INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3352 - 3357
RECEIVED : 15.03.2018 PUBLISHED : 23.04.2018
April 23, 2018

NON INVASIVE BLOOD GLUCOSE MONITORING COMMUNICATING THROUGH WIRELESS SHARINGFACILITY IN GSM

M. Priyadharsini ,Dept Of Cse,Priyadharshini Engg College Vaniyambadi, Vellore

Abstract

Predominantly blood glucose monitoring (BGM) the development of a non- invasive blood glucose measurement system will be boon to the diabetic patients. Blood glucose monitoring LIFI-BGM device is used .The handheld LIFI-BGM device displays blood glucose concentrations within 10 seconds.This device has 4-four main components which are the 650 nm LIFI transmitter, photo-sensor, Arduino-UNO and LCD display Visible LED light of 650 nm wavelength has 30 times higher transmittance.The glucose concentration in the blood is determined by analyzing the variation in the intensity of received signal obtained after reflection. The measurement accuracy of the proposed system can be improved by incorporating it with noise filtering techniques. Iam developing BGM device added to GSM. In addition, GSM module attached to this device will enable wireless data sharing facility. The wireless sharing facility enables us to study the results accurately.overall accuracy of 90%-92% in glucose measurementBGM device such has operational cost. Accuracy, precision in settling time for the glucose level measurement.High sensitivity. The obtained results can also be stored for the future records.

1. INTRODUCTION

Diabetics or Diabetes Mellitus occurs when someone has abnormal blood sugar [1]. Thereare two major types of diabetes in Type 1 diabetic patients, diabetes occurs due autoimmune destruction of the insulin-producin beta cells in the pancreas whereas in Type 2 diabetics the diabetes mellitus occurs from insulin resistance and relative insulin deficiency [2], [3]. Diabetes can cause many serious secondary health issues such as blindness, stroke, kidney failure, Ulcers, Infections, obesity and blood vessels damage, among other health complications [4]-[6]. Approximately US $ 376 billion is spent annually in the US on the treatment and of diabetes in diabetic patients and this amount is expected to rise to a projected US$ 490 billion by the end of 2030 [11], [7]. According to the International Diabetes Federation (IDF) the diabetes patients in 2011 are 366 million would this number is expected to rise to 552 million by latest advances introduced to the field of BGM are non-invasive technologies to detect blood glucose concentration using secretions such as sweat, urine, saliva or tears. Besides these secreted fluids glucose concentration is also measured through the skin, earlobe and tongue tissue [11]-[17]. In addition a need for GSM. GSM module attached to this device will enable wireless data sharing facility. The tested results are easily transmitted to the doctor for further examination using GSM. This result reaches the examiners mobile at a given instant without any delay. The obtained results can also be stored for the future records. The objective of this work includes

1) To design a portable embedded system.
2) Developing an simple and accuracy
3) BGM device such as operational cost, accuracy precision in settling time Or

glucose level measurement.

2. LITERATURE SURVEY

The need for the Non inavasive blood glucose monitoring such as communicating the gsm wireless sharing facilityenables us to study the results accurately. A NonInvasive BGM is a portable device which can be easily detect the glucose level.

Author : Prospects and limitations of non-invasive blood glucose monitoring using near-infrared spectroscopy J.YADAV, V.SINGH, presented Diabetes is a chronic metabolic disorder which can lead to severe complications and affect all vital organs. The occurrence of complications due to diabetes can be prevented by regular monitoring and maintaining the blood glucose level in the normal range. Most of the commercially available devices for glucose measurement are invasive or minimally invasive. Invasive devices used for blood glucose monitoring are inconvenient and painful whereas minimal invasive devices have limited time span and stability. Thus, there is a need of an economic, compact, painless and convenient non-invasive device which can promote frequent blood testing which help in control of blood glucose level. In this paper various methods of glucose monitoring are .In this paper various methods of glucose monitoring are reviewed and overall emphasis is laid on the development of NIRS (near-infrared spectroscopy) based non-invasive glucose. monitoring. The motivation of this review is to demonstrate the prospects, limitations and technical challenges for development of NIRS based non- invasive blood glucose measurement.

AUTHOR: Development of highly sensitive polysilicon nanogap with APTES/GOx based lab-on-chip biosensor to determine low levels of salivary glucose Sharma Rao Balakrishnana, , M. Kashif c, presented highly sensitive and non- invasive label-free biosensor was demonstrated for glucose detection using (3- aminopropyl)triethoxysilane (APTES) and glucose oxidase (GOx) surface modified polysilicon nanogap (PSNG) lab-on-chip. Fabricated gap size below 100 nm nanogap (NG) was used to discriminate the detection of the prepared dextrose monohydrate (DEX) which used as reference. The results were compared with salivary glucose (SAL) samples and an on spot blood glucometer. A simple immobilization step of APTES and GOx was demonstrated and the result shows an excellent catalytic activity toward the oxidation of glucose with a current sensitivity of 42.08 A mM−1 cm−2 (or NG conductance sensitivity of 165.3 nS cm−1). It was found that the working capability of this enzyme based biosensor was extremely wide linear ranging from 5 M to 50 mM, and the limit of detection (LOD) can be achieved down to 0.6 M. Moreover, the amperometric response has affectively distinguished, the sensor response time of 3 s is achieved. The reproducibility and stability of the enzymatic activity of biosensor were successfully distinguished for glucose sensing. AC dielectric and impedance spectroscopy measurement also shows insignificant effect of polarization which is due to the accumulation of ions (double layers) on the surface of PSNG electrodes.

Author Continuous Glucose Monitoring Systems: A Review Sandeep Kumar Vashist,presented *continuous* advances in the field of glucose monitoring during the last four decades, which have led to the development of highly evolved blood glucose meters, non- invasive glucose monitoring (NGM) devices and continuous glucose monitoring systems (CGMS). Glucose monitoring is an integral part of diabetes management, and the maintenance of physiological blood glucose concentration is the only way for a diabetic to avoid life-threatening diabetic complications. CGMS have led to tremendous improvements in diabetic management, as shown by the significant lowering

of glycated hemoglobin (HbA1c) in adults with type I diabetes. Most of the CGMS have been minimally- invasive, although the more recent ones are based on NGM techniques. This manuscript reviews the advances in CGMS for diabetes management along with the future prospects and the challenges involved.

Author Noninvasive Blood Glucose Measurement Based on NIR Spectrums and Double ANN Analysis

D. X. Guo, Y. Z. Shang, presented new noninvasive blood glucose monitoring method based on four near infrared spectrums and double artificial neural network analysis. We choose four near infrared wavelengths, 820 nm, 875 nm, 945

, as transmission spectrums, and capture four fingers transmission PPG signals simultaneously. The wavelet transform algorithm is used to remove baseline drift. *smooth* signals and extract eight eigenvalues of each PPG signal. The eigenvalues are the input parameters of double artificial neural network analysis model.Its should be used on PPG signals on it,its double value on it. *artificial* neural network regression combines the classification recognition algorithm with prediction algorithm to improve the accuracy of measurement. Experiments show that the root mean square error of the prediction is between 0.97 mg/dL - 6.69 mg/dL, the average of root mean square error is 3.80 mg/dL.

Author :A Simple Li-Fi Based System

Rahul R. Sharma, Akshay Sanganal, Sandhya Pati, presented Li-Fi stands for Light-Fidelity. Li-Fi is transmission of data using visible light by sending data through an LED light bulb that varies in intensity faster than the human eye can follow. If the LED is on, the photo detector registers a binary one; otherwise it's a binary zero. This paper deals with the implementation of the most basic Li-Fi based system to transfer data from one computer to another. The main components of this communication system are high brightness LED which acts as a communication source and silicon photodiode serving as the receiving element. The data from the sender is converted into intermediate data representation, i.e. byte format and is then converted into light signals which are then emitted by the transmitter. The light signal is received by the photodiode at the receiver side. The reverse process takes place at the destination computer to retrieve the data back from the received light.

I. METHODOLOGY

3.1 BLOCK DIAGRAM OF SYSTEM

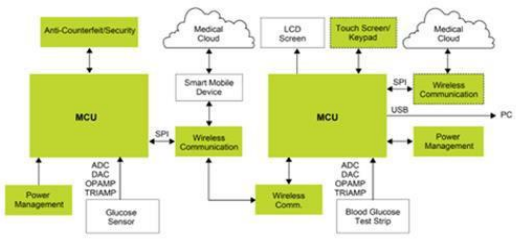

Fig 1.blockdiagram

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3352 - 3357
RECEIVED : 15.03.2018 PUBLISHED : 23.04.2018
April 23, 2018

3.2 ARDUINO BOARD

is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. The project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named Processing, which also supports the languages C and C++.

II. DESCRIPTION OF THE PROPOSED SYSTEM

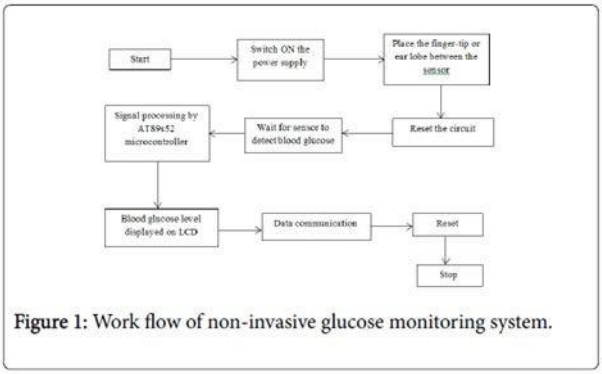

Figure 1: Work flow of non-invasive glucose monitoring system.

4.1 DATA FLOW DIAGRAM

When the blood is added to the glucose sensor.the glucose sensor is performed by oxidized by enzyme coated on the working electrode and should be Voltage is applied between the working electrode and reference electrode. To measure the exact and the accuracy levels.

Fig 4.1.1 GLUCOSESENSOR

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3352 - 3357
RECEIVED : 15.03.2018 PUBLISHED : 23.04.2018
April 23, 2018

4.2 ANALYZING THE GLUCOSE LEVELS

A glucose meter is a medical device for determining the concentration of glucose in the bloodA test strip with a small impregnated with glucose oxidase.Each test strip is used once and then discarded

4.2.Analyzing the glucose levels

4.3MESSAGE DISPLAY USING GSM

GSM module attached to this device will enable wireless data sharing facility.The tested results are easily transmitted to the doctor for further examination using GSM.This result reaches the examiners mobile at a given instant without any delay.The obtained results can also be stored for the future records.

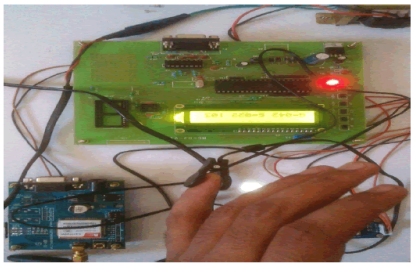

Figure 3: Hardware model of GSM based non-invasive glucose monitoring system.

4.4. Display the value

Blood glucose monitoring is way of testing the concentration of glucose in the blood.It shows the accurate accuracy higher the average blood glucose monitoring.It have no blood samples is needed for a test.which means completely pain- free use.It takes a measurement and reading the value.

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3352 - 3357
RECEIVED : 15.03.2018 PUBLISHED : 23.04.2018
April 23, 2018

4.4.NONINVASIVE BGM

III RESULT

In my proposed system, the patients easily detected the glucose levels .it should be pain free process. and also higher accuracy, lower cost on it. LIFI- BGM device displays blood glucose concentrations within 10 seconds .This device has 4-four main components which are the 650 nm, LIFI transmitter, photo-sensor, Arduino-UNO and LCD display Visible LED light of 650 nm wavelength has 30 times higher transmittance. The glucose concentration in the blood is determined by analyzing the variation in the intensity of received signal obtained after reflection. The measurement accuracy of the proposed system can be improved by incorporating it with noise filtering techniques. Iam developing BGM device added to GSM. In addition, GSM module attached to this device will enable wireless data sharing facility. The wireless sharing facility enables us to study the results. obtained results can also be stored for the future records.

REFERENCES

[1] . Duckworth et al., "Glucose W control and vascular complications in veterans with type 2 diabetes, " New England Journal of Medicine, vol. 360, no. 2, pp. 129–139, Jan. 2009.

[2] J. L. Leasher, R. R. Bourne, S. R. Flaxman, J. B. Jonas, J. Keeffe, K. Naidoo, K. Pesudovs, H. Price, R. White, T. Y. Wong, S. Resnikoff, and H. R. Taylor, "Global Estimates on the Number of People Blind or Visually Impaired by Diabetic Retinopathy: A Meta- analysis From 1990 to 2010," *Diabetes Care*, vol. 39, no. 9, pp. 1643–1649, 2016.

[3] "Diagnosis and classification of diabetes Mellitus," Diabetes Care, vol. 33, no. Supplement_1, pp. S62–S69, Dec. 2009.

[4] J. W. Gardner, H. W. Shin, and E. L. Hines, "An electronic nose system to diagnose illness," Sensors and Actuators B: Chemical, vol. 70, no. 1-3, pp. 19–24, Nov. 2000.

[5] S. Vashist, "Continuous Glucose Monitoring Systems: A Review," Diagnostics, vol. 3, no. 4, pp. 385–412, 2013.

[6] D. R. Whiting, L. Guariguata, C. Weil, and J. Shaw, "IDF diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030," Diabetes Research and Clinical Practice, vol. 94, no. 3, pp. 311–321, Dec. 2011.

[7] A. Esteghamati et al., "Trends in the prevalence of diabetes and impaired fasting glucose in association with obesity in Iran: 2005– 2011," Diabetes Research and Clinical Practice, vol. 103, no. 2, pp. 319–327, Feb. 2014.

[8] C. E. Ferrante do Amaral and B. Wolf, "Current development in non-invasive glucose monitoring," Medical Engineering & Physics, vol. 30, no. 5, pp. 541–549, Jun. 2008.

[9] S. K. Vashist, "Non-invasive glucose monitoring technology in diabetes management: A review," Analytica Chimica Acta, vol. 750, pp. 16–27, Oct. 2012.