viduals are hospitalized. The training creates model coefficients that are invariant between the individuals.

[0010] The method obtains second glucose measurements from the individual using the type of glucose monitoring device utilized to obtain the first glucose measurements, or using a type of glucose monitoring device that is different from the type of glucose monitoring device used to obtain the first glucose measurements. The glucose prediction function is used to predict future glucose levels in the individual. The predicted glucose levels represent glucose levels at least 5 minutes into the future, i.e., 5 minutes from the time that the second glucose measurement is obtained from the individual. Specifically, the model coefficients of the glucose prediction function are multiplied by the second glucose measurements obtained from the individual. Because the model coefficients are invariant between individuals, the predictions are independent of the type of glucose measurement device utilized to obtain the first and second glucose measurement. The predictions are also independent of the diabetes type of the individual, the age of the individual, and whether the individual is hospitalized. The glucose prediction function reduces a time lag of the future glucose levels.

[0011] Another embodiment of the invention provides a system for predicting future glucose levels in an individual. A glucose measuring device generates glucose signals representing glucose levels obtained from the individual at fixed time intervals. In at least one embodiment, a memory unit is housed in the glucose measuring device for storing the glucose signals.

[0012] A programmed processor housed within the glucose measuring device converts the glucose signals into numerical values representing the glucose levels obtained from the individual. The processor is programmed with a glucose prediction function that is portable between individuals irrespective of health of the individuals. The health of the individual includes the age of the individual, the diabetes type of the individual, and whether the individual is hospitalized. In at least one embodiment of the invention, the glucose prediction function is a universal autoregressive model.

[0013] The glucose prediction function includes model coefficients that are invariant between the individuals irrespective of the type of the glucose measuring device utilized to measure the glucose signals. The processor selects the model coefficients based on the sampling rate of glucose measuring device utilized to obtain previous glucose signals from the individual. The glucose prediction function outputs the future glucose levels by weighing the previous glucose signals obtained from the individual by the model coefficients.

[0014] The system further includes a display connected to the processor for displaying the future glucose levels. A threshold detector is also provided for generating an alert when a future glucose level of the individual exceeds an upper glucose threshold and/or falls below a lower glucose threshold.

[0015] A system according to yet another embodiment of the invention includes one or more glucose measuring devices for measuring current glucose levels in humans. One or more first types of glucose measuring devices are utilized to measure glucose levels from individuals (i.e, test subjects) at fixed time intervals (first output). A second type of glucose measuring device is utilized to measure glucose levels from the individual (second output). In at least one embodiment, the second type of glucose measuring device is different from the first types of glucose measuring devices.

[0016] The individuals from which the first output is obtained include individuals having type I and type II diabetes, individuals that are hospitalized, and individuals that are not hospitalized. The individuals range in age from 3 years old to 70 years old. In at least one embodiment of the invention, the average age of the individuals is different from the age of the individual (from which the second output is obtained).

[0017] A processor trains a glucose prediction function using the first output from the glucose measuring device. The glucose prediction function is a universal autoregressive model that is portable between individuals. The glucose prediction function includes model coefficients that are invariant between individuals.

[0018] In another embodiment, an analyzer uses the trained glucose prediction function and current output from the glucose measuring device to predict the future glucose levels in the individual. The predicted glucose levels represent glucose levels at least 5 minutes into the future, i.e., 5 minutes from the time that the second glucose measurement is obtained from the individual. Because the model coefficients are invariant between individuals, the glucose prediction function predicts the future glucose levels independent of the age of the individual, the diabetes type of the individual, and whether the individual is hospitalized.

IV. BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The present invention is described with reference to the accompanying drawings. In the drawings, like reference numbers indicate identical or functionally similar elements.

[0020] FIG. **1**A illustrates a flow diagram for a method of predicting at least one future glucose level in an individual according to an embodiment of the invention;

[0021] FIG. **1**B illustrates a flow diagram for a method of predicting at least one future glucose level in an individual according to another embodiment of the invention;

[0022] FIG. **2**A illustrates a system for predicting at least one future glucose level in an individual according to an embodiment of the invention;

[0023] FIG. **2**B illustrates a system for predicting at least one future glucose level in an individual according to another embodiment of the invention;

[0024] FIG. **3** is a table illustrating three independent studies using three different CGM systems;

[0025] FIG. **4** illustrates a graph including the values of the AR model coefficients according to an embodiment of the invention;

[0026] FIG. **5**A is a table illustrating the values of thirty model coefficients according to an embodiment of the invention;

[0027] FIG. **5**B is a table illustrating the values of thirty model coefficients according to another embodiment of the invention;

[0028] FIG. **6** is a table illustrating root mean squared errors (RMSEs) and prediction time lags for iSense study subjects tested using different models from three validation scenarios;

[0029] FIG. **7** is a table illustrating root mean squared errors (RMSEs) and prediction time lags for Guardian RT study subjects tested using different models from three validation scenarios;