A ball or sport accessory allows players to interact using a variety of computing functions; combines one or more sensors, displays, cameras, projectors, memory, hardware, processors or other components capable of providing computer functionality; allows users to record and share images and video, to receive live directions from coaches or other players, to understand or correct mistakes by replaying videos instantaneously, or to undertake other computing activity without the need of additional devices; allows users to listen to music or to watch two or three dimensional movie or television files; and/or functions as a cell phone. The ball or sport accessory may allow users to play video games, view holograms, project images or videos, and download websites and/or third party applications. The sport accessory may determine whether the user has sustained an impact that may cause a concussion, or whether the user may suffer a sunstroke.
SENSOR ACTIVATED BALL AND SPORT ACCESSORY WITH COMPUTER FUNCTIONALITIES

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This patent application claims priority to U.S. Provisional Patent Application No. 61/581,898, filed on Dec. 30, 2011, the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention generally relates to balls, athletic equipment, and sports accessories, and specifically sensor activated balls, athletic equipment and sports accessories.

[0004] 2. Description of the Related Art

[0005] Many recreational or athletic activities require balls and other sport accessories, such as hats, helmets, basketball hoops, etc. But conventional balls or sport accessories typically are dull and dull, failing to stimulate the players’ senses. For example, conventional balls and sport accessories do not display images or play sounds when a player catches or touches them. The lack of interactivity of conventional balls and sport accessories is particularly noticeable when a user is exercising alone, without anyone with whom to interact. U.S. Pat. Nos. 5,316,293, 5,492,329, 5,761,096, 5,779,576, 6,012,995, 6,157,898, 6,582,330, 6,695,728, 6,945,887, 7,273,431 and D647,286; U.S. Patent Publication Nos. 2005/0064966, 2010/0031424, 2010/0069181, 2010/0285909, 2011/0265722, and 2011/0237367; and foreign patents nos. EP 0136217, EP 1232772, JP 2011-12375, KR 10-2011-0881353, discuss balls, sport accessories or devices with displays, but do not disclose activating these displays by touch or sound. U.S. Publication No. 2010/0313334 discloses a sports cap with a display that may be touched, however the sports cap is not a durable ball or sport accessory that players may use to engage in athletic or recreational activity. U.S. Publication No. 2009/0029808 discloses a basketball board with a display and a pressure type sensor, but does not disclose that the display provides computer functionality, such as mobile web browsing, social networking and/or voice calling. Conventional touch activated devices do not have the design or durability to be used during physical athletic activities. For example, U.S. Pat. Nos. 7,082,578 and 7,755,605 discuss devices that are used to activate a display screen; however these devices are not designed for athletic activity. These touch activated devices are similar to control devices, such as a computer mouse, that are used to manipulate graphical objects on user interfaces, and are not durable enough to withstand sport activities. Thus, there is a need for balls and sport accessories that react to a player’s actions, including touch, heat, and sound and have interactive functionality, yet are durable enough to withstand sport activities.

[0006] Additionally, conventional balls or sport accessories lack computer functionality. For example, conventional balls or sport accessories do not allow players to record images or videos, and share them with others, such as through web pages and/or social networking sites. Often during athletic play, players may want to record videos, play computer games, browse the web or execute other computer or electronic functionalities. However, many players do not use their phones, cameras, computers, game consoles, or other electronics during athletic activity for fear these electronics might be damaged. U.S. Publication No. 2011/0281621 provides a system that wirelessly integrates golf equipment with a computer, but does not provide computer functionality as part of the actual golf equipment. Thus, there is a need for balls or sport accessories that can be used during athletic play while allowing players to socially interact with one another.

[0007] Furthermore, conventional sport accessories lack the ability to sense the potential for or existence of concussions or sunstroke, and inform a physician, parent, or other person when there is a potential for or existence of concussions or sunstroke so that medical attention can be provided if necessary. For example, conventional sport accessories lack the ability to sense the impact of forces that may cause a player to suffer a concussion; determine when a potential concussion may have occurred; and communicate to the player and/or with an outside party (e.g., coach, physician or parent) when a player has suffered a potential concussion. Thus there is a need for a sport accessory that can determine when a concussion may have occurred, and instantly alert the player and the contact the appropriate personnel to assist the player.

[0008] Conventional sport accessories also lack the ability to sense the vital signs of a player, determine whether the player may suffer or has suffered a sunstroke, and communicate with an outside party (e.g., coach, physician or parent) when the player may suffer or has suffered a sunstroke. Thus there is a need for a sport accessory that can determine when a player may be in danger of sunstroke or that a player has suffered a sunstroke, and instantly alert the player of the existing danger, and contact the appropriate personnel to assist the player.

SUMMARY OF THE INVENTION

[0009] In view of the above discussion and the shortcomings in the prior art, various embodiments of the invention seek to overcome such shortcomings of the prior art by providing a ball or sport accessory that combines sensors, displays, and computer functionality.

[0010] According to an embodiment of the present invention, a novel ball for use in sport activities includes a ball skin, a display that may be attached to the ball skin, one or more sensors that may be located on either the ball skin or the display, and electronic components that are within the ball skin. The display of the ball may be activated when one or more sensors are activated. The ball may include computer functionality.

[0011] In some embodiments, the sensors may sense touch, sound, light, image or heat. In some embodiments, the ball may include one or more cameras, projectors, speakers, or microphones that may be activated by the sensors. The display of the ball may be composed of flexible materials, such as OLED, AMOLED or PMOLED materials. The display of the ball may be a touchscreen that may display images, videos, emails, articles, web pages, touchscreen keyboards, menus, interactive panels or social network pages. The electronic components may include a processor, a memory, a power supply, an accelerometer, a gyroscope, a Wi-Fi chip, a Wi-Fi antenna, a USB dock, a power supply, a speaker controller chip, a touchscreen controller chip, a camera sensor chip and lens, a projector sensor chip and lens, a microphone, a holographic image sensor, a Bluetooth transmitter and receiver, a video recorder, a projector, a fan, and a cooling pad. The electronic components may include software
instructions for executing at least one of music players, web browsers, e-mail access, text messaging, onscreen keyboards, voice dialing, Bluetooth capabilities, character recognition, synchronization of multiple email accounts, synchronization of desktop or laptop computers or other devices, voice recording, GPS, Microsoft Office (MS) compatible applications, social networking functionality, multi-player connectivity, multi-application execution capability, software applications, Wi-Fi, 2G/3G/4G connectivity, menus allowing the navigation of different applications, multimedia applications, digital camera access applications, Internet television display, Internet radio, touch holograms and kinetic technology.

[0012] According to another embodiment of the present invention, a novel sport accessory for use in sport activities includes a shell, a display that may be attached to the shell, one or more sensors that may be located on either the shell or the display, and electronic components that are within the shell of the sport accessory. The display may be activated when one or more sensors are activated. The sport accessory may include computer functionality.

[0013] In some embodiments, the sensors may sense touch, sound, light, image or heat. In some embodiments, the sport accessory may include one or more cameras, projectors, speakers, or microphones that may be activated by the sensors. The display of the sport accessory may be composed of flexible materials, such as OLED, AMOLED or PMOLED materials. The display of the sport accessory may be a touchscreen that may display images, videos, emails, articles, web pages, touchscreen keyboards, menus, interactive panels or social network pages. The electronic components may include a processor, a memory, a power supply, an accelerometer, a gyroscope, a Wi-Fi chip, a Wi-Fi antenna, an USB dock, power supply, a speaker controller chip, a touchscreen controller chip, a camera sensor chip and lens, a projector sensor chip and lens, a microphone, a holographic image sensor, a Bluetooth transmitter and receiver, a video recorder, a projector, a fan, and a cooling pad. The electronic components may include software instructions for executing at least one of music players, web browsers, e-mail access, text messaging, onscreen keyboards, voice dialing, Bluetooth capabilities, character recognition, synchronization of multiple email accounts, synchronization of desktop or laptop computers or other devices, voice recording, GPS, Microsoft Office (MS) compatible applications, social networking functionality, multi-player connectivity, multi-application execution capability, software applications, Wi-Fi, 2G/3G/4G connectivity, menus allowing the navigation of different applications, multimedia applications, digital camera access applications, Internet television display, Internet radio, touch holograms and kinetic technology.

[0014] In some embodiments of the sport accessory, the sport accessory may include one or more pressure sensors that measure a force exerted on the sport accessory and transmits the force to the electronic components. The sport accessory may be a helmet and its electronic components may determine whether the force exerted on the helmet caused a concussion. The electronic components may store information about a person wearing the helmet that includes at least one of the person’s weight, height, age, blood pressure, pulse rate, allergies, medical history of past concussion, and medical history of hypertension. The electronic components may use one or more of the force and the stored information to determine whether a potential concussion has occurred. The electronic components may determine that a potential concussion has occurred and transmit an alert to an outside party and/or the person wearing the helmet. The sport accessory may include a microphone, speaker and/or headset that provide for communication between the person and the outside party. The sport accessory may communicate wirelessly with at least one health monitor device, at least one of the health monitors senses the person’s vital signs and transmits them to the helmet, and the electronic components determine whether the person is in danger of suffering a sunstroke. The electronic components may alert at least one of an outside party and the person wearing the helmet when the electronic components determine that the person is in danger of suffering a sunstroke.

[0015] In some embodiments, the sports accessory may be a helmet that communicates wirelessly with at least one health monitor device that senses a person’s vital signs and transmits the vital signs to the helmet, and the electronic components determine whether the person is in danger of suffering a sunstroke. The electronic components transmit an alert to an outside party and/or the person wearing the helmet when the electronic components determine that the person is in danger of suffering a sunstroke or has suffered a sunstroke. The sport accessory may include a microphone, speaker and/or headset providing for communication between the person and the outside party.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Certain embodiments of the present invention will be better understood when read in conjunction with the appended drawings wherein like reference numerals refer to like components. For the purposes of illustrating the present application, preferred embodiments are shown in the drawings. It should be understood and appreciated, however, that the application is not limited to the precise arrangements, structures, features, embodiments, aspects, and devices shown, and the arrangements, structures, features, embodiments, aspects and devices shown may be used singularly or in combination with other arrangements, structures, features, embodiments, aspects and devices.

[0017] The drawings are not necessarily drawn to scale and are not in any way intended to limit the scope of this invention, but merely to illustrate embodiments of the invention. In the drawings:

[0018] FIG. 1 is a perspective view of a football according to an embodiment of the present invention;
[0019] FIG. 2 is an x-ray view of the football shown in FIG. 1;
[0020] FIG. 3 is a perspective view of the football shown in FIG. 1 and an illustrative screen shot displayed on the football shown in FIG. 1;
[0021] FIG. 4 is a perspective view of the football shown in FIG. 1 and another illustrative screen shot displayed on the football shown in FIG. 1;
[0022] FIG. 5 is a perspective view of the football shown in FIG. 1 and a plurality of devices for use with the football shown in FIG. 1;
[0023] FIG. 6 is a perspective view of a football according to an embodiment of the present invention;
[0024] FIG. 7 is an exploded perspective view of a football according to an embodiment of the present invention;
[0025] FIG. 8 is a perspective view of a basketball according to an embodiment of the present invention;
[0026] FIG. 9 is a perspective view of a bat according to an embodiment of the present invention;
[0027] FIG. 10 is a rear view of a helmet according to an embodiment of the present invention;

[0028] FIG. 11 is a perspective view of the helmet shown in FIG. 10;

[0029] FIG. 12 is a side view of the helmet shown in FIG. 10;

[0030] FIG. 13 is a block diagram of a system according to an embodiment of the present invention;

[0031] FIG. 14 is a front view of a helmet according to an embodiment of the present invention;

[0032] FIG. 15 is a side view of the helmet shown in FIG. 14; and

[0033] FIG. 16 is a helmet according to an embodiment of the present invention with an illustrative screenshot, and a physician and a plurality of devices that may interact with the helmet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0034] Certain exemplary embodiments of the invention will now be discussed with reference to the aforementioned figures. In general, such embodiments relate to a ball or sport accessory, although as one of ordinary skill in the art can appreciate, certain embodiments of the present invention can be utilized in connection with various other recreational or athletic devices or the like. Embodiments of a ball or a sport accessory according to the present invention are described below. These embodiments are provided for the purpose only of illustrating principles of the present invention, and should not be interpreted as limiting the invention in any way beyond the scope of the claims and their equivalents.

[0035] A ball or sport accessory combines one or more sensors, displays, cameras, projectors, memory, hardware, processors or other components capable of providing computer abilities. The ball or sport accessory may be suitable for games such as basketball, soccer, American football, rugby, volleyball ball, handball, dodge ball, baseball, softball, tennis, etc. The ball may include footballs, basketballs, soccer balls, handballs, dodge balls, volleyball balls, etc. The sport accessory may be a variety of accessories that may be used during athletic activities, including, but not limited to bats, racquets, basketball hoops, etc.

[0036] A ball or sport accessory, according to the present invention, is interactive and may be used during athletic or recreational activity. The ball or sport accessory may be made out of any material that is suitable for athletic play and/or smart touch technologies. The material may be composed of material that is weather proof, including material that is resistant to water, wind, heat, and cold. Alternatively, the material may be coated with a coating that is weather proof, such as rubber, polyvinyl chloride (PVC), polyurethane (PU), silicone elastomer, fluoropolymers, or wax.

[0037] The present invention provides an advantage over the prior art by allowing players to activate a variety of features and computer functions through a variety of sensors. For example, the present invention allows players to use a ball or sport accessory to record and share images and video, receive live directions from coaches or other players, understand or correct mistakes by replaying videos instantaneously, or undertake other computer activity without the need of additional devices. The smart touch electronic balls or sport accessories, according to the present invention, are cordless, mobile, wirelessly connectable to the Internet, and/or capable of voice and video communication.

[0038] The ball or sport accessory may include sensors that may sense motion, touch, light, heat or sound for activating a display, sound, or other features. The ball or sport accessory may also include a projector and an input device, such as a keyboard or track-pad. The ball or sport accessory may include a display that may display lights, two or three dimensional images or videos, and/or lenticular images. The surface of the display may have sufficient mechanical strength to withstand the forces that the ball or sport accessory may be subjected to during recreational and competitive athletic play. The display may be in part or in whole bendable or stretchable, resistant to abrasion, and/or have non-slip properties. The display may be weather proof, including material that is resistant to water, wind, heat, and cold. For example, the display may be composed of material that is weather proof. Alternatively, the display may be coated with a weather proof coating, such as rubber, polyvinyl chloride (PVC), polyurethane (PU), silicone elastomer, fluoropolymers, or wax.

[0039] The ball or sport accessory may also have speakers or other devices for recording and outputting sound and music. The display, speakers or other elements of the ball or sport accessory may be controlled by a remote device, such as a remote controller or keyboard. The ball may also include a camera that may record pictures or video and/or output pictures or video to the display.

[0040] The ball or sport accessory may include computer functionality, including an operating system capable of running software applications. The operating system may be a Microsoft based system, an Apple based operating system, a Google operating system, or any other type of operating system. The software applications may be related to nationally known sport organizations, such as the National Football League (NFL), National basketball Association (NBA), Major League Baseball (MLB), National Hockey League (NHL), National Basketball League (NBL), etc. The ball or sport accessory may provide athletic players the ability to interact with others via a ball or sport accessory computer device that is also designed for sport activities. The computer functionality may allow players additional advantages in sport training, as well as the ability to connect live to other players and instantaneously share files with other players or friends. The computer functionality of the ball or sport accessory may also allow users to listen to music or to watch two or three-dimensional movie or television files that are streamed live via the Internet or are downloaded to the ball or sport accessory. The ball or sport accessory may function as a cellular or mobile phone. The ball or sport accessory may also allow users to play video games, view holograms, project images or videos, and download web servers and/or third party applications.

[0041] The ball or sport accessory preferably implements smart touch technology that allows players to experience and share their sport activities on many levels, including using mobile computer functions while undertaking these sport activities. The ball or sport accessory provides the advantage that it can withstand athletic impact forces, weather, and athletic activities, while providing computer functionality. The ball or sport accessory further provides the advantage of a touch activated flexible screen that may be stretched and that can fit within any ball or sport accessory.

[0042] The sport accessory may be a helmet that may sense and alert a player and/or outside party when the player experiences forces associated with a concussion, such as when the player experiences an impact. The helmet may include pres-
sure sensors that detect when there is an impact to the helmet, and/or the force exerted on the head of the player wearing the helmet. The pressure sensors may be positioned around the inner wall and/or padding of the helmet. The helmet may include accelerometer sensors to detect the acceleration of the helmet to calculate the force exerted on the player’s head. The helmet may also sense and alert when a player may suffer or has suffered a sunstroke. The helmet may include photo-sensors for determining a player’s vital signs, including blood pressure, pulse rate, and/or body temperature, and alert the player and/or outside party when there are signs of sunstroke, such as high body temperature and rapid pulse. The helmet may be used in a variety of sports, such as baseball, football, ice hockey, etc.

[0043] The helmet may also communicate with a variety of external devices that may sense the player’s health vital signs. For example, the helmet may communicate with a watch or a body band that may register the player’s blood pressure, pulse rate, and/or body temperature. The external devices may sense a variety of vital signs, such as blood pressure, pulse rate, and/or body temperature. The external devices may be watches, body bands, or wearable fabrics.

[0044] The helmet may include a computer that may determine whether the impact may have caused a concussion. The helmet may warn players of the potential concussion. The helmet may include the capability for one or two way communication between the player wearing the helmet and an outside third party, such as a physician, parent and/or coach. After the computer determines that a potential concussion may have occurred, the computer may initiate one way communication with the player and/or an outside party not within the immediate proximity of the player; and/or two-way communication between the player and/or the outside party. The helmet may notify the player by a voice or sound alert via a microphone or speaker that advises the player that he has suffered an impact that may have caused a concussion. The helmet may notify the outside party via a text message and/or voicemail message that the player has suffered an impact that may have caused a concussion. The helmet may allow the outside party to communicate with the player wearing the helmet. The outside party may be a person or it may be an automated voice response system. The outside party may determine whether the player has concussion symptoms or should seek medical attention by asking the player questions to evaluate whether the impact has disrupted brain function such as memory, consciousness, and organized thought; and may perform neurocognitive testing on the player while he is on the field. The helmet may communicate with an outside system or may determine on its own whether the player has a concussion.

[0045] The helmet may allow outside personnel to assist a player during the game and alert the appropriate medical staff. The helmet may allow live access to a player’s health statistics and may allow monitoring of the player’s health during injury or sunstroke.

[0046] An embodiment of a football 100 according to the present invention is illustrated in FIGS. 1-5. The football 100 preferably includes one or more sensors 110, a display screen 120, components 230, a camera 140, speakers 150, and an Universal Serial Bus (USB) port 260. The components 230 may communicate directly and indirectly with the sensors 110, the display screen 120, the camera 140, the speakers 150, and the USB port 260 via wires or wireless connections. The football 100 may communicate with other devices via wires or wireless connections. With reference to FIG. 5, the football 100 may wirelessly send signals to and receive signals from a television 510, joystick 520, laptop 530, keyboard 540, cell phone 550, remote control 560, tablet computer 570, or game console 580. Alternatively, the football 100 may communicate with any other devices that are capable of wirelessly sending and/or receiving signals. The television 510, joystick 520, laptop 530, keyboard 540, cell phone 550, remote control 560, tablet computer 570, or game console 580 may control the functionality of the football 100 or may send and receive content and electronic files to and from the football 100, including files such as video, image, music, or sound files. The football 100 may include a keypad or trackpad integrated on the outer surface of the football 100 for controlling the content and functionality of the football 100.

[0047] The sensors 110 of football 100 preferably sense motion, touch, light, heat or sound. The sensors 110 can be located on the outer surface of the football 100 or may be located in whole or in part on the display 120 of the football 100.

[0048] The sensors 110 may include components that are responsive to touch. For example, the sensors 110 may include panels or portions that include components that have resistive components, surface acoustic wave components, and/or capacitive components. The sensors 110 may sense when a user touches certain parts of the football 100. Alternatively, or in addition to, the sensors 110 may sense when a user touches any part of the football 100.

[0049] In order to sense touch, the sensors 110 preferably have a continuous electrical current running through them. When a user touches the sensors 110, the voltage in and around the area touched by the user preferably changes in magnitude. The sensors 110 sense this change and transmit the location and magnitude in the changes in voltage to the components 230. The touch sensors may be activated by a voltage of 1.8-12 V, or by a variety of other voltage ranges, depending on the type of touch sensors that are implemented in the football 100. The sensors 110 may sense complex gestures, including gestures that involve touching multiple parts of the display screen in order to interact with the content displayed on the display screen. For example, the sensors 110 may sense when a user is attempting to move content across a visual display by dragging the content with their finger. The sensors 110 may also sense when a user uses their fingers to make a “pinching” motion in order to manipulate content shown on the display.

[0050] The sensors 110 may include one or more of the following types of touch sensors: single/double button, Active stylus, two-touch, unlimited touch, sliders, wheel sensors, touch switches, deadman switches, capacitive sensing sensors, multi touch technology sensors, touch pad and track pad sensors. For example, the sensors 110 may be capacitive sensors such as those manufactured by Alps Electric Corporation, Cirque, or Synaptics. Alternatively, or in addition to, the sensors 110 may be touchscreen sensors, such as those manufactured by Bending Wave, GDS, Capacitive-Alps Electric Corporation, Atmel, Cirque, Cypress, Host Optical, Synaptics, Infrared, or Neonode. Alternatively, or in addition to, the sensors 110 may be projected capacitance sensors, such as those manufactured by Visual Planet, Bending Wave, GDS, 3M, Elo or any other type of touch sensors. Alternatively, or in addition to, the sensors 110 may be surface acoustic wave sensors, such as those manufactured by Elo TouchSystems or GeneralTouch. Alternatively, or in addition...
to, the sensors 110 may be resistive sensors, such as those manufactured by Elo TouchSystems or 3M.

[0051] The sensors 110 may be a variety of sound sensors. For example, the sensors 110 may be one or more of the following types of sound sensors: piezoelectric microphone, fiber optic microphone, liquid microphone (which may be operable in an aquatic environment), Microelectromechanical systems (MEMS) microphone, speakers as microphone, or any other type of sound sensors.

[0052] The sensors 110 may be a variety of image or light sensors. For example, the sensors 110 may be one or more of the following types of image or light sensors: electro-optical sensors, ambient light sensors, active-matrix light-emitting diode (AMOLED) circuit, light-addressable potentiometric sensors, photo sensors, active-pixel sensors, photodiode arrays, light emitting diode (LED) circuits, photodiodes, phototransistors, photoelectric sensors, photomultipliers, photoresistors, or any other type of image sensors. Some manufacturers of the sensors 110 may include Agilent, Aptina, Canesta, Canon, Micron Technology, Nikon, ESS Technology, Fujitsu, MagnaChip, Cypress Semiconductor, Eastman Kodak, Matsushita, Fujitsu, MagnaChip, Pix Art Imaging, TransChip, or Visrtus.

[0053] The sensors 110 may be a variety of heat, sound, motion or other types of sensors. For example, the sensors 110 may be motion sensors, such as sensors that sense proximity and/or movement. The sensors 110 may be visual sensors, such as one or more of the following: optical sensor, virtual sensor, video sensor technology, touch hologram, infra-red sensor. The sensors 110 may be heat sensors, such as silicon bandgap temperature sensors. The sensors 110 may be pressure and impact sensors. The sensors 110 may be transducers, or any other type of temperature, motion, visual and pressure sensors.

[0054] Upon activation of one or more of the sensors 110, the football 100 may display one or more of the following: lights, lenticular images, images, video, or various computer generated graphics. The sensors 110 may also activate an operating system, such as a Microsoft, Apple, Google operating system that provides users the ability to access a variety of software applications and functions, including the applications and functions discussed below with respect to components 230. In particular, the display 120 of the football 100 may display lights, colors, two or three-dimensional images or videos, or lenticular images. The display 120 may have sufficient mechanical strength to withstand the normal forces and high impact pressure that the football 100 may be subjected to during recreational and competitive play. The display 120 may include a single display or multiple display panels. The display 120 may be in part or in whole resistant to abrasion and may have non-slip properties.

[0055] The display 120 and/or the outside skin of the football 100 may be bendable, stretchable, or flexible, allowing a user to manipulate the shape of the football 100 while maintaining the ability to utilize the display 120 and other features of the football 100. Additionally, the display 120 may be stretched during or after manufacturing. For example, a bendable or flexible display 120 may be composed of a skin flexible AMOLED that may include thin-film display technology in which organic compounds form the electroluminescent material and an active matrix refers to the technology behind the addressing of pixels. Alternatively, the display 120 may be composed of an organic light-emitting diode (OLED), which is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compounds that emits light in response to an electric current. This layer of organic semiconductor material may be situated between two electrodes. Generally, at least one of these electrodes is transparent. Alternatively, the display 120 may be composed of a passive-matrix OLED (PMOLED) that may include strips of cathode, organic layers and strips of anode. The display 120 may be printed onto any surface or suitable substrate and in particular may be composed of a flexible OLED structure that allows the surface to be shaped in the shape of football 100.

[0056] The display 120 may include touch sensors that may sense a user’s interaction with the display 120. The display 120 may include one or more of the sensors 110 described above. The display 120 may be in whole or in part a touchscreen display, such as a resistive screen and/or a capacitive screen display.

[0057] The display 120 may sense the touch of a finger or a stylus. The display 120 may include multi-touch technology that senses when multiple portions of a display are touched simultaneously by fingers and/or styluses. With reference to FIG. 3, the display 120 may display a screenshot 370 that has an interactive touchscreen keyboard that allows the user to type emails, notes, commands, status updates via social networks, etc. FIG. 4 demonstrates another illustrative screen shot 470 that displays a different interface on the display 120. The screen shot 470 displays an interactive menu that allows a player to play music by touching the display 120. The sensors on the display 120 may allow users to interact with a graphical interface shown on the display 120. For example, users may use their fingers to zoom in and out of web pages and images by placing two fingers on the screen and spreading them farther apart or bringing them closer together. The sensors on the display 120 may allow users to scroll through a long list or menu by sliding a finger over the display from bottom to top, or vice versa. The sensors 120 may allow users to type texts, hyperlinks, notes, articles, social networking updates, and other information by tapping the display.

[0058] The components 230 may allow the display 120 and the football 100 to provide computer functionality. For example, the components 230 may allow the football 100 to provide Internet connectivity, social networking functionality, games, third party applications, web browsing, email, etc. The components 230 in combination with display 120 may display lights, images, or videos in two or three dimensions. Alternatively, the components 230 in combination with the speakers 150 may play sounds and/or music. The components 230 may include elements that connect to a memory or the USB port 260 via a wired or wireless Internet connection.

[0059] The components 230 may include a memory and a processor. The memory may be any type of memory, including, but not limited to random access memory such as DRAM, SRAM, T-RAM, ZRAM, TTRAM memory, virtual memory, flash memory, or embedded memory. The processor may include one or more of the following: a microprocessor that draws power from a rechargeable battery, a computer CPU that executes commands in clock cycles, an under clocked processor that may run fewer instructions per second then the processor is capable of executing in order to reduce heat production and conserve battery life.

[0060] The components 230 may include one or more of the following: an accelerometer, a two- or three-axis gyroscope, a graphics and/or video processor, a Wi-Fi and/or cellular chip and/or antenna, a USB dock, a power supply, a speaker controller chip, a touchscreen controller chip, a camera sen-
sensor chip and lens, a projector sensor chip and lens, a microphone operating alone or with a microphone connector, a holographic image sensor, data storage, a Bluetooth transmitter and receiver, a video recorder, a projector, a fan, and/or a cooling pad for cooling the components 230.  

[0061] The components 230 may include hardware and/or software for and providing the football 100 computer functionalities, including, but not limited to: music players; web browsers; e-mail access; text messaging; mini-keyboards; on-screen keyboards; voice dialing; Bluetooth capabilities; distributed or embedded processing for fan, mobile input; synchronization capabilities of multiple email accounts; synchronization capabilities of desktop or laptop computers or other devices; voice recording; GPS; web browsing; Microsoft Office (MS) compatible applications (for example, a native system with Pocket PC operating systems or a Google operating systems that may require third-party software); social networking functionality, including YouTube, Facebook, Twitter, and Internet connectivity; multi-player connectivity; multi-application execution capability; software applications, including third party applications; Wi-Fi, and/or 2G/3G/4G connectivity.  

[0062] The components 230 may include software that includes instructions for executing an operating system with a set of programs that manage computer hardware resources and provide common services for application software. For example, the components 230 may be pre-loaded with operating systems. Alternatively, operating systems may be later downloaded to the components 230. The operating systems may include android operating system, iOS, Linux, Mac OS X, Microsoft Windows, or any operating systems that can be incorporated in a computer device, include cellular phones, computer, or video game devices, or web servers.  

[0063] The components 230 may include one or more pre-loaded or downloaded software applications, including browsers, menus allowing the navigation of different applications, multimedia applications, digital camera access applications, Internet television display, touchscreen keyboards, Internet radio, or kinetic technology. The components 230 may allow real-time remote access to and from the football 100. The components 230 may allow either multi-user or single-user access, and may allow multi-tasking or single-tasking access. The components 230 may allow the use of a distributed network, such as a Wi-Fi, mobile phone, television, internet, or game consoles. The components 230 may allow personalized access for a specific user, including authentication functionality. The components 230 may allow the football 100 to act as a single portal, for example as a web portal.  

[0064] The components 230 are preferably fixed to the inner surface of the football 100. As shown in FIG. 1, the components 230 are preferably fixed to the inner surface of the skin of the football 100. For example, the components 230 may be secured in a compartment fixed on the inner surface of skin of the football 100. Alternatively, the components 230 may be located anywhere within the interior of the football 100.  

[0065] The camera 140 may include the ability to take pictures or video. The camera 140 may include one or more of the following: a Digital Micromirror Device (DMD) chip in a projector based on Digital Light Processing (DLP) technology, an image sensor format camera, a high definition or high resolution digital camera, a Digital Video camera, a built-in digital camera, a virtual camera, or a kinetic camera. Alternatively, the football 100 may include multiple cameras. The images or video recorded by the camera 140 may be displayed on the display 120 or may be transmitted via a wired or wireless connection to other users. The images or video recorded by the camera 140 may also be stored in the football 100 for later use. The operation of the camera 140 may be controlled through a touch interface of the display screen 120. Alternatively, or in addition to, the operation of the camera 140 may be controlled through a variety of buttons or touch interfaces on the football 100. Alternatively, or in addition to, the operation of the camera 140 may be controlled through a remote device, such as the devices shown in FIG. 5.  

[0066] The speakers 150 may allow the football 100 to output sound and music. The speakers 150 may be two or more internal speakers that push sound through two small channels leading to three audio ports in the device. The football 100 may include a volume switch, a 3.5-mm TRRS connector, an audio output for providing sound or music for headphones or other devices, a video jack for allowing connection to other devices, and a microphone that can be used for recording sound.  

[0067] The USB port 260 may allow a user to connect the football 100 to a computer or an electronic device. The football 100 may download data or information relating to videos, images, sounds, music, or other information via the USB port 260. The USB port 260 may also allow a battery of the football 100 to be charged via the USB port 260.  

[0068] Using the components 230, the display 120 and other features, the football 100 may advantageously provide players a smart touch sports computer device that is cordless (unless being charged), mobile (easily transportable), always connected (via Wi-Fi, 3G, 4G etc.) and is capable of voice and video communication, Internet browsing, and/or "geo-location" capabilities. The football 100 can operate multiple applications simultaneously, such as simultaneous operation of email and video applications.  

[0069] The football 100 may also include a projector. The project is preferably a mini-projector that is sized to fit within the football 100. The projector may allow players or users to project and view images and/or video on a larger screen. The projector may allow users to use one device for both athletic and recreational activities and for displaying videos or images. The projector may be located within the interior of the football 100, or may be in whole or in part located outside of the football 100. The projector 100 may allow players and coaches to review games or plays in order to correct their play and share their favorite moments of the game.  

[0070] The football 100 may include touch hologram technology. For example, the touch holograms may be implemented using haptic technology, such as Airborne Ultrasound Tactile Display technology, that provides tactile feedback to a user by applying forces, vibrations or motions to the user. The touch hologram may create tactile feeling for a user or player. The touch hologram may also display an interactive hologram. The touch hologram may be part of the outer surface of the football 100 or as part of the display 120.  

[0071] Another embodiment of a football 600 is illustrated in FIG. 6. The football 600 may include sensors 610, display 620, speakers 650, and an USB port 660 with components, and computer functionality and operability as described above with reference to the football 100. The football 600 may be entirely stretchable and/or bendable. For example, the football 600 may be composed of OLED, AMOLED or PMOLED material as described above with regard to the display 120. Alternatively, the football 600 may be composed
of any flexible or bendable material. The flexible or bendable material may allow the football 600 to be twisted in a variety of directions, such as directions A and B. The football 600 can also be stretched in a variety of directions, such as directions C and D.

[0072] Another embodiment of a football 700 is illustrated in FIG. 7. The football 700 may include sensors, a display, inner components 730, camera, speakers, a USB port, and/or computer functionality and operability as described above with reference to the football 100. The inner components 730 may be connected to an inner part 701. The inner part 701 may be composed of plastic or other hard material, and may be aligned to the interior of the football 701. The inner part 701 may stabilize the components 730, allowing the football 701 to function as a computer during or after athletic play.

[0073] An embodiment of a basketball 800 is illustrated in FIG. 8. The basketball 800 may include sensors 810, display 820, camera 840, and a USB port 860 as described above with reference to the football 100. The basketball 800 may include a plurality of components, and computer functionality and operability as described above with reference to the football 100.

[0074] An embodiment of a bat 900 is illustrated in FIG. 9. The bat 900 may include sensors 910, display 920, camera 940, and an USB port 960 as described above with reference to the football 100. The bat 900 may include a plurality of computer functionalities as described above with reference to the football 100.

[0075] An embodiment of a helmet 1000 is illustrated in FIGS. 10-12. The helmet 1000 may include sensors 1010, display 1020, camera 1140, speakers 1050, and a USB port 1060 as described above with reference to the football 100. The helmet 1000 may include a plurality of components, and computer functionality and operability as described above with reference to the football 100.

[0076] An embodiment of a system 1300 of a ball or sport accessory is illustrated in FIG. 13. The system 1300 may be implemented in the footballs 100, 600 or 700, the basketball 800, bat 900, helmets 1000 or 1400, or any other ball or sport accessory in accordance with the present invention. The system 1300 may include display/touch sensors 1310, projector/third party application software 1320, storage 1330, audio/volume components 1340, microphone 1350, video card/light sensor 1360, lens 1370, sensor 1380 and processor 1390. The processor 1390 may control the functionality of all the other components functioning within the ball or sport accessory of the present invention. For example, the processor 1390 may control the sensors, including touch sensor 1310, light sensor 1360, or sensor 1380. The processor 1390 may also control software that affects the information that is displayed or the sound that is outputted for the ball or sport accessory. The processor 1390 receive a signal that one of the sensors has been activated, and in turn activate a variety of components of the ball or sport accessory. For example, the processor 1390 may activate the display 1310 to display video or images, including graphical user interfaces. The processor 1390 may also execute the projector software or third application software 1320 that may access information stored in memory 1330.

[0077] The display 1310 may include touch sensors that are capable of sensing complex hand or stylus motions. Based on the projector software or third party application software 1320, the ball or sport accessory may project information for display on a screen, or may display or project information about a variety of activities, including email or social networking. The audio/volume control 1340 may control the output of sound and may register sound information received by a device, such as microphone 1350. The video card/light sensor 1360 may register video or images received by a device, such as the lens 1370. The video card/light sensor 1360 may include the ability of adding special effects which may be programmed or customized by a user. The sensor 1380 may be any type of sensor, include a sensor that may sense temperature, sound, light, touch, motion, etc.

[0078] An embodiment of a helmet 1400 is illustrated in FIGS. 14-15. The helmet 1400 may include sensors, display, camera, speakers, a USB port, components and/or a plurality of computer functionality and operability as described above with reference to the football 100. The helmet 1400 may include a plurality of pressure sensors 1401. The pressure sensors 1401 may include one or more of the following types of sensors: flex force pressure sensors, piezoelectric sensors, impact sensors, miniature tri-axial sensors, velocity sensors, or any other type of motion sensor. The sensors 1401 may be integrated into the structure of the helmet, such as into the shell of the helmet, the foam padding of the helmet, or any other part of the helmet structure. The sensors 1401 may detect force, torque, and/or acceleration exerted on the helmet 1400.

[0079] The helmet 1400 may include a computer that may receive information from sensors 1401 and/or other sensors and may determine whether the player wearing the helmet may have suffered a concussion. The computer of the helmet 1400 may also determine whether to notify the player and/or an outside party. The computer may store information about the player, such as the player’s weight, height, age, blood pressure, pulse rate, allergies, medical record of past concussion, hypertension tendencies, etc. The computer may register an impact based on the information sensed by the sensors 1401. Upon registering an impact, the computer may determine the force of the impact based on the information from the sensors 1401 and/or from the stored information. Based on the stored information and/or the information from the sensors 1401, the computer may determine whether a potential concussion has occurred using the Head Impact Criterion (HIC) and Head Severity Index (HSI). If the computer determines a potential concussion has occurred, the computer may notify (1) an outside party via a text message and/or voicemail message; and/or (2) the player wearing the helmet 1400 via a voice and/or sound alert. The computer may include software and/or hardware that may calculate acceleration, force, torque, power, velocity, distance, or impact suffered by a player; and perform the HIC and HSI. The computer may include software and/or hardware that may analyze whether potential danger exists to the player based on prior determinations and stored information.

[0080] The helmet may include a microphone and/or a speaker or headset that permits one and/or two-way communication between the player and an outside party. The outside party may be a person, such as a coach, parent, physician, nurse, assistant, etc. Alternatively, the outside party may be an automated voice service, such as an artificial intelligence interactive voice response system. The communication system may be similar to automatic collision notification system available in the automobile industry, such as the OnStar System.

[0081] Upon notification, the outside party may perform neurocognitive testing, ask the player a series of questions in
order to determine if the impact disrupted brain function such as memory, consciousness, and organized thought, and/or determine whether the player is ready to return to the game. If the outside party is an automated system, the helmet may include software or may communicate with outside software that performs the neurocognitive testing, asks the player a series of questions in order to determine if the impact disrupted brain function such as memory, consciousness, and organized thought, and/or determines whether the player is ready to return to the game.

[0082] The computer in the helmet 1400 may perform neurocognitive testing on the player; determine whether the player wearing the helmet 1400 suffered memory loss, lacks clarity of thought, and/or suffers from loss of balance, dizziness, light sensitivity, and/or noise sensitivity; whether certain methods of treatment are particularly appropriate; whether medical attention should be sought; or whether it is safe to return to the game.

[0083] An embodiment of a helmet 1600 is illustrated in FIG. 16. Helmet 1600 may include sensors, display, camera, speakers, a USB port, components, and/or a plurality of computer functionality and operability as described above with reference to the football 100. Helmet 1600 may include a plurality of pressure sensors, a computer, computer, software and communication functionalities as described above with reference to helmet 1400.

[0084] Helmet 1600 may communicate with a plurality of external devices that can sense a player’s vital signs. Helmet 1600 may communicate with a watch 1601, a body band 1602, and/or a wearable sensor fabric 1603. Devices 1601, 1602, 1603 may communicate with the helmet 1600 using Bluetooth, Wi-Fi, Internet, or other wireless communication methodology. Devices 1601, 1602, 1603 may sense a variety of vital signs, such as pulse rate, blood pressure, and/or body temperature. The information sensed by devices 1601, 1602, 1603 may be used by the computer to determine to perform HCI and HSI and determine whether a potential concussion has occurred, whether the player should participate in a game, and/or whether the player should receive a particular method of treatment, as explained above with reference to helmet 1400.

[0085] The information sensed by devices 1601, 1602, 1603 may also be used to determine whether the player may suffer or has suffered a sunstroke. As explained above with reference to helmet 1400, helmet 1600 alerts the player and/or outside party when the player may suffer from a concussion or sunstroke, and/or has suffered a concussion or heatstroke. The computer of helmet 1600 may further include software and/or hardware that may determine whether the player may suffer or has suffered a sunstroke.

[0086] Helmet 1600 may also display information about the player’s vital signs. For example, as shown in screenshot 1604, helmet 1600 may display a player’s blood pressure and pulse rate. As described with respect to the helmet 1400, the helmet 1600 may allow an outside party, such as physician 1606, to ask a player questions about a potential concussion.

[0087] While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention. Accordingly, the invention is to be limited only by the scope of the claims and their equivalents.

[0088] Any number of the features of the different embodiments described herein may be combined into one single embodiment, the locations of particular elements can be altered and alternate embodiments having fewer than or more than all of the features herein described are possible. Functionality may also be, in whole or in part, distributed among multiple components, in manners now known or to become known.

[0089] It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the spirit and scope of the present invention. While there had been shown and described fundamental features of the invention as applied to being exemplary embodiments thereof, it will be understood that omissions and substitutions and changes in the form and details of the disclosed invention may be made by those skilled in the art without departing from the spirit of the invention. Moreover, the scope of the present invention covers conventionally known, future developed variations and modifications to the components described herein as would be understood by those skilled in the art.

What is claimed is:

1. A ball for use in sport activities comprising:
   a. a ball skin having an outer surface and an inner volume;
   b. a display that is attached to the ball skin;
   c. at least one sensor located on at least one of the outer surface of the ball skin and the display;
   d. electronic components located within the inner volume of the ball skin;
   wherein the display is activated by the sensor, and wherein the ball provides computer functionality.

2. The ball of claim 1, wherein the at least one sensor is at least one of a touch sensor, sound sensor, light sensor, image sensor, and heat sensor.

3. The ball of claim 1, further comprising at least one of a camera, a projector, a speaker, and a microphone that is activated by the at least one sensor.

4. The ball of claim 1, wherein the display is composed of flexible materials.

5. The ball of claim 4, wherein the flexible materials include at least one of an OLED material, an AMOLED material, and a PMOLED material.

6. The ball of claim 1, wherein the display is a touchscreen that allows the display of at least one of an image, a video, an email, an article, a web page, a touchscreen keyboard, a menu, an interactive panel and a social networking page.

7. The ball of claim 1, wherein the electronic components include at least one of a processor, a memory, a power supply, an accelerometer, a gyroscope, a Wi-Fi chip, a Wi-Fi antenna, an USH dock, a power supply, a speaker controller chip, a touchscreen controller chip, a camera sensor chip and lens, a projector sensor chip and lens, a microphone, a holographic image sensor, a Bluetooth transmitter and receiver, a video recorder, a projector, a fan, and a cooling pad.

8. The ball of claim 1, wherein the electronic components include software instructions for executing at least one of music players, web browsers, e-mail access, text messaging, onscreen keyboards, voice dialing, Bluetooth capabilities, character recognition, synchronization of multiple email accounts, synchronization of desktop or laptop computers or other devices, voice recording, GPS, Microsoft Office (MS)
compatible applications, social networking functionality, multi-player connectivity, multi-application execution capability, software applications, Wi-Fi, 2G/3G/4G connectivity, menus allowing the navigation of different applications, multimedia applications, digital camera access applications, Internet television display, Internet radio, touch holograms and kinetic technology.

9. A sport accessory for use in sport activities comprising:
   a shell having an outer surface and an inner area;
   a display that is attached to the shell;
   at least one sensor that is located on at least one of the outer
   surface of the shell and the display;
   electronic components located within the inner area of the
   shell;
   wherein the display is activated by the sensor and wherein
   the sport accessory provides computer functionality.

10. The sport accessory of claim 9, wherein at least one
     sensor is at least one of a touch sensor, sound sensor, light
     sensor, image sensor, and heat sensor.

11. The sport accessory of claim 9, further comprising at
     least one of a camera, a projector, a speaker, and a microphone
     that is activated by the at least one sensor.

12. The sport accessory of claim 9, wherein the display is
     composed of flexible materials.

13. The sport accessory of claim 9, wherein the flexible
     materials include at least one of an OLED material, an
     AMOLED material, and a PMOLED material.

14. The sport accessory of claim 9, wherein the display is a
     touchscreen that allows the display of at least one of an image,
     a video, an email, an article, a web page, a touchscreen key-
     board, a menu, an interactive panel and a social networking
     page.

15. The sport accessory of claim 9, wherein the electronic
     components include at least one of a processor, a memory, a
     power supply, an accelerometer, a gyroscope, a Wi-Fi chip, a
     Wi-Fi antenna, an USB dock, a power supply, a speaker
     controller chip, a touchscreen controller chip, a camera
     sensor chip and lens, a projector sensor chip and lens, a micro-
     phone, a holographic image sensor, a Bluetooth transmitter
     and receiver, a video recorder, a projector, a fan, and a cooling
     pad.

16. The sport accessory of claim 9, wherein the electronic
     components include software instructions for executing at
     least one of music players, web browsers, e-mail access, text
     messaging, onscreen keyboards, voice dialing, Bluetooth
     capabilities, character recognition, synchronization of mul-
     tiple email accounts, synchronization of desktop or laptop
     computers or other devices, voice recording, GPS, Microsoft
     Office (MS) compatible applications, social networking func-
     tionality, multi-player connectivity, multi-application execution
     capability, software applications, Wi-Fi, 2G/3G/4G con-
     nectivity, menus allowing the navigation of different
     applications, multimedia applications, digital camera access
     applications, Internet television display, Internet radio, touch
     holograms and kinetic technology.

17. The sport accessory according to claim 11, further
     comprising:
     at least one pressure sensor that measures a force exerted
     on the sport accessory and transmits the force to the
     electronic components,
     wherein the sport accessory is a helmet, and the electronic
     components determine whether the force exerted on the
     helmet caused a concussion.

18. The sport accessory according to claim 17, wherein the
     electronic components store information about a person
     wearing the helmet that includes at least one of the person’s
     weight, height age, blood pressure, pulse rate, allergies, med-
     ical history of past concussion, and medical history of hyper-
     tension, and wherein the electronic components use at least
     one of the force and the stored information to determine
     whether a potential concussion has occurred.

19. The sport accessory according to claim 17, wherein if
     the electronic components determine that a potential con-
     scussion has occurred, the electronic components transmit an alert
     to at least one of an outside party and the person wearing the
     helmet.

20. The sport accessory according to claim 19, wherein the
     sport accessory further comprises:
     at least one of a microphone, speaker and headset provid-
     ing for communication between the person and the out-
     side party.

21. The sport accessory according to claim 18, wherein the
     helmet communicates wirelessly with at least one health
     monitor device, at least one of the health monitors senses the
     person’s vital signs and transmits them to the helmet, and the
     electronic components determine whether the person is in
     danger of suffering a sunstroke.

22. The sport accessory according to claim 21, wherein if
     the electronic components determine that the person is in
     danger of suffering a sunstroke or has suffered a sunstroke,
     the electronic components alert at least one of an outside party
     and the person wearing the helmet.

23. The sport accessory according to claim 11, wherein the
     sports accessory is a helmet that communicates wirelessly
     with at least one health monitor device, at least one of the
     health monitors senses vital signs of a person wearing the
     helmet and transmits the vital signs to the helmet, and the
     electronic components determine whether the person is in
     danger of suffering a sunstroke.

24. The sport accessory according to claim 23, wherein if
     the electronic components determine that the person is in
     danger of suffering a sunstroke or has suffered a sunstroke,
     the electronic components transmit an alert to at least one of
     an outside party and the person wearing the helmet.

25. The sport accessory according to claim 24, wherein the
     sport accessory further comprises:
     at least one of a microphone, speaker and headset provid-
     ing for communication between the person and the out-
     side party.

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