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(54) Title: SPORTING EVENT REVIEW

(57) Abstract: Apparatus for reviewing an event within a sporting activity, the apparatus including a processing system for receiving first person video footage from a video capture device mounted to at least one participant and displaying at least one video portion of the first person video footage, the at least one video portion including the event, thereby allowing the event to be reviewed. The video capture device may be provided in a helmet or other headgear.

Fig. 1

Record first person video footage during sporting fixture

Display portion first person video footage

Optionally assess, train or prepare participants

100

110

120
SPORTING EVENT REVIEW

Background of the Invention

The present invention relates to a method and apparatus for reviewing an event within a sporting activity, and in particular to reviewing an event during a sporting activity for training, assessing or preparing participants.

Description of the Prior Art

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that the prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

It is known to utilise video replay technology in reviewing events within sporting activities for training and assessment purposes. However, currently the technology is limited to replays from a third person's perspective. Whilst this can assist with training and reviewing referring decisions, this only provides limited assistance. For example, when reviewing a decision, it is possible to discern whether the decision is correct, but it is not always possible to assess why the referee made an incorrect decision, for example to determine if their view of an event was obstructed.

Summary of the Present Invention

In a first broad form the present invention seeks to provide apparatus for reviewing an event within a sporting activity, the apparatus including a processing system for:

a) receiving first person video footage from a video capture device mounted to at least one participant; and,

b) displaying at least one video portion of the first person video footage, the at least one video portion including the event, thereby allowing the event to be reviewed.

Typically the apparatus includes a video capture device.
Typically the video capture device is wirelessly connected to the processing system.

Typically the video capture device is mounted within headgear worn by the participant.

Typically the video capture device includes a camera mounted in a housing.

Typically the housing includes a foam layer provided on at least one surface thereof.

Typically the housing is arranged so that the housing is provided adjacent a forehead of the user.

Typically the housing is arranged so that a foam layer is provided between the housing and the forehead of the user.

Typically the headgear includes at least one of a strap and a helmet body.

Typically the headgear includes a helmet having a number of padded elements, the housing being provided in a pocket to thereby form a padded element including a camera.

Typically the headgear includes at least one of:
   a) a headband;
   b) glasses; and,
   c) a protective device.

Typically the headgear includes:
   a) a bridge for positioning on a nose of the participant;
   b) a headband connected to the bridge for retaining the bridge in position; and,
   c) a camera mounted in the bridge.

Typically the headgear includes, at least one of processing electronics, a transmitter and a power supply provided in a housing attached to the headband.

Typically the headgear includes:
   a) a compression moulded foam housing; and,
   b) a camera mounted within the housing.
Typically the headgear includes, at least one of processing electronics, a transmitter and a power supply provided in a housing attached to the headgear.

Typically the apparatus includes a display for displaying the at least one video portion.

Typically the display is for displaying the at least one video portion during the sporting activity thereby allowing at least one of:

a) preparing a participant for participation in the sporting activity; and,

b) reviewing a decision of an official.

Typically the method includes, in the processing system:

a) determining an identifier indicative of an identity of the participant on which the video capture device is mounted; and,

b) recording an association between the video footage and the identifier.

Typically the processing system is for storing at least one of:

a) time information indicative of a time at which the video footage was recorded;

b) an identifier indicative of an identity of the participant on which the video capture device is mounted; and,

c) the video footage.

Typically the processing system is for:

a) receiving an indication of at least one of an event time and a participant identifier; and,

b) retrieving the at least one video portion using the event time and participant identifier.

Typically the participant is at least one of:

a) a player; and,

b) an official.

Typically the review is for at least one of:

a) assessing participants;

b) training participants; and,

c) preparing participants.
In a second broad form the present invention seeks to provide a method of reviewing an event within a sporting activity, the method including:

a) receiving first person video footage from a video capture device mounted to at least one participant; and,

b) displaying at least one video portion of the first person video footage, the at least one portion including the event, thereby allowing the event to be reviewed.

Typically the video capture device is mounted within headgear worn by the participant.

Typically the method includes displaying the at least one video portion during the sporting activity thereby allowing at least one of:

a) preparing a participant for participation in the sporting activity; and,

b) reviewing a decision of an official.

Typically the method includes:

a) determining an identifier indicative of an identity of the participant on which the video capture device is mounted; and,

b) recording an association between the video footage and the identifier.

Typically the method includes storing at least one of:

a) time information indicative of a time at which the video footage was recorded;

b) an identifier indicative of an identity of the participant on which the video capture device is mounted; and,

c) the video footage.

Typically the method includes:

a) receiving an indication of at least one of an event time and a participant identifier; and,

b) retrieving the at least one video portion using the event time and participant identifier.

Typically the participant is at least one of:

a) a player; and,

b) an official.
Typically the review is for at least one of:
   a) assessing decisions by match officials;
   b) preparing match officials; and,
   c) preparing players.

In a third broad form the present invention provides apparatus for capturing an event within a sporting activity, the apparatus including:
   a) headgear worn by a participant; and,
   b) a video capture device provided in a housing mounted in the headgear.

Typically the headgear includes at least one of:
   a) a headband;
   b) glasses;
   c) a protective device; and,
   d) a helmet.

Typically the headgear includes, at least one of processing electronics, a transmitter and a power supply provided in a housing attached to the headgear.

Typically the headgear includes a camera mounted in a housing.

Typically the housing is a compression moulded foam housing.

Typically the housing includes a foam layer provided on at least surface thereof.

Typically the housing is arranged so that the housing is provided adjacent a forehead of the user.

Typically the housing is arranged so that a foam layer is provided between the housing and the forehead of the user.

Typically the headgear includes a body extending around a user's head in use, the body being arranged to urge the housing against a user's forehead in use.

Typically the body includes at least one of a strap and a helmet body.
Typically the headgear includes a helmet having a number of padded elements, the housing being provided in a pocket to thereby form a padded element including a camera.

Typically the pocket includes an aperture for allowing the camera to capture images therethrough.

Typically the pocket includes an opening for receiving the housing, the opening including a closing mechanism to retain the housing therein.

**Brief Description of the Drawings**

An example of the present invention will now be described with reference to the accompanying drawings, in which:

- Figure 1 is a flow chart of an example of a process for reviewing an event within a sporting activity;
- Figure 2 is a schematic diagram of an example of an example of a distributed computer architecture;
- Figure 3 is a schematic diagram of an example of an example of a processing system;
- Figure 4 is a schematic diagram of an example of an example of an end station;
- Figure 5 is a schematic diagram of an example of an example of a video capture device;
- Figures 6A and 6B are schematic front and plan views of a first example of a video capture device integrated into headgear;
- Figures 7A and 7B are schematic front and plan views of a second example of a video capture device integrated into headgear;
- Figure 7C is a schematic cross sectional view of the video capture device integrated into the headgear;
- Figures 7D and 7E are schematic front and plan views of a second example of a video capture device integrated into headgear;
- Figures 8A to 8D are schematic diagrams of an example of a clip on camera;
- Figures 9A and 9B are schematic diagrams of an example of glasses incorporating a camera;
- Figure 10 is a flow chart of a second example of a process for reviewing an event within a sporting activity; and,
Figures 11A and 11B are examples of video footage captured for a line official and umpire respectively.

**Detailed Description of the Preferred Embodiments**

An example of a process for reviewing an event in a sporting activity will now be described with reference to Figure 1.

In this example, first person video footage is captured during the sporting activity. The first person video footage is captured using a video capture device, such as a micro-video camera, or the like, mounted to a participant in the sporting event. The video capture device is typically mounted to the participant’s head so that the first person video footage is similar to the view of the participant. Whilst the video capture device can be mounted in any suitable manner, in one example this is achieved by having the video capture device mounted to or in an article worn by the participant, such as a piece of headgear including glasses, a headband, protective helmet or the like.

At step 110, a portion of the first person video footage is displayed. This may be achieved in any one of a number of ways depending on the preferred implementation. Typically, however, the video footage is transmitted from the video capture device wirelessly to a computer system. The computer system is then able to store the video footage allowing this to be displayed either in real time, or subsequently, via a suitable screen such as a monitor, TV, or the like. Alternatively video footage may be downloaded via a wired connection for viewing after the event has finished.

In any event, it will be appreciated that the video footage can then be reviewed as desired, for example, by allowing an operator to select a particular piece of video footage containing an event of interest.

It will be appreciated that in the above described process the participant can be any form of participant including players or match officials, such as referees, umpires, or the like, thereby allowing views of the activity to be captured from a range of different perspectives.
This lends the process to a number of different applications, and in particular, can be used to assess, train or prepare participants, as shown at step 120, as well as for entertainment purposes.

For example, video footage of refereeing or umpire decisions can be used to help assess not only the validity of the decision, as is the case with traditional third party views, but also whether there was any reason why the referee made the wrong decision, such as if the referee's view was obstructed. This can therefore allow the process to be used not only to assess the validity of decisions, but also to assess the performance of the match official. This can be used for a number of reasons, such as assessing which officials are suitable for officiating particular sporting activities, as well as providing justification for controversial decisions.

In a further example, the process can be used to assist in training officials, for example, by demonstrating common errors and how these may be avoided, as well as potential issues that the official may encounter. By providing the footage in first person perspective, this typically has a greater impact and allows the official to relate to the situation more directly, in turn allowing the officials to be more prepared.

The process can be used to view the sporting activity from a player's perspective, allowing this to be used to assess the player's interaction within the game, for example to determine where the player is looking and hence how aware they are of the general play. Again, this can be used for both assessment and training purposes, in a manner similar to that described above.

In respect of player footage, it will be appreciated that this also allows coaches to more accurately understand the game from the players perspective, and understand how the players game can be improved.

Additionally, the process can be used to prepare individuals for playing in a game. For example, in cricket, a batsman could wear the video capture device, with the footage being displayed to the next incoming batsman waiting in the pavilion. As a consequence, when the batsman finally comes in to play, they will have been able to view a number of balls of the
respective bowler from the batsman's perspective. This can assist the player in ensuring they are mentally prepared when they start batting themselves. The process could be used in a similar manner in other games where substitutions are to be made, for example by allowing the oncoming player to view the game from the perspective of the player they are to replace.

In one example, the process is performed at least in part using a processing system, such as a suitably programmed computer system, which communicates with the video capture device. Whilst this can be performed on a stand alone machine, in one example, this may be performed by one or more processing systems operating as part of a distributed architecture. An example of a distributed architecture will now be described with reference to Figure 2.

In this example, a base station 201 is coupled via a communications network, such as the Internet 202, and/or a number of local area networks (LANs) 204, to a number of end stations 203, and to one or more video capture devices 205.

In use, the base station 201 includes one or more processing systems 210 that can be used in receiving the video footage from the video capture devices 205, allowing the video footage to be displayed and/or stored in a store, such as the database 211, for subsequent retrieval. The end stations 203 can be used to interact with the processing systems 210, allowing the video capture process to be controlled and/or to allow the video footage to be retrieved from the database 211 and displayed thereon. Thus, in one example, applications software can be loaded on each end station 203 and/or hosted by the processing system 210, providing the end stations 203 with access to the video footage. However, this is not essential and any suitable arrangement may be used.

An example of a suitable processing system 210 is shown in Figure 3. In this example, the processing system 210 includes at least one processor 300, a memory 301, an input/output device 302, such as a keyboard and/or display, and an external interface 303, interconnected via a bus 304 as shown. In this example the external interface 303 can be utilised for connecting the processing system 210 to peripheral devices, such as the communications networks 202, 204, databases 211, other storage devices, or the like. Although a single external interface 303 is shown, this is for the purpose of example only, and in practice
multiple interfaces using various methods (eg. Ethernet, serial, USB, wireless or the like) may be provided.

In use, the processor 300 executes instructions in the form of applications software stored in the memory 301 to allow the video footage to be received and either displayed or stored, as well as providing access to the video footage by the end stations 203. Accordingly, it will be appreciated that the processing system 300 may be formed from any suitable processing system, such as a suitably programmed computer system, PC, web server, network server, or the like, or custom hardware such as a media player.

As shown in Figure 4, in one example, the end station 203 includes at least one processor 400, a memory 401, an input/output device 402, such as a keyboard and/or display, and an external interface 403, interconnected via a bus 404 as shown. In this example the external interface 403 can be utilised for connecting the end station 203 to peripheral devices, such as the communications networks 202, 204, databases 211, other storage devices, or the like. Although a single external interface 403 is shown, this is for the purpose of example only, and in practice multiple interfaces using various methods (eg. Ethernet, serial, USB, wireless or the like) may be provided.

In use, the processor 400 executes instructions in the form of applications software stored in the memory 401 to allow communication with the base station 201 thereby allowing an operator to retrieve and view stored video footage. Accordingly, it will be appreciated that the end stations 203 may be formed from any suitable processing system, such as a suitably programmed PC, Internet terminal, lap-top, hand-held PC, mobile phone, or other communications device, which is typically operating applications software. However, alternatively the end stations 203 may be displays, such as televisions, able to stream or otherwise display video footage hosted by the base station 201.

An example of a video capture device 205 is shown in Figure 5.

In this example, the video capture device 205 includes a camera 500, such as a micro-camera, including a sensor 501, such as a CCD sensor, or the like, and a lens system 502. It will be appreciated that micro-cameras of this form are known in the art, and are used for example in
mobile phones and other similar devices. In use, the camera 500 is typically connected to a processor 510, which is in turn coupled to a memory 520 and external interface 530.

In use, signals generated by the camera 500 are transferred to the processor 510, which may perform basic processing, allowing image data to be stored in the memory 510 and/or transferred to a computer, such as the processing system 210, via the external interface 530. One example of this involves transmitting the images via a wireless connection to the processing system 210, although this is not essential, and alternatively, the image data may be stored and retrieved via a wired connection, or through transfer of removable storage media, such as a memory card.

It will be appreciated by a person skilled in the art that with contemporary video capture devices these can be made relatively small and incorporated into headgear. Whilst it is known to provide video capture devices in sunglasses or the like, these are not always appropriate for use in sporting activities, for example as the frames can cause injury and obstruct vision.

Accordingly, alternative devices can be used. In one example, the video capture device can be incorporated into a headband. Whilst this can be achieved in any manner, a specific example will now be described with reference to Figures 6A and 6B.

In this example, the head band includes a bridge 600 having a housing 601 and optional nose pads 602 extending outwardly therefrom. The nose pads are for engaging a nose 660 of the participant so that the housing 601 is positioned above the user's eyes 650. A strap or band 610 then extends around the user's head holding the bridge 600 in position. It will be appreciated that the bridge 600 is sufficiently small that it typically does not obstruct vision, and significantly reduces the chance of injury compared to normal glasses. However, the bridge can be held in a stable position through engagement with the participant's nose, thereby ensure that the captured video footage is also stable and aligned with the participant's field of vision. Additionally, the strap can be elasticated or adjustable, thereby the bridge 600 to be retained in position, and ensuring the camera remains stable on the user's head even during strenuous activity. It will be appreciated that the strap alone may provide sufficient stability thereby removing the requirement for the nose pads 602.
In one example, a second housing 620 may be provided elsewhere on the headband, such as at the back as shown in Figure 6B, allowing processing electronics, such as the processor 510, memory 520, external interface 530, and/or a power supply to be incorporated therein, if required, although these can alternatively be incorporated into the housing 601.

In some more physical sporting activities, it is commonplace for players to wear a helmet such as compression moulded foam helmet. Accordingly, as shown in Figures 7A and 7B, the camera 500 can be incorporated into the body 700 of a helmet, which is typically retained in position by a helmet strap 710. The camera 500 may be mounted in a thickened section 701 of the body, thereby helping protect the camera from damage and the participants from injury.

In one example, as shown in Figure 7C, the camera 500 is provided in a housing 720, with 4mm thick EVA padding 740 for positioning against the wearer, and 1mm thick EVA padding 730 on an outer surface. Despite this, the camera 500 is sufficiently small to not add undue weight or volume to the helmet, so that the participant would typically not even notice the presence of the camera system. It will be appreciated that additionally the processing electronics can be provided in a separate housing mounted elsewhere within the body 700, or even moulded directly into the body, thereby further reducing the impact of the video capture device. It will be appreciated that this form of housing can be used in conjunction with the strap 610 previously described.

In the example of Figures 7A and 7B, the camera is mounted on an upper side of the helmet 700, so that the camera 500 is on top of the user's head H, facing forward. However, as a further alternatively, the camera 500 can be mounted in a housing 720 provided on a front of the helmet, as shown for example in Figures 7D and 7E.

In this example, the helmet includes a number of padded elements 750 provided on the helmet body 700, as is typical in helmets for activities such as rugby, or the like. In this example, the housing 720 is mounted in a pocket 751 on the front of the helmet, so as to form a padded element. The camera 500 can be positioned adjacent an aperture in the pocket 751, allowing images to be captured therethrough. In this arrangement, the camera 500 is positioned adjacent the user's forehead, with padding 730, 740 acting to provide equivalent
functionality to the padded elements 750, and thereby protect the user in the event of an impact. The pocket 751 typically includes an opening for receiving the housing 720, the opening including a closing mechanism, such as hook and loop fasteners to retain the housing therein.

It will be appreciated that in the current example, the housing 720 is held securely in position using the helmet. In particular, the helmet is typically elasticated or adjustable, allowing the largest surface of the housing 720 to be urged against the user's forehead, in a manner similar to that achieved with the strap 610, in the example of Figures 6A and 6B. Thus, the helmet body 700 or strap 610 act as a body extending around the user's head so as to urge the housing 720 towards the user's forehead, thereby maintaining the stability of the camera relative to the user's head, which in turn ensures stable images are obtained.

A further benefit of this arrangement is that even in the event that the user is impacted during the sporting activity, the camera housing 720, and in particular the padding 740, which is provided between the housing 720 and the user's forehead, act to ensure any force is at least partially absorbed, thereby protecting the user. Any remaining force is also distributed over the user's forehead by the relatively large surface area of the housing 720, thereby further preventing injury, as well as ensuring image stability as previously described. An optional switch for actuating the camera 500 may also be provided in the housing 720, as shown at 760, allowing the camera to be activated as required by the user.

It will be appreciated that similar configurations can be used for a wide range of sporting activities where helmets are employed, such as boxing, cricket, motor racing, or the like. In some example, the helmet includes a hardened case, in which case, the camera and housing is typically mounted

As an alternative to embedding the camera within a helmet, a clip-on style camera can be provided as shown in Figure 8A to 8D. Additionally, as mentioned above, the camera 500 can be incorporated into glasses, as shown in Figures 9A and 9B. In this example, the glasses include a frame having a raised portion 900 above the lenses of the glasses, thereby ensuring the user's vision is not obstructed during the game.
A second example of the process for reviewing an event within a sporting activity will now be described with reference to Figure 10.

For the purpose of this example, it is assumed that the base station 201, and in particular one of the processing systems 210, executes applications software for receiving, storing and displaying the video footage, with the end stations 203 being used to control the processing systems 210 and/or displaying the video footage. However, this is not essential and it will be appreciated that end stations 203 may not be required, and actions described could alternatively be performed solely by the processing system 210.

It will also be assumed that actions performed by the processing system 210 are performed by the processor 300 in accordance with the instructions stored as applications software in the memory 301 and/or input commands received from a user via the I/O device 302. Similarly, it will be assumed that actions performed by the end station 203 are performed by the processor 400 in accordance with instructions stored as applications software in the memory 401 and/or input commands received from a user via the I/O device 402.

In this example, selected participants are equipped with a video capture device 205. This typically involves selecting those individuals that are to wear the device and then providing a respective device to each individual. It will be appreciated that participants may be any participants such as match officials including referees, umpires or the like, as well as players.

At step 1010 an association is recorded between the participant and the video capture device 205, allowing for the subsequent identification of the participant for which the video footage was captured.

A participant identifier is used to allow the relevant participant to be identified and can be indicative of the participant's identity, such as the participant's name, an assigned team number, biometric data, or the like. Similarly, a video capture device identifier, such as an alphanumeric character sequence, MAC address, or the like, which can be stored in the video capture device, can be used to distinguish each video capture device being used. This allows the processing system 210 to record an association between the participant and video capture identifiers. The identifiers can be determined in any suitable manner. For example, in the
case of participants, this can be achieved in accordance with user input, by sensing the identifiers using a sensing system, such as a card reader, biometric scanner, or the like. In the case of the video capture device 205, this is typically achieved by communicating with the video capture device 205, and downloading the video capture device identifier therefrom.

At step 1020, the video footage is captured during the sporting activity. It will be appreciated that this can be achieved in any one of a number of manners depending on the preferred implementation. Typically, however, the video capture device 205 is activated at all times and simply captures video footage of everything in the participant's field of vision during the duration of the sporting activity. Examples of video footage captured by a line official and cricket umpire are shown in Figures 11A and 11B, respectively.

At step 1030, the video footage is transferred to the processing system 210. This may be achieved in any suitable manner and could be via download through a physical connection, transfer of physical media after the game, or the like. More typically however, the video footage is wirelessly transmitted to the processing system 210, for example using an appropriate communications technology.

At step 1040 the processing system determines the participant identifier from the video capture device identifier. In particular, when transfer of the video footage to the processing system 210 commences, the video capture identifier can be transferred to the processing system 210, allowing the processing system 210 to determine the relevant participant identifier using the association, and hence identify with which participant the footage should be associated.

At step 1050 the processing system 210 stores the video footage, the participant identifier, and any optional metadata, such as timing information, activity details, or the like, in a store such as the database 211. This allows the video footage to be stored for optional subsequent retrieval and viewing, for example using one of the end stations 203. In one example, this can be achieved by having the processing system 210 host a web-page, which can be accessed via a suitable browser application executed by the end station 203, and which allows the user to access and view the footage as desired. It will be appreciated that by storing the participant identifier and optional metadata with the video footage, this allows
relevant footage to be retrieved easily through a suitable database search, or the like. Additionally, and/or alternatively, the video footage could be streamed so that it is presented in real time.

Accordingly, in the above described example, the video footage can be made available effectively in real time to users of the end stations 203, or the base station 201.

It will be appreciated that the above described methodology can be used to provide greater information for match preparation, analysis and review for officials and sportspeople. The process typically utilises one of several video capture devices, such as HD quality Digital Video Recording (DVR) mechanisms, attached to one or more participants of interest. In one example, the video capture device is provided in a position centrally aligned on the forehead, to approximate the actual vision seen during a match. Video footage taken by the system can be recorded and / or transmitted via a 2.4Ghz relay to a peripheral viewing or recording system.

The video capture device can be incorporated into a range of DVR glasses; DVR headgear; DVR helmets; DVR headbands and DVR clips.

This allows the record footage to be used in a number of ways, including:

(1). As a live first-person feedback where an individual can be provided with feedback and review during any stoppage in the match and even referred to by a third party if necessary for decision making,

(2). As a post-match review of performance from a first-person perspective and aligned with any available third-person view as per standard video recording, and

(3). As a pre-match preparation or training through the use of either self or another individuals first-person view of match conditions.

This can lead to a number of benefits. For example, currently, reviews of player's or official's decisions are currently made only from a third party angle. Depending on the sport involved, the angle may not reflect the actual view seen at all. This review can often distort the perception of how a decision should have been made, and rightly or wrongly, judged as to whether it was the correct decision or not.
Using the first person video footage however, there is an opportunity to see what the referees and umpires see. It will present the public and commentators with an insight to decision making never previously available. It also provides officials with unprecedented evidence as to how and why they made a decision. Presently reviews and commentary of official's decisions are made from positions, views and angles that seldom represent, even moderately, the actual view that the official would have seen. At present it is therefore quite inaccurate for anyone other than the official, or another official standing close by to judge the decision he or she has made. However these decisions are criticised quite unfairly and without adequate resource. The system will enable many officials to answer their critics with confidence, by demonstrating that they made the correct decision on what they saw, not what someone else saw from a different angle, with the benefit of sitting in the grandstands or the benefit of video replay.

A further benefit is the experience of seeing the first-person view without entering the playing field. That these reviews can be undertaken either during the match or post-match makes the system invaluable to the advancement of an individual's decision making. For example, coaches and mentors can actively review match performances using any of the readily available video editing programs to overlay the first-person view and third-person view. Discussion between the coaches and their charges is then able to take on a new format whereby the coach can better understand why a decision was made with feedback from the individual as to what he or she may have been thinking. This footage can also be used in preparing an individual prior to or during a match by demonstrating and discussing what decision are best made when the individual does in fact "see" these situations during a match. This surpasses the current third-person demonstration for such situations.

Accordingly, the use of first person video footage, particularly in competitive sporting activities, can provide a monumental shift on the education of coaches, players and officials alike. For skill-acquisition and strategists the list of new opportunities will prove boundless.

Persons skilled in the art will appreciate that numerous variations and modifications will become apparent. All such variations and modifications which become apparent to persons skilled in the art, should be considered to fall within the spirit and scope that the invention broadly appearing before described.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1) Apparatus for reviewing an event within a sporting activity, the apparatus including a processing system for:
   a) receiving first person video footage from a video capture device mounted to at least one participant; and,
   b) displaying at least one video portion of the first person video footage, the at least one video portion including the event, thereby allowing the event to be reviewed.

2) Apparatus according to claim 1, wherein the apparatus includes a video capture device.

3) Apparatus according to claim 2, wherein the video capture device is wirelessly connected to the processing system.

4) Apparatus according to claim 2 or claim 3, wherein the video capture device is mounted within headgear worn by the participant.

5) Apparatus according to claim 4, wherein the headgear includes at least one of:
   a) a headband;
   b) glasses;
   c) a protective device; and,
   d) a helmet.

6) Apparatus according to any one of the claims 1 to 5, wherein the headgear includes:
   a) a bridge for positioning on a nose of the participant;
   b) a headband connected to the bridge for retaining the bridge in position; and,
   c) a camera mounted in the bridge.

7) Apparatus according to claim 6, wherein the headgear includes, at least one of processing electronics, a transmitter and a power supply provided in a housing attached to the headband.

8) Apparatus according to any one of the claims 1 to 7, wherein the headgear includes:
   a) a compression moulded foam housing; and,
   b) a camera mounted within the housing.

9) Apparatus according to claim 8, wherein the headgear includes, at least one of processing electronics, a transmitter and a power supply provided in a housing attached to the headgear.
10) Apparatus according to any one of the claims 4 to 9, wherein the video capture device includes a camera mounted in a housing.

11) Apparatus according to claim 10, wherein the housing includes a foam layer provided on at least one surface thereof.

12) Apparatus according to claim 10 or claim 11, wherein the housing is arranged so that the housing is provided adjacent a forehead of the user.

13) Apparatus according to claim 12, wherein the housing is arranged so that a foam layer is provided between the housing and the forehead of the user.

14) Apparatus according to any one of the claims 10 to 13, wherein the headgear includes at least one of a strap and a helmet body.

15) Apparatus according to claim 14, wherein the headgear includes a helmet having a number of padded elements, the housing being provided in a pocket to thereby form a padded element including a camera.

16) Apparatus according to any one of the claims 1 to 15, wherein the apparatus includes a display for displaying the at least one video portion.

17) Apparatus according to claim 16, wherein the display is for displaying the at least one video portion during the sporting activity thereby allowing at least one of:
   a) preparing a participant for participation in the sporting activity; and,
   b) reviewing a decision of an official.

18) Apparatus according to any one of the claims 1 to 17, wherein the method includes, in the processing system:
   a) determining an identifier indicative of an identity of the participant on which the video capture device is mounted; and,
   b) recording an association between the video footage and the identifier.

19) Apparatus according to any one of the claims 1 to 18, wherein the processing system is for storing at least one of:
   a) time information indicative of a time at which the video footage was recorded;
   b) an identifier indicative of an identity of the participant on which the video capture device is mounted; and,
   c) the video footage.
20) Apparatus according to any one of the claims 1 to 19, wherein the processing system is for:
   a) receiving an indication of at least one of an event time and a participant identifier; and,
   b) retrieving the at least one video portion using the event time and participant identifier.
21) Apparatus according to any one of the claims 1 to 20, wherein the participant is at least one of:
   a) a player; and,
   b) an official.
22) Apparatus according to any one of the claims 1 to 21, wherein the review is for at least one of:
   a) assessing participants;
   b) training participants; and,
   c) preparing participants.
23) A method of reviewing an event within a sporting activity, the method including:
   a) receiving first person video footage from a video capture device mounted to at least one participant; and,
   b) displaying at least one video portion of the first person video footage, the at least one portion including the event, thereby allowing the event to be reviewed.
24) A method according to claim 23, wherein the video capture device is mounted within headgear worn by the participant.
25) A method according to claim 23 or claim 24, wherein the method includes displaying the at least one video portion during the sporting activity thereby allowing at least one of:
   a) preparing a participant for participation in the sporting activity; and,
   b) reviewing a decision of an official.
26) A method according to any one of the claims 23 to 25, wherein the method includes:
   a) determining an identifier indicative of an identity of the participant on which the video capture device is mounted; and,
   b) recording an association between the video footage and the identifier.
27) A method according to any one of the claims 23 to 26, wherein the method includes storing at least one of:
a) time information indicative of a time at which the video footage was recorded;
b) an identifier indicative of an identity of the participant on which the video capture device is mounted; and,
c) the video footage.

28) A method according to any one of the claims 23 to 27, wherein the method includes:
   a) receiving an indication of at least one of an event time and a participant identifier; and,
   b) retrieving the at least one video portion using the event time and participant identifier.

29) A method according to any one of the claims 23 to 28, wherein the participant is at least one of:
   a) a player; and,
   b) an official.

30) Apparatus according to any one of the claims 23 to 29, wherein the review is for at least one of:
   a) assessing decisions by match officials;
   b) preparing match officials; and,
   c) preparing players.

31) Apparatus for capturing an event within a sporting activity, the apparatus including:
   a) headgear worn by a participant; and,
   b) a video capture device provided in a housing mounted in the headgear.

32) Apparatus according to claim 31, wherein the headgear includes at least one of:
   a) a headband;
   b) glasses;
   c) a protective device; and,
   d) a helmet.

33) Apparatus according to claim 31 or claim 32, wherein the headgear includes, at least one of processing electronics, a transmitter and a power supply provided in a housing attached to the headgear.

34) Apparatus according to any one of the claims 31 to 33, wherein the headgear includes a camera mounted in a housing.
35) Apparatus according to claim 34, wherein the housing is a compression moulded foam housing.

36) Apparatus according to claim 34 or claim 35, wherein the housing includes a foam layer provided on at least surface thereof.

37) Apparatus according to any one of the claims 34 to 36, wherein the housing is arranged so that the housing is provided adjacent a forehead of the user.

38) Apparatus according to claim 37, wherein the housing is arranged so that a foam layer is provided between the housing and the forehead of the user.

39) Apparatus according to any one of the claims 34 to 38, wherein the headgear includes a body extending around a user's head in use, the body being arranged to urge the housing against a user's forehead in use.

40) Apparatus according to claim 39, wherein the body includes at least one of a strap and a helmet body.

41) Apparatus according to any one of the claims 34 to 40, wherein the headgear includes a helmet having a number of padded elements, the housing being provided in a pocket to thereby form a padded element including a camera.

42) Apparatus according to claim 41, wherein the pocket includes an aperture for allowing the camera to capture images therethrough.

43) Apparatus according to claim 41 or claim 42, wherein the pocket includes an opening for receiving the housing, the opening including a closing mechanism to retain the housing therein.
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100

Record first person video footage during sporting fixture

110

Display portion first person video footage

120

Optionally assess, train or prepare participants

Fig. 1
1. Equip participant with video capture device
2. Record association between participant and video capture device IDs
3. Capture video footage
4. Transfer video footage to processing system 210
5. Determine participant ID from video capture device ID
6. Store video footage together with participant ID and optional metadata
7. Display video footage

Fig. 10
INTERNATIONAL SEARCH REPORT

PCT/AU2011/00140

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.
H04N 7/18 (2006.01)  H04N 5/225 (2006.01)

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)

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>US 2010/0283630 A1 (ALONSO) 11 November 2010 paragraphs 6-9, 11-14, 17-26, 47-66, 78, 101, 102 and figure 2 and 16</td>
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<td>X</td>
<td>US 6292213 B1 (JONES) 18 September 2001 column 2 lines 55-67, column 7 line 38 to column 9 line 15, column 11 lines 30-67 and figures</td>
<td>1-5, 10, 16, 17, 22-25, 31-34</td>
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* Special categories of cited documents:
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Date of the actual completion of the international search
29 September 2011

Date of mailing of the international search report
06/10/2011

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<td>US 2008/01921 14 A1 (PEARSON et al.) 14 August 2008 Abstract, paragraphs 2, 13-16, 26, 27, 54, 55, 58, 61, 64, 65, 72-76 and 85 and figures</td>
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<td>US 652253 1B1 (QUINTANA et al.) 18 February 2003 Abstract, figures, paragraph 21, 26, 32, 35-37, 44, 55, 58 and claim 3</td>
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<td>Y</td>
<td>US 6028627 A (HELMSDERFER) 22 February 2000 See abstract, column 3 lines 39-57, column 5 line 37 to column 6 line 9, figures</td>
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX