technology including especially wireless network technologies and wire-based network technologies. Networks being based on different network technologies can be interconnected by the means of so called gateway devices or gateway devices, which allow making devices on the one network visible (available, accessible) on the other network and vice versa. The wireless network technologies for home networks comprise typically Bluetooth networks and wireless local area networks, whereas the wire-based network technologies include usually local area networks and power-line networks.

[0047] The peripheral device discovery operation has to fulfill typical usability requirements. Several service discovery methodologies are known in the art. Universal plug and play (UPnP) framework represents the most promising implementation of service discovery as required for the concept of the present invention. The UPnP framework enables the discovery of devices and their services in an IP based home network. There are other competing standards for service discovery in IP and non IP networks. The detailed implementation of the service discovery methodology used in the present invention is out of the scope of the present invention. Exemplarily, a brief introduction is given to UPnP for the sake of completeness. Any device (such as sensor devices) can advertise its service(s) in the network, control devices (such as actuator and ubiquitous devices) can ask for specific services. The common language to invoke the remote services of the peripheral devices is standardized and known as simple object access protocol (SOAP). Incompatible home networks can be interconnected through gateways and bridging network devices so that the services from one network are made available/visible in the other one.

[0048] A typical UPnP protocol stack can be taken from "Michael Jeronimo et al": "UPnP Design by Example", Intel Press, 2003. Detailed description thereof hence can be omitted.

[0049] With reference to FIG. 4, the CE device **100** including additionally a UPnP application interface **165** is illustrated. The application interface **165** is logically connected to the interface component **160** for operating the device discovery and preferably the access to the peripheral devices discovered. According to an embodiment of the invention, the UPnP application interface **165** is provided as an application program interface for instance as part of a game development platform and offers the functionality of

service discovery. Other platforms may offer service advertisement and service invocation through which the gaming application implementation can search for services and invoke these services from within the gaming application. The implementation of this application program interface (API) can then invoke all related implementations inside the CE device **100**.

[0050] For example, the CE device **100** may make use of an interface operated as UPnP interface component **160**. The CE device **100** can try to find the relevant services through the Bluetooth service discovery, which is similar to the simple service discovery described above and known as Service discovery Protocol (SDP) directly included in the Bluetooth standard. Moreover, the CE device **100** can also create an IP communication connection over a Bluetooth access point to the home network (using the PAN profile) and additionally use the aforementioned UPnP methodology to locate and discover relevant devices and services on the home network (which is typically a LAN, WLAN, power line based network or the like).

[0051] It is appreciated that not necessarily all communication actually goes through the UPnP protocol and platform and also the use of SOAP is not mandatory, if during service discovery another access method to the service is discovered. Streaming data like audio data preferably does not go via UPnP protocols. The main or prevailing purpose of UPnP is to discover the services and the way to access them.

[0052] Moreover, a setup menu may be implemented that allows a user to select the devices (out of a list of devices and services found by the previous service discovery) which should be used to create the life effects. Those skilled in the art will appreciate that similar scenarios can be created with a WLAN enabled CE device **100** connecting to the home network through a WLAN access point or a LAN enabled CE device **100** being directly connected to the home network (eventually via a proxy or gateway network device).

[0053] Several features and aspects of the present invention have been illustrated and described in detail with reference to particular embodiments by the way of example only, and not by the way of limitation. Those skilled in the art will appreciate that alternative implementations and various modifications to the disclosed embodiments are within the scope and contemplation of the invention. Therefore, it is intended that the invention be considered as limited only by the scope of the appended claims.

[0054] The present invention equally not only applies to games and gaming environment but also to other media such as movies, movie environment, music, music environment, which could be complemented by auxiliary data which are used by e.g. the media player to invoke actions on proximity devices. Typical applications for Music would be light effects for discotheques. A video projector could control the room lighting which is dimmed when the film begins or flickers when there is thunder and lightning in the movie. A television chair could provide a different seating position or vibration effects on haptic feedback.

1. Method for generating effects in a gaming environment, comprising:

- initiating a gaming application;
- identifying peripheral devices and the services these devices offer, wherein said services include access to one or more actuators and/or ubiquitous devices;

establishing communication connections to at least one of said peripheral devices providing said services; and

accessing said peripheral devices providing access to one or more actuators and/or ubiquitous devices to generate effects matching with current gaming environment or gaming scene.

2. Method according to claim 1, wherein said services further include provision of sensor information, said operations comprising adapting a gaming environment on the basis of sensor information received from said peripheral devices providing sensor information.

3. Method according to claim 2, wherein said provision of sensor information includes time information and environmental information comprising especially interior and/or exterior temperature information and light condition information.

4. Method according to claim 1, wherein said ubiquitous devices comprise audio/video equipment for reproducing audio/video signals and especially hi-fi equipment for reproduction of audio signals.

5. Method according to claim 1, wherein said actuator services include light switching, dimmer light switching, blind controlling, and air-conditioning system controlling.

6. Method according to claim 1, wherein said identification of peripheral devices comprises:

broadcasting a discovery request;

receiving service information from a plurality of peripheral devices; and

parsing said service information to identify matching services.

7. Method according to claim 6, wherein said parsing of said service information to identify matching services comprises:

displaying a list of matching services; and

receiving user input identifying a selection of said matching services.

8. Computer program product for generating effects for enhancing gaming experience, comprising program code sections for carrying out the operations of claim 1, when said program is run on a computer, a microprocessor based device, a terminal, a network device, a mobile terminal, a consumer electronic device, or a mobile communication enabled terminal.

9. Computer program product for generating effects for enhancing gaming experience, comprising program code sections stored on a machine-readable medium for carrying out the operations of claim 1, when said program is run on a computer, a microprocessor based device, a terminal, a network device, a mobile terminal, a consumer electronic device, or a mobile communication enabled terminal.

10. Software tool for generating effects for enhancing gaming experience, comprising program code sections for carrying out the operations of claim 1, when said tool is run on a computer, a microprocessor based device, a terminal, a network device, a mobile terminal, a consumer electronic device, or a mobile communication enabled terminal.

11. Computer data signal embodied in a carrier wave and representing instructions, which when executed by a processor cause the operations of claim 1 to be carried out.

12. Processor based consumer electronic device applicable with gaming application enabled for generating effects in gaming environment, said device comprising:

a gaming application;

an interface for connecting peripheral devices providing services and establishing communication connections to at least one of said peripheral devices providing said services, wherein said services include provision of sensor information, and access to one or more actuators and/or ubiquitous devices;

an application program interface component applicable for identifying said peripheral devices providing said services;

said application program interface component applicable for adapting a gaming environment on the basis of sensor information received from said peripheral devices providing sensor information; and

said application program interface component applicable for accessing said peripheral devices providing access to one or more actuators and/or ubiquitous devices to generate effects matching with current gaming environment or gaming scene.

13. Device according to claim 12, wherein said provision of sensor information includes time information and environmental information comprising especially interior and/or exterior temperature information and light condition information.

14. Device according to claim 12, wherein said ubiquitous devices comprise audio/video equipment for reproducing audio/video signals and especially hi-fi equipment for reproduction audio signals.

15. Device according to claim 12, wherein said actuator services include light switching, dimmer light switching, louver controlling, and air-conditioning system controlling.

16. Device according to claim 12, wherein said application program interface component applicable for identification of peripheral devices comprises:

a component for initiating a broadcast discovery request; said interface for receiving service information from a plurality of peripheral devices; and

said application program interface component for parsing said service information to identify matching services.

17. Device according to claim 16, wherein said application program interface component for said parsing of said service information to identify matching services comprises:

a display for displaying a list of matching services; and inputting means for receiving user input identifying a selection of said matching services.

18. Gaming system comprising a processor based consumer electronic device applicable with gaming application enabled for generating effects for enhancing gaming experience and peripheral devices providing services including provision of sensor information, and access to one or more actuators and/or ubiquitous devices; said processor based consumer electronic device is a device according to claim 12.