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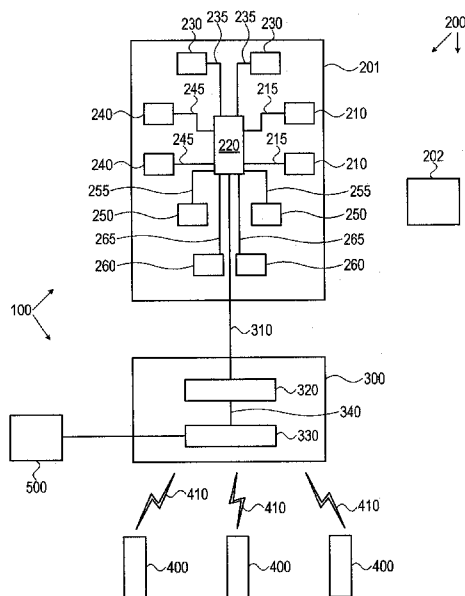

FIGURE. 1

(57) **Abstract:** The present invention relates to dynamic connected multi-functional system adapted to provide a user at least one of a learning experience, an entertaining experience, a social experience, and combinations thereof, the system comprising: a multi elements base comprising at least a base structure, at least one sensor, and a plurality of detachable elements, a communication manager, and an external supporting subsystem comprising at least a smart device and a server, wherein an action performed by the user on said multi element base via a specific detachable element or a sensor, or both, creates at least one signal containing at least information related to identification of the specific detachable element involved in the action and the relative position over said multi elements base that the action was performed, and at least one signal indicating the sensor in use, said signals are delivered through the communication manager to the external supporting system and activates at least one response to be perform by the external supporting system. The signals produced or consequent signals may further be delivered to a server to allow processing of the signals by dedicated software for creating either one of a learning experience, an entertainment experience, a social experience, and combinations thereof, to the user.

5   **CONNECTED MULTI FUNCTIONAL SYSTEM AND METHOD OF USE**

       FIELD OF THE INVENTION

              The present invention is directed to connected multifunctional systems in
       general and to a connected multifunctional system adapted to provide a user a learning
10   experience, entertaining experience, and a social experience, in particular.

       BACKGROUND

              Toys, games, playing systems, learning and tutorial systems and tools and
       other similar entertainment and educational systems are well known for providing
       entertainment opportunities as well as valuable learning to children and adults.

15   In the new era when smart devices become integral part of our life, it seems
       that the possibilities of bringing fun and excitement as well as education and learning
       through games and toys are limitless and the options to challenge children's
       imaginations and to encourage creativity and social interactivity are infinite.

              Although enormous number of games and toys as well as learning systems and
20   tools are available in the market, most of them offer only a primitive engaging
       play/learning experience, particularly for older children, and thus, there is a need for
       more exciting and entertaining games and toys that will increase learning and
       entertainment opportunities for children and adults and stimulate creativity and
       imagination.

25   Social networking services, such as Facebook, Twitter, Google, MySpace and
       Orkut, are changing our communication habits by introducing new tools that simplify
       and increase on-line interaction between remote users that satisfy a basic need of
       human beings for socialization, a need that in recent years has raised due to
       technological developments and intensification of a human with a computers that in
30   many cases causes a loneliness feeling.

              Consequently, not only that computerized social networks between individual
       has become a popular trend, but also, forming of groups in a computer-based (e.g., on-
       line) gaming environment, based on social relationships between players also became
       a popular habit. Individuals as well as group interaction between remote users
35   provides a mechanism for social and cooperative game play experience.

5   The dramatic technological development in communication aid devices and
sensors enables the playing as well as the learning experiences to be having several
new characteristics. Some of them are:

1. Content can be updated and not just stored in advance in a learning system
    and/or toys.

10   2. Content and playing experience can be shared by several players.

3. Sensors can identify in real time player's commands and change learning
    system's/toy's attributes accordingly.

4. Toy as well as learning systems can be personalized.

The object of the present invention is to provide a connected multi functional
15   system with such new capabilities. The connected multifunctional system of the
present invention is aimed to entertain the entire family, children and adults, to
educate the children and adults, to provide all users a platform for creativity and social
activity, and further to serve as an interface to a Central Artificial Intelligence, all in
an affordable price.

20   The following Patents and published patent applications are believed to
represent the current state of the art:

U.S. Pat. No. 6,773,322; U.S. Pat. No. 6,959,166; U.S. Pat. No. 6,160,986;
U.S. Pat. No. 6,022,273; U.S. Pat. No. 5,752,2880, U.S. Pat. No. 6,206,745; U.S. Pat.
No. 7810037; U.S. Pat. App. No. 2011/0213785; U.S. Pat. App. No. 2007/0173324;
25   U.S. Pat. App. No. US 2006/0273907.

SUMMARY OF THE INVENTION

It is the aim of the present invention to provide a connected multifunctional
system adapted to provide a user at least one of a learning experience, and
30   entertaining experience, and combinations thereof, said system comprising: a multi
elements base comprising at least a base structure and a plurality of detachable
elements, a communication manager, and an external supporting system comprising at
least a smart device, wherein an action performed by the user on the multi element
base via a specific detachable element creates a signal containing at least information
35   related to identification of the specific detachable element involved in the action and

5   the relative position over the multi elements base that the action was performed, the signal is delivered via the communication manager to the external supporting system and activates at least one response to be perform by the external supporting system.

It is a further aim of the present invention to provide a dynamic connected multifunctional system adapted to provide a user a social experience, the system

10 comprising: a multi elements base comprising at least a base structure and at least one sensor, a communication manager, and an external supporting subsystem comprising at least a smart device and a server, wherein an action performed by the user on the multi element base creates a signal delivered via said communication manager to the smart device and further delivered to the server to thereby allow processing of the

15 signal by dedicated software on the server for creating a social experience to the user.

It is still another aim of the present invention to provide a dynamic connected multifunctional system adapted to provide a user at least one of a learning experience, an entertaining experience, a social experience, and combinations thereof, the system comprising: a multi elements base comprising at least a base structure, at least one

20 sensor, and a plurality of detachable elements, a communication manager, and an external supporting subsystem comprising at least a smart device and a server, wherein an action performed by the user on said multi element base via a specific detachable element or a sensor, or both, creates at least one signal containing at least information related to identification of the specific detachable element involved in the

25 action and the relative position over the multi elements base that the action was performed, and at least one signal indicating the sensor in use, the at least one signal is delivered via the communication manager to the external supporting system and activates at least one response to be perform by the external supporting system, and wherein the signal or a consequent signal is further delivered to the server to allow

30 processing of the signal by a dedicated software on the server for creating either one of a learning experience, an entertainment experience, a social experience, and combinations thereof, to the user.

The present invention is also directed to a central artificial intelligence adapted to collect and analyze data related to personal preferences and behavior of large amount

35 of users while using a connected multifunctional system comprising learning and entertaining abilities to further implement according to statistical analysis of a group

5   of users with common characteristics on a specific user preferences that comply with the predetermined characteristics defining said group of users.

The present invention is further aimed to provide a connected multifunctional system adapted to provide a user at least one of a learning experience, and

10   entertaining experience, and combinations thereof, the system comprising: a multi elements base comprising at least a base structure and either one of at least one sensor and a plurality of detachable elements, or both, a communication manager, and a smart device with a touch screen, wherein an action performed by the user on said multi element base via a specific sensor or a detachable element, or both, creates a

15   signal containing at least information related to identification of the specific sensor or the detachable element involved in the action and the relative position over the multi elements base that the action was performed, the signal is delivered via said communication manager to the smart device and activates at least one response to be perform by the smart device that is either displayed on the touch screen or involves a

20   production of sounds via said smart device, and wherein said user further controls said multi elements base via the touch screen of the smart device.

BRIEF DESCRIPTION OF THE DRAWINGS

Examples illustrative of embodiments of the disclosure are described below

25   with reference to figures attached hereto. In the figures, identical structures, elements or parts that appear in more than one figure are generally labeled with the same numeral in all the figures in which they appear. Dimensions of components and features shown in the figures are generally chosen for convenience and clarity of presentation and are not necessarily shown to scale. Many of the figures presented are

30   in the form of schematic illustrations and, as such, certain elements may be drawn greatly simplified or not-to-scale, for illustrative clarity. The figures are not intended to be production drawings.

The figures (Figs.) are listed below.

Figure 1 is a schematic block diagram illustration of a connected multi functional

35   system in accordance with variations of the present invention.

5   **Figure 2** is a schematic illustration of one particular example of a connected multifunctional system implemented in a toy bear system in accordance with variations of the present invention.

Figure 3 is a schematic block diagram illustration of one variation of major components and connection links between the play structure, the connection manager,

10   and the smart device illustrated with reference to figure 1, in accordance with variations of the present invention.

DESCRIPTION OF VARIATIONS OF THE INVENTION

In the following description, various aspects of connected learning and playing

15   system will be described. For the purpose of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the invention.

In accordance with the present invention a connected multifunctional system adapted to provide a user at least one of a learning experience, and entertaining experience and combinations thereof is provided. The system comprising: a multi

20   elements base comprising at least a base structure and a plurality of detachable elements, a communication manager, and an external supporting system comprising at least a smart device, wherein an action performed by said user on said multi element base via a specific detachable element creates a signal containing at least information related to identification of the specific detachable element involved in the action and

25   the relative position over said multi elements base that the action was performed, said signal is delivered via said communication manager to said external supporting system and activates at least one response to be perform by said external supporting system.

Upon attaching a detachable element to said base structure at least one signal

30   is produced, said signal produced is specific to the particular detachable element being attached to said base structure and differ from a signal that is produced by another detachable elements and further comprises information as to the relative positioning of said detachable element on said base structure.

In accordance with variations of the invention the base structure further

35   comprises at least one of a sensor, and an input element, and wherein a signal obtained by activating said sensor and/or input element is delivered via said

5   communication manager to said external supporting system and activates at least one response to be performed by said external supporting system.

The smart device comprises a dedicated software application adapted to allow recognition of said multi element base and signals obtained through it and activate at least one response in said smart device.

10   In accordance with one further variation of the invention the multi elements base further comprises at least one of an output element and at least one of a structural changing element, and wherein activation of said at least one output element and said at least one structural changing element is executed upon delivery of at least one signal to either one of them or to both from said external supporting system.

15   In accordance with the system presented herein, the output element may produce a sound, an image, a light, and a vibration, and said structural changing element may alter the shape or form of said multi elements base and portions thereof, and may provide said multi elements base and parts thereof a movement and navigation capabilities.

20   The produced response may be selected from the group consisting of: producing an image on the smart device screen, producing a sound via the smart device audio elements; processing information and storing it on the smart device memory; processing information and delivering the processed data to said server either for storage or for further analysis via a dedicated application installed on said

25   server.

In accordance with one further variation of the invention the external supporting system further comprises a server. The server functionally allows gathering information for creating a central artificial intelligence that serves as a general external system analysis tool.

30   The external supporting system allows said multifunctional connected system to be dynamic and to constantly update learning content and entertaining content.

In accordance with the present invention the base structure is either a two dimensional board or a three dimensional board or a structure and it may be selected from the group consisting of: alphabetic characters board, numbers board, color

35   learning board, musical notes board, playing board, monopoly play board, snakes and ladders play board, chess board, a jungle, a savanna, a field, an island, a battlefield, a garden, a beach, a river with one or two sides, a kitchen, a working tool desk, a doll

5   house, a farm, a castle, a pirate ship, a car racing track, a car racing stadium, an
       airport, a swimming pool, a zoo, a doll, a knight, an imaginary creature, an animal
       doll, a human body, a robot, a musical instruments board, an adventures board, a
       world globe, puzzles and riddles, a board for construction toys, board for cubes,
       cardboard games, a train, an airplane, a spaceship, a village, a mountain, a lake, a
10   general propose board.

       In accordance with further variation of the invention, the multi element base
       further comprises at least one output element and wherein said response to said signal
       produced to said user's action is performed by said at least one output element and
       activated by signals obtained from said smart device or from said server via said
15   communication manager.

       In accordance with another variation of the invention a dynamic connected
       multifunctional system adapted to provide a user a social experience, said system
       comprising: a multi elements base comprising at least a base structure and at least one
       sensor, a communication manager, and an external supporting subsystem comprising
20   at least a smart device and a server, wherein an action performed by said user on said
       multi element base creates a signal delivered via said communication manager to said
       smart device and further delivered to said server to thereby allow processing of said
       signal by dedicated software on said server for creating a social experience to said
       user.

25   The social experience is consisted of at least one of the following: sharing
       content created by said user with other users, sharing learning experience and playing
       experience of the user obtained by utilizing said multi element base and said smart
       device, either synchronized or non-synchronized, with at least one other user, learning
       from preferences and behavior of said user to create a central artificial intelligence
30   and to further implement according to statistical analysis on said user preferences of
       other users and vice versa; ranking scores of shared games; ranking liking of shared
       content.

       In accordance with one another variation of the invention a dynamic connected
       multifunctional system adapted to provide a user at least one of a learning experience,
35   an entertaining experience, a social experience, and combinations thereof, said system
       comprising: a multi elements base comprising at least a base structure, at least one
       sensor, and a plurality of detachable elements, a communication manager, and an

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5   external supporting subsystem comprising at least a smart device and a server, wherein an action performed by said user on said multi element base via a specific detachable element or a sensor, or both, creates at least one signal containing at least information related to identification of the specific detachable element involved in the action and the relative position over said multi elements base that the action was

10   performed, and at least one signal indicating the sensor in use, said signal is delivered via said communication manager to said external supporting system and activates at least one response to be perform by said external supporting system, and wherein said signal or a consequent signal is further delivered to said server to thereby allow processing of said signals by a dedicated software on said server for creating either

15   one of a learning experience, an entertainment experience, a social experience, and combinations thereof, to said user.

The signal created upon an action performed by said user on said multi element base via a sensor, or via a specific detachable element is delivered directly to the server through a wireless internet connection.

20   In accordance with additional variation of the invention a central artificial intelligence adapted to collect and analyze data related to personal preferences and behavior of large amount of user while using a connected multifunctional system comprising learning and entertaining abilities such as the system of the present invention to further implement according to statistical analysis of a group of users

25   with common characteristics on a specific user preferences that comply with the predetermined characteristics defining said group of users.

In accordance with one further variation of the invention a connected multifunctional system adapted to provide a user at least one of a learning experience, and entertaining experience, and combinations thereof, said system comprising: a

30   multi elements base comprising at least a base structure and either one of at least one sensor and a plurality of detachable elements, or both, a communication manager, and a smart device with a touch screen, wherein an action performed by said user on said multi element base via a specific sensor or a detachable element, or both, creates a signal containing at least information related to identification of the specific sensor or

35   the detachable element involved in the action and the relative position over said multi elements base that the action was performed, said signal is delivered via said communication manager to said smart device and activates at least one response to be

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5   perform by said smart device that is either displayed on said touch screen or involves
       a production of sounds via said smart device, and wherein said user further controls
       said multi elements base via said touch screen of said smart device.

              In such variation, the learning experience, and entertaining experience
       provided to said user are obtained by utilizing said smart device touch screen as a
10   learning and playing tool concomitantly with said multi elements base.

              In accordance with such variation the system may further comprise a server
       that allows creating of a social experience.

              Although various features of the disclosure may be described in the context of
       a single embodiment, the features may also be provided separately or in any suitable
15   combination. Conversely, although the disclosure may be described herein in the
       context of separate embodiments for clarity, the disclosure may also be implemented
       in a single embodiment. Furthermore, it should be understood that the disclosure can
       be carried out or practiced in various ways, and that the disclosure can be
       implemented in embodiments other than the exemplary ones described herein below.
20   The descriptions, examples and materials presented in the description, as well as in
       the claims, should not be construed as limiting, but rather as illustrative.

              Terms for indicating relative direction or location, such as "right" and "left",
       "up" and "down", "top" and "bottom", "back" and "front", "horizontal" and "vertical",
       "higher" and "lower", and the like, may also be used, without limitation.

25   Reference is now made to the figures.

       Figure 1 is a schematic block diagram illustration of a connected multifunctional
       system 100 adapted to provide the user either one of a learning experience, an
       entertaining experience and a social experience, and combinations thereof. The
       learning experience as well as the entertaining experience such as playing may also be
30   a social experience allowing the user to use the multifunctional system of the
       invention either alone or with other users both, users in its proximity and/or remote
       users, and may also provide the user, a content and preferences adjusted to the
       specific user accordance to statistical preferences suitable to the specific user. For
       example, if the user is Spanish five years old boy then the system will prove the user
35   content and setup preferences that are suitable to his, age, gender and geographical
       location integrated with the specific child recorded preferences.

5   The system illustrated in this figure is one exemplifying variation of the present invention. However, for simplifying the description and avoiding unnecessary repetitions the explanation below will mainly refer to a multi element toy system with extended explanation and description of usage of the system for learning and for providing a social experience to the user.

10   In accordance with one variation of the invention, connected multi element toy system 100 may comprise two subsystems: a multi element base toy 200 (hereinafter: "MEBT"), and an external supporting subsystem 300.

           In accordance with one preferred variation of the invention, MEBT 200 comprises two components: a play structure 201 and a plurality of detachable toy
15   elements 202 (hereinafter: "DTE").

           Play structure 201 may be configured as a plane two dimensional shape structure such as a monopoly play board, snakes and ladders play board, chess board, color learning board, shapes learning board, numbers learning board and the like. Alternatively play structure 201 may be configured as a three dimensional landscape
20   structure such as, but not limited to a jungle, a savanna, a field, an island, a battlefield, a garden, a beach, a river with one or two sides, and the like. Alternatively play structure 201 may be configured as a three dimensional structure such as but not limited to a kitchen, a working tool desk, a doll house, a farm, a castle, a pirate ship, a car racing track, a car racing stadium, an airport, a swimming pool, a zoo, a globe, a
25   shape puzzle, a number puzzle, and others of the same type. Alternatively play structure 201 may be configured in a three dimensional shape such as a doll, a knight, an imaginary creature like monster, an imaginary creature from outer space, an animal including without limitation prehistoric animals such as dinosaurs, marine animals such as fish, dolphin, shark, octopus, turtle, snake, and other marine animals, wild
30   animals such as lion, tiger, elephant, giraffe, dingo and other wild animals, domesticated animals and pets like horse, cow, sheep, goat, pig, dog, cat, and the like, robots, musical instruments such as a guitar, a violin, a trumpet, a piano and other musical instruments, and any other figured character.

           DTEs 202 are configured according to the opportunities that play structure
35   201allows. For example, when play structure 201 is a savanna then DTE 202 may be various animals such as a lion, a zebra, a giraffe, an elephant, and any other typical

5   animal. It may also be human characters such as an animal savior and his team, a researcher and his team, authentic (exotic) tribe members, and various accompanying accessories suitable for each variation. In accordance with the specific example illustrated above, one or more of the elements may further be a field-vehicle such as a jeep, a tent, and in fact, DTE 202 may be any other element that may create a story in

10 the savanna, and combinations of elements thereof. Similarly, when play structure 201 is a kitchen then DTE 202 may be a plate, a pot, a tea pot, etc. Similarly, when play structure 201 is an "ABC" learning board then DTE 202 may be the letters A to Z. Similarly, when play structure 201 is a mathematics learning board, then DTE 202 may be numbers 0 to 9. Similarly, when play structure 201 is a doll then DTE 202

15 may be a wearing particles and accessories such as a shirt, a dress, trousers, skirt, a hat, eye glasses, shoes, bags, and the like. In the same manner, each play structure 201 may interact with enormous variations of DTEs 202 designed in various shapes, materials, sizes, and colors.

The interaction of each DTE 202 with play structure 201 in accordance with

20 the present invention may be established by using various technologies, including without limitation by RFID (Radio Frequency Identification) technology, by NFC (Near field communication) technology, by Bluetooth technology, via sensors and sensor detectors such as but not limited to, pressure sensors, touch sensors, odor sensors, temperature sensors, distance sensors, acceleration sensors, humidity sensors,

25 sound sensors, and image sensors, and by utilizing plurality of toy connective recognition elements, as fully described in U.S. Patent Application No. 61657914 in which two of the joint inventors are the inventors of the present application, the disclosures of which is hereby incorporated by reference, or by using a mixture of available technologies. For simplifying the description of the invention the interaction

30 of each DTE 202 with play structure 201 will be demonstrated in details with reference to the toy connective recognition elements mentioned above, however it should be clear that similar implementation may be utilize by using sensors and sensors detectors, or any other technology as mentioned above as well as other communication technologies available in the art mutatis mutandis to the specific

35 communication technology in use.

The toy connective recognition elements described in U.S. Patent Application No. 61657914 are generally based on a TAG element that is functionally attached to

5   DTE 202, and at least one toy environmental recognition component denoted hereinafter: "**hotspot element**" 210. In such variation, a plurality of hotspot elements 210 may be embedded in play structure 201 in predetermined locations and serve for identifying the attachment of a specific DTE 202 in a specific location on play structure 201 at a specific time point.

10   In accordance with such variation of the invention, each DTE 202 has its unique signature signal that upon generation in a specific hotspot 210 provides the information of the identity and location of the specific DTE 202 attached thereto to play structure 201. For example, a lion being attached in a hotspot near the river of a savanna play structure will generate a different signal than a zebra attached in the

15   same position. Another example, the letter "D" being attached in a hotspot near a picture of a dog will generate a different signal than the letter "X" attached in the same position.

The information from hotspot elements 210 may be carried through wires 215 to a communication manager 220. Alternatively, the information may be delivered to

20   communication manager 220 wirelessly (not shown).

In accordance with one variation of the present invention, each DTE 202 may be cascaded with another element to create a combination of elements - this is rendered possible by including a hotspot circuitry on top of each additional element, allowing the upper element to be mated with the lower one. The final hotspot on

25   MEBT 200 is able to recognize the combination of the accumulated elements.

Communication manager 220 may be designed as an independent, separated unit housed, for example, in a simple packaging that is functionally attached to play structure 201, or it may be designed as a dependent unit embedded in play structure 201.

30   In accordance with further variation of the invention play structure 201 may comprise a play board and a doll (not shown). In such variation, communication manager 220 may be either attached to the doll or to the board or it may stand alone as a separated unit functionally connected to either one of them or to both. When communication manager 220 is an independent unit play structure 201 may be

35   replaced from time to time to thereby provide the player a variety of game experiences. In the same manner, when communication manager 220 is attached to or

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5   embedded in a doll the play board (not shown) may be interchangeable to challenge and satisfy the player's curiosity and imagination.

In accordance with variations of the invention, each hotspot element 210 may functionally be connected to communication manager 220 in a specific known location within the communication manager, therefore, a signal from a specific

10   hotspot element 210 indicates the exact location of the DTE 202 that triggered the signal generation. For example, a signal coming from the attachment of a cow in the grass will be captured by communication manager 220 in a different location than a same signal generated when the cow is attached in the dairy barn. Another example, a signal coming from the attachment of a circle shape on car wheels will be captured by

15   communication manager 220 in a different location than a same signal generated when the circle shape is attached on the car door.

Alternatively, each hotspot element 210 may functionally be connected to communication manager 220 via an analog multiplexer (as illustrated in fig. 3), wherein said analog multiplexer may either be positioned on play structure 201 or on

20   communication manager 220.

Alternatively, information from hotspot elements 210 to communication manager 220 may be transferred wirelessly by any known means. In that configuration, each hotspot element 210 comprises a unique signal for identifying the location of the hotspot in addition to the signal for identifying the specific DTE 202

25   that was attached to the hotspot element 210.

Additionally, in the specific variation illustrated in figure 1, communication manager 220 may further receive supplemental information from sensors 230 through wires 235 or in a wireless manner (not shown). Sensors 230 are preferably embedded in play structure 201 and may be, for example but not limited to, sensors of pressure,

30   touch, odor, temperature, distance, acceleration, Capacitive touch sensors, humidity, sound, image, and other sensors known in the art.

Sensors 230 may be activated by the player's activities (not shown). A player may touch, press, caress, and activate any of the sensors embedded in play structure 201. The user may talk to MEBT 200 or just approach MEBT 200 and a sound sensor

35   or an image sensor (such as a camera) will capture the signal.

5   Communication manager 220 may also be connected to input elements 240 either through wires 245 or wirelessly. Input elements 240 may be for example, a camera or a microphone or any other audio and/visual elements capable of capturing sound and/or image of the player and the playing activity and transmit the information to communication manager 220. Communication manager 220 may, for example, but

10   not limited to, capture the voice of the player or its image for identification of its presence; capture voice signal of the player for activity commands, and the like.

Communication manager 220 may further be connected to output elements 250 either through wires 255 or wirelessly. Output elements 250 may be a speaker or a screen for example that may produce a sound or image. Therefore, output elements

15   250 may receive from communication manager 220 instructions to generate a sound or an image, or both, and act accordingly. One example for such scenario is when communication manager 220 instructs output element 250 of a doll to cry or to laugh, a cow to moo, a pirate to shout, a guitar to play and the like. Another example for such scenario is when communication manager 220 instructs output element 250 to

20   produce an image according to the player's movements. Additionally, output element 250 may also be an odor producing element. In such scenario output element 250 may produce a specific smell according to the situation. In a kitchen game when the players bake a cake then a sweet smell may be produce and when the player prepare an omelet a significant smell of a fried egg is produced and so on. In a doll, when the

25   player makes a shower to the doll, then the doll may say: "now I smell good" and a perfume smell may be produced. It should be clear that in accordance with the present invention MEBT 200 may comprise several different output elements 250 or none.

Communication manager 220 may further be connected to structure changing elements (hereinafter: "SCE") 260 either through wires 265 or wirelessly. SCE 260

30   may cause structural changes in play structure 201, and/or in DTE 202. SCE 260 may cause a doll, animal, robot, monster, and any other optional figured character of play structure 201 to open/close its eyes or its mouth, a dog to wag his tail, a flag in a pirate sheep to flutter and so on. SCE 260 may comprise engines and may further provide play structure 201 movement capabilities. In such variation, play structure

35   201 may be designed for example as a vehicle (e.g. a car, a bus, a motorcycle, a truck, an airplane, a helicopter, a train, a boat, etc.), as an animal (continental animal, marine animal or flying animal).

5   It should be clear that for simplifying reasons only a pair of hotspots 210, wires 215, sensors 230, wires 235, input elements 240, wires 245, output elements 250, wires 255, SCE 260 and wires 265 are drawn in figure 1, but the number of all of the above, embedded in a single play structure may be smaller or larger, and the

10   number of each pair is not connected to any other pair, besides its connecting wires.

MEBT 200 may functionally be connected to an external supporting subsystem 300. Supporting subsystem 300 may comprise at least two elements: A smart device 320 and a server 330. The connection of MEBT 200 to smart device 320 may be established by direct connectivity by cables, for example by wires 310, or it

15   may be established wirelessly by any known wireless technology including without limitation, Standard Bluetooth (BT), Bluetooth 4.0, Infra Red (IR), Radio frequency (RF), Near Field Connection (NFC), Zigbee, I2C, SPI, UART, sound, Ultrasonic sound, and other 2.4 GHz RF protocols, and any other wireless communication technology know in the art.

20   The connection between MEBT 200 to server 330 may be established via smart device 320 or directly by using for example Wi-Fi, WiMAX, 3G, any other internet communication technology know in the art. In such direct connection between MEBT 200 to server 330 smart device 320 may also be remotely connected to MEBT 200.

25   Smart device 320 may be a Smartphone, a tablet, a smart TV (IPTV), a personal computer (PC), a notebook, a Gaming console (mobile and immobile) or any other device with connectivity and computational needed abilities. In accordance with the present invention, a smart device may also be either one of an Apple TV device, Google TV, Boxee-Box, Gaming console, streamer, and a PC, being connected to a

30   TV or computer screen.

In accordance with one option of the invention, smart device 320 may be embedded in play structure 201. For example, when smart device 320 is a Smartphone it may be embedded in play structure 201. In accordance with one another option of the invention, smart device 320 is functionally attached to play structure 201.

35   In accordance with one further variation of the invention, play structure 201 may be a virtual toy and only software with graphical representation of the toy exists.

When connectivity of MEBT 200 is established through smart device 320, smart device 320 is functioning as the information transferring unit and for that purpose has mainly three functionalities: a. receiving and sending information to and from MEBT 200 through communication manager 220; b. directly interacting with the player or players; c. receiving and sending information to and from server 330.

As part of its first functionality, smart device 320 receives information from communication manager 220. Such information may be, but not limited to, information about the attachment of a specific DTE 202 in a specific hotspot 210, information from sensors 230 on some activity of the player, sound and/or picture information from a player through input element 240, and the like.

As part of the same first functionality, smart device 320 may also send information to communication manager 220. Such information may be, but not limited to, information on sound or image to be activated by output element 250, information to SCE 260 to perform a structural change or to start/cease moving, etc.

As part of the second functionality as directly interacting with the player, smart device 320 may offer the player to select from available games or applications. For example, smart device 320 can display a picture similar to play structure 201 including locations of different DTEs 202 positioned in play structure 201. When the player positions the DTEs 202 in an appropriate position a success indication will be created, and when the player misses the appropriate position then a hint may be created, either a vocal hint such as "MOVE FORWORD" "MOVE TO RIGHT", "MOVE BACK", or a visual hint such as lightening an optional spot.

In accordance with one another example, smart device 320 may display an image of play structure 201 and upon attachment of a specific DTE 202 to play structure 201 an image of the specific DTE 202 attached thereto is displayed on the smart device screen, and the virtual character displayed on the screen may talk, sing, move, dance, tell a story, and interact with other characters either similar to other DTEs or virtual characters.

Further, as part of its third functionality, smart device 320 is adapted to interact with server 330. Smart device 320 comprises an application that gathers signals and data from MEBT 200 and sends for decoding and processing, preferable over the internet to server 330. The server generally processes the gathered data and

5   detects the physical interaction of the player with the toy, such as head petting, hand
shake, lift, tilt, etc., and in response, server 330 sends relevant commands to the
application preferably via the internet. These commands are converted, for example,
to voice reactions in speakers that may be part of smart device 320 or be embedded in
MEBT 200, and/or to a visual reaction on the screen of smart device 320.

10   Smart device 320 may be connected to server 330 by wireless connection or
by wires 340. In accordance with variations of the invention, server 330 may be a
physical server located in the vicinity of MEBT 200. Alternatively it may be a remote
or a virtual server located in cyber space as an internet site or in any other form
available. Alternatively, smart device 320 may include server capabilities within and
15   may serve as both functionalities.

In accordance with variations of the invention smart device 320 comprises and
run dedicated software that includes at least the following:

i. a driver adapted to communicate with a Central Artificial Intelligence
(denoted hereinafter as: "CAI"), as will be described in details below by using
20   a proprietary protocol that allows transferring data between the tangible toy and the
smart device;

ii. a game engine i.e. a software framework which allows rapid development
of game content and includes various graphics, toolkits, and a special software
interface that allows the game content to receive and send events to the driver;

25   iii. game content i.e. the main game idea concept behavior and graphics which
interacts with the player and responds to actions taken on the MEBT. As the smart
device has internet connectivity the game content also has the ability to communicate
with the server, thus, enabling at least: to customize game behavior, to increase the
game content, to allow multi player experiences, and to allow sharing and viewing the
30   player generated content.

In accordance with variations of the invention, server 330 has various
functionalities and some of them are listed below:

First, it may function as the information processing unit; Second, it may
function as the storage medium for all sound, picture, software applications, software
35   games, and else; Third, it serves as the junction for other satellite toys to participate in
the social activities of the system provided herein; Forth it may serve as the vehicle

5   for gathering information for CAI 500 that serves as the system analysis tool; Fifth it
     has a role in the recognition process and authentication of toys and/or users; Sixth it
     gathers and stores information about each user and its preferences; Seventh it has a
     role in advertisement management that may afterwards run in front of the users
     screens; Eighth it gathers and store User Generated Content and distribute it later on
10   in a smart manner.

        As part of the first functionality of server 330, as the information processing
     unit, server 330 may receive data from smart device 320 or directly from
     communication manager 220 in MEBT 200. Data may be retrieved from either one of
     sensors 230, hotspots 210 and input elements 240, or from some of them. Server 330
15   manipulates the data and acts accordingly. For example, but not limited to, server 330
     may receive sound commands that were entered by the player to input element 240.
     Server 330 analyses the sound commands and sends back to MEBT 200 an action
     instruction. Such action instruction reaches communication manager 220 directly or
     via smart device 320. The action instruction may be, for example but not limited to, a
20   sound to be generated by output element 250, a structural changing activity, or a
     movement to be performed by SCE 260.

        As another example, server 330 may receive as a data the sound of the player's
     name and use it when approaching the player after identifying him/her.

        As another example, the player may ask a question, the question is delivered
25   as sound to server 330 that by using software that was preinstalled on the server
     answers the player's question.

        As another example, server 330 may identify, using software preinstalled on
     the server, the player playing at the moment by identifying its voice or its picture and
     act accordingly. Server 330 may have a database of players already played in MEBT
30   200 by their voice, picture, playing preferences, scoring in plays, toy's identity and the
     like, and personalize the gaming experience of each player. Additionally, server 330
     may further collect contents generated by users and re-distribute this content.

        As part of the second functionality of server 330 as the storage medium for all
     sound, picture, software applications, software games, users generated content, etc.,
35   server 330 is functionally operating as a library, updated continuously by sounds and

5   images to be created by input elements 240, games and applications to be played using smart device 320, and the like.

As part of the third functionality of server 330 as the junction for other satellite toys to participate in the social activities of the system, server 330 is functionally connected to satellite toys 400 preferably via wireless connection 410.

10   Satellite toys 400 may be similar to MEBT 200 and connect with server 330 in the same manner, or they may differ from MEBT 200 as long as they are capable of connecting with server 330. The interaction between satellite toys 400 and MEBT 200 through server 330 may be for one or more of the following: sharing content created by a player using sounds, pictures, text, paintings and other kind of data with other

15   players; rate content created by other players; compete in games with other players, and the like.

Server 330 may further be connected to CAI 500 that is functionally adapted to serve as a system analysis tool. CAI 500 has two main functionalities: learning about   a   specific   player   (the   same   child)   from   different   toys

20   and adjusts all his toys accordingly; and learning from all toys on statistical behavior of players and act accordingly.

In accordance with additional variation of the invention, smart device 320 and server 330 may further be connected to stand alone Apps that may be compatible with system 100. In such scenario, the specific player will be recognized by server 330

25   (authentication) and adaptation to its preferences according to data that previously was collected may occur to thereby enhance the player's gaming experience.

In the following, specific examples of interaction between the player and the different components of system 100 as well as specific implementation of various feature of the connected interactive system provided herein and the creation of a novel

30   central artificial intelligence platform will be describes to better demonstrate the major capabilities and characteristic of the system provided herein. Also, in the following examples specific excerpt of proprietary coding protocols will be provided. For simplicity of the description in the following the system and parts thereof will be generally denoted as: "toy". Also, the terms "player", "user" and "child" may be used

35   in the following interchangeably.

Example 1 - Voice

Speech to text (Voice recognition) - The toy reacts to the player's instructions;

Text to speech - The toy answers the player without relying on preloaded recorded voice;

Recording and embedding of voice - The toy asks for the player's name, the player answers and the toy uses that name from now on with its own voice;

Voice identification - The toy identifies the player's voice.

Example 2 - Vision

Face identification - The toy identifies the player's face;

Video recording and sharing - Parents are at work x it using a method such as pattern recognition.

Example 3 -Mechanics

Wheels/Legs - The toy is mobile and can move around independently;

Empathy spurring organs - The toy has a human look that establishes emotional connection with the child. This concept could be referred as "biological MMI" (Man Machine Interface) or "emotional MMI", and will make leverage of human emotions in order to achieve greater attention, dedication and other goals;

Arms - The toy can build a small tower from cubes or move a pawn on a chess board.

Example 4 – sensors

Touch sensors - The toy can identify the player's touch;

Distance sensors - The toy can identify an obstacle;

Accelerometer/Gyroscope - The toy can identify how it was moved by the player;

RFID - Toy can identify RFID tags on other elements;

Camera - Toy can process image/video;

Direct conductor interface - Toys can identify other elements based on direct conductors interface.

Example 5 – Navigation and Orientation

Movement capabilities -The toy can move around the house independently.

Example 6 – Personality

The toy has moods and emotions.

Example 7 - Inter-personal interactions

Social capabilities -A Boy-toy independently decides to ask a Girl-toy to a dance while they meet each other in the kitchen.

Social connection between a toy to a remote toy.

5   *Social connection between a child to a remote child, through their toys.*

Multiple social connections, which form a "group" of children and toys that share a related playing experience.

Example 8 - Multi-element

The toy can recognize that a new nose was connected to it and says "Wow, now I can

10 smell better!"

The color learning board can recognize that the yellow and blue elements are connected and say: "Blue and Yellow make Green!"

Example 9 – Cross platform

Personal artificial intelligence (PAI) can be installed on various type of smart devices,

15 such as iOS devices, Android devices, Windows devices, Linux devices and others

Example 10 - PAI learning

Natural learning - The toy can adjust to the player: to his skills, abilities, knowledge and personal taste. This can be achieved by at least four models of natural learning:

1. Habituation – new elements in the environment will get bigger attention

20 than old elements. For example: the toy reacts to a new shirt that was purchased for him differently than to an already known element. Another example: the toy will be more calm when it's in the hands of someone known (the child), rather than in the hands of a stranger.

2. Operant conditioning – The toy will constantly change its own reactions to

25 the environment, by measuring the child's reactions to its behavior. For example: the child will discover that when he pets the toy, the toy enjoys it and closes its eyes. If the child liked this reaction, he will probably pet it more often. The toy will respond by enhancing its reaction to the petting. This method allows the toy to change its moods and basic traits according to the reinforcements it receives from the child.

30 3. Classical conditioning – two events that often occur together, can be used for a new type of learning. For example: The child usually listens to the toy's story before bed time, and then gives the toy a kiss. After several times the toy identifies the pattern, and reacts to it. For example, by saying before bed time: "now a story and a kiss!"

35 4. Play – the toy can learn new things from playing with the child. For example, after a game of learning new words, the toy also learns some new words.

Guided learning - The child records a new voice that should be played when the toy is lifted. In general, while in learning mode, the user can evoke events and record new

21

5   sounds right afterwards. Sounds will be twisted and then be used by the toy, when
       same events are evoked.

       Advanced users learning - A parent from Poland teaches the toy to speak Polish –
       although the toy was released to the market without this language. Any advanced user
       can change the toy's behavior.

10   **Example 11 – CAI learning and PAI personalization**

       Specific user - The CAI learns about the same player from different toys, and adjusts
       all his toys accordingly.

       All users – The CAI learns from all toys and makes usage of what it learnt in order to
       optimize the personalization of each PAI for each player. This learning process will

15   happen both automatically and manually by the CAI's operators.

       Example 12 – CAI scalability

       CAI supports millions of PAIs simultaneously.

       Example 13 - Authentication

       Toy-PAI authentication - PAI knows which toy is connected and when.

20   *Toy-CAI authentication* - CAI knows which toy is connected and when and makes
       sure that only original toys are supported.

       Toy-Communication manager authentication – the communication manager identifies
       which toy it is connected to.

       Example 14 - Player analysis

25   CAI can determine capabilities and characteristics of the player.

       Example 15 - User rating and collaboration interface

       Interface which allows users to explicitly rate content created by other users, share the
       content created by them and download content created by others.

       Example 16 - Interface to application developers

30   Main technological parts will be packaged as a platform. Third party developers will
       receive API and/or SDK add-ons.

       Example 17 - Alter-ego

       Online remote person can speak through phone/internet while the toy plays the sounds
       along with synced animation. A person's face can also be animated into the toy based

35   on standard pictures. Offline recording could be used as well.

       Example 18 – Pop-up Toy

       The toy may also appear and react on a close screen (Smartphone/Tablet/TV/Etc.)
       when the child calls the toy by its name.

5   **Example 19 -No-Host-mode**

Toys have a very basic behavior also when not connected to any smart device. For

example the toy seems to be sleeping.

Example 20 - Excerpt from Communication manager C code based on Arduino

board: scanning hardware hotspots, debouncing, transmitting to iPhone based

10   **on audiojack connector via proprietary FSK protocol**

```
       #include <stdio.h>
       const int sensorPin = A0;
       const int muxSelectPin0 = 2;
15     const int muxSelectPin1 = 3;
       const int muxSelectPin2 = 4;
       const int muxSelectPin3 = 5;
       const int transmitPin = 7; //12
       const int ledPin = 13;
20     #define NUM_OF_ELEMENTS 8
       #define ELEMENT1_VALUE 90//lion 1k
       #define ELEMENT2_VALUE 195//zebra 3k
       #define ELEMENT3_VALUE 512//tiger 10k
       #define ELEMENT4_VALUE 445//giraffe 7.6k
25     #define ELEMENT5_VALUE 343//elephant //5k
       #define NOELEMENT_VALUE 1023
       #define TOLERANCE_PERCENTAGE 10.0
       ...
       void selectMuxInput(int index)
30     {
         digitalWrite(muxSelectPin3, LOW);
         switch (index)
         {
           case 0:
35           digitalWrite(muxSelectPin0, LOW);
             digitalWrite(muxSelectPin1, LOW);
             digitalWrite(muxSelectPin2, LOW);
             break;
           case 1:
40           digitalWrite(muxSelectPin0, HIGH);
             digitalWrite(muxSelectPin1, LOW);
             digitalWrite(muxSelectPin2, LOW);
             break;
       ...
45         case 7:
             digitalWrite(muxSelectPin0, HIGH);
             digitalWrite(muxSelectPin1, HIGH);
             digitalWrite(muxSelectPin2, HIGH);
             break;
50       }
       }
       byte detectElementNumber(int ADCvalue)
```

```
 5    {
          if (isAround(ADCvalue,  (int)ELEMENT1_VALUE))
             return 1;
          if (isAround(ADCvalue,  (int)ELEMENT2_VALUE))
             return 2;
10        if (isAround(ADCvalue,  (int)ELEMENT3_VALUE))
             return 3;
          if (isAround(ADCvalue,  (int)ELEMENT4_VALUE))
             return 4;
          if (isAround(ADCvalue,  (int)ELEMENT5_VALUE))
15           return 5;

      if (ADCvalue>=1000) // nothing
          return 0;
      }
20    void loop() {
          char hotspot, byte4send;
          int i;
          for (i=0; i<(int)NUM_OF_ELEMENTS; i++)
          {
25            selectMuxInput(i);
              sensorValue = analogRead(sensorPin);
              hotspot = 'A';
              hotspot += i;
              byte                    elementDetected          =
30    detectElementNumber(sensorValue);
              if (lastDetected[i] != elementDetected)
              {
                  delay(100);
                  elementDetected                              =
35    detectElementNumber(analogRead(sensorPin));
                  if (lastDetected[i] != elementDetected) {
                      delay(100);
                      elementDetected                          =
      detectElementNumber(analogRead(sensorPin));
40                    if (lastDetected[i] != elementDetected) {
                          if (elementDetected>0)
                              sprintf(serialStr,   "hotspot   %c   has
      element %d",hotspot,elementDetected);
                          else if (elementDetected == 0)
45                            sprintf(serialStr,   "hotspot   %c   is
      empty",hotspot);
                          else if (elementDetected<0)
                              sprintf(serialStr,   "hotspot   %c   ---
      invalid detected: %d",hotspot, sensorValue);
50
                          Serial.println(serialStr);
                          if (elementDetected>=0)
                          {
                              lastDetected[i] = elementDetected;
55                            transmitHotspotState();
```

24

```
                ledState = !(ledState);                    5
                digitalWrite(ledPin, ledState);
              }
          }
        }
      }                                                     10
    }
}
```

Example 21 – Excerpt from iPhone driver Objective-C code: decodes proprietary audio FSK protocol from microphone input and converts it to numerical data regarding tag/hotspot info, sends to application

```
#import "remoteIO.h"
#import "globals.h"
          switch( stateMachineSelector )
          {
              case 1:
                  if(q[i]>maxSignal)
                  {
                      sampelsCounter++;
                      break; //from case
                  }
                  else if (q[i]<minSignal)
                      stateMachineSelector=2;


              case 2:
                  if(q[i]>maxSignal)
                  {
                      frequencyM(sampelsCounter);
                      stateMachineSelector=1;
                      sampelsCounter=0;
                      break;


                  }
                  else if(q[i]<minSignal)
```

```
5                         sampelsCounter++;
                          break;
        }
        void frequencyM(int samplesPerPeriod)
        {
10          const int Min2k=1400;
            const int Max2k=2800;
            const int Min8k=6700;
            float f;
            float time;
15          static float fArray[4] ;
            static int f2k=0;
            static int f8k=0;
            time=(float)samplesPerPeriod/44;
            f=(1/time)*1000;
20  if( !(f>3600 && f<4800) )
            {

            for(int j=0; j<4; j++)
            fArray[j]=fArray[j+1];
25          fArray[3]=f;
            }
            else if( (f>3600 && f<4800) )
            {
                for(int j=0; j<4; j++)
30                  fArray[j]=0;
            }
            for(int i=0;i<4;i++)
            {
            if(fArray[i]>Min8k )
35              f8k++;
                else if (fArray[i]>=Min2k && fArray[i]<=Max2k )
                f2k++;
            }
```

26

```
5        if(f2k==4)
         {
             f=2000;
             for(int j=0; j<4; j++)
                 fArray[j]=0;
10       }
         else if(f8k==4)
         {
             f=8000;
             for(int j=0; j<4; j++)
15               fArray[j]=0;
         }
         else
            f=0;
          f2k=f8k=0;
20       if(f==2000 || f==8000)
            getHexa(f);
         }
     -(void)showDigital:(int *) word
     {
25       static int stateOfWords=WAIT_FOR_FIRST_F;
         static int numOfFrames =NUM_HOTSPOTS;
         int decimal= [refToSelf binaryToDecimal:word];
         switch (stateOfWords)
         {
30           case WAIT_FOR_FIRST_F:
                     if(decimal==15)
                   stateOfWords=WAIT_FOR_SECOND_F ;
                 break;


35

             case WAIT_FOR_SECOND_F :
                     if(decimal==15)
                   stateOfWords=WAIT_FOR_INIT_ZERO ;
```

```
                            else

                                  stateOfWords=WAIT_FOR_FIRST_F ;

                            break;

                      case WAIT_FOR_INIT_ZERO :

                            if(decimal==0)

                                  stateOfWords=ADD_DATA_BYTE;

                            else if(decimal==15)

                                  stateOfWords=WAIT_FOR_SECOND_F ;

                            else

                                  stateOfWords=WAIT_FOR_FIRST_F ;

                            break;

                      case ADD_DATA_BYTE :

                            if(decimal==15)

                            {

                                  stateOfWords=WAIT_FOR_SECOND_F ;

                                  numOfFrames=NUM_HOTSPOTS;

                                  _countSpots=0;

                            }

                            else

                            {

                                  [refToSelf insertWord:decimal];

                                  numOfFrames=numOfFrames-1;

                                  if(numOfFrames==0)

                                  {

                                        numOfFrames=NUM_HOTSPOTS;

                                        stateOfWords=WAIT_FOR_FIRST_F;

                                  }

                            }

                            break;

      }

-(void)StartListeningWithFrequency//:(float)frequency

{

      OSStatus status;

      _countSpots = 0;
```

```
 5        AudioComponentDescription desc;
          desc.componentType = kAudioUnitType_Output;
          desc.componentSubType = kAudioUnitSubType_RemoteIO;
          desc.componentFlags = 0;
          desc.componentFlagsMask = 0;
10        desc.componentManufacturer                          =
   kAudioUnitManufacturer_Apple;
          AudioComponent          inputComponent              =
   AudioComponentFindNext(NULL, &desc);
          status   = AudioComponentInstanceNew( inputComponent,
15 &audioUnit);
          UInt32 flag = 1;
          status          =          AudioUnitSetProperty(audioUnit,
   kAudioOutputUnitProperty_EnableIO,
   kAudioUnitScope_Input,kInputBus, &flag, sizeof(flag));
20        AudioStreamBasicDescription audioFormat;
          audioFormat.mSampleRate                             =
   44100.00;//44100.00;
          audioFormat.mFormatID                               =
   kAudioFormatLinearPCM;
25        audioFormat.mFormatFlags                            =
   kAudioFormatFlagIsSignedInteger                            |
   kAudioFormatFlagIsPacked;
          audioFormat.mFramesPerPacket    = 1;
          audioFormat.mChannelsPerFrame   = 1;
30        audioFormat.mBitsPerChannel     = 16;
          audioFormat.mBytesPerPacket     = 2;
          audioFormat.mBytesPerFrame      = 2;
          status = AudioUnitSetProperty(audioUnit,
   kAudioUnitProperty_StreamFormat,
35 kAudioUnitScope_Output,
   kInputBus,
   &audioFormat,
   sizeof(audioFormat));
```

```
5    AURenderCallbackStruct callbackStruct;
         callbackStruct.inputProc = recordingCallback;
         callbackStruct.inputProcRefCon = self;
         status = AudioUnitSetProperty(audioUnit,
     kAudioOutputUnitProperty_SetInputCallback,
10   kAudioUnitScope_Global,
       kInputBus,
     &callbackStruct,
     sizeof(callbackStruct));
     float bufferLength = 0.005;
15   AudioSessionSetProperty(kAudioSessionProperty_PreferredHa
     rdwareIOBufferDuration,
     sizeof(bufferLength), &bufferLength);
         status = AudioOutputUnitStart(audioUnit);
     }
20
```

Reference is now made to **Figure 2** that is an example of a connected interactive multi element toy system in accordance with variations of the present invention.

A multi elements toy bear system 600 comprises a toy bear 700, a detachable element 780, a smart device 800, and a server 900.

Toy bear 700 has four types of elements: it has sensors such as touch sensors 710 that can identify caressing activity of the player/child in the belly and/or on the head of the toy bear 700. It has input elements like microphone 720 located in toy bear 700 ear and can simulate the feeling of hearing by toy bear 700. It has output elements like speaker 730 located in toy bear 700 mouth simulating talking by toy bear 700. It has structural changing elements like mechanical lips 740 and mechanical eyes 750 that upon command either one of them can be opened and closed. In addition, it may have movement capabilities so as to allow the bear for example, to walk, to jump, to set, to lie and stand afterwards, to turn to other directions, etc. Further, for regular operation it may have an operation button 760 and indication LED 770 assuring the operation of the device.

5   All elements embedded in toy bear 700 are connected to communication manager (not shown) that is connected wirelessly to smart device 800, for example by Bluetooth technology. In such example, bear 700 may further comprise activation button for the Bluetooth.

All the elements embedded in toy bear 700 can create by dedicated software
10   algorithms installed either in smart device 800 or in server 900, or in both, a gaming experience of a "live" animal.

For example, toy bear 700 may talk to the player when he/she touches it for the first time and greet it with "hello"; it may record the player voice for identification; it may identify the player by identifying its voice and call him/her by
15   the name when talking; toy bear 700 may make sounds when touched in touch sensor 710 areas like giggling, or growling softly; it may change the sound according to the pattern of touch; it may close its eyes when the player pets him via the structural changing elements; it may read a story or sing a song or teach math through speaker (stories, songs and math problems can be downloaded from server 900 that may
20   update its database library on a regular basis; bear 700 may also teach the player to sing a song by giving him a line of song (through speaker 730) and check if line is correct (through microphone 720) by using a dedicated software in smart device 800 or in server 900. Similarly, bear 700 may also teach the player to solve a math problem by giving him a math riddle (through speaker 730) and check if answer is
25   correct (through microphone 720) by using a dedicated software in smart device 800 or in server 900. It should be clear that the above examples are only an un-limiting pinch of activities and functionalities of system 600 and many other optional functionalities and operating ability of multi elements toy bear system 600 as described in details with reference to figure 1 are practicable and within the scope of
30   the present invention.

Reference is now made to **Figure 3** that is a schematic block diagram illustration of one variation of major components and connection links between play structure 3201 comprising sensors 3230 and hotspots 3210, communication manager 3220, and smart device 3320. In accordance with the example illustrated in figure 3
35   communication manager mainly comprises: an analog multiplexer/sensor detector 3222, a micro control unit (MCU) 3224 (that comprises at least an ADC 32241(AC to DC convertor), and a GPIO port 32242 (general purpose input/output pin), and may

5   further comprise a Bluetooth connector 3225), an oscillator 3226, and a battery 3228 and a power supply and management unit 3229 that are functionally adapted to provide communication manager operation power.

Upon connection of a DTE with a tag similar to DTE 202 illustrated in details with reference to figure 1, to a hotspot 3210 (similar to hotspot 210 illustrated in

10   figure 1) embedded in the play structure 3201, a circuit with a predefined resistance (defined by the tag value) is closed. As the MCU 3224 instructs the analog multiplexer 3222 to scan all possible inputs continuously, when a change in resistance is detected (via voltage comparison on the ADC port 32241) the MCU 3224 reports to smart device 3320 via Bluetooth transmission, on which port a

15   change occurred (position) and to which new value (tag value detection). Consequently, smart device 3320 recognizes the specific DTE attached to the play structure and the specific location that it was attached to. GPIO port 32242 is further connected to analog multiplexer 3222 and controls which entrance will be active at each specific moment.

20   It should be clear that that the combination illustrated in figure 3 is only an example and in accordance with variations of the invention, the system may or may not contain an analog multiplexer. In addition, while existing, the analog multiplexer may be positioned on play structure or as a component of the communication manager.

25   In accordance with one specific variation of the invention (not shown), system 100 may comprise a MEBT designed as a doll, preferably but not necessarily a plush doll, and a smart device such as smart phone or a tablet is preferably embedded in the doll. The doll may be designed in many different shapes, sizes, and resemble various types of creatures. The doll functionally comprises touch sensors embedded for

30   example in the doll's legs, arms, head and stomach and optionally in other organs and areas of the doll. The sensors in addition to their major functionalities, further allow the PAI to be aware of locations and relations between all objects. The smart device is functionally connected to a server, preferably but not necessarily on a cloud technology. The smart device may comprise among other things, a face animation that

35   virtually complete the flash doll face, and as such the doll is virtually able to open and close the eyes, to open and close the mouth, to blink, to giggle, to cry, to sing a song, to tell a story, and to perform many other functionalities, as illustrated above. In

5   accordance with this specific application, the doll may also react to the smart device
     sensors and add-on applications. The personality of a specific doll and related
     applications can be updated by CAI and the doll usage is constantly monitored. In
     accordance with the specific variation provided herein, the doll may implement an
     asynchronous digital communication protocol, which may also include an error

10   detection mechanism, based on FSK (Frequency Shift Key) modulation. The same
     line (cord) can also transmit the regular microphone input since different frequencies
     are used. Other communication protocols including without limitation: Standard
     Bluetooth, Bluetooth 4.0, NFC, Infra-red, I2C, SPI, UART, Ultrasonic sound and
     other 2.4 GHz RF protocols, may also be used between the doll's integrated circuit

15   (IC) and the smart device.

         Optionally, an image/video analysis can replace some of the sensors. More
     specifically, a camera of the smart phone or the tablet may be used instead of a sensor.
     Alternatively, a built-in screen may be implemented in the doll. In such scenario, the
     smart device may not be embedded in the doll. In such model and when there's more

20   than one smart device, the player can control the doll via the smart device.

         Additionally or alternatively, a mechanical face and other mechanical organs
     such as mechanical legs and arms may be implemented in the doll. Alternatively, the
     doll may have movement capabilities via wheels. In such scenario, some of the
     sensors allow orientation and navigation, e.g. distance sensor and accelerometer. The

25   doll can navigate autonomously, based on algorithms implemented on the PAI. In
     such variation complex relations between the player and the "playing system" are
     possible. One example is having a game where the player holds a "gun" and the target
     is the navigating doll. After a successful "shot", the doll reacts accordingly.

         The player (child) can create "scenes" based on teaching the doll new

30   behaviors. The child can also "play" scenes created by other children, and related
     videos can be presented on adjacent screens such as Smartphone/tablet/IPTV.

         The Smart device may further be connected to several buzzers, wherein each
     buzzer is being used by a different player to thereby allow multi-player games such as
     trivia.

5   It should be clear that in the variation illustrated above other kinds of toys instead of a doll may also be used, e.g. a car, a boat, an airplane, a basket for basketball game, a football goal, and other toys that are not based on a doll.

         In accordance with specific variation of the invention, a basket can recognize shots and differentiate between successful shots to unsuccessful shots. This may be
10   practiced by utilizing a movement sensor that is adapted to identify vibrations on the basket in order to identify that the basket was hit by the ball. Inside the ring of the basket, a beam and another sensor may be positioned. When the sensor stops recognizing the beam, it means that the shot was successful. In such variation, the PAI may track scores, provide statistics, and manage competitions between the players.

15   It should be clear that the description of the embodiments and attached Figures set above in this specification serves only for a better understanding of the invention, without limiting its scope. It should also be clear that a person skilled in the art, after reading the present specification could make adjustments or amendments to the attached Figures and above described embodiments that would still be covered by the
20   present invention.

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5   **CLAIMS**

1. A connected multifunctional system adapted to provide a user at least one of a
    learning experience, and entertaining experience, and combinations thereof, said
    system comprising: a multi elements base comprising at least a base structure and
    a plurality of detachable elements, a communication manager, and an external

10   supporting system comprising at least a smart device, wherein an action
    performed by said user on said multi element base via a specific detachable
    element creates a signal containing at least information related to identification of
    the specific detachable element involved in the action and the relative position
    over said multi elements base that the action was performed, said signal is

15   delivered via said communication manager to said external supporting system and
    activates at least one response to be perform by said external supporting system.

2. A connected multifunctional system according to claim 1, wherein upon attaching
    a detachable element to said base structure at least one signal is produced, said
    signal produced is specific to the particular detachable element being attached to

20   said base structure and differ from a signal that is produced by another detachable
    elements and further comprises information as to the relative positioning of said
    detachable element on said base structure.

3. A connected multifunctional system according to claim 1, wherein said base
    structure further comprises at least one of a sensor, and an input element, and

25   wherein a signal obtained by activating said sensor and/or input element is
    delivered via said communication manager to said external supporting system and
    activates at least one response to be performed by said external supporting system.

4. A connected multifunctional system according to claim 1, wherein said smart
    device comprises a dedicated software application adapted to allow recognition of

30   said multi element base and signals obtained through it and activate at least one
    response in said smart device.

5. A connected multifunctional system according to claims 1, wherein said multi
    elements base further comprises at least one of an output element and at least one
    of a structural changing element, and wherein activation of said at least one output

35   element and said at least one structural changing element is executed upon
    delivery of at least one signal to either one of them or to both from said external
    supporting system.

5   6. A connected multifunctional system according to claim 5, wherein said output element may produce a sound, an image, a light, and a vibration, and wherein said structural changing element may alter the shape or form of said multi elements base and portions thereof, and may provide said multi elements base and parts thereof a movement and navigation capabilities.

10   7. A connected multifunctional system according to claims 1 and 5, wherein said external supporting system further comprises a server.

8. A connected multifunctional system according to claims 1 and 7, wherein said response is selected from the group consisting of: producing an image on the smart device screen, producing a sound via the smart device audio elements;

15   processing information and storing it on the smart device memory; processing information and delivering the processed data to said server either for storage or for further analysis via a dedicated application installed on said server.

9. A connected multifunctional system according to claim 7, wherein said external supporting system allows said multifunctional connected system to be dynamic

20   and to constantly update learning content and entertaining content.

10. A connected multifunctional system according to claim 7, wherein said server functionally allows gathering information for creating a central artificial intelligence that serves as a general external system analysis tool.

11. A connected multifunctional system according to claim 1, wherein said base

25   structure is either a two dimensional board or a three dimensional board or a structure.

12. A connected multifunctional system according to claim 1, wherein said base structure is selected from the group consisting of: alphabetic characters board, numbers board, color learning board, musical notes board, playing board,

30   monopoly play board, snakes and ladders play board, chess board, a jungle, a savanna, a field, an island, a battlefield, a garden, a beach, a river with one or two sides, a kitchen, a working tool desk, a doll house, a farm, a castle, a pirate ship, a car racing track, a car racing stadium, an airport, a swimming pool, a zoo, a doll, a knight, an imaginary creature, an animal doll, a human body, a robot, a musical

35   instruments board, an adventures board, a world globe, puzzles and riddles, a board for construction toys, board for cubes, cardboard games, a train, an airplane, a spaceship, a village, a mountain, a lake, a general propose board.

5   13. A connected multifunctional system according to claim 1, wherein said multi
           element base further comprises at least one output element and wherein said
           response to said signal produced to said user's action is performed by said at least
           one output element and activated by signals obtained from said smart device or
           from said server via said communication manager.

10   14. A dynamic connected multifunctional system adapted to provide a user a social
           experience, said system comprising: a multi elements base comprising at least a
           base structure and at least one sensor, a communication manager, and an external
           supporting subsystem comprising at least a smart device and a server, wherein an
           action performed by said user on said multi element base creates a signal delivered

15   via said communication manager to said smart device and further delivered to said
           server to thereby allow processing of said signal by dedicated software on said
           server for creating a social experience to said user.

       15. A dynamic connected multifunctional system according to claim 15, wherein said
           social experience is consisted of at least one of the following: sharing content

20   created by said user with other users, sharing learning experience and playing
           experience of the user obtained by utilizing said multi element base and said smart
           device, either synchronized or non-synchronized, with at least one other user,
           learning from preferences and behavior of said user to create a central artificial
           intelligence and to further implement according to statistical analysis on said user

25   preferences of other users and vice versa; ranking scores of shared games; ranking
           liking of shared content.

       16. A dynamic connected multifunctional system adapted to provide a user at least
           one of a learning experience, an entertaining experience, a social experience, and
           combinations thereof, said system comprising: a multi elements base comprising

30   at least a base structure, at least one sensor, and a plurality of detachable elements,
           a communication manager, and an external supporting subsystem comprising at
           least a smart device and a server, wherein an action performed by said user on said
           multi element base via a specific detachable element or a sensor, or both, creates
           at least one signal containing at least information related to identification of the

35   specific detachable element involved in the action and the relative position over
           said multi elements base that the action was performed, and at least one signal
           indicating the sensor in use, said signals are delivered via said communication
           manager to said external supporting system and activates at least one response to

5   be perform by said external supporting system, and wherein said signals or consequent signals are further delivered to said server to thereby allow processing of said signals by a dedicated software on said server for creating either one of a learning experience, an entertainment experience, a social experience, and combinations thereof, to said user.

10   17. A dynamic connected multifunctional system according to claim 16, wherein said signal created upon an action performed by said user on said multi element base via a sensor, or via a specific detachable element is delivered directly to said server through a wireless internet connection.

     18. A central artificial intelligence adapted to collect and analyze data related to

15   personal preferences and behavior of large amount of user while using a connected multifunctional system comprising learning and entertaining abilities to further implement according to statistical analysis of a group of users with common characteristics on a specific user preferences that comply with the predetermined characteristics defining said group of users.

20   19. A central artificial intelligence according to claim 18, wherein said system is the system according to claim1.

     20. A connected multifunctional system adapted to provide a user at least one of a learning experience, and entertaining experience, and combinations thereof, said system comprising: a multi elements base comprising at least a base structure and

25   either one of at least one sensor and a plurality of detachable elements, or both, a communication manager, and a smart device with a touch screen, wherein an action performed by said user on said multi element base via a specific sensor or a detachable element, or both, creates a signal containing at least information related to identification of the specific sensor or the detachable element involved in the

30   action and the relative position over said multi elements base that the action was performed, said signal is delivered via said communication manager to said smart device and activates at least one response to be perform by said smart device that is either displayed on said touch screen or involves a production of sounds via said smart device, and wherein said user further controls said multi elements base via

35   said touch screen of said smart device.

     21. A connected multifunctional system according to claim 20, wherein said learning experience, and entertaining experience provided to said user are obtained by

5   utilizing said smart device touch screen as a learning and playing tool concomitantly with said multi elements base.

22. A connected multifunctional system according to claim 20 further comprising a server for allowing creating a social experience.
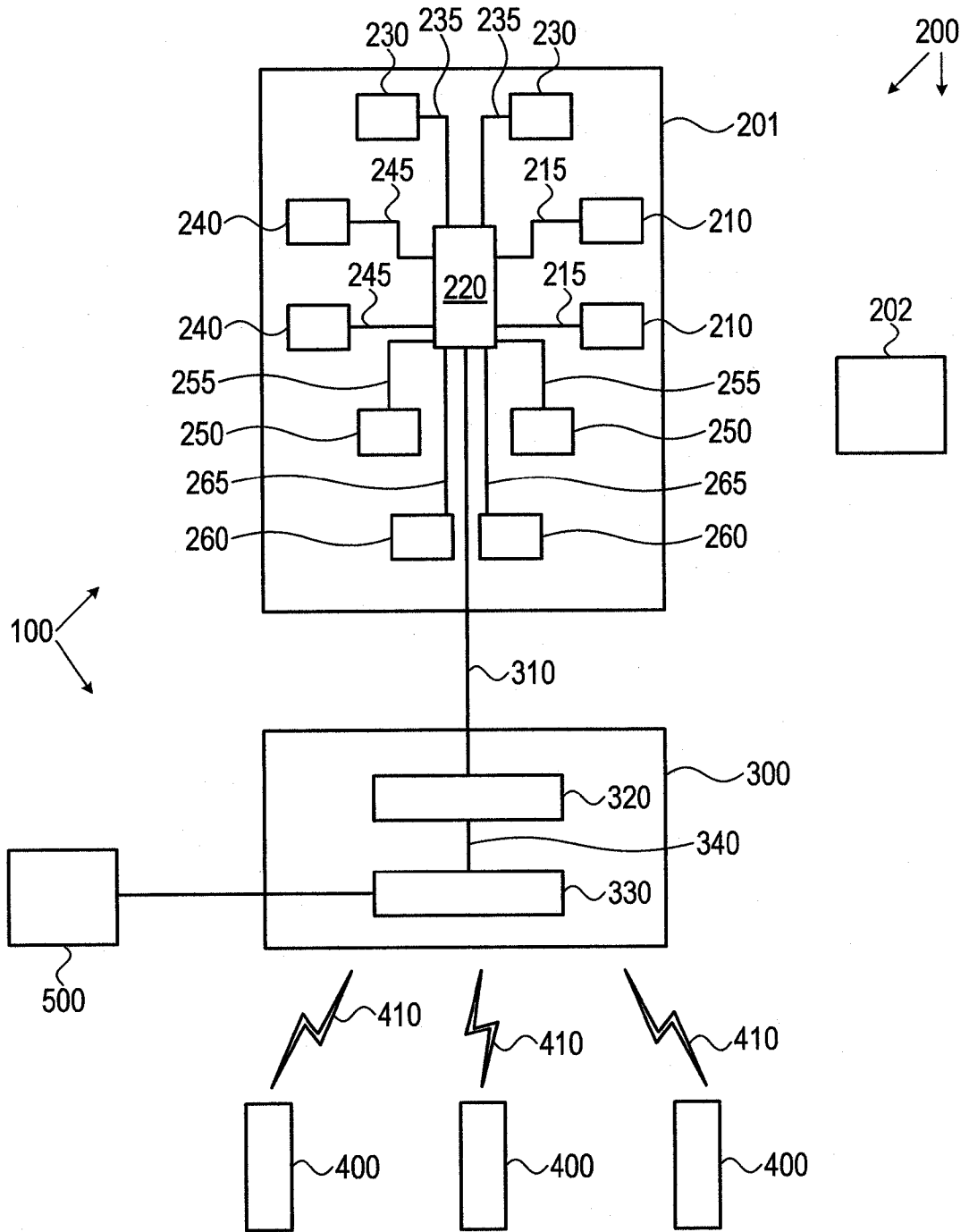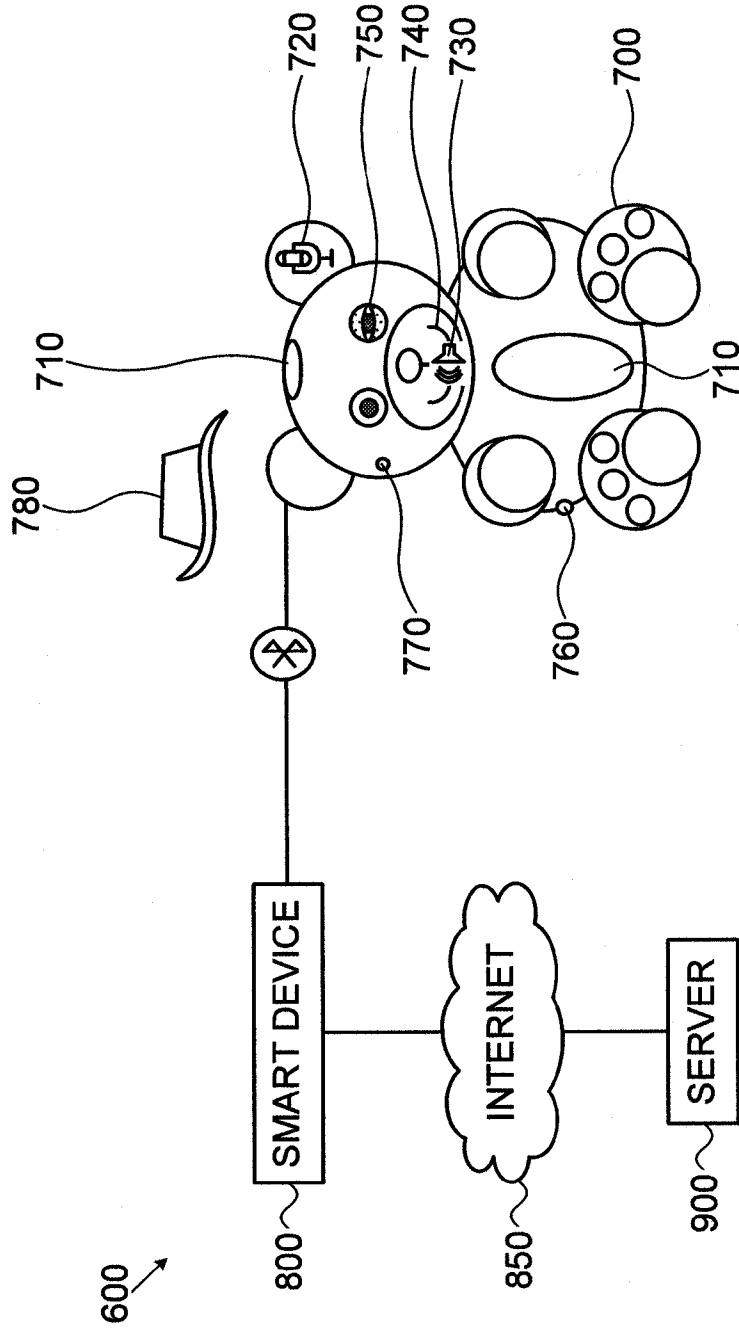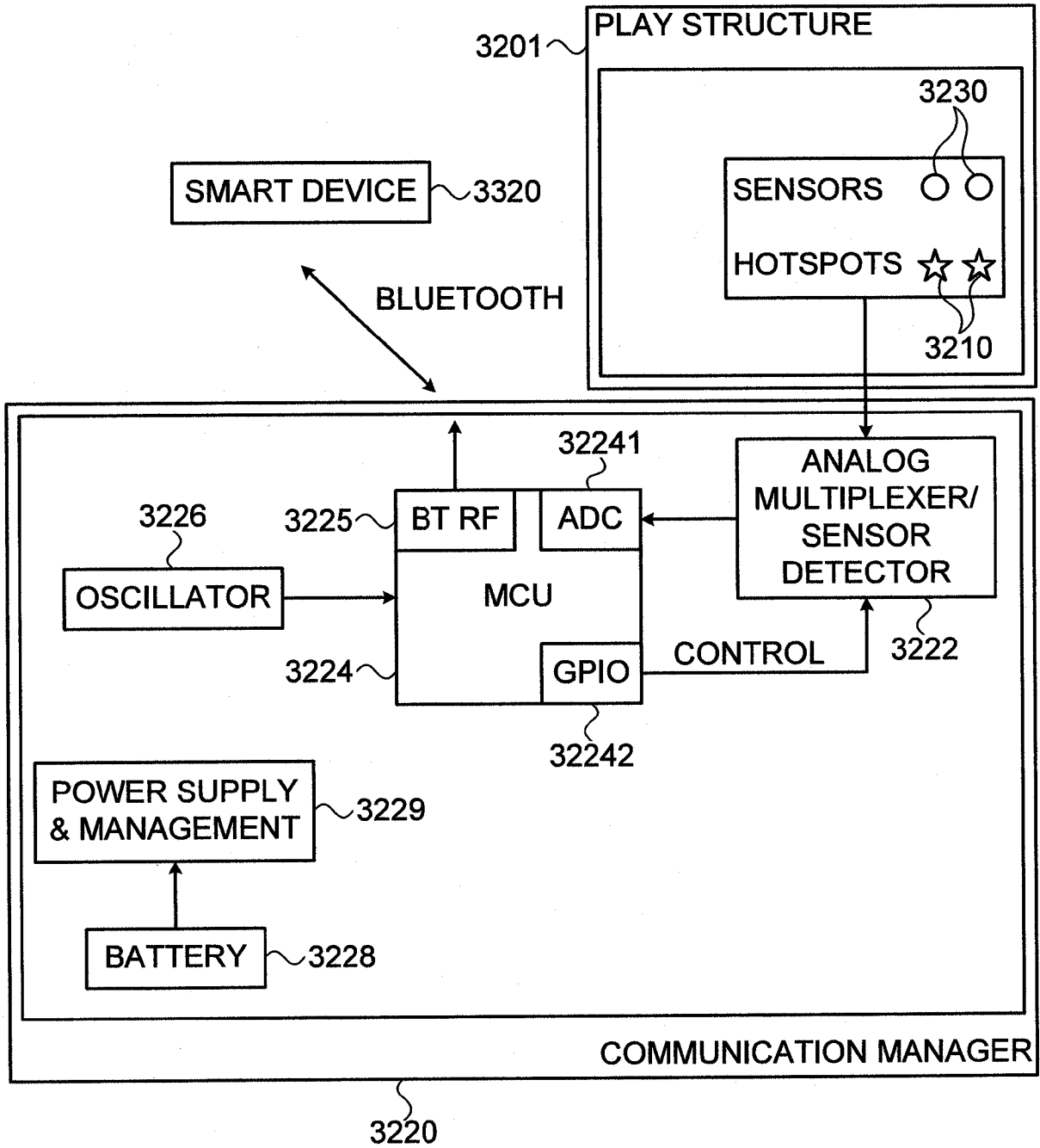
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FIGURE. 1

FIGURE. 2

FIGURE. 3

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC (2012.01) A63H 3/36, A63H 3/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC (2012.01) A63H 3/36, A63H 3/28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☐ Further documents are listed in the continuation of Box C.   ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 Dec 2012	06 Dec 2012

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