

DESIGN OF BLOOD GLUCOSE MEASUREMENT WITH HEALTH MANAGEMENT SYSTEM

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Abstract:

Most of the people in India are diabetic patients and it is mainly due the lifestyle they are following. In older days we very often heard about these diabetics but nowadays it is very common. But people are reluctant about the seriousness of the disease. It is not reluctantness rather laziness that makes them feels that this disease is not series. It is a very important fact that consistent care and check-up is required in order to keep away from the danger of diabetics. Our objective in this project is to provide easy access for the patient to check their blood glucose level in their own premises without wasting their valuable time at hospitals. And also the patient will be informed about the action they have to perform in accordance with their glucose content it will be related to their tablet they have to consume. In the village areas the people would be having only limited access to doctors so by our project the patient can anytime contact with the centres to measure their glucose level with visiting doctors. In the existing glucometric technique the patient would only measure the glucose level but for the suggestion they have to consult with the doctors or physicians but in this setup the machine would itself suggest for what are the measures they have to take to make glucose level under control.

Keywords: Blood glucose measurement, Glucometer, Health management system, diabetic patients

I INTRODUCTION

Present industry is increasingly shifting towards automation. Programmable controllers and robots are two principle components of today's industrial automations. In order to aid the monotonous work and to serve the mankind, today we develop an intelligent operation. The proposed system **"DESIGN OF BLOOD GLUCOSE MEASUREMENT WITH HEALTH MANAGEMENT SYSTEM"** Designed and developed to accomplish the various tasks in an adverse environment of an industry. This project is an own to the technical advancement. This prototype system can be applied effectively and efficiently in an expanded dimension to fit for the requirement of industrial, research and commercial applications.

II BLOCK DIAGRAM

Microcontroller is the heart of the device which handles all the sub devices connected across it. It has flash type reprogrammable memory. It has some peripheral devices to play this project perform. It also provides sufficient power to inbuilt peripheral devices. We need not give individually to all devices. The peripheral devices also activates as low power operation mode. These are the advantages are appear here.

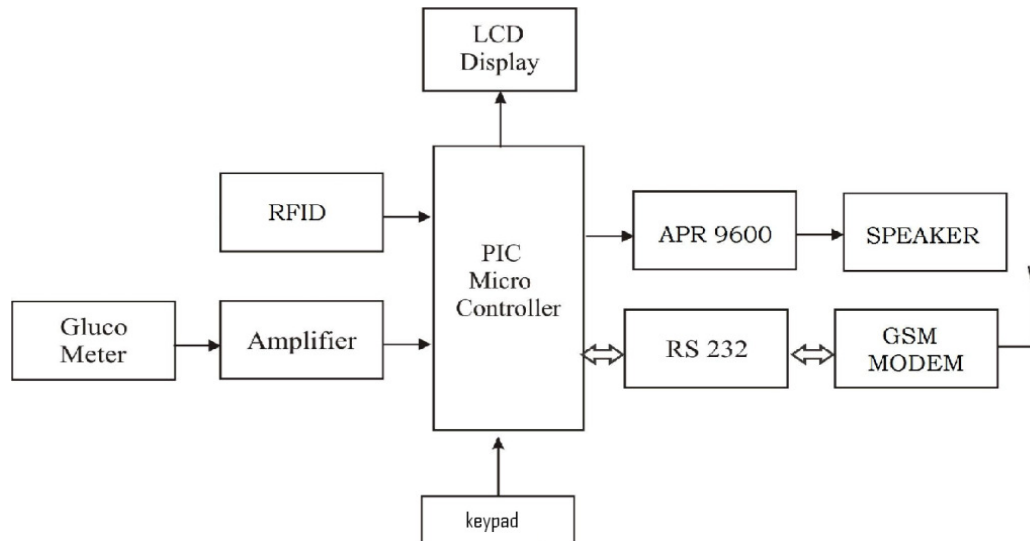


Figure 2.1 Block diagram of proposed method

Block diagram explanation

Glucometer consist of a glucometric strip in which the blood is collected. The voltage difference is amplified by the help of an amplifier and the amplified signal is connected to the PIC microcontroller. Radiofrequency tag is provided which could be detected by the radiofrequency ID which is also connected to PIC microcontroller.

A keypad is provided which is used to enter the numbers in which the message has to be sent. APR9600 is voice portel IC where the output of the microcontroller is connected. The voice message is entered by the help of mic and the entered message is brought out by the help of speaker. The output from the RS232 is given to the GSM modem from which the message is send to the provided numbers. The LCD display, displays the glucose level.

Glucometer

A glucose meter (or glucometer) is a medical device for determining the approximate concentration of glucose in the blood. It is a key element of home blood glucose monitoring (HBGM) by people with diabetes mellitus or hypoglycemia. A small drop of blood, obtained by pricking the skin with a lancet, is

placed on a disposable test strip that the meter reads and uses to calculate the blood glucose level. The meter then displays the level in mg/dl or mmol/l.

RFID

Radio-frequency identification (RFID) is the use of an object applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

GSM modem

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages

A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities. The term GSM modem is used as a generic term to refer to any modem that supports one

or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.

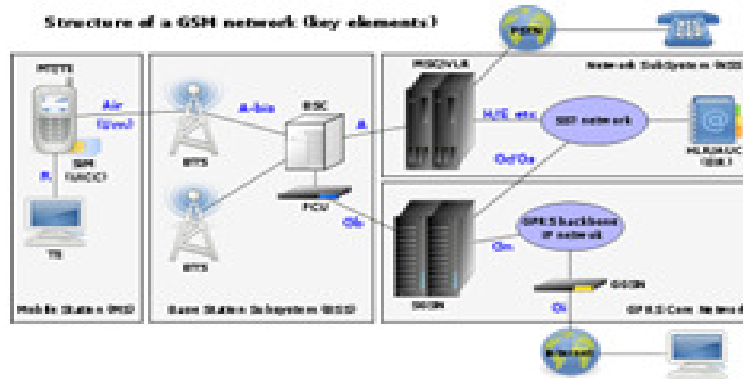


Fig 2.2 Network structure

Figure. The structure of a GSM network

The network is structured into a number of discrete sections:

- The Base Station Subsystem (the base stations and their controllers).
- The Network and Switching Subsystem (the part of the network most similar to a fixed network). This is sometimes also just called the core network.
- The GPRS Core Network (the optional part which allows packet based Internet connections).
- The Operations support system (OSS) for maintenance of the network.

III CONCLUSION

The progress in science & technology is a non-stop process. New things and new technology are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place. The proposed system based on Atmel microcontroller is found to be more

compact, user friendly and less complex, which can readily be used in order to perform. Several monotonous work and repetitive tasks is done. Though it is designed keeping in mind about the need for industry, it can extended for other purposes such as commercial & research applications. Due to the probability of high technology used this **“DESIGN OF BLOOD GLUCOSE MEASUREMENT WITH HEALTH MANAGEMENT SYSTEM”** is fully software controlled with less hardware circuit. The feature makes this system is the base for future systems. The principle of the development of science is that “nothing is impossible”. So we shall look forward to a bright & sophisticated world.

REFERENCES:

- [1] C.J.Harland, T.D.Clark and R. J.Prance, "Remote Detection of Human Input Impedance Electric Potential Sensors," Appl. Phys. Lett., vol. 81, pp. 3284-6, 2002.
- [2] C.J.Harland, T.D.Clark and R.J.Prance, "Electric Potential Human Body," Measurement Science and Technology, vol. 13, pp. 163-9, 2002.
- [3] S.Vaishnodevi, G.Sureshkumar, C. Arun kumar Madhuvappan, S.Mathankumar "Wireless Server for Total Healthcare System for Clients" in International Journal of Applied Engineering Research (IJAER) vol.10, No.11, pp.29439-29444, June 2015.
- [4] Veena J Ukken, S.Vaishnodevi, S.Mathankumar "EOG Based Prosthetic Arm-Hand Control" in International Journal of Innovative Research in Science, Engineering and Technology, vol.4, Issue.5, pp.3693-3698, May 2015.
- [5] J.R. Lyons, "Blood Measurement Units-Abbott Diabetes Care" Australia.
- [6] S.Vaishnodevi, S.Mathankumar, S.Kalaivani "Hand - Talk Assistive Kit for the Dumb" in International Journal of Advance Engineering and Research Development, vol.2, Issue.8, pp.101-104, August 2015.
- [7] Mill Man J and Hawkies C C. "Integrated Electronics" McGraw Hill, 1972.
- [8] Roy Choudhury D, Shail Jain, "Linear Integrated Circuit", New Age International Publishers, New Delhi, 2000.
- [9] Shijo Joseph Mathew, S.Mathankumar, S.Vaishnodevi "Portable Neonatal Intensive Care Unit" in International Journal of Innovative Research in Science, Engineering and Technology, vol.4, Issue.5, pp.3699-3703, May 2015.
- [10] "The 8051 Microcontroller and Embedded System" by Mohammad Ali Mazidi.
- [11] AT Commands for GSM/GPRS Wireless Modem Reference Guide.
- [12] S Mathankumar, K Natarajan, Amrutha Treesa Kurian "Asthma Monitoring Using Web Based Information System and Wireless Sensor Network" in International Journal of Scientific & Engineering Research, vol.7, Issue.4, pp.1028-1032, April 2016.
- [13] Clark L. "Portable Meter to Aid Diabetics", 1981, pp-6.
- [14] "How Do Blood-Glucose Meters Work?" by C. Ann. NY Acad.
- [15] S.Vaishnodevi, K.Natarajan, R.Divya "Low-power Wireless ECG Acquisition and Classification System for Body Sensor Networks" in International Association of Scientific Innovation and Research (IASIR), vol. 1, Issue.16, page no 37-39, March-May 2016.
- [16] C.J.Harland, T.D.Clark and R.J. Prance, "Short-Term and Potentially Life Threatening Complications of Hypoglycemia", vol.5, 2003.
- [17] S.Vaishnodevi, Sajith S. Nair "Hyperbilirubinemia is Treated Using L.E.D Phototherapy for Neonatals" in International Journal of Science and Research (IJSR), vol.4 Issue.4, April 2015.
- [18] K Sairam, Akesh Govada, Dr.CH Renumadhavi, Dr.B.S.Satyanarayana, Dr. K B Ramesh, "Design and Development of Non-Invasive Blood Glucose Measurement System using Near Infrared technique", International Journal of Advanced Research in Computer and Communication Engineering, vol.4, Issue.7, pp.74-79, July 2015.

[19] S.S.Mule, T.H.Mujawar, M.S.Kasbe, and L.P.Deshmukh, "Microcontroller Based Blood Glucose Meter: Design and Development", International Journal of Engineering Sciences & Emerging Technologies, vol.8, Issue.5, pp.234-239, March 2016.

[20] J.Jirka, M.Prauzek, M.Stankus, "Glucose Measuring Device with Advanced Data Processing and Improved Strip Detection", Elektronika IR Elektrotechnika, vol.19, No.1, pp.40-43, 2013