controller to process the measured values according to a control algorithm and a hormone dosing unit to administer a hormone dose. Additionally, the degree of physical activity of the diabetic is taken into consideration by a pilot control device having an activity measuring unit for the sensory detection of the degree of physical activity of the patient. With regard to the differentiated detection of resting states of the patient such as lying, sitting, standing, the pilot control device has a position sensor and in particular a mercury switch or spirit level. In order to detect states of movement the pilot control device has a movement sensor, such as a pedometer. For indirect detection the pilot control device can further include sensors for detecting body parameters of the patient such as heart rate, body temperature or skin conductivity.

US 8,601,005 B2 discloses a portable device that accesses a food database over the internet. The portable device detects its location using GPS coordinates to detect its location. Based on the detected location, the portable device queries the food database, and the food database returns a list of menu items for that particular location. For example, if the first food source location is a fast food restaurant, the processor via the food database refines the list of available food items based on that location. If the portable device is located at the second food source location, then the menu of items would be based on the items available at that location. Manual entry of contextual data / health event (illness, sport. etc.) to automatically recommend bolus adjustment / correction (after use confirmation) does already exist (e.g., EP 2 627 251 B1).

Summary

Embodiments of the present invention provide improved technologies for controlling a medical system provided with a medical device to be operated. Specifically, operation of the medical system depending on different use situations shall be improved.

According to a first aspect of the present invention, there is provided a control apparatus for providing control data in a medical system, including a portable device; a plurality of active context data carriers, comprising a first context data carrier placed in a first location of a use environment of the portable device, wherein the plurality of active context data carriers provide a local location reference system; and a data handling system provided in the portable device, including a data input interface, and a device controller functionally connected to the data input interface; wherein the data handling system is configured to determine a presence of the portable device within the local location reference system by determining that the portable device is in vicinity of one or more active context data carriers; receive, through the

data input interface, first local context data from the first context data carrier, the first local context data being indicative of at least one of location, patient identity, patient activity, and time, wherein the first local context data is received by receiving, by a receiver of the portable device, the first local context data transmitted by a transmitter of the active context data carrier; generate, in response to receiving the first local context data, a first context dependent device control data by the device controller, comprising processing of the first local context data and generating the first context dependent device control data in dependence on electronic context information derived from the processing of the first local context data; and output, through a data output interface of the portable device, output data indicative of the first context dependent device control data.

According to a second aspect of the present invention, there is provided a system, including the above medical device and control apparatus, the medical device functionally connectable to the control apparatus for receiving context dependent device control data from the control apparatus.

According to a third aspect of the present invention, there is provided a method for controlling a medical system, including: providing a control apparatus, the control apparatus comprising a portable device, a plurality of active context data carriers with a first context data carrier individually placed in a first location of a use environment of the portable device, wherein the plurality of active context data carriers provide a local location reference system, and a data

handling system provided in the portable device and comprising a data input interface, and a device controller functionally connected to the data input interface; determining a presence of the portable device within the local location reference system by determining that the portable device is in vicinity of one or more active context data carriers; receiving, through the data input interface, first local context data from the first context data carrier, the first local context data being indicative of at least one of location, patient identity, patient activity, and time, wherein the first local context data is received by receiving, by a receiver of the portable device, the first local context data transmitted by a transmitter of the active context data carrier; generating, in response to receiving the first local context data, a first context dependent device control data by the device controller, comprising analyzing of the first local context data and generating the first context dependent device control data in dependence on context information derived from the analyzing of the first local context data; andoutputting, through a data output interface of the portable device, output data indicative of the first

context dependent device control data.

According to a fourth aspect of the present invention, there is provided a computer program stored on a computer readable recording medium, the computer program intended to control a medical system by a control apparatus comprising a portable device, a plurality of active context data carriers with a first context data carrier individually placed in a first location of a use environment of the portable device, wherein the plurality of active context data carriers provide a local location reference system, and a data handling system provided in the portable device and comprising a data input interface, and a device controller functionally connected to the data input interface, and the computer program including: means recorded on the recording medium for determining a presence of the portable device within the local location reference system by determining that the portable device is in vicinity of one or more active context data carriers; means recorded on the recording medium for receiving, through the data input interface, first local context data from the first context data carrier, the first local context data being indicative of at least one of location, patient identity, patient activity, and time, wherein the first local context data is received by receiving, by a receiver of the portable device, the first local context data transmitted by a transmitter of an active context data carrier; means recorded on the recording medium for generating, in response to receiving the first local context data, a first context dependent device control data by the device controller, comprising analyzing of the first local context data and generating the first context dependent device control data in dependence on context information derived from the analyzing of the first local context data; and means recorded on the recording medium for outputting, through a data output interface of the portable device, output data indicative of the first context dependent device control data.

The local context data may be provided with encrypted local context data on the context data carrier.

The local context data may be indicative of at least one of location, patient identity, patient activity, and time. Location data may be indicative of a location where the context data carrier is placed. Patient activity data may indicate a level of physical activity. For example, the patient's level of activity will be different for working in the office on one side and for doing exercises in a gym on the other side. With regard to time, the context data may refer to different control data depending on the day time.

Claims

1. A control apparatus for providing control data in a medical system, comprising

- a portable device (3);

- a plurality of active context data carriers (1.1, ..., 1.n), comprising a first context data carrier placed in a first location of a use environment of the portable device (3), wherein the plurality of active context data carriers (1.1, ..., 1.n) provide a local location reference system; and

- a data handling system provided in the portable device (3), comprising a data input interface (7), and a device controller (8) functionally connected to the data input interface (7);

wherein the data handling system is configured to

- determine a presence of the portable device (3) within the local location reference system by determining that the portable device (3) is in vicinity of one or more active context data carriers (1.1, ..., 1.n);

- receive, through the data input interface (7), first local context data from the first context data carrier, the first local context data being indicative of at least one of location, patient identity, patient activity, and time, wherein the first local context data is received by

- receiving, by a receiver of the portable device (3), the first local context data transmitted by a transmitter of the active context data carrier;

- generate, in response to receiving the first local context data, a first context dependent device control data by the device controller (8), comprising processing of the first local context data and generating the first context dependent device control data in dependence on electronic context information derived from the processing of the first local context data; and

- output, through a data output interface (9) of the portable device (3), output data indicative of the first context dependent device control data.

2. Control apparatus according to claim 1, wherein the passive local context data carrier comprises at least one of a data matrix such as a one-dimensional barcode or a two-dimensional barcode, and an electronic data storage element such as an RFID transponder.

3. Control apparatus according to claim 1, wherein the transmitter of the active context data carrier and the receiver of the portable device (3) are configured for contactless data transmission by a transmission technology selected from the following group: near field data communication, and Bluetooth communication.

4. Control apparatus according to claim 1, wherein the portable device (3) comprises a detection module functionally connected to the device controller (8), the data handling system further configured to detect local vicinity of the portable device (3) to the first context data carrier.

5. Control apparatus according to claim 1, wherein the first context dependent device control data are configured to control at least one process of operation of a medical device (4) selected from the following group: video data output, audio data output, outputting a warning signal, controlling pump operation, and amending at least one of medication plan, a bolus administration, a target range of measurement such as glucose values, a device setting of a medical device such as an insulin pump or a glucose measurement device, a threshold value for measurement values such as glucose values, an insulin profile, and a time block defining a time period.

6. Control apparatus according to claim 1, wherein the portable device (3) is selected from the following group of portable devices: mobile phone, tablet computer, laptop

computer, portable medical device, portable medical measurement device, and smart watch.

7. Control apparatus according to claim 1, wherein the plurality of active context data carriers (1.1, ..., 1.n) comprises a second context data carrier placed in a second location of the use environment of the portable device (3) which is different from the first location, the second local context data carrier providing second context data which are different from the first local context data.

8. A system, comprising a medical device (4) and a control apparatus according to one of the claims 1 to 7, the medical device functionally connectable to the control apparatus for receiving context dependent device control data from the control apparatus.

9. System according to claim 8, wherein the medical device (4) is selected from the following group of medical devices: blood glucose meter, insulin pump, continuous glucose monitoring system, and insulin pen.

10. A method for controlling a medical system, comprising

- providing a control apparatus, the control apparatus comprising a portable device (3), a plurality of active context data carriers (1.1, ..., 1.n) with a first context data carrier individually placed in a first location of a use environment of the portable device (3), wherein the plurality of active context data carriers (1.1, ..., 1.n) provide a local location reference system, and a data handling system provided in the portable device (3) and comprising a data input interface (7), and a device controller (8) functionally connected to the data input interface (7);
- determining a presence of the portable device (3) within the local location reference

system by determining that the portable device (3) is in vicinity of one or more active context data carriers (1.1, ..., 1.n);

- receiving, through the data input interface, first local context data from the first context data carrier, the first local context data being indicative of at least one of location, patient identity, patient activity, and time, wherein the first local context data is received by
  - receiving, by a receiver of the portable device (3), the first local context data transmitted by a transmitter of the active context data carrier;
- generating, in response to receiving the first local context data, a first context dependent device control data by the device controller (8), comprising analyzing of the first local context data and generating the first context dependent device control data in dependence on context information derived from the analyzing of the first local context data; and
- outputting, through a data output interface (9) of the portable device (3), output data indicative of the first context dependent device control data.

11. Method according to claim 10, wherein the providing the control apparatus comprises loading a software application into a memory of the portable device (3) and running the software application on the portable device (3).

12. Method according to claims 10 or 11, further comprising placing the first context data carrier in a user-defined location of the local use environment of the portable device (3).

13. A computer program stored on a computer readable recording medium, the computer program intended to control a medical system by a control apparatus comprising a portable device (3), a plurality of active context data carriers (1.1, ..., 1.n) with a first context data

carrier individually placed in a first location of a use environment of the portable device (3), wherein the plurality of active context data carriers (1.1, ..., 1.n) provide a local location reference system, and a data handling system provided in the portable device (3) and comprising a data input interface (7), and a device controller (8) functionally connected to the data input interface (7), and the computer program comprising:

- means recorded on the recording medium for determining a presence of the portable device (3) within the local location reference system by determining that the portable device (3) is in vicinity of one or more active context data carriers (1.1, ..., 1.n);
- means recorded on the recording medium for receiving, through the data input interface, first local context data from the first context data carrier, the first local context data being indicative of at least one of location, patient identity, patient activity, and time, wherein the first local context data is received by
    - receiving, by a receiver of the portable device (3), the first local context data transmitted by a transmitter of an active context data carrier;
- means recorded on the recording medium for generating, in response to receiving the first local context data, a first context dependent device control data by the device controller (8), comprising analyzing of the first local context data and generating the first context dependent device control data in dependence on context information derived from the analyzing of the first local context data; and
- means recorded on the recording medium for outputting, through a data output interface (9) of the portable device (3), output data indicative of the first context dependent device control data.