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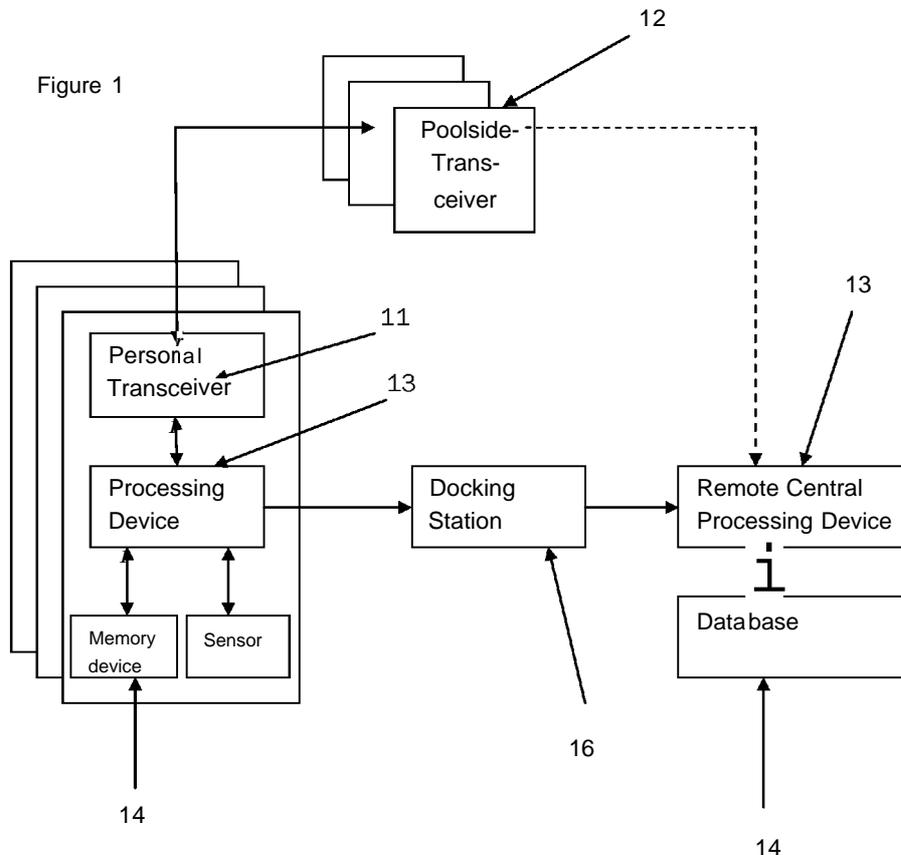
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(54) **Title:** A SPORTS MONITORING SYSTEM



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(57) Abstract: A sports monitoring system, which can monitor progress of one or more users in terms of physical performance. The system includes a number of transceivers mounted in a suitable position relative to each other for example in the corners of an area in which the activity is taking place. In addition personal transceivers are attached to the users of said system. Such an arrangement would result in the generation of various data, which can be stored, processed and displayed.

A Sports Monitoring System

This invention relates to a sports monitoring system particularly although not exclusively for use in a swimming pool.

In the past few years, keeping fit through swimming at a swimming pool has increased in popularity enormously and therefore there are many swimming pools being built at the present time to accommodate the increased demand for such facilities.

It has been recognised by users of facilities for swimming, that it would be beneficial to have the ability of having their swimming monitored by an external monitoring system, which automatically captures data relating to the swimming undertaken by a user and can process that information or simply store it for future use.

For the purpose of monitoring progress in developing or maintaining fitness levels, the swimming pool could have a monitoring system installed which could be suitably located so as to monitor, in any suitable manner, the exercises being carried out by a user and can forward the information gathered to a central processing device for processing of the raw data into a user friendly form for display or storage. The monitoring system typically would gather data concerning the performance of a user for example as to the number of lengths swum, the time taken to swim a set distance, the type of stroke swum and the number of strokes per length and this data can be compared to previous stored data to identify any improvement in the fitness of a user.

Whilst a documentary record of performance can be kept by a user themselves, it is simpler to form an automated system which would be much more convenient for a user insofar as the user would not need to be concerned with the need to perform specific exercises in a specific location, since the system would take all the information gathered and process that to provide the information required by a user. Furthermore, use of an automated monitoring system would also allow more accurate user independent data to be gathered and saved after any necessary processing. An automated system would also permit the provision of information to the user on a real-time basis, if desired. The use of an external processing step within the system in conjunction with the accelerometer will provide greater flexibility in the range of data provided to the user, through the application of additional processing algorithms.

It is accordingly an object of the present invention to provide a monitoring system, which can communicate with a user and can generate from the data received, data relating to preinstalled or user-defined parameters relating to the user and/or performance of the user.

Thus and in accordance with the present invention there is provided a sports monitoring system comprising a personal transceiver carried by a user, said personal transceiver communicating with at least one poolside transceiver mounted for communication with at least one personal transceiver, the system further comprising a processing device linked to each personal transceiver, which acts to process information from the personal transceiver, a memory device in which the processed data can be stored, wherein said personal

transceiver can be connected with a docking device allowing automatic download or upload to or from the data processing device.

With such an arrangement, it is possible to capture and process in any desired manner, information regarding any user of the facilities of the swimming pool in terms of performance. If required, membership or other information relating to a user can be stored in the same way.

The invention will now be described further by way of example only and with reference to the accompanying drawings, in which;

Figure 1 shows in block form, one embodiment of monitoring system in accordance with the present invention; and

Figures 2 to 4 show in block form components of an embodiment of monitoring system in accordance with the present invention.

Figures 5 and 6 show the data analysis process and the transceiver network in greater detail.

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Referring now to the drawings, there is shown in Figure 1 a monitoring system comprising at least one personal transceiver 11, linked wirelessly, to one or more poolside transceivers 12 disposed around the swimming pool. The data from each poolside transceiver 12 is passed to a processing device 13 for processing and display if desired. Alternatively, the data can be stored in a storage device 14 either before or after processing.

A docking station is attached to the processing device to enable an automatic or manual upload of data to the database.

Figures 2 to 4 show component parts of the system of figure 1, in more detail. The personal transceiver is linked wirelessly to one or more poolside transceivers disposed around the swimming pool. The data from each poolside transceiver is passed to a processing device for processing and display if desired. Alternatively, the data can be stored in a storage device, either before or after processing.

In Figure 2 there is shown one embodiment of a personal transceiver in accordance with the present invention. The personal transceiver device comprises a Radio Frequency (RF) or Infra red (IR) transceiver which is configured to be mounted on a user so as to be movable therewith. Whilst RF personal transceivers are described herein, it will of course be appreciated that the personal transceivers can operate at any frequency required as desired or as appropriate. Each personal transceiver is conveniently carried in an arm or wristband worn by a user. Whilst arm or wristband personal transceivers are described herein, it will be appreciated that the personal transceivers can be located as desired on any part of a user.

Whilst a single personal transceiver is envisaged as only being necessary, as many personal transceivers as desired can be carried in a single arm or wristband by a user. The personal transceiver receives data from poolside transceivers via an integral antenna linked to an RF transceiver and memory device in which data received can be stored. The signal from the poolside transceiver can be used as a time stamp or other form of signal to determine the place or location. Further data can be collected by the personal transceiver from an acceleration sensor. Whilst an acceleration sensor is described herein, it will be appreciated that a wide range of sensors could be interfaced with the personal transceiver.

An external processing device is included as a second processing device and acts to provide a high degree of processing of the raw data and enables avoidance of all the processing being acted on the personal.

Referring now to Figure 3 there is shown a poolside transceiver for use in the system of the invention. The transceiver devices comprise in the present embodiment RF transceivers, which are positioned in appropriate locations to allow data to be gathered. Whilst RF transceivers are described herein, it will be appreciated that the poolside transceivers can operate at any frequency required as desired or as appropriate. Data received from the transceivers can be downloaded and can be transformed into any suitable form.

Furthermore, whilst the use of RF frequencies for data transmission, radiation of any suitable frequency as desired or as appropriate can be used.

The one or more data processing devices can comprise a microprocessor-based device, which is suitably programmed to carry out any necessary processing of the gathered data, as desired or as appropriate. The data processing device can be provided to the personal transceivers or can be wirelessly linked to a remote central processing device as desired or as appropriate.

The data processing device can also have associated therewith, a memory device, which can be arranged to store all data received, whether in raw or processed form, for future use as desired or as appropriate. The memory device can be formed as part of the data processing device or can be completely separate from the processing device. Communication between the data processing device and the memory device can also be carried out wirelessly.

A docking station as shown in Figure 4 may be provided as part of the invention with which a user can interact automatically to update or download data of interest to them. The docking station may be formed integrally with the remote central processing device or separately there from. Where the docking station is provided remotely of the remote central processing device, it may be linked to the remote central processing device either wirelessly or in hard wired form. The docking station may be linked to the transceivers by way of Bluetooth, WiFi or any other suitable wireless link. Alternatively, the docking station can be formed integrally with the remote central processing device. The docking station may provide a manual or automated interface for the capture of personal details such as membership numbers, types of exercise, times visited and exercises completed to be accessed for use by the system,

third parties or edited as a means for monitoring any fitness improvements and/or changes in personal details.

The monitoring system of this invention comprises a tag or personal transceiver, which can be attached to each user and becomes a unique identifier for that user. The poolside transceiver is mounted in a fixed position in the swimming pool or other location where exercise is taking place and the docking station and the subsequent data storage and processing devices, which are independent of the user.

As mentioned above, a personal transceiver is associated with a wristband or is temporarily connected to the swimming attire of a user in any suitable matter. The swimming pool has poolside transceiver devices mounted in preselected positions in which they can provide positional information to a personal transceiver, which is in possession of or mounted on a user. Interfacing the above mentioned personal transceiver device with a docking station will facilitate access to all relevant or necessary data stored on the personal transceiver recorded during an exercise session.

Thus, when a user is for example swimming in a pool, the personal transceiver carried by the user will receive positional information from the poolside transceiver devices mounted around the pool. Such transceivers can also be utilised to derive data relating to a users actions whilst swimming such as by way of example the number of lengths swum, the time for each length of the pool to be swum, the number of strokes needed to complete a length, the type of stroke used, total distance swam, speed of swimming and calories burnt. The

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transceiver will then transmit the data to the data processor where any necessary further processing can take place. It is also possible to use a similar system to provide updates to the personal transceiver. Further the memory device can be formed as a flash memory of conventional form.

Also there may be one or more displays of relevant information strategically placed for users of the system.

It is also possible to allow the contents of the processed data to be made available over an internet connection to a web page, which only a user having the required access codes or passwords can access the page and the information stored therein. With such an arrangement, the user can view and/or change the data on the database from their home or work without needing to go to the health club or leisure centre to do so.

It can be seen that with the arrangement of the present invention, a much more versatile system for monitoring the performance of a user's exercise and inherent change in fitness can be provided and which can function remotely and automatically.

It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiment, which are described by way of example only.

Thus, for example, whilst in the embodiment described the personal transceiver is carried by the user in a wristband, and the poolside transceivers are mounted at fixed positions around the swimming pool it is envisaged that in some circumstances it may be advantageous to have the personal transceivers carried by the user and the poolside transceivers to be disposed around the swimming pool. Further, accelerometer sensors can also be utilised and therefore be attached to the wristband and these assist in detecting movement of a user. The use of a combination of RF and Accelerometers or other sensors can significantly reduce the need for processing and increasing the accuracy of data processing.

It is envisaged that the invention can be utilised in sports or exercise not connected with swimming, in particular, the system can be used to monitor movement of participant along a route of known direction for example running, triathlon, sailing, kayaking, mountain biking, horseracing, mountain climbing , motor racing.

The system of the present invention can also be used in other sports activities in which the participants are restricted to a given area and/or proximity activities such as for example football, rugby, tennis, squash, hockey, badminton, cricket, baseball and basketball

Still further, the system of the invention can interact with the user via a screen or display, which is mounted on the wristband or poolside.

Claims

1. A sports monitoring system comprising a personal transceiver carried by a user, said personal transceiver communicating with at least one pool side transceiver, the system further comprising a processing device linked to each personal transceiver which acts to process information from the poolside transceiver, and a memory device in which the received data can be stored, wherein said personal transceiver can be connected with a docking device allowing automatic download or upload to or from a secondary data processing device.
2. A Sports monitoring system according to Claim 1 in which each of said transceivers operate on one or a plurality of radio frequencies.
3. A Sports monitoring system according to Claim 2 wherein the processing device is capable of transferring received data into a form suitable for its intended purpose.
4. A sports monitoring system according to any one of Claims 1 to 3 in which said processing device is wirelessly connected to a memory device in which raw or processed data can be stored.
5. A sports monitoring system according to any one of Claims 1 to 4 wherein said docking device is operable to allow a large volume of data to be uploaded.
6. A Sports monitoring system according to any of claims 1 to 5, wherein said personal transceivers are configured so as to be capable of being mounted on a wristband for wear by a user.
7. A sports monitoring system according to Claim 6, in which a plurality of personal transceivers and fixed transceivers can be provided and used simultaneously.
8. A sports monitoring system according to any preceding claim in which said system is arranged to allow more than one user at any particular time.
9. A sports monitoring system according to any preceding claim in which raw data is captured on

a personal transceiver and it is downloaded to a docking station where detailed processing takes place

10. A sports monitoring system according to any preceding claim in which acceleration data is captured on the personal transceiver and processed to provide additional performance data.

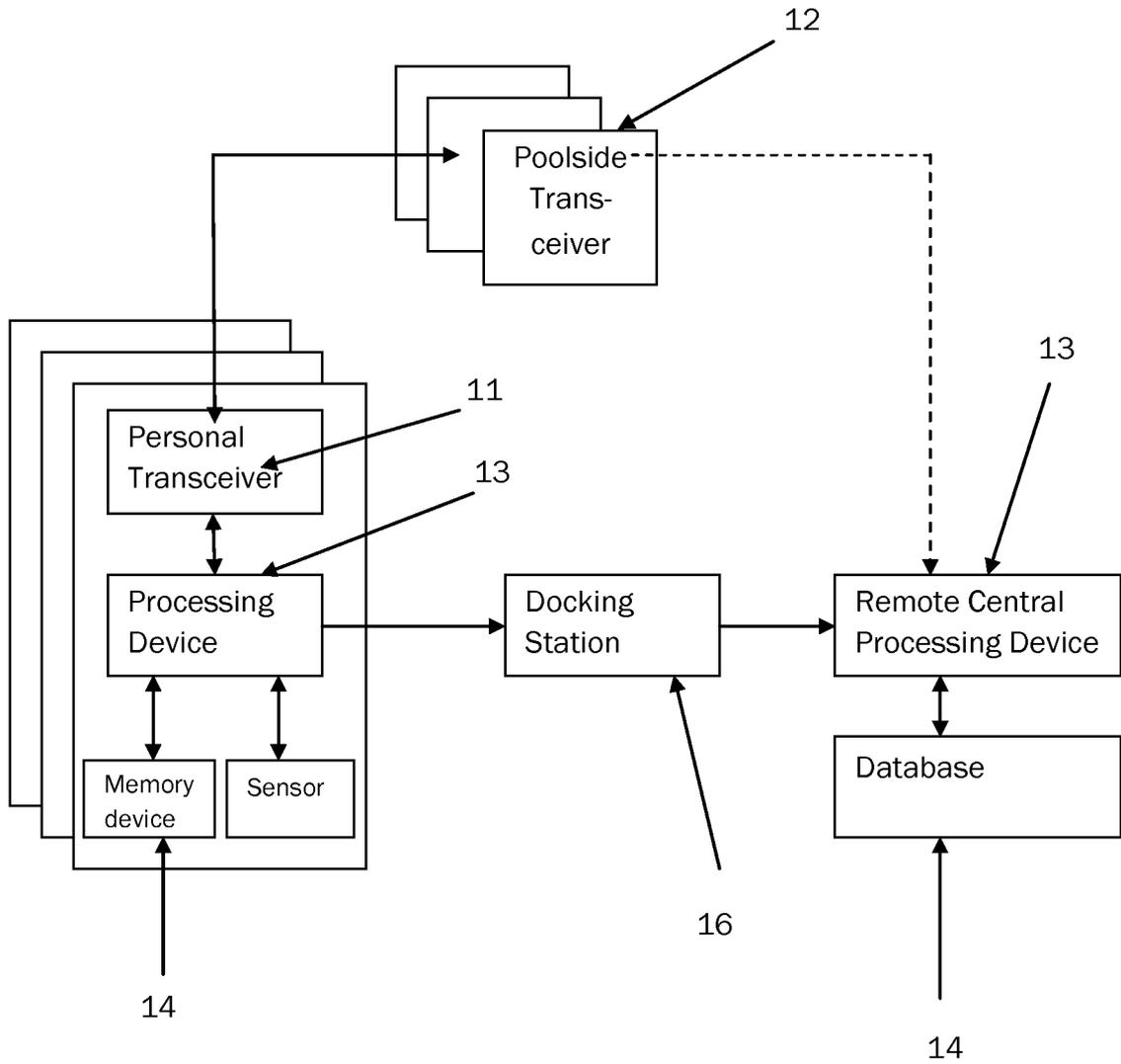


Figure 1

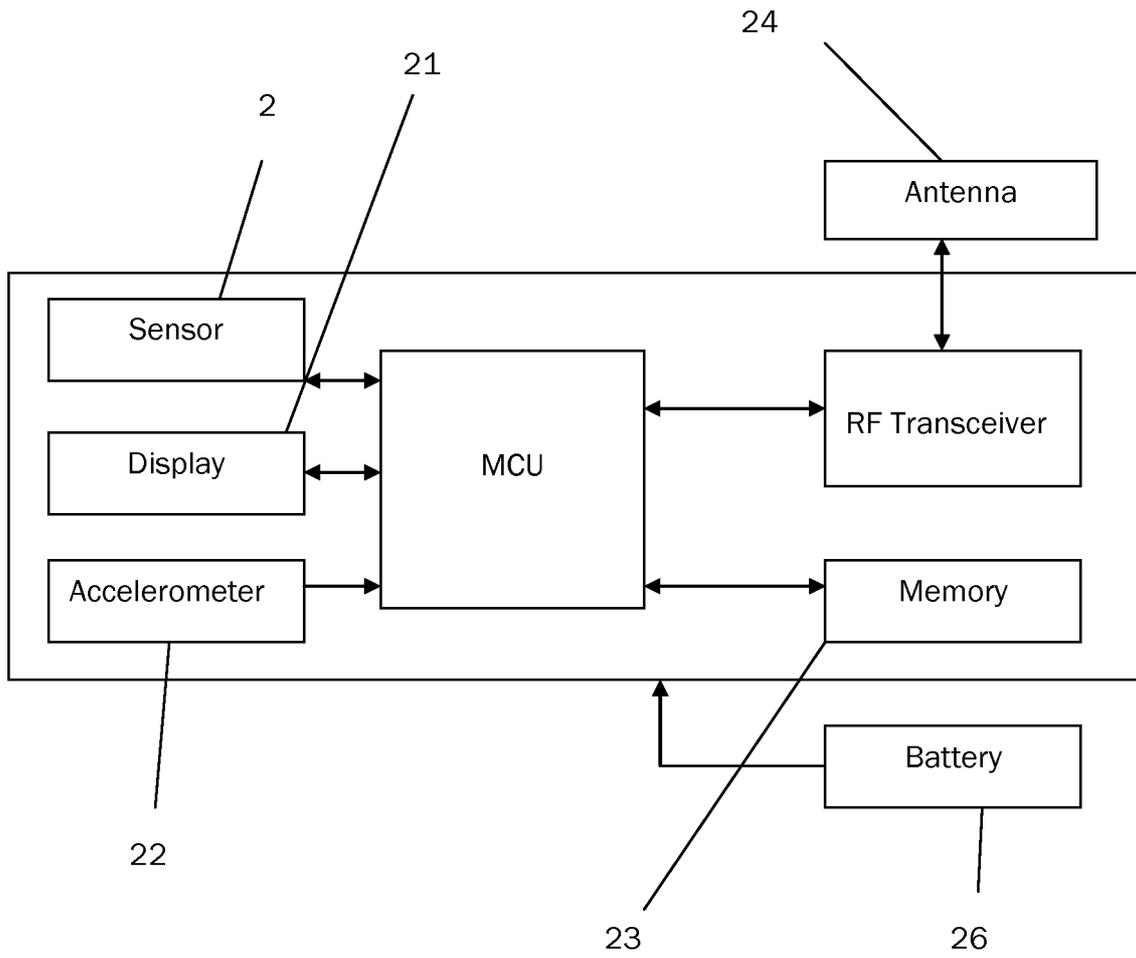


Figure 2

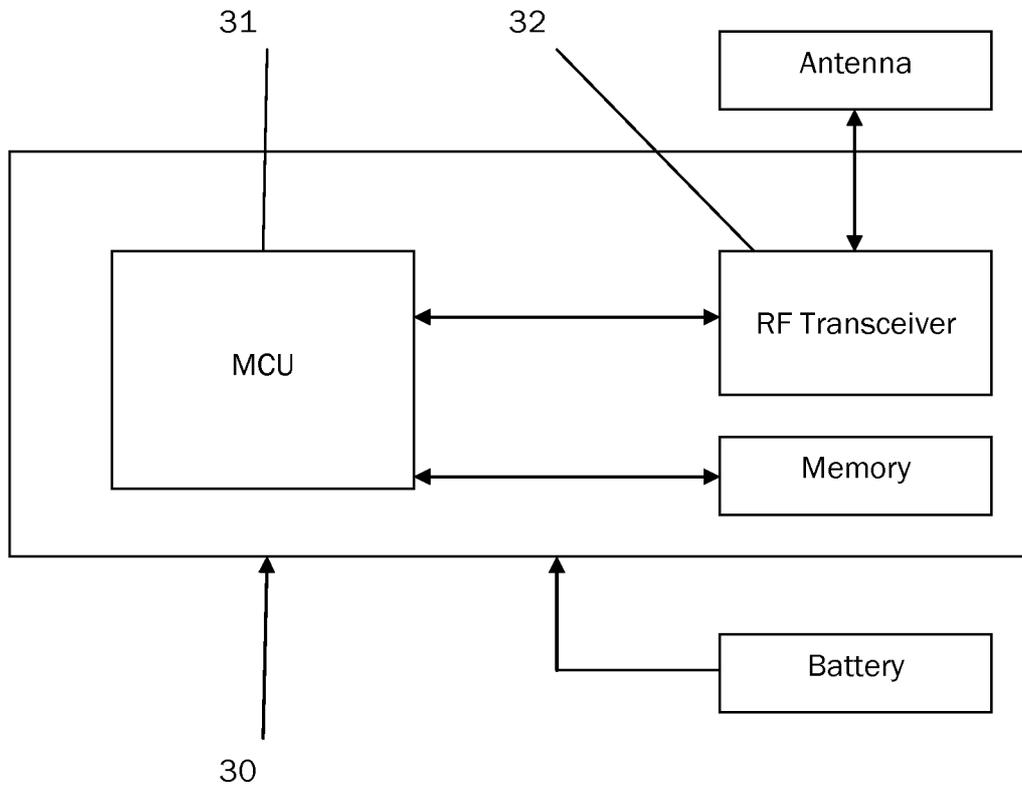


Figure 3

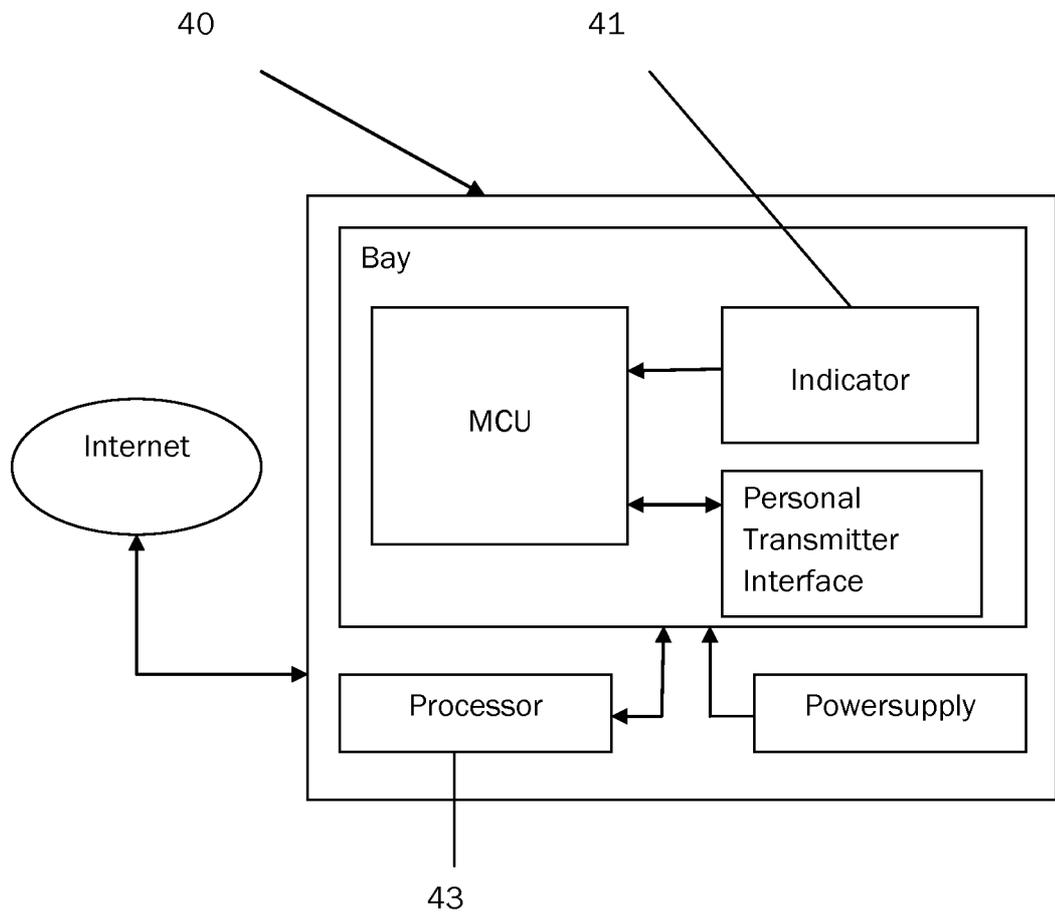


Figure 4

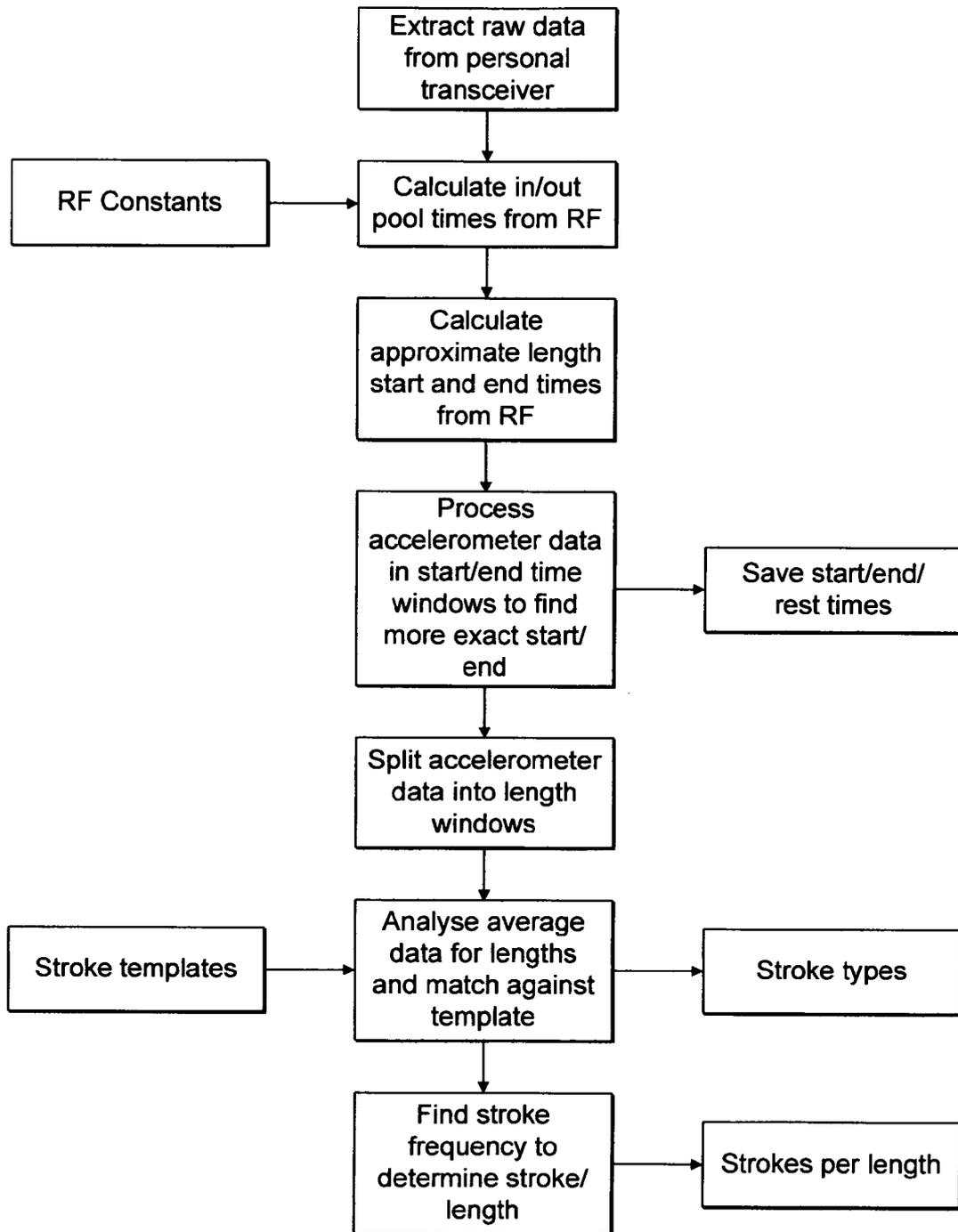


FIG. 5

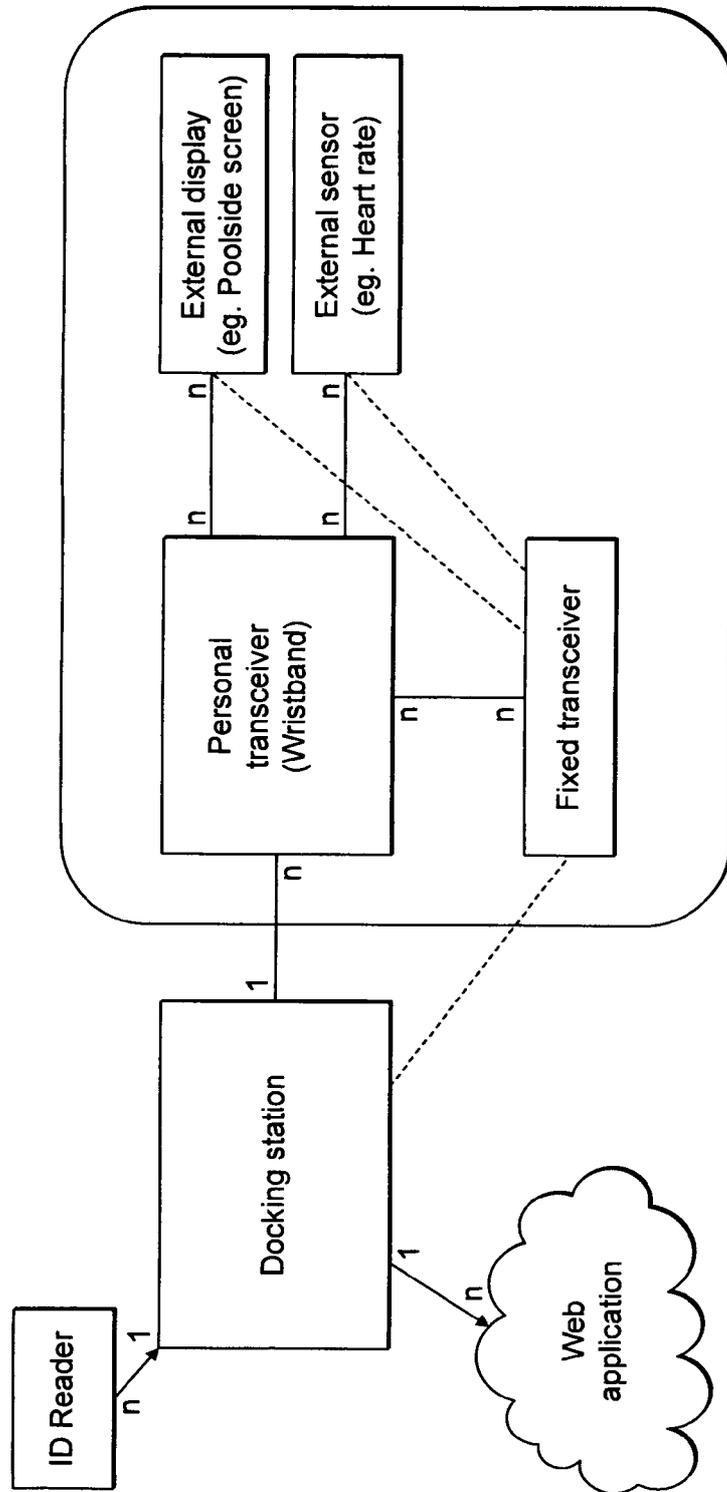


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/069009

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B5/11 A63B24/00
ADD.
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)
A61B A63B

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

See patent family annex.

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| Date of the actual completion of the international search 10 May 2011 | Date of mailing of the international search report 17/05/2011 |
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/069009

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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