A system, method and apparatus for geospatial tracking and analysis of sports activities. A plurality of wireless electronic sensors with geo location capabilities communicate via a wireless network to track sporting activities. The system eliminates the subjectivity in performance data tracking and analysis by relying on autonomous sensors with geocode technologies and related software. Once the sensors are in place and linked to the geospatial sports tracking software, performance data is nearly 100% accurate to identify players, game equipment, and determine their exact latitude and longitude positions in relation to other players or objects on same playing field. Output reports are digitally available instantly, and immediately upon completion of a collection period or the end of the game.
THE GEOCODER SOFTWARE IS INSTALLED ON A DEVICE WITH WIRELESS CAPABILITIES

AN ELECTRONIC SENSOR IS EMBEDDED INTO THE JERSEY OF EACH PLAYER TO BE TRACKED

AN ELECTRONIC SENSOR IS EMBEDDED INTO THE PRIMARY GAME EQUIPMENT (E.G., THE BALL)

AN ELECTRONIC SENSOR IS EMBEDDED INTO MULTIPLE FIELD BOUNDARY MARKERS, AND THE MARKERS ARE PLACED TO OUTLINE THE FIELD OF PLAY

THE GEOCODER SOFTWARE ACTIVATES THE SENSORS AND BEGINS TO RECEIVE THEIR TRANSMITTED DATA

IS THE FIELD PERIMETER RECOGNIZED?

NO

TRACKING IS TERMINATED UNTIL CONDITIONS ARE MET

NO

ARE THE SENSORS LESS THAN 500 YARDS FROM THE RECEIVING DEVICE?

YES

YES

THE SOFTWARE USES THE TRANSMITTED GEOCODED LOCATION DATA TO DISPLAY A FIELD OF PLAY ON THE DEVICE SCREEN

ON THE SOFTWARE’S GAME SETUP SCREEN, UNIQUE SENSOR IDENTIFIERS ARE AUTOMATICALLY PROGRAMMED TO LINK TO EACH PLAYER, PIECE OF GAME EQUIPMENT, TEAM NAME, LOCATION, AND GAME START TIME


AT THE END OF THE GAME, RECEIVED SENSOR DATA IS AUTOMATICALLY SAVED AND AVAILABLE TO AUTO-POPULATE PERFORMANCE METRIC REPORTS

THE COMPUTER CAN GRAPHICALLY DISPLAY MULTIPLE REPORTS OF THE METRICS FOR THE PLAYERS AND GAMES

FIG. 3
SYSTEM, METHOD AND APPARATUS FOR GEOSPATIAL TRACKING AND ANALYSIS OF SPORTS ACTIVITIES

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority of U.S. provisional application No. 62/455,276, filed Feb. 6, 2017, the contents of which are herein incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to sports activities and, more particularly, to automated systems for tracking sports activities.

[0003] Sports event coaches lack readily available “real-time”, accurate, and reliable player and team performance data during and immediately after a game. Currently, this problem is addressed by manual video recordings, computer software tagging, and time consuming report creation of compiled data. The performance results are mostly subjective because of manual intervention. An approximation of the total time to complete this entire data gathering, performance analysis and reporting processes can take several hours to complete.

[0004] As can be seen, there is a need for improved systems and methods for evaluating sports events to eliminate subjectivity in sports performance data tracking and analysis by relying on autonomous sensors with geocode technologies and related software.

SUMMARY OF THE INVENTION

[0005] In one aspect of the present invention, a geospatial sports tracking system, for determining performance metrics of one or more players participating in a sports activity, includes a plurality of sensors equipped with a geolocation determining and wireless reporting capabilities. The plurality of sensors are attached to an item of sports equipment worn by the one or more players and one or more game objects associated with the sports activity. A computing apparatus is configured to receive and process geolocation data associated with the plurality of sensors and the conduct of the sports activity. A wireless network device is configured to communicate with the plurality of sensors and the computing apparatus. The system may also include, one or more of the plurality of sensors attached to a designated object associated with a field of play for the sports activity.

[0006] The system may be configured to provide a visual depiction of the field of play on a display of the computing apparatus. The visual depiction is based on a geolocation coordinate of the designated object. The geospatial sports tracking system may also include a visual depiction of the geolocation of the one or more players on the field of play during the sports activity. Similarly, the geospatial sports tracking system may include a visual depiction of the geolocation of one or more game objects during the sports activity.

[0007] An analysis engine may be configured to determine a performance metric for the one or more players. The performance metric may include one or more of a player speed, a player acceleration, a player endurance, derived from the geolocation data. The performance metric may also include an acceleration applied to the game objects by the one or more players. The geospatial sports tracking system may also be provided with a reports module configured to present the performance metric for the one or more players.

[0008] Other aspects of the invention include a method of geospatial tracking and analysis of a sports activity. The method includes attaching a plurality of sensors equipped with a geolocation determining and wireless reporting capabilities to an item of sports equipment worn by the one or more players, a game object associated with the sports activity, and a designated object associated with a field of play for the sports activity. The geolocation data associated with the plurality of sensors is received on a computing device, via a wireless network during conduct of the sports activity. The geolocation data is analyzed to determine a performance metric of the one or more players. A visual depiction of the geolocation data may be presented on a display associated with the computing device.

[0009] The method may also include determining whether the plurality of sensors corresponding to the designated objects recognize the field of play. It may also include determining whether a proximity range of the plurality of sensors to the wireless network is met. The method will also include receiving streamed geolocation data from the plurality sensors if the field of play is recognized and the plurality of sensors are within the proximity range.

[0010] These and other features, aspects and advantages of the present invention will become better understood with reference to the following drawings, description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 illustrates a schematic system view of a system for geolocation tracking sports activities.

[0012] FIG. 2 illustrates a representative sports activity tracking according to aspects of the invention.

[0013] FIG. 3 illustrates a flow of a flow chart implementing a method of geolocation tracking.

DETAILED DESCRIPTION OF THE INVENTION

[0014] The following detailed description is of the best currently contemplated modes of carrying out exemplary embodiments of the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention, since the scope of the invention is best defined by the appended claims.

[0015] Broadly, an embodiment of the present invention provides an improved system, method and apparatus for monitoring and evaluating performance data for sports activities.

[0016] As seen in reference to FIG. 1, a system according to aspects of the present invention includes a plurality of wireless electronic sensors 10. The wireless electronic sensors 10 are configured for wireless data communication over a wireless computer network 26. The wireless electronic sensors 10 are embedded or integrated with a geospatial determining and reporting capabilities.

[0017] The electronic sensors 10 may be attached to a player jersey 12, or other equipment item worn by an individual participant in the sports activity. Additional sensors 10 may also be associated with a playing object 14, such as a ball, that is the object of the sports activity. Likewise, as seen in reference to FIG. 2, the electronic sensors 10 may
be associated with one or more designated objects 16 corresponding to a field of play 24 for the sports activity. By way of non-limiting example, the one or more designated objects 16 may be one or more of a boundary line, a boundary marker, a goal, a base, and the like. Stationary designated objects 16 on a field of play may also be assigned a geographic coordinate corresponding to a known location, for example a “home” practice field, a stadium, and the like.

[0018] The system also includes at least one computing system 20 in communication with the wireless network 26 and the plurality of wireless sensors 10. Preferably, the computing system 20 and/or the wireless network 26 have a geospatial determining and reporting capability. A geospatial sports tracking software 18 is accessible to the computing system 20. The geospatial sports tracking software 18 is coded to provide a user interface and a representation of the field of play on the display of the computing system 20.

[0019] Once the sensors 10 are in place and linked to the geospatial sports tracking software 18, performance data is nearly 100% accurate to identify players 12 and determine their exact latitude and longitude positions in relation to other players 12, playing objects 14, or designated objects 16 on the field of play 24.

[0020] As seen in reference to FIG. 3, a method of geospatial tracking of sports activities may include installing the geospatial sports tracking software 18 in a computing device 20 with wireless network communications capabilities 26. The plurality of electronic sensors 10 are embedded in a jersey 12 or other game equipment of each player to be tracked. Similarly, an electronic sensor 10 is embedded into the game object 14, such as a ball. Likewise, when necessary, the designated objects 16 may be equipped with an electronic sensor 10.

[0021] The geospatial sports tracking software 18 is activated and the wireless network 26 establishes communications with the plurality of sensors 10 and begins to receive the transmitted geolocation data corresponding to each of the plurality of sensors. The geospatial sports tracking software 18 is configured to determine whether the sensors 10 corresponding to the designated objects 16 are communicating sufficient geolocation data to recognize the field of play 24. If the field of play 24 is not recognized, the tracking is terminated until the field of play 24 is recognized. The geospatial sports tracking software 18 may be configured to assist the user in determining which of the plurality of designated objects 16 are missing to recognize the field of play 24.

[0022] Likewise, the geospatial sports tracking software 18 is configured to determine whether a proximity range of the plurality of sensors 10 to the wireless network device 26 or computing device 20 is met. The proximity range may be set at a desired distance, (by way of non-limiting example 500 yards), corresponding to a reliability level for the sports tracking session or that of the sensors 10 and wireless network 26 capabilities. If the system determines that the proximity range of the sensors 10 exceeds the desired distance, tracking is terminated. The geospatial sports tracking software 18 may also be configured to determine and recommend a position for the wireless network device 26 or the computing device 20 that will be within desired parameters.

[0023] When the geospatial sports tracking software 18 determines that the field of play 24 is recognized and the proximity range meets the established parameters, the geospatial sports tracking software 18 displays the geolocation data on a representation of the field of play 24 on a display screen of the computing device 20. The geospatial sports tracking software 18 may have a game (event) setup module, permitting a unique sensor identifiers to automatically link each of the plurality of sensors 10 to their associated player jersey 12, game object 14, or designated object 16. Additional setup parameters may provide for inputs of the team names, player names, and a date/time for the event.

[0024] When the game event begins, the geospatial sports tracking software 18 begins receiving streamed geolocation data from each of the plurality of sensors 10 for the duration of the game. The geospatial sports tracking software 18 may present a depiction of the players 12, the game object 14, and designated objects 16 on the field of play 24 as it receives and processes the geolocation data associated with the plurality of sensors 10 during game play. The depiction is presented on a display of the computing device 20. The geospatial sports tracking software 18 may be configured to suspend data collection during periods when the game or event is not active, such as timeouts, halftime, or other times when geolocation data recording is not desired.

[0025] The geospatial sports tracking software 18 may also be configured to automatically save the geolocation data at a predetermined time interval, at a designated conditional event, such as the end of the game, a quarter, a half-time, or the like. The geospatial sports tracking software 18 is configured with an analysis engine to generate one or more performance metrics based on an analysis of the geolocation data corresponding to the one or more players 12, the game object 14, and the designated objects 16. The one or more performance metrics may include a player speed, acceleration, an acceleration and direction imparted by the player to the game object, and the like. The geospatial sports tracking software 18 may also be configured to populate one or more performance metric reports 22 corresponding to the sports activity being tracked. The performance metric reports may be directed to individual players, shifts or squads, offense, defense, and the like, depending upon the sports activity.

[0026] The system of the present invention may include at least one computer 20 with a user interface. The computer 20 may include any computer including, but not limited to, a desktop, laptop, and smart device, such as, a tablet and smart phone. The computer 20 includes a program product 18 including a machine-readable program code for causing, when executed, the computer 20 to perform steps. The program product 18 may include software which may either be loaded onto the computer 20 or accessed by the computer 20. The loaded software 18 may include an application on a smart device. The software 18 may be accessed by the computer 20 using a web browser. The computer 20 may access the software 18 via the web browser using the internet, extranet, intranet, host server, internet cloud and the like.

[0027] The computer-based data processing system and method described above is for purposes of example only, and may be implemented in any type of computer system or programming or processing environment, or in a computer program, alone or in conjunction with hardware. The present invention may also be implemented in software stored on a non-transitory computer-readable medium and executed as a computer program on a general purpose or special purpose computer. For clarity, only those aspects of the system germane to the invention are described, and product details
well known in the art are omitted. For the same reason, the computer hardware is not described in further detail. It should thus be understood that the invention is not limited to any specific computer language, program, or computer. It is further contemplated that the present invention may be run on a stand-alone computer system, or may be run from a server computer system that can be accessed by a plurality of client computer systems interconnected over an intranet network, or that is accessible to clients over the Internet. In addition, many embodiments of the present invention have application to a wide range of industries. To the extent the present application discloses a system, the method implemented by that system, as well as software stored on a computer-readable medium and executed as a computer program to perform the method on a general purpose or special purpose computer, are within the scope of the present invention. Further, to the extent the present application discloses a method, a system of apparatuses configured to implement the method are within the scope of the present invention.

[0028] It should be understood, of course, that the foregoing relates to exemplary embodiments of the invention and that modifications may be made without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A geospatial sports tracking system, for determining performance metrics of one or more players participating in a sports activity, comprising:
   a plurality of sensors equipped with a geolocation determining and wireless reporting capabilities, wherein the plurality of sensors are attached to an item of sports equipment worn by the one or more players and a game object associated with the sports activity;
   a computing apparatus, configured to receive and process geolocation data associated with the plurality of sensors during the conduct of the sports activity; and
   a wireless network device configured to communicate with the plurality of sensors and the computing apparatus.

2. The geospatial sports tracking system of claim 1, further comprising:
   one or more of the plurality of sensors attached to a designated object associated with a field of play for the sports activity.

3. The geospatial sports tracking system of claim 2, further comprising:
   a visual depiction of the field of play on a display of the computing apparatus, wherein the visual depiction is based on a geolocation coordinate of the designated object.

4. The geospatial sports tracking system of claim 3, further comprising:
   a visual depiction of the geolocation of the one or more players on the field of play during the sports activity.

5. The geospatial sports tracking system of claim 4, further comprising:
   a visual depiction of the geolocation of the game object during the sports activity.

6. The geospatial sports tracking system of claim 5, further comprising:
   an analysis engine configured to determine a performance metric for the one or more players.

7. The geospatial sports tracking system of claim 6, wherein the performance metric includes one or more of a player speed, a player acceleration, a player endurance.

8. The geospatial sports tracking system of claim 7, wherein the performance metric includes an acceleration applied to the game object by the one or more players.

9. The geospatial sports tracking system of claim 8, further comprising:
   a reports module configured to present the performance metric for the one or more players.

10. A method of geospatial tracking and analysis of a sports activity, comprising:
    attaching a plurality of sensors equipped with a geolocation determining and wireless reporting capability to an item of sports equipment worn by the one or more players, a game object associated with the sports activity, and a designated object associated with a field of play for the sports activity;
    receiving, on a computing device, geolocation data associated with the plurality of sensors via a wireless network during conduct of the sports activity; and
    analyzing the geolocation data to determine a performance metric of the one or more players.

11. The method of claim 10, further comprising:
    presenting a visual depiction of the geolocation data on a display associated with a computing device.

12. The method of claim 11, further comprising:
    determining whether the plurality of sensors corresponding to the designated objects recognize the field of play.

13. The method of claim 12, further comprising:
    determining whether a proximity range of the plurality of sensors to the wireless network is met.

14. The method of claim 13, further comprising:
    receiving streamed geolocation data from the plurality sensors if the field of play is recognized and the plurality of sensors are within the proximity range.