Blood Glucose Level Measurement from Breath Analysis

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Abstract : The constant monitoring of blood glucose level is necessary for maintaining health of patients and to alert medical specialists to take preemptive measures before the onset of any complication as a result of diabetes. The current clinical monitoring of blood glucose uses invasive methods repeatedly which are uncomfortable and may result in infections in diabetic patients. Several attempts have been made to develop non-invasive techniques for blood glucose measurement. In this regard, the existing methods are not reliable and are less accurate. Other approaches claiming high accuracy have not been tested on extended dataset, and thus, results are not statistically significant. It is a well-known fact that acetone concentration in breath has a direct relation with blood glucose level. In this paper, we have developed the first of its kind, reliable and high accuracy breath analyzer for non-invasive blood glucose measurement. The acetone concentration in breath was measured using MQ 138 sensor in the samples collected from local hospitals in Pakistan involving one hundred patients. The blood glucose levels of these patients are determined using conventional invasive clinical method. We propose a linear regression classifier that is trained to map breath acetone level to the collected blood glucose level achieving high accuracy.

Keywords : blood glucose level, breath acetone concentration, diabetes, linear regression
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