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An instructional aid (10) for enabling and assisting a person to emulate a predetermined movement such as a golf swing including an image/data capturing device (11) for scanning capturing and storing the image/data signals of the person's golf swing or movement, and a transceiver (14) for transmitting the image/data signals over a communications network (15) to a remote computer (17). The computer (16) contains a database (17) which stores in digital form image signals and bio-mechanical data of a number of preselected swings or movements. The computer (16) analyses the person's image/data signals against image/data of a preselected swing and generates in digital form further visual images/data signals which can be transformed so as to assist or enable a person to be able to emulate the preferred swing. The instructional aid may also be used for analysing or reporting on particular geographical regions or objects and provides a specialized presentation for development of that region or object from information stored in the computer database.



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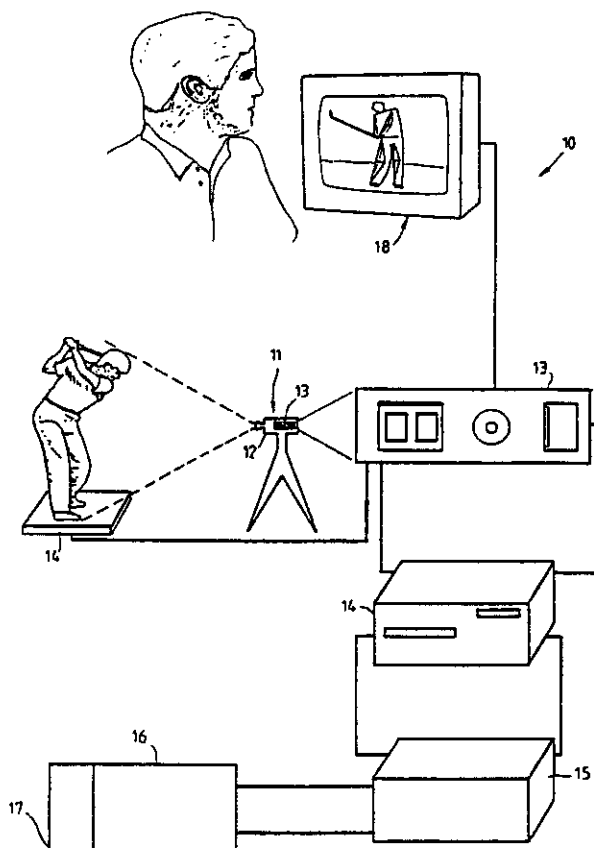
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(54) Title: PERSONALIZED INSTRUCTIONAL AID

(57) Abstract

An instructional aid (10) for enabling and assisting a person to emulate a predetermined movement such as a golf swing including an image/data capturing device (11) for scanning capturing and storing the image/data signals of the person's golf swing or movement, and a transceiver (14) for transmitting the image/data signals over a communications network (15) to a remote computer (17). The computer (16) contains a database (17) which stores in digital form image signals and bio-mechanical data of a number of preselected swings or movements. The computer (16) analyses the person's image/data signals against image/data of a preselected swing and generates in digital form further visual images/data signals which can be transformed so as to assist or enable a person to be able to emulate the preferred swing. The instructional aid may also be used for analysing or reporting on particular geographical regions or objects and provides a specialized presentation for development of that region or object from information stored in the computer database.



PERSONALIZED VIDEO AIDTechnical Field

This invention relates to a method and means for providing an expert knowledge base in a video teaching aid which in one aspect may be used as an audio visual teaching aid and in particular as an audio visual teaching aid for teaching of movements and techniques, such as used in sports for the game of golf. The present invention, however, is applicable to other movements, sports pastimes or techniques.

In a further aspect the present invention relates to a method and means for providing an expert visual or audio visual assessment of a particular proposal relating to geographical locations. One such application is to generate a visual display of a particular tract of land for a golf course layout made up from a number of pre stored hole designs or computer generated hole designs which have taken into account all aspects of the final layouts design on the overall development, with the inclusion of audio or audio visual data pertaining to structural methods for success.

The present invention has further application in providing an assessment on a particular object by for example comparing properties of that object with those of a preferred object or objects.

Background Art

As golf has become an increasingly popular pastime over the years, many players wishing to improve their own personal techniques, have pursued professional assistance. Often players, be they professionals or amateurs, may wish to emulate successful movements of top players or coaches who are exposed in the mass-media. At the present time, these players have a number of choices available to them in attempting to try to emulate such movements, which may include general practice, private coaching, viewing current audio visual instruction tapes, recording their own personal movements and analyzing same, or studying photographs/slides etc. of their swing in action.

In all the above cases, the onus is placed upon



the individual or coach, to perceive those areas of movement that differ between the current technique of the player and that of the preferred technique they are trying to achieve. Even for a specialized person working in their own chosen sport or profession, such differences in movement can be so minute or hard to detect, with say a person's weight shift or pressure in their grip or arms, that they can go undetected and so handicap that persons potential rate of improvement. The reason for this particularly in the above instructional visual teaching cases is that the viewer watches information flowing to him in one direction only regarding the current or preferred technique and thus the viewer cannot perceive all aspects of the movement because of no corresponding physical forces or certain performance data to relate specifically with because such visual presentations do not show their current technique along with the preferred technique with the addition of bio mechanical information. Also in the use of current general prerecorded instructional audio visual presentations they direct their information towards a mass audience as a whole without any allowance for a persons particular technique or requirement of problem solving.

In other situations where conceptual instructional advice is required, the quality of advice can vary, for example when a person is considering whether or how to best construct a particular tract of land he owns or is considering acquiring, say for the development or remodelling of a golf course, normally expensive preliminary surveying, design and feasibility works are carried out, to which he is reliant on all aspects of the development being expertly covered, to which this is not always the case. Similarly, if alternative ventures in particular areas are proposed, no audio visual means are presently available which provides a customized or personalized completely regenerated, expertly compiled computer analysis in the visual or audio visual form of potential works, described within.



Summary of the Invention

The present invention aims to provide in one aspect an

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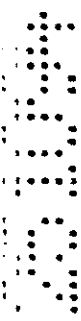
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expertly analyzed instructional aid employing visual or audio/visual techniques which allows for a flow of information in both directions between say selected coaches and pupils so as to help that pupil/viewer improve his or her personal movements and techniques more quickly and without as much guesswork on his or her part.

The present invention also provides a method and means for teaching or instructing such movements or techniques in precise ways, that enables a person/mechanism to more clearly emulate another movement. Whilst the present invention is particularly suited in one application to sports coaching it may also be applied to other areas where an emulation of a precise movement/procedure is required, as will become more apparent from the following operating description. The present invention may additionally be applied to providing expertly compiled opinion in the form of a visual or audio/visual overview of a particular geographical location altered in accordance with selected criteria.

With the above, and other objects in view, the present invention provides in a first preferred aspect, a method for providing an instructional aid for assisting a person to emulate a preferred movement including the steps of capturing and storing visual image signals representative of a particular movement, comparing said captured image signals with stored image signals representative of a selected preferred movement, and regenerating further visual image signals based on said image signals of said particular movement adjusted to emulate said stored image signals of said selected movement.

In a second aspect, the present invention provides apparatus for providing an instructional aid for assisting a person personally to emulate a preferred movement or technique, said apparatus including means for capturing visual image signals of a particular movement or technique, means for storing said captured visual image signals, means for storing visual image signals of a plurality of preferred movements or techniques, means for comparing said captured visual image signals with the stored image signals of a selected said

preferred movement or technique, and means for regenerating further visual image signals of said particular movement or technique adjusted in accordance with said selected preferred movement or technique to assist a person to emulate said
5 selected preferred movement or technique. The term "image signals" as used herein includes signals representative of such images such as digital information which can be converted in to visual images.

Preferably the visual images of the particular movement
10 are captured and stored in digital form using known video recording techniques such as with a video camera which produces a video cassette containing the images of said particular movement. Alternatively other means may be provided for capturing and storing the visual images as described further
15 below.

The visual images of the preferred movements are preferably stored in digital form in a database of a computer so that a selected preferred movement can be readily accessed. The computer is most preferably located at a remote location
20 so as to be accessible from a number of different locations.

Preferably means are provided to transmit the captured images in digital form for receipt by the computer. The transmitting means preferably transmits the images over the normal telephone network, however, other communications links
25 may be employed.

The comparison in the computer can be carried out using either software techniques or hardware techniques and various sampling procedures. The computer is also preferably software or hardware programmed to take into account the size
30 of the player and other physical characteristics such as length of arm so that a compensation factor may be included whereby the movements such as swings of the player and the preprogrammed stored movements or swing in the computer can be truly compared. This comparison can take place at different
35 times or positions in say a swing to produce signals representative of the difference between the swing. This comparison signal may comprise a measurement of distance,

angle, speed of swing or other parameters. Such signals may then be employed in regenerating the new visual image which approximates the captured image altered to emulate the preferred image.

5 Whilst the invention described within has particular applications to audio visual teachings in sport, so as to help and assist a person emulate a particular movement or technique, it may also be applied to many other situations and fields where an emulation or overview of a
10 precise movement or technique is required. Thus, the invention may be applied to various applications in the arts fields, for example the teaching of dance steps, the computing field where precise movements of a person using a keyboard, mouse or the like are required to be studied to
15 help an end-user progress in learning software, or within the medical field where precise movements are required to be studied, an expert advice given such as with human body movements.

 Additionally the present invention may be applied
20 to fields where expert audio visual systems appraisals and emulations of a development structure may be required such as in the property field for precise calculations and designs of future development proposals, or where expert audio visual systems appraisal of a particular object/s is
25 required by comparison with a preferred or ideal or object/s.

 The present invention thus provides in a further aspect a method of providing an instructional aid relating to a development proposal comprising the steps of capturing
30 and storing visual image and location data signals of a proposed development location, analyzing said captured signals against the signals of a selected or preferred known development or means for forming a new design development and regenerating further visual image/data signals based on
35 said signals of said proposed development adjusted in accordance with said preferred development or said newly formed design development so as to provide a recommendation for said preferred development proposal.



In a further aspect the present invention provides apparatus for providing an instructional aid based on a visual image of a particular movement or location, said apparatus including means for visually scanning said movement or location and for producing visual image signals representative of said movement or location, means for storing said visual image signals, means for transmitting said visual image signals to a remote location, means for comparing said transmitted visual image signals with corresponding signals of a selected prestored image or images, means for regenerating further image signals comprising said image signals of said particular movement or location adjusted in accordance with said prestored signals of said image or images, and means for retransmitting said regenerated image signals and converting said image signals into a format which enables viewing thereof.

In yet a further aspect, the present invention provides apparatus for providing a personalised instructional aid in a development presentation based upon a visual image signal of a particular location, said apparatus including means for visually scanning said location and for producing image and informational data signals representative of said location, means for storing said visual/data signals, means for transmitting said visual/data signals to a remote location, means for comparing said visual/data signals with the signals of a selected prestored location and the structural procedure relating thereto visual/data signals, means for regenerating further visual data/signals based on said signals of said particular location adjusted in accordance with said prestored procedure signals to assist in said development, means for adding dialogue and information data to said regenerated signals and means for transmitting said regenerated image/data signals and converting said signals into a format which enables viewing thereof.

In another aspect, the present invention provides apparatus for providing a personalised audio visual aid based upon optical photometric characteristics of a selected



object, said apparatus including means for visually scanning, sensing and capturing visual/data signals representative of said object, means for storing said visual/data signals, means for transmitting said visual/data signals to a remote location, means for comparing said captured visual/data signals with prestored image signals of a selected object/s, means for regenerating further visual data/signals comprising said signals of said captured object adjusted in accordance with said prestored preferred object/s signals, means for transmitting said regenerated image/data signals and converting said image signals into a format which enables viewing thereof.

Preferably the characteristics of the object are sensed using imaging and non-imaging sensor systems. Preferably also means are provided for adding dialogue or informational data to the regenerated format.

In yet a further aspect the present invention provides a method for providing a personalized audio visual teaching aid for assisting a person to emulate, or consider advice on a preferred activity or subject of interest, said method including the steps of capturing and storing visual image, audio and/or data signals representative of a particular activity or subject of interest, comparing said captured signals with stored image, and audio and/or data signals representative of a selected preferred activity or subject of interest, and generating audio visual image signals based on said captured signals analysed against the signals of said selected preferred activity or subject of interest.

In yet a further aspect the present invention provides apparatus for providing an audio visual teaching aid for assisting a person personally to emulate or consider advice on a preferred activity or subject of interest, said apparatus including means for capturing visual image, and audio and/or data signals of a particular activity or subject of interest, means for storing said captured signals, means for storing signals of a plurality of preferred activities or subjects of interest, means for

comparing said captured signals with said stored signals of a selected preferred activity or subject of interest, and computer means for regenerating further audio visual and data signals of said particular activity or subject of interest adjusted in accordance with said selected preferred activity or subject of interest whereby to assist a person to emulate or consider said selected preferred activity or subject of interest.

Brief Description of the Drawings

10 Reference will now be made to the accompanying drawings which illustrate a preferred embodiment of the invention and wherein:-

 Fig. 1 illustrates in block diagram the instructional aid according to the present invention applied to the game of golf; and

 Fig. 2 is a flow chart showing the procedure involved in the invention.

Detailed Description of the Preferred Embodiment

 Fig. 1 illustrates the apparatus for use in the present invention described below in reference to emulation of a golf swing but useable in any situation where emulation of personalised audio visual interactive advice relating to a particular movement is required. The apparatus 10 includes a visual image capturing device 11 which is adapted to capture movement of the person undertaking a golf swing for subsequent analysis and correction as described below with reference to Fig. 1 and the flow chart of Fig.2.

 To capture the initial detailed visual images relating to physical characteristics including movement techniques, employed during the golf swing various scanning or electronic collecting procedures are used. For this purpose the image capturing device 11 preferably incorporates or comprises a portable electronic camera such as a video camera 12 or the like having an associated recording or signal storage means 13 as is known in the art to form and store signals representative of the characteristics of movement etc. being viewed.

 Where recording of movements takes place, bio-

mechanical information/data may be transmitted to the recording or storage means 13 by an electronic means, hard wiring or other communication means, either at the same time, as the captured visual signals relating to scanned
5 images of the person being viewed or at a different time. In the embodiment illustrated, bio-mechanical information may be captured using a weight sensing pad or pads 13' which will sense weight transference during the swing.

The means used to collect and transmit such
10 bio-mechanical information/data, is at all times non restrictive in its overall performance, so as to allow the pupil being analyzed to achieve normal free flowing movement without restriction. One such means may take the form of mechanical device/s affixed, or attached, to the person or
15 golf club moved by the person so as to show data such as pressures transferred through the arms or hands, proper releasing techniques, velocities achieved etc. Alternatively or additionally, sensing devices maybe positioned alongside, below or above the person whose image
20 is being captured. Such sensing devices as above may comprise weight or load sensitive pads, monitors electronic light beaming device or the like. Bio-mechanical, signals may also be obtained by various scanning, editing and digital techniques, used within a remote computer database
25 as described further below, once the signal has been received by the remote database, to determine also the many characteristics of the person being studied.

The image capturing device 11 is preferably of portable construction, and of high recording quality, so as
30 to scan, receive and store images and information/ data, in broadcast quality. These visual or information signals are converted by sensors or the like, into electrical charge patterns etc, which are read out or scanned to produce, digital electronic signals representative thereof, from
35 electrical or light signals,

produced by an electronic pick up tube, charge-coupled device (CCD), or the like means within the camera framework, or by the information signalling devices referred to above.

For initially capturing the necessary signals for
5 analysis, more than one image capturing device 11 may be used, so as to channel information regarding various visual details, information/data or the like, to one recording or storage medium. In this regard various switching techniques may also be used to switch between selected image capturing devices 11.

10 The signal storage or recording means may take the form of Magnetic Tape/Disk, Laser Based or Optical Video Disk, Magneto-Optic Disk, Magnetic-Laser-Optical Disk or other storage medium. Alternatively digitised signals representative of the scanned images or bio mechanical and information data
15 may be also transferred or stored onto a computer memory chip or the like, held within the camera framework.

The apparatus 10 also includes an audio/visual signal transceiver 14 adapted to receive and transmit audio/visual signals and other information signals in the manner described
20 below.

The image capturing device 11 referred to above in one form is a unit discrete from the audio/visual signal transceiver 14 and adapted to be connected thereto or the two maybe one and the same, so that the image capturing device 11
25 also incorporates a unit for transmission and reception of signals to and from remote databases.

The audio/visual signal transceiver 14 may take the form of a portable signal unit or a personal computer (PC), which can convert, compress or suitably accept, a down loading
30 of captured signals, stored within the storage means 13 of the portable camera unit and then reform, record or store such signals in a suitable digital state for later transmission over a communications network 15. The communication network 15 may comprise the general switched telephone network, satellite
35 links, television quality cable links or the like over which the signals representative of the persons movement together with bio-mechanical information where stored are directed as

electrical or light signals to a remote computer 16 for storage in a computer database 17 for later analysis against selected preferred signals also stored in a database of the computer or a further computer. As is conventional a modem or other
5 similar signal conversion device may be associated with the computer 16 to receive the transmitter signals and convert those signals into a suitable form for reading by the computer 16. The modem or other similar signal conversion device may also be employed for transmission of signals from the computer
10 16 as described further below.

Initial capturing of audio, visual and data signal information, may also be undertaken using the audio visual signal transceiver 14 (if not a personal computer) to which a video camera 12 may be directly connected so as to enable
15 signals captured by the camera 12 to be recorded directly onto suitable storage medium held within the transceiver 14. The transceiver 14 is then able to transmit these captured signals to remote locations, when directly connected to the communications network described above. Thus a single unit
20 may perform all functions of recording, transmitting and receiving audio, visual and data signal information. The transceiver 14 for this purpose may include dual signal storage facilities, to achieve the above functions, however the transceiver 14 may also be constructed so as to enable all
25 functions of recording and playback in each mode within a single signal storage device.

This transceiver 14 is software and hardware programmed and may offer some of the following features:

- 1) The senders details for later personalizing effects to
30 the final video presentation i.e. name and spoken language and means for selecting the person with whom the golf swing of the person is to be compared;
- 2) The transmitting parties/agents details for account keeping purposes and security for the system i.e. digitised
35 security code;
- 3) Circuitry for increased transmission speed;
- 4) Circuitry and displays for showing details regarding

signalling times to reach database and regeneration times once retransmitted back to pupil/agent remote location, for account keeping purposes;

5) . Circuitry and displays for showing format of
5 transmitted or requested signals in i.e. PAL, NTSC or SECAM etc;

6) . Circuitry for Time, Date, Auto Dial - Redial, Stop, Start, Receive, Send and possibly an Advertising channel etc; and

10 7) . Circuitry and displays for showing to whom the regenerated signals belong and to enable the retransmitted regenerated signal to be added to the already prerecorded signal, described below, if desired.

As stated above, the computer 16 is arranged
15 normally at a remote location from the audio/visual transceiver 14 and includes a database 17 which stores selected prerecorded video signals in digital form which in the case of golf swings may include a selection of swings showing the movement of different golf professionals which
20 are required to be emulated. As the computer 16 and image capturing device 11 are not physically affixed or attached together, the computer 16 and database 17 may be of a sufficient size and capacity to enable the desired functions to be achieved at one and the same location.

25 The computer 16 may be at many remote locations and holds within its database the following prerecorded information in digital form, which provide a basis for forming the regenerated audio visual signals.

1) . A digitised audio visual library of selected
30 coaches, advisers professional or mechanisms (such as a golf simulation machine) movements, techniques, steps, objects or procedures, that have been previously analysed, recorded and reformed into suitable digitised signals, for later analysis and regeneration in the database against the remote signals
35 received.

2) . A digitised bio mechanical library of selected coaches or mechanisms movements measured individually or as a group, for later display with the regenerated audio/visual



signals.

The computer 16 incorporates a means for receiving and editing the transmitted visual data or bio-mechanical and information data signals, relating to the movement of the golfer and arranges same in such a way as to be able to match the received visual data signals with the previously established and selected database signals of their preferred applications and generates a new video signal to enable the viewer to see personally, in regenerated form, those differences that exist in (a) a teaching mode, between the two movements, that of the pupil and the selected professional or coach and (b) in an analysis mode, those ideas that might be possible for their preferred swings (or applications in development fields where the method and apparatus of the invention is used in this application.) For this purpose, the computer is software and/or hardware programmed to compare the respective swings of the person being analyzed and the selected preferred swing with adjustments made such as for size of person, speed of swing and other parameters to allow a correct comparison. The differences between the swings are measured by sampling or other techniques and this difference added or subtracted from a persons recorded swing and new visual images generated on this basis which emulates the preferred movements.

The computer 16 may also include a means for adding dialogue to the regenerated audio visual signal recordings, so that the viewer can receive personalized instruction or advice from afar, similar to having private instruction or personal consultation.

The computer 16 may further include a means for converting received signals, if needed, in one broadcasting mode, into those of another countries i.e. PAL-NTSC-SECAM etc. To accomplish this within the computer, a Standards Converter or the like may be used, using Optical Scan or Digital Standards features or the like.

The computer 16 may additionally include a means for determining costing on each and every received and



regenerated signal that passes through the system, based upon the following information:-

- (a) Signal transmission time to and from the computer.

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(b) The amount of analysis and regeneration time required, for each and every presentation, such as with the showing of audio visual faults, bio mechanical/characterized data graphs, dialogue and broadcasting changes etc.

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The computer 16 is software and hardware programmed, to accept digitised signals transmitted to it, from remote locations, associated with the audio visual transceiver 14, so as to personally relate in the final regeneration and editing phases to the viewer, this being performed by, using various digital editing techniques and procedures as described below.

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The audio visual presentation generated by the computer 16 can take the form of split-screening (generating new visual images of the preferred technique displayed along side the present technique), superimposing (where the preferred technique is superimposed over the present technique) or other display. Graphics and charts etc, for bio-mechanical/information displays, so that the viewer can clearly see those changes that are required or need to be performed, to develop or pursue the preferred movement, procedure or proposal are also displayed. These superimposing effects or the like, may take the form of stick figures, detailed drawings etc, to normal human or visual appearances, so as to show the viewer any variances between his stroke and the preferred stroke. For ease of editing the subject material within this computer database, a time code or the like, maybe also burnt into the original recorded signal, so as to make final editing much more efficient within the remote database. This procedure may also be linked with an edit controller or the like, within the computer 16, which locks the two signals electronically together during edits.

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To personalize the regenerated signal, dialogue is also added when required, so that the selected instructor or adviser may relate to the viewer/pupil more personally, than with other audio visual presentations. Part of this personalizing effect is initially accomplished in the original transmission phase, by the name, spoken language, broadcasting mode or location

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statistics etc of the final viewer being captured, within this database, to which an addition of dialogue can also be added when required, in the regeneration signal phase, showing those changes they need to perform or consider, to
5 obtain the preferred movement, thus totally personalizing the new regenerated signal to the viewer.

For this purpose such dialogue, may be initially captured from selected instructors and advisers and stored in the data base and may only take the form of a brief
10 statement, so as to make the viewer fully aware of those changes that are required, or need their consideration, to perfect the movement, procedure or development etc. In a further aspect where a range of model swings are being analysed, the computer may also form the dialogue from
15 previously learned words or phrases.

The means for adding such dialogue may take the form of a voice energy monitor, speech synthesiser or software programmed computer which can analyse incoming information from the viewer pupil and scan its memory bank
20 of stored or learned words or phrases to find suitable terms, to bring attention to these problem areas or matters needing their attention.

Dialogue may also be added relating to recommendations for the viewers consideration in regards to,
25 suitability of equipment being used to perform the desired movements and techniques.

To increase acceptance as a true teaching aid, scientific data, which in many applications could only be assumed before, such as with personalized coaching, may be
30 presented to a viewer, when needed, in the form of graphs, charts, or the like, set either above, below, alongside or within the total regenerated video signal recording. This information is gathered from their received signals, being matched to, their preferred established signals contained
35 within the database 17 so that the person/pupil can clearly see, those bio mechanical differences that exist between, their current procedures/techniques and that of their selected coaches/professionals procedures/techniques.



Once the new audio visual signal is regenerated the signal is then retransmitted back by the computer 16 and via a modem or the like and the communications network 15 to the remote senders/agents transceiver 14. This procedure
5 maybe performed, from within the computer 16 itself, using various digital, compression and sampling techniques, or it can be again sent back by a further audio/visual transceiver associated with the computer 16.

On receipt at the remote pupils/agents receiving
10 location, the regenerated signal may be in a form suitable for direct saving on suitable saleable storage means such as video tape, disk, chip or the like which enables home viewing such as by a video cassette or disk player or the signal could be shown directly through a monitor 18. If not
15 in a suitable form for direct saving when it arrives at agents/pupils receiving location, the signal may be reformed for storage as above on storage means which permits home viewing by the use of either the receiving audio visual transceiver, or by other suitable conventional means,
20 offering various slowing down or speeding up signal procedures. If desired the regenerated audio/visual signal may be stored on the original storage means eg. video tape containing the players current movements or techniques or stored on a new storage means.

25 In the embodiment described and shown, the image capturing device 11 stores the captured images on a video cassette 19 of known form in the storage means 13 and the regenerated images are stored on the same cassette 19 or alternatively an additional cassette. The regenerated image
30 in this embodiment is in the form of a stick figure 20 which is superimposed on the true visual image 21 of the players swing or movement and which indicates to the player the angles and positions which he must adopt to emulate the swing.

35 To add further to this advanced audio visual teaching aids value, as a complete teaching system, compared to other audio visual presentations, previously recorded instructional material, of a non-personalized nature, may



also be added, to the final home storage presentation means
such as a video cassette. Thus this regenerated transmitted
signal of the pupil's audio visual presentation and data
pertaining to movements, maybe then simply added to the
5 prerecorded material already held at the senders/agents
remote location. In this format the single recording may
then show (a) an initial complete recorded procedure of
instruction, as currently

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presented with audio visual presentations (b) an addition of their current movements, procedures or images etc, taken before regeneration and (c) the final regenerated personalized audio visual changes, that are required, or affect, the desired changes needed by the viewer.

A typical presentation with a preferred format and structure in the final video tape or other viewable means could be as follows :

Pupil: Mr Rick Baker

10 Selected coach : Mr Bobby Jones

Applications for: Golf

Dialogue in: English

1. Preferred audio visual start/introduction:

"Hi, Rick, I am Bobby Jones, it is my pleasure to have studied your golf swing and these are the points I feel you should be concentrating on : "

2. Preferred audio visual presentation in progress:

During the presentation whilst the pupil, Mr Baker is viewing the subject matter, the viewing monitor is showing segments of the previously recorded swing, taken at the recording facility, with superimposed preferred movements of Mr Jones against Mr. Baker's current movements and pointing out with the addition of dialogue, those areas that he should be concentrating on, so as to improve his current technique.

25 Bio mechanical data in the form of graphs or charts etc.

are also added during the presentation, so as that he and his local coach may also quite clearly see scientific data pertaining to those performed movements. Dialogue may also be added regarding suitability of equipment being used at this

30 stage.

3. Towards the conclusion of this audio visual presentation, the coach could conclude by saying:

"Thank you Rick for allowing me to help you improve your game, but please continue to work on these points with the help of your local professional, who is also there to assist you in overcoming these problems. Good golfing, Bobby Jones."

The above embodiment has been described with reference to a golf swing movement, however, as previously stated the invention may be readily applied where other movements are required to be emulated. Such movement may
5 comprise movements of persons or movements of objects or mechanisms of which emulation is required.

In a further form the invention may be applied to the property field to enable professional assessments and presentations of designs for future development proposals or
10 the like. In this form visual images and data relating to signals of a particular area of ground are captured using remote sensing techniques. For this purpose a camera and remote sensing device may be fixed to the underside of an
15 aircraft so as to capture and record geometrical or statistical information of the earth or objects featured beneath. Geographical data achieved through using this remote sensing as above may be computer coded or digitised using video cameras, array scanners, laser beam, microwave or other means.

20 Information regarding the geographical area being scanned is then transmitted as before using a transceiver to a remote computer containing a database of prestored expert information on attributes required of a particular area of land. Thus where the best standard of golf course is
25 required to be laid out upon a specific parcel of land the data base may include a library of selected hole layouts from different courses. The computer which is software programmed may then select preferred hole layouts to match to the area of land of which geographical features has been
30 scanned and recorded. Alternatively, the computer may itself design the appropriate hole layouts to best fit the area of land and proposed development. The computer database may additionally include feasibility study means for determining and displaying measurements, costings and
35 other procedures required to achieve the end result. The computer may further be programmed to take into account residential housing around the course and the location of same, so as to maximize view of the course etc.



As before, dialogue may be added to the regenerated audio visual presentation as well as statistical graphs or other information relating to the development being studied.

5 The present invention may also be applied to enable a particular object to be analysed against prestored data relating to a currently known object. In this embodiment and as before an object is scanned so that its characteristics may be determined. Scanning is carried out
10 to obtain the optical photometric characteristics of the object using imaging and non-imaging sensor systems. As before the data obtained is stored and then transmitted to a remote location for analysis in a computer with the corresponding data of a preferred object whose data
15 information is captured in a data base. After comparison and adding, where appropriate, suitable dialogue from say an expert in that field, a regenerated signal is formed and transmitted back to the sender so that the sender has an expert audio visual assessment of the differences between
20 the respective objects. A particular application in this embodiment is for component parts as used in an assembly. The data information obtained relating to that part may be compared to a perfect component part whose data is stored at the remote location so that the differences may be assessed.
25 This embodiment may also be employed for detecting for example faults in a particular component part.

It will be apparent that the latter embodiment may be applied to any suitable targets of which analysis is required.

30 The present invention thus provides an interactive method and means for expertly teaching, advising or instructing procedures, strategies, assessments or perceptions in audio visual form to enable a viewer/end-user to more closely emulate calculate or develop techniques or
35 make decisions suitable to their various applications.

Whilst the above has been given by way of illustrative embodiment of the invention, all such modifications and variations thereto as would be apparent to



persons skilled in the art are deemed to fall within the broad scope and ambit of the invention as herein defined by the appended claims.

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CLAIMS

1. A method for providing an instructional aid for assisting a person to emulate a preferred movement including the steps of capturing and storing visual image signals representative of a particular movement, comparing said
5 captured image signals with stored image signals representative of a selected preferred movement, and regenerating further visual image signals based on said image signals of said particular movement adjusted to
10 emulate said stored image signals of said selected movement.

2. A method according to Claim 1 wherein said image signals of said particular movement are captured and stored using a video camera.

- 15 3. A method according to Claim 1 wherein said visual image signals of said preferred movements are stored in a database of a computer and wherein a selected preferred movement is accessed from said data base for comparison with
20 said particular movement.

4. A method according to Claim 3 wherein said image signals are captured and stored at a first location and wherein said computer is located at a second location remote
25 from said first location and wherein means are provided for transmitting said captured images from said first location to said computer at said second location.

5. A method according to Claim 4 wherein said
30 transmitting means comprise independent signal transmitting means or a personal computer.

6. A method according to Claim 4 wherein said transmitting means transmits said image signals over a
35 communication network to said computer.

7. A method according to Claim 4 wherein said regenerated signals are transmitted from said remote second



location to said first location.

8. A method according to Claim 7 wherein said regenerated image signals are stored in image presentation means which permits viewing thereof by said person.

9. A method according to Claim 8 and wherein dialogue relating to said regenerated image signals is added for presentation with said regenerated image signals.

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10. A method according to claim 9 wherein said dialogue is selected from words or phrases stored in a database.

15 11. A method according to claim 7 wherein bio mechanical data relating to said regenerated images is displayed within image presentation means.

12. A method of providing an instructional aid relating to a development proposal comprising the steps of capturing and storing visual image and location data signals of a proposed development location, analyzing said captured signals against the signals of a selected or preferred known development or means for forming a new design development and regenerating further visual image/data signals based on said signals of said proposed development adjusted in accordance with said preferred development or said new design development so as to provide a recommendation for said preferred development.

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13. A method according to Claim 12 wherein said visual image/data signals of said proposed location are captured and stored using a video camera and remote sensing devices.

35 14. A method according to Claim 12 wherein said signals of said selected or preferred known development or new design development are stored in a database of a computer.



15. A method according to Claim 14 wherein said computer is arranged at a location remote from said proposed location and wherein said captured image signals are transmitted to said remote location for said analysis by
5 said computer.

16. A method according to Claim 15 and wherein said regenerated image/data signals are transmitted from said computer to said proposed location and are provided in a
10 format to enable when transferred or added to home viewing means for viewing thereof.

17. A method according to Claim 16 and including means for adding dialogue to said format so as to provide an audio
15 visual presentation.

18. A method according to Claim 17 wherein said dialogue is selected from words or phrases previously stored in a database.
20

19. Apparatus for providing an instructional aid for assisting a person personally to emulate a preferred movement or technique, said apparatus including means for capturing visual image signals of a particular movement or
25 technique, means for storing said captured visual image signals, means for storing visual image signals of a plurality of preferred movements or techniques, means for comparing said captured visual image signals with the stored image signals of a selected said preferred movement or
30 technique, and means for regenerating further visual image signals of said particular movement or technique adjusted in accordance with said selected preferred movement or technique to assist a person to emulate said selected preferred movement or technique.

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20. Apparatus according to Claim 19 wherein said means for storing visual image signals of a plurality of preferred movements or techniques comprises a computer database and



wherein said comparing and regenerating means comprises a computer associated with said computer database.

21. Apparatus according to Claim 20 and including
5 transceiver means for transmitting to said computer said visual image signals of said particular movement or technique and for receiving from said computer said regenerated visual images signals.

10 22. Apparatus according to Claim 20 and including means for converting said regenerated image signals into a format which allows viewing thereof.

23. Apparatus according to Claim 22 and including
15 means for adding to said format dialogue relating to said regenerated images.

24. Apparatus according to Claim 23 and including means for scanning and selected stored words or phrases for
20 addition to said format as said dialogue.

25. Apparatus according to Claim 22 and including means for adding to said format bio-mechanical data relating to said regenerated images.

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26. Apparatus for providing an instructional aid based on a visual image of a particular movement or location, said apparatus including means for visually scanning said movement or location and for producing visual image signals
30 representative of said movement or location, means for storing said visual image signals, means for transmitting said visual image signals to a remote location, means for comparing said transmitted visual image signals with corresponding signals of a selected prestored image or
35 images, means for regenerating further image signals comprising said image signals of said particular movement or location adjusted in accordance with said prestored signals of said image or images, and means for retransmitting said

regenerated image signals and converting said image signals into a format which enables viewing thereof.

27. Apparatus for providing a personalised
5 instructional aid in a development presentation based upon a visual image signal of a particular location, said apparatus including means for visually scanning said location and for producing image and informational data signals representative of said location, means for storing
10 said visual/data signals, means for transmitting said visual/data signals to a remote location, means for comparing said visual/data signals with the visual/data signals of a selected prestored location and the procedure relating to the development thereof, means for regenerating
15 further visual data/signals based on said signals of said particular location adjusted in accordance with said prestored procedure signals to assist in said development, means for adding dialogue and information data to said regenerated signals and means for transmitting said
20 regenerated image/data signals and converting said signals into a format which enables viewing thereof.

28. Apparatus for providing a personalised audio
visual aid based upon optical photometric characteristics of
25 a selected object, said apparatus including means for visually scanning, sensing and capturing visual/data signals representative of said object, means for storing said visual/data signals, means for transmitting said visual/data signals to a remote location, means for comparing said
30 visual/ data signals with corresponding prestored signals of a selected object, means for regenerating further visual data/signals comprising said signals of said particular object adjusted in accordance with said prestored preferred object signals, means for transmitting said regenerated
35 image/data signals and converting said image signals into a format which enables viewing thereof.

29. Apparatus according to Claim 28 and including



means for adding dialogue or informational data to said regenerated format.

30. Apparatus according to Claim 28 wherein said
5 object scanning means comprise imaging or non-imaging sensor systems.

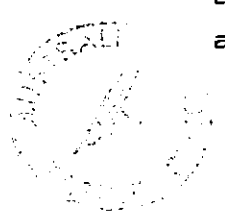
31. A method for providing a personalized audio visual teaching aid for assisting a person to emulate, or consider
10 advice on a preferred activity or subject of interest, said method including the steps of capturing and storing visual image, audio and/or data signals representative of a particular activity or subject of interest, comparing said captured signals with stored image, and audio and/or data
15 signals representative of a selected preferred activity or subject of interest, and generating audio visual image signals based on said captured signals analysed against the signals of said selected preferred activity or subject of interest.

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32. A method according to Claim 31 wherein said visual image, audio and/or data signals relating to said particular activity or subject of interest are captured and stored by using a portable video camera and imaging or non-imaging
25 remote sensing devices.

33. A method according to Claim 31 wherein said visual image, audio and/or data signals of said preferred activity or subject of interest are captured and stored in a database
30 of a computer and wherein signals representative of said selected preferred activity or subject of interest are accessed from said data base for comparison with said signals of said particular activity or subject of interest.

35 34. A method according to Claim 33 wherein said visual image, and audio and/or data signals of said particular activity or subject of interest are captured and stored at a first location and wherein said computer is located at a



second location remote from said first location and wherein means are provided for transmitting said captured visual image, and audio and/or data signals from said first location to said computer at said second location.

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35. A method according to Claim 34 wherein said transmitting means comprises independent signal transmitting means or a personal computer.

10 36. A method according to Claim 34 or 35 wherein said transmitting means transmits said visual image, and audio and/or data signals over communication network means to said computer.

15 37. A method according to any one of Claims 34 to 36 wherein said generated signals are transmitted from said remote second location to said first location by communication network means.

20 38. A method according to Claim 37 wherein said generated image and, audio and/or data signals are stored in image presentation means, or displayed on a monitor for permitting viewing thereof by said person.

25 39. A method according to any one of Claims 31 to 38 wherein dialogue is added for presentation with said generated audio visual image signals.

30 40. A method according to Claim 39 wherein said dialogue is selected from words and phrases stored within a database.

35 41. Apparatus for providing an audio visual teaching aid for assisting a person personally to emulate or consider advice on a preferred activity or subject of interest, said apparatus including means for capturing visual image, and audio and/or data signals of a particular activity or subject of interest, means for storing said captured

signals, means for storing signals of a plurality of preferred activities or subjects of interest, means for comparing said captured signals with said stored signals of a selected preferred activity or subject of interest, and
5 computer means for regenerating further audio visual and data signals of said particular activity or subject of interest adjusted in accordance with said selected preferred activity or subject of interest whereby to assist a person to emulate or consider said selected preferred activity or
10 subject of interest.

42. Apparatus according to Claim 41 wherein said means for storing visual image, audio and/or data signals of said particular activity or subject of interest captures, stores
15 and compresses said signals at a first location and wherein said signals of said preferred activities or subjects of interest are stored within a database associated with said computer means at a second location remote from said first location, said computer means being adapted to compare and
20 regenerate said further audio visual signals for transmission to said first location.

43. Apparatus according to Claim 42 and including transceiver means for transmitting said visual image, audio
25 and/or data signals of said particular activity or subject of interest over communications networks means to said computer means and for receiving from said computer means said regenerated audio visual, and/or data signals adjusted in accordance with said selected preferred activity or
30 subject of interest.

44. Apparatus according to Claim 43 wherein said transceiver means comprises a portable transceiver means or a personal computer.
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45. Apparatus according to any one of Claims 41 to 44 and including means for converting and presenting said regenerated visual image, and audio and/or data signals into

a format which allows viewing thereof through a monitor.

46. Apparatus according to any one of Claims 41 to 45 wherein said computer means adds to said regenerated signals
5 dialogue relating to said signals, said dialogue being selected from words or phrases stored in a database.

47. A method for providing an instructional aid substantially as hereinbefore described with reference to the
10 accompanying drawings.

48. A method for providing a personalized audio visual teaching aid substantially as hereinbefore described with reference to the accompanying drawings.
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49. Apparatus for providing an instructional aid substantially as hereinbefore described with reference to the accompanying drawings.

20 50. Apparatus for providing an audio visual teaching aid substantially as hereinbefore described with reference to the accompanying drawings.

DATED this nineteenth day of October 1994

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By My Patent Attorney


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