



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 6, June 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.512



9940 572 462



6381 907 438



ijirset@gmail.com



www.ijirset.com

Patient Monitoring System (PMS) Using Embedded System

Poonam Vijaykant Gaikwad, Dr. S.R.Patil

Department of Electronics and Communication Engineering, MIT (E) College of Engineering, Aurangabad, India

Assistant Professor, Department of Electronics and Communication Engineering, MIT (E) College of Engineering,
Aurangabad, India

ABSTRACT: Nowadays in developing countries such as India, a rising number of individuals are pushing for new solutions to constantly track health check-ups. For doctor consultation, which has become financially linked and a time-consuming operation, it has become a requirement to visit hospitals regularly. We suggest a design to track the health conditions of the patient, such as heart rate and temperature, to resolve this situation and give the message to the doctor using android application. The doctor can constantly track the patient on his mobile using this device and the doctor can also access the information from anywhere whenever appropriate. In this paper we propose a PMS (Patient Monitoring System) using embedded system.

KEYWORD: Patient Monitoring System, Heart Rate, Health Check-Ups, Health Conditions, Smart Mobile Phone.

I. INTRODUCTION

Providing treatment and health care to bed ridden patients Critical stages have evolved with advanced medical facilities In the current hectic world, one of the big problems, the need for a cost-effective and quick-responding alert mechanism is inevitable in hospitals where a large number of patients whose physical conditions are frequently monitored as part of a diagnostic procedure. Sensors that are hardwired to a PC next to the bed are used by present-day systems and Doctors/nurses need to regularly visit the patient to assess his or her current condition. In addition to this, the use of a smart device based on multiple microcontrollers offers high-level applicability in hospitals where a large number of Patients must be checked regularly [1]. To overcome to this problem, the proposed system provides facility i.e. doctor can constantly track the patient on his mobile using this device and the doctor can also access the information from anywhere whenever appropriate.

II. LITERATURE SURVEY

Chanakya Mothukuri and K. CH. Prathap Kumar [1] present the design and development of a low cost apparatus which uses GSM technology for monitoring the health condition of the patient. For a wide variety of applicability in multi-specialty hospitals where multiple critical care units are present, the new structure opens up. The networking facility, which offers multiple Sensor-Microcontroller modules to send data consecutively to the gateway attached to the PC, achieves scalability. In addition, the extension of the project to allow two-way communication between doctors and patients would be beneficial in many instances where patients need to interact directly with doctor. V. Ramya et al. [2] presents the embedded intensive care unit using PIC microcontroller. The project tracks the body temperature of the patient and the drip status administered and conducts data logging (on PC) and reporting/alerting (using cell phone). The availability of the in-built A/D converter in PIC16F877A has been very helpful in the simple digital temperature measurement implementation. The chip (PIC16F877A) used in this project comprises 8 analogue chips.

Md. Manirul Islam et al. [3] propose the microcontroller based continuous non invasive cuff less blood pressure measurement system with an alarm circuit for health care monitoring system. In the sensor network segment of this embedded device, the light signal is used and while it runs in continuous mode, light has no adverse impact on the human

body. Using a sensor network, pulse rate estimation and body temperature determination are also integrated in this device. N. V Panicker et al. [4] propose a system, which includes sensors for continuous collection and evaluation of physiological parameters. For efficient physiological information transmission, a wireless personal area network has been launched. This patient monitoring system's hardware architecture is based on the microcontroller 8051. The microcontroller serves as a ZigBee and GSM module gateway. By using the necessary sensors that are mounted near the body of the patient under examination, the temperature, pulse and blood pressure are all sensed. The sensed output is sent to the A/D converter where the digital signal is transformed to an analogue signal. The microcontroller receives the digital output. For the ZigBee cell phone and GSM networks, the microcontroller provides the signal. The ZigBee and GSM networks allow the patient to communicate both within the hospital networks and from a distant location.

III.SYSTEM DESIGN

Figure 1 shows the block diagram of the system. This proposed system contains different sensors like Body Temperature Sensor, Heart Beat Sensor, Blood pressure sensor, Patient positioning sensor, heart beat sensor, etc. Proposed system includes the sensors, interfacing module, connected through GSM to server. The interfacing module is Raspberry Pi, which will further relay information to the health worker of that village's android phone so that individuals can also have alerts on the health of the patient and can also preserve the data for the relevant remedies.

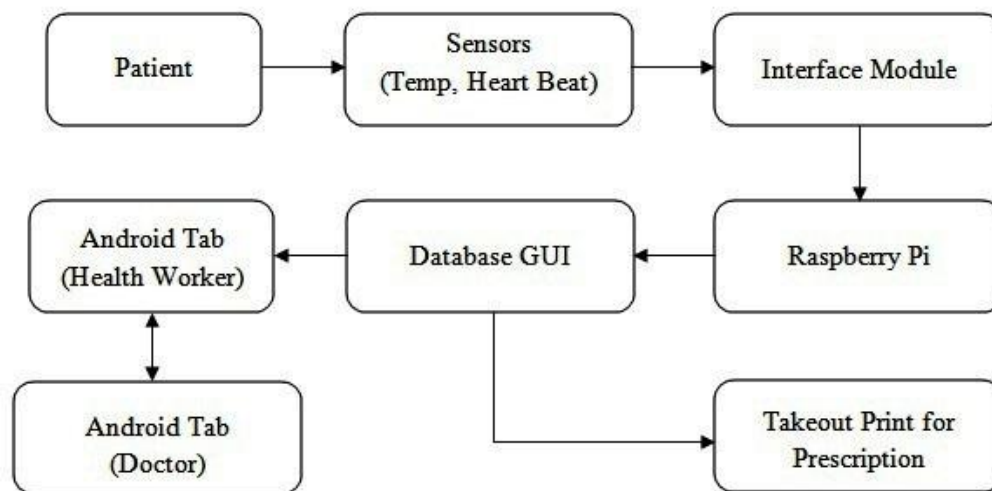


Figure 1 Block diagram of the system.

a) Sensors

Two basic parameters of the body are tracked in the project; body temperature and heart beat sensor; so the most important items are covered for doctor's study.

i. Body Temperature Sensor

Checking the DS18B20 temperature sensor (shown in figure 2)is achieved by holding the end of the sensor or pairing the sensor for two or three minutes on the armpit. The Armpit is a part of the body that can be used as a base for sensor readings. The digital thermometer DS18B20 offers 9-bit to 12-bit Celsius temperature measurements and has an alarm feature with upper and lower trigger points that are non-volatile user programmable. The DS18B20 communicates over a 1-Wire bus that needs only one data line (and ground) for central microprocessor communication by definition. It has an operating temperature range of -55°C to $+125^{\circ}\text{C}$ and over the range of -10°C to $+85^{\circ}\text{C}$ it is accurate to $\pm 0.5^{\circ}\text{C}$ [8,9,10].

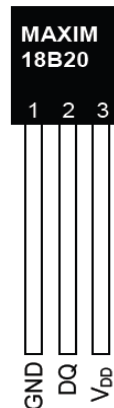


Fig.2 Body Temperature Sensor

ii. Heart Beat Sensor

The 1157 heart rate sensor (as shown in figure 3) module provides a digital heartbeat output when the finger is placed on the sensor. The LED flashes in unison with each pulse when the heart rate detector works. Light modulation via blood flow through the finger at each pulse is the working principle of the sensor. The operating voltage is controlled by 5V DC and 100mA is the operating current. [11,12]



Figure 3 Heart Rate Sensor 1157

iii. Patient Position Sensor

The sensor for Patient Position Sensor, i.e. The ADXL335 sensor (shown in figure 4) is a 3-axis thin, lightweight, low-power, conditioned-voltage output accelerometer. Acceleration measurements were performed on the ADXL335 with a minimum full-scale range of +3 and -3 g. In tilt sensing applications, this sensor can measure the static acceleration of gravity, as well as the dynamic acceleration resulting from shock, vibration, or motion [5, 6, 7].



Figure 4 Patient Position Sensor.

b) Raspberry Pi

The most recent item in the Raspberry Pi 3 area is the Raspberry Pi 3 Model B (as shown in figure 5), flaunting a 64-bit quad centre with 1.4GHz processor, 2.4GHz double band and 5GHz remote LAN, Bluetooth 4.2/BLE, faster Ethernet. The Raspberry Pi three Model B+ still retains an indistinguishable mechanical impression from each and even a pair of Model B Raspberry Pi. In addition, the Raspberry Pi 3 has improved executive capacity to endorse all the more dominant external USB gadgets with an updated exchanged power supply of up to 2.5 Amps [13, 14].



Figure 5 Raspberry Pi 3 Model B

c) Arduino UNO/Nano

A lightweight, full, and breadboard-friendly board based on the ATmega3288 is the Arduino Nano (Arduino Nano 3.x). It has the same features as the Arduino Duemilanove, more or less, but in a separate box. It just lacks a DC power port, and operates instead of a normal one with a Mini-B USB cable. [15, 16]



Figure 6 Arduino Nano

IV.RESULT

Figure 7 shows the GUI i.e Graphical User Interface of the proposed system. We suggest a design to track the health conditions of the patient, such as heart rate and temperature, to resolve this situation and give the message to the doctor using android application. Figure 8 shows the Sample Email, which is send by the system to the doctor. System send mail to the doctor, will contains all reading of the patient.

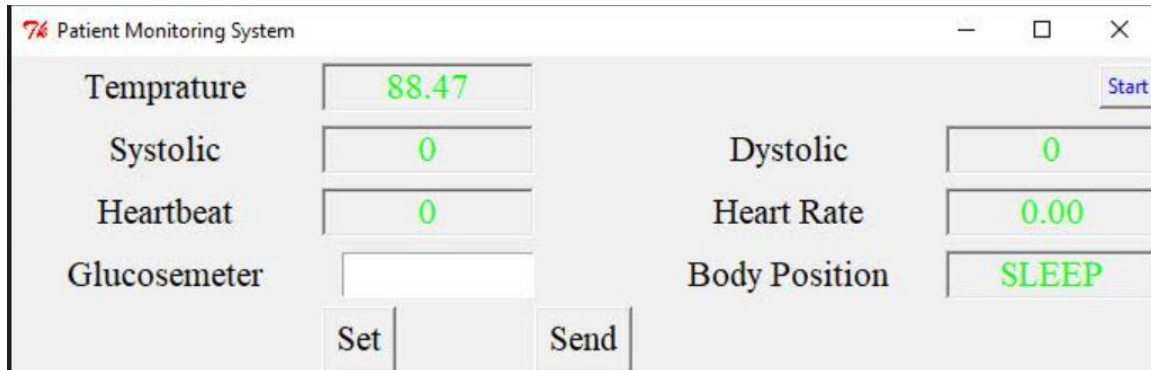


Figure 7 GUI (graphical user interface)

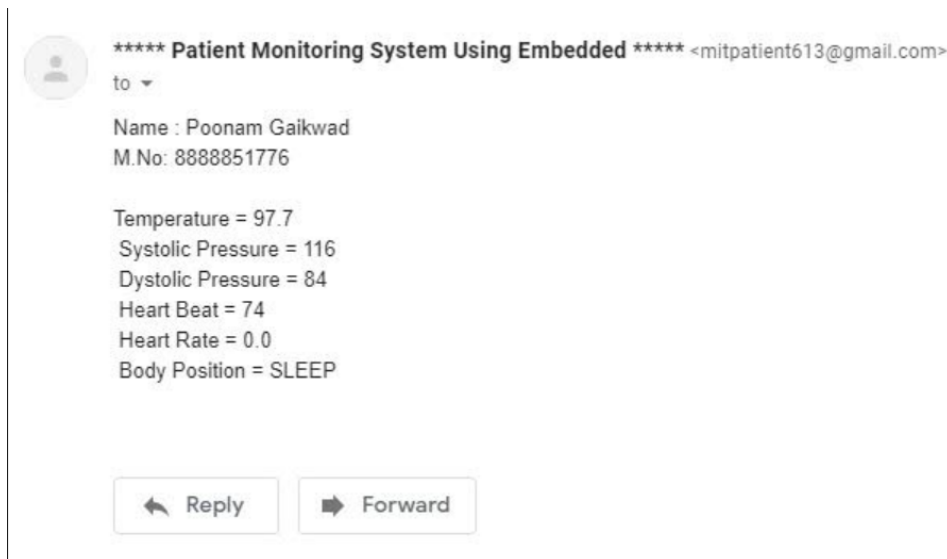


Figure 8 Sample Email

V.CONCLUSION

In conclusion we have reached to a successful implementation of Patient Monitoring system using embedded technology. With help of this project we can effectively monitor patients in rural area. Patient Monitoring parameters are effectively seen through GUI with latest concept of IOT (Internets of Things). In Future work for the patient monitoring proposed system; some more body parameters can be considered like ECG sensor, Sugar level sensor, etc.

REFERENCES

- [1] Chanakya Mothukuri and K. CH. Prathap Kumar. M, "Patient Monitoring System" International Journal of Science and Research (IJSR), Volume 2 Issue 2, February 2013, pp. 418-422.
- [2] V.Ramya, B.Palaniappan and Anuradha Kumari, "Embedded Patient Monitoring System", International Journal of Embedded Systems and Applications (IJESA) Vol.1, No.2, December 2011, pp. 51-63.

- [3] Md. Manirul Islam, Fida Hasan Md. Rafi, Mohiuddin Ahmad, and Abu Farzan Mitul, T. M. N. Tunku Mansur, M. A. Rashid, "Microcontroller Based Health Care Monitoring System Using Sensor Network, 2012 7th International Conference on Electrical and Computer Engineering, IEEE, 2012, pp. 272-275.
- [4] N. V Panicker, A. Sukeshkumar, Sivin M. Stephen, "Patient Monitoring System using GSM and ZigBee Technology", AMSE JOURNALS –2014-Series: Modelling C, Vol. 75, N° 1, 2014, pp. 13-21.
- [5] Shrey Gupta, Simrat Singh Gill, Richa Pandey, Ria Agarwal and Smarika Agarwal, "Jeevan Rakshak Patient Monitoring System Using Matuino", IJRET: International Journal of Research in Engineering and Technology, Volume 05, Issue 03, Mar-2016, pp. 231-235.
- [6] Shruthi V Pai, Nagalakshmi N, Santhrupthi K, Raksha R, "IoT based Advanced Accident Monitoring System using ThingSpeak Web Server", International Journal of Engineering Research & Technology (IJERT), NCCDS - 2020 Conference Proceedings, Volume 8, Issue 13, 2020, pp. 70-72.
- [7] C. Suganthi Evangeline and Ashmiya Lenin, "Human health monitoring using wearable sensor", Sensor Review, 2018.
- [8] Tan Suryani Sollu1, Alamsyah, Muhammad Bachtiar and Benyamin Bontong, "Monitoring System Heartbeat and Body Temperature Using Raspberry Pi", E3S Web of Conferences 73, ICENIS, 2018.
- [9] Khin Thet Wai, Nyan Phyo Aung, Lwin Lwin Htay, "Internet of Things (IoT) Based Healthcare Monitoring System using NodeMCU and Arduino UNO", International Journal of Trend in Scientific Research and Development (IJTSRD), Volume 3 Issue 5, August 2019, pp. 755-759.
- [10] Mrs. G. Abinaya, Mr. Kartik Singh Rathore, Ms. Anushka Khandelwal, Mr. Ritik Raj, Ms. Sonal Gupta, "IoT Based Health Monitoring Wearable Device Using Security Mechanisms For Storage", International Journal of Computer Trends & Technology (IJCTT), Vol. 57, Issue 1, 2018, pp.56-62.
- [11] Prasad Lavgi and Mr. Lakshaman Kora, "Patient Health Monitoring System Using Can Protocol", International Research Journal of Engineering and Technology (IRJET), Volume: 06. Issue: 06, June 2019, pp. 394-398.
- [12] D.Chandana and B.Hema Latha, "A Tele-medicine System for Measuring Heart Rate, Blood pressure, And Drug Level Detection", International Journal of Engineering Development and Research(IJEDR), Volume 2, Issue 1, 2014, pp.23-29.
- [13] S.J.Grace Shoba, C.Vijayanand, S.Vijayanand, R.D.Balaji and A.S.Anand, "Real Time Patient Monitoring and Visualization Using Raspberry Pi 3 in IOT", International Journal of Applied Engineering Research, Volume 14, Number 6, 2019, pp. 159-164.
- [14] E. N. Ganesh, "Health Monitoring System using Raspberry Pi and IOT", Oriental Journal of Computer Science and Technology, Vol. 12, No. (1) 2019, Pp. 08-13.
- [15] <https://store.arduino.cc/usa/arduino-nano>
- [16] Mohan Lal Sahu and Jigyasu Kumar Kaushal, "Real time health monitoring system using Arduino and LabVIEW with GSM Technology", International Seminar On Non-Conventional Energy Sources for Sustainable Development of Rural Areas, IJAERD- International Journal of Advance Engineering & Research Development, 2015, pp. 2348-6406.
- [17] K.Latha, G.Sravanth, N.V.Pavan Kumar and B.V.S.Nagarjuna, "An IoT based Patient Monitoring System using Arduino uno", International Research Journal of Engineering and Technology (IRJET), Volume: 07, Issue: 07, July 2020, pp. 3170-3174.



**Impact Factor:
7.512**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

9940 572 462 6381 907 438 ijirset@gmail.com



www.ijirset.com

Scan to save the contact details