WIRELESS REAL TIME IMPLEMENTATION OF HEALTH ASSIST SYSTEM FOR RURALS

Dr.M PREMKUMAR[1], ANANDHA KRISHNAN R[2], MOHAMMED AZARUDDIN R[3], BALAKRISHNAN P[4]

[1]*Professor, Department of Electronics and Communication Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India*

[2,3,4]*B.E. Student, Department of Electronics and Communication Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India*

---***---

Abstract - *Medicine plays an important role in humanity in each and every scenario and situation. An automated medical system is introduced to reduce power time and energy spent by human workforce. The arrangement of this prototype is similar to an automated teller machine (ATM) through which we get the required money at any time and any place. A similar type of arrangement is followed for the pharmaceuticals also which is real time health assist system (RTHAS) and it is somewhat like an ATM machine in structure. The purpose of this research paper is to propose an arrangement to provide basic medical services to remote villages via the proposed model presented herewith. In our ATM machine it will dispense Pills Instead of money. RF tag is used to verify the patient's identity (id) and a video call is used for the communication purpose in rural areas where there is no medical facilities due to lack of Physician or Medical Doctor. Even though medical facilities are available in remote villages the patients have to go longer distance and there is no 24x7 medical care provided due to unavailability of Doctors. Thus we have proposed a prototype of a Real Time Health Assist System where the system acts as an any time medicine (AYTM). The patient can use this system easily, since it is user friendly where the Patient can interact with the doctor with their native language through a video call making it a good way of communication. To overcome the lack of doctors and medical facilities in rural villages this system can be implemented and the medical prescription received through wireless system or as print out is obtained from the thermal print out. If there is any lack or unavailability of medicine we need to just take the printout from the thermal printer if we show the slip to any of the Pharma or chemist medical shop where they will offer the medicine for free cost. The above task can be implemented using the components such as Arduino mega, EM18 card reader heart beat sensor, transceiver module, l293d driver, servo motor and LCD display.*

Key Words: *Arduino Mega, EM18 card reader, Any Time Medicine (AYTM), RF transceiver.*

1. INTRODUCTION

In the contemporary day life style, people have no time to spend with their family. In such a busy life it's difficult to keep an isolated day out of their busy schedule for the doctor for consistent medical check-up. Internet of Things(IoT) enabled with cloud technology for medical pills dispensing is significant nowadays[1] and also there is a necessity for design and modelling new modern idea & technology for medical health system [2]which helps in saving time for healthcare. In rural areas there is no medical facilities due to lack of doctors and even though medical facilities are available in remote villages the patients have to go longer distance. Also, there is no 24 x7 medical care provided due to doctors unavailability. Programmable medical health systems[3] are developing at a faster pace for dispensing medical pills. In present day scenario real time health monitoring with mobile devices[4] is also essential for human welfare. Various research papers have been proposed such the works from [4]-[7]. In the research paper of [5] a smart device is suggested for alterting health of a person using internet of things technology. Another framework using IoT for autonomous hospital management system is proposed as a real time case in [6].An electronic pill dispenser which is capable of programming in a dynamic manner is proposed in [7]. A wireless sensor network(WSN) arrangement is presented in [8] were the lifetime extension related concepts were considered which will be useful for handling of sensors in a wireless network arrangement. Similarly a low cost medical dispenser is proposed in [9] and a health care monitoring system is considered for a wireless sensor network[10].

In addition to the existing works we propose a prototype of a real time health assist system where the system act as an any time medicine(AYTM). The controller that we have used is ARDUINO Mega. The Patient can interact with the doctor with their native language through video call making it a good way of communication. To overcome the lack of doctors and medical facilities in rural villages this system is used. Moreover in rural hospitals the facilities for health caring are not upgraded to the state-of-the-art ultimately limited in all forms and poor quality in health management enables issues in health care system. Human welfare should get the knowledge of own health as easy and early as possible. In developing countries there is lack of resources and management to reach out the problems of individuals. A common man cannot afford the expensive and daily checkup for his health. For this purpose various system which give easy and assured caring unit have been developed. The system which we intend to propose reduces time with safety in handling equipment. The

purpose of this research paper is to provide basic medical services to remote villages. In our research paper we propose a prototype which will dispense Pills for the basic health care related issues for human ailments such as fever, cold, cough to name a few. R F tag is used to verify the patient's id. Video call is done for the communication purpose with the doctor. Using this E-health application the patient can test their body condition as in this system the sensors are used where here there is heart beat sensor used to measure the heart beat of the patient and the LM35 is used for the body temperature of the patient for the weight and the blood pressure we have used the potentiometer (POT). In future implementation we can use the load cell to get the weight of the patient. All the information of the patient is recorded and sent to the doctor through the RF transceiver module.

The research paper is organized in the following manner. Section I presents introduction of the pill dispenser system along with research works. Section II presents the proposed system and its overview with objectives, block diagram in the transmitter and receiver side and its associate components. Section III gives the output results obtained and Section IV gives conclusion about the paper.

2. PROPOSED SYSTEM AND OVERVIEW

A. Objective

- To develop a wireless health assist system which measures the body temperature, heart rate, blood pressure, weight.

- To develop the pill mechanism to dispense the pills that need for patient.

- Design a system to save data using a database.

- Analyze collected data from sensors.

B. Block Diagram

Transmitter side

Fig 1 shows the working of transmitter side. The Arduino mega is used as the controller of this system and all the health monitoring devices are connected to the Arduino. A heart beat sensor is used for recording the heart beat rate of the patient. For the body temperature we use the LM35 which inturn is connected to the arduino. For the blood pressure and weight we use the potentiometer(POT) used for variations. The RFID card reader is connected to the Arduino and a RF transceiver is used to transmit the data to the receiver. There we use the pills dispenser mechanism which is rotated by using the servomotor connected to the controller and thus the details of the patient is collected in this transmitter side of the system and sent to the receiver side.
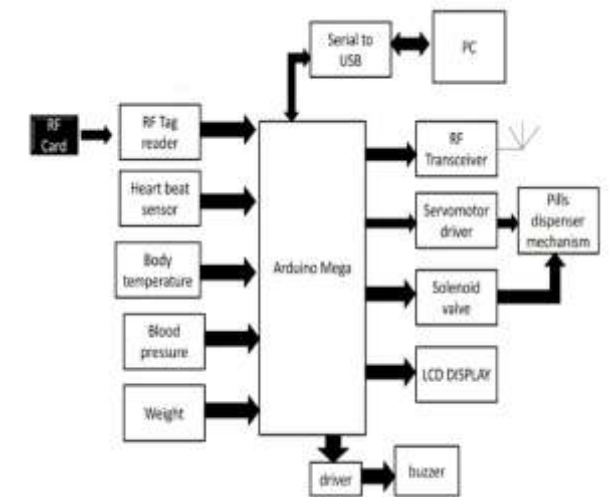

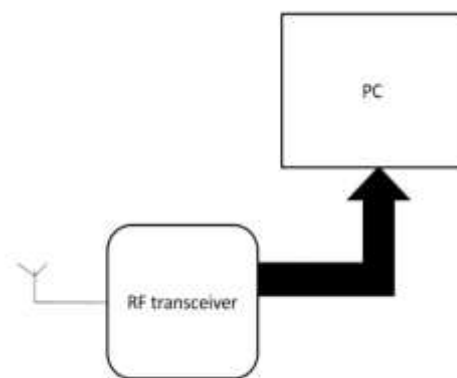Fig 1: Transmitter side of the system

Receiver Side

Fig 2: Receiver side of the system

Fig 2 shows the working of the receiver side of the proposed system, where the information of patient which are measured are received through the RF transceiver. The obtained information is sent to the doctor in this receiver end where the physician or doctor goes through the details of the patient and he prescribes the medic pill from his intelligent device such as computer, laptop and thus in the transmitter side there is a pill mechanism where the prescribed medicine is dispensed.

C. Components used

1) Arduino Mega:

Arduino Mega is a microcontroller setup which is from ATmega 2580 which can be obtained from standard database repository.

2) Temperature Sensor:

LM35 sensor is used for the measurement of body temperature. Sensor is put in contact with body and it senses body temperature. It is calibrated linearly in celsius. It has low self heating capability. Also it doesn't require external calibration.

3) Heart Pulse sensor:

Pulse sensor is designed to give output of heart beat when a finger is placed on sensor where it starts working. To observe the sensor output, output pin of sensor is connected to the controller and it is displayed in the LCD display as it is connected to the Arduino mega. The working principle of sensor is based on the IR sense the blood flow through nerves at each heart pulse.

4) EM18 Card Reader Module:

- Radio Frequency Identification (RFID) is a wireless identification technology that uses radio waves to identify the presence of RFID tags.

- Similar to Bar code reader, RFID technology is used for identification of people and object.

- In barcode technology, we need to optically scan the barcode by keeping it in front of reader, whereas in RFID technology we just need to bring RFID tags in range of readers. Also, barcodes can get damaged or unreadable, which is not in the case for most of the RFID.

- RFID is used in many applications like attendance system in which every person will have their separate RFID tag which will help identify person and their attendance.

- RFID is used in many companies to provide access to their authorized employees.

- It is also helpful to keep track of goods and in automated toll collection system on highway by embedding Tag (having unique ID) on them.

Fig 3: EM-18 Reader Module

5) RF Transceiver:

Generally, an RF module is a small size electronic device, that is used to transmit or receive radio signals between two devices. The main application of RF module is an embedded system to communicate with another device wirelessly. This communication may be accomplished through radio frequency communication. For various applications the medium of choice is radio frequency since it does not need line of sight. The applications of RF modules mainly involves low volume and medium volume products for consumer applications like wireless alarm systems, garage door openers, smart sensor applications, wireless home automation systems and industrial remote controls.
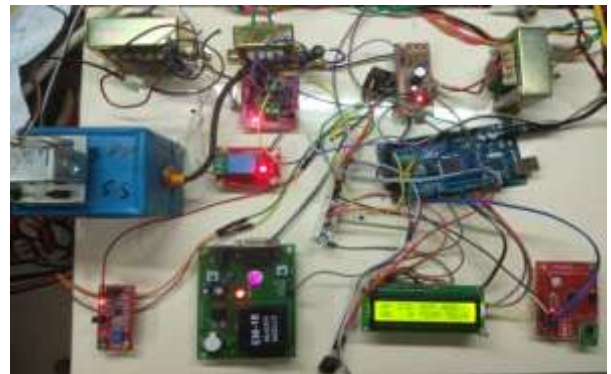
3. RESULTS AND ANALYSIS

Fig 4: Setup of system

Fig 4 shows the set up of the system where the output where the health details of the patient are shown on the LCD.

Fig 5: LCD display output

Before taking the heart beat rate we have to press the push button after pressing the LCD it will be displayed as shown in the Fig 6

Fig 6: LCD indication

Thereafter we keep the finger between the IR of the heart beat sensor as shown in the Fig 7.
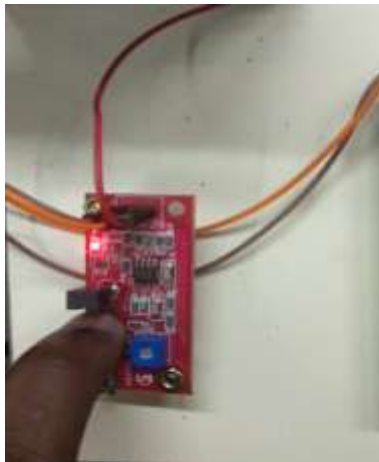

Fig 7: Heart beat sensor

Here the sensor is designed to give output of heart beat when a finger is placed on sensor. To observe the sensor output, the output pin of sensor is connected to the controller where it is displayed in the LCD display as it is connected to the Arduino mega.

Fig 8: Heart beat rate output

The heart beat rate of the patient is displayed on the LCD display as shown in the Fig 8.

Fig 9: Pill Dispenser Mechanism System

Fig 10 shows the pill dispenser mechanism system where the main output of this research paper and here the pills are filled in the pipe and the pill dispenser will rotate using the servomotor that is connected in the bottom of this system as it rotates and there is hole in it and the pills are pushed out using the solenoid valve and quick release of the lock is done and the pills are pushed out of the pipes. The refilling is done if there is less number of pills are available.
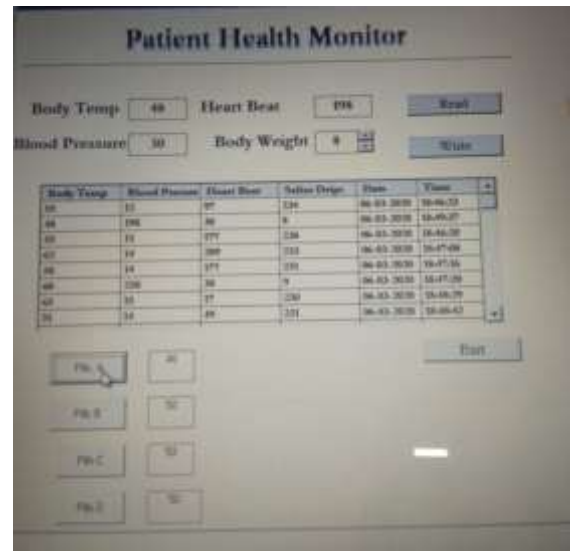

Fig 10: output view of Doctor

Fig 10 shows the output view from the doctors perspective where the patients details are recorded with date and time. The doctor go through the report of the patient and he selected the prescribed pills by clicking pill A, B, C, D. The decreasing of the pills can also detected by the doctor to indicate for the refill.

4. CONCLUSION

Thus in this research paper we have constructed a prototype of a real time health assist System. Where the system act as an AYTM. The patient can use this system easily it is user friendly. The Patient can interact with the

doctor with their native language through video call. To overcome the lack of doctors and medical facilities in rural villages this system is used. The proposed prototype via this research paper can be used for developing effective healthcare for humanity for village ecosystem.

5. REFERENCES

[1] Suganya G, Premalatha M, Anushka sharma, Muktak Pandya, Abhishek Joshi, "IOT based Automated Medicine Dispenser for Online Health Community Using Cloud", International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7, Issue-5S4, pp.759-762, February 2019

[2] Dr.A.Sabanayagam, G.Anish Girija, "Design and Modeling of Mobile Health Monitoring System", International Journal of Innovations in Scientific and Engineering Research (IJISER),vol4,no 2,pp.63-65,February 2017.

[3] James Lim 2016, Programmable Automatic Pill Dispenser, United States Patent, l(12).

[4] Amna Abdullah, Asma Ismael, Aisha Rashid, Ali Abou-ElNour, and Mohammed Tariqu, "Real time wireless health monitoring application using mobile devices", International Journal of Computer Networks & Communications (IJCNC) vol.7, no.3, pp.13-30, May 2015,

[5] M. Prakash, U. Gowshika, T. Ravichandran, "A Smart Device Integrated with an Android for Alerting a Person's Health Condition: Internet of Things" Indian Journal of Science and Technology, Vol 9 (6), pp.1-6, February 2016.

[6] Muthuraman Thangaraj Pichaiah Punitha Ponmalar Subramanian Anuradha, "Internet Of Things (IOT) Enabled Smart Autonomous Hospital Management System – A Real World Health Care Use Case with the Technology Drivers", in Proceedings of 2015 IEEE International Conference on Computational Intelligence and Computing Research, December 2015.

[7] Boquete L , Rodriguez Ascariz J M, Artacho I, Cantos Frontela J, Peixoto N, " Dynamically programmable electronic pill dispenser system", journal of medical systems.34,pp.357-366, 2015.

[8] M.Premkumar, M.P.Chitra, X.Alisha Celestin, T.Kausalya, M.N.Nandhini Priya, " Game theory based Ad-hoc On Demand Distance Vector Routing Protocol to Extend the Wireless Sensor Networks Life Time Vol. 7, No. 3, , pp. 463~471, Sep 2019.

[9] Ahadani M A, De Silva L C, Petra I, Hameed M F A,& Wong T S , "Low Cost Robotic Medicine Dispenser", Procedia Engineering. 41, pp.202-209, 2012.

[10] D. Mahesh Kumar, "Healthcare Monitoring System Using Wireless Sensor Network", International Journal of Advanced Networking and Applications, vol 04, Issue 01 pp.1497-1500, 2012.