

A HEALTHCARE MONITORING SYSTEM USING WIFI MODULE

MRS. SONAL CHAKOLE¹, RUCHITA R.JIBHKATE², ANJU V.CHOUDHARI³,
SHRUTIKA R.GAWALI⁴, PRAGATI R.TULE⁵

¹Professor, Department of Computer Science and Engineering, PJLCOE, Nagpur, India.

^{2,3,4,5}Student, Department of Computer Science and Engineering, PJLCOE, Nagpur, India.

-----***-----
Abstract - Present systems allow constant monitoring and require the sensors to be placed in such a way that it limits the patient to his bed. This paper focuses on creating a Health monitoring System using sensors and can help people by providing healthcare services such as medical monitoring and medical data access. The system would benefit the patient as the patient will no longer be confined to the hospital bed as the sensors are wearable nor any assistant doctor or nurse will be required to log the health vitals of the patient manually thus reducing any possible human error. The goal of such systems is to provide early warning of physiological deterioration such that preventative clinical action may be taken to improve patient outcomes. There are many advantages of using different type of sensor. It can be used for broader range of patients and medical professionals and those people living in rural or isolated regions.

Key Words: LM35 Sensor, Heart Rate Sensor, Arduino, Wifi module, Embedded system

1.INTRODUCTION

The patient's physical parameters & movement status is continuously sent to hospital center through wifi module. The monitoring center receives the information from each patient and transmits it through Arduino microcontroller. The data from patient can be displayed as graph or numeric on monitor if it is necessary. The doctor can diagnose the

patient according to continuously recorded data, a sensor electronics module permits the acquisition of different physiological parameters and their online transmission to the handheld portable device connected to the processor.

1.1 Patient Monitoring

The sensor electronics module constitutes a wireless personal area network. Thus Arduino has low power consumption, low cost, small size, free frequency etc. so that real time monitoring is possible & patient can be treated on time with the system & is helpful in worst condition. Nowadays, a monitor can move with the patient from the operating room to an intensive care unit, to the hospital room, and even into their home. This is paramount in today's world of health care. The most important features in today's patient monitors are mobility, ease of use, and effortless patient data transfer.

2. LITERATURE SURVEY

1)"A Healthcare Monitoring System Using Wireless Sensor Network with GSM", Prof. Sunil L. Rahane, Prof. Ramesh S.Pawase.

By using Wireless sensor networks we make patients life relaxed. The safety is very important in monitoring of healthcare which can be provide by wireless sensor network. This paper provides a wide range study of security in healthcare application using WSNs. This paper presents the

design, deployment, and evaluation of a wireless monitoring system in a hospital unit.

2)“Zigbee Based Wearable Remote Healthcare Monitoring System for Elderly Patients”,Khalifa AlSharqi, Abdelrahim Abdelbari, Ali Abou-Elnour, and Mohammed Tarique.

In current years remote healthcare monitoring system is attentive. As the populations are increasing and also the health care cost is increased the patient need to be monitor from the remote location.The proposed system is able to send alarming messages to the healthcare specialized about the patients critical condition.

3)“Embedded Real-Time Data Acquisition system for Patient Monitoring using Zigbee Technology” Prof. Sonal R. Chakole

In this paper the development of a system for online monitoring of a subject’s physiological parameters and subjective workload regardless of location has been presented, which allows for studies not only on occupational health but also provides the necessary platform to monitor, analyze & control the system remotely. For this purpose modern acquisition systems are needed.

3. PROBLEM STATEMENT

In early decades the situation was like large numbers of patients and limited availability of doctors ,large size medical instruments in special care units like ICU’S so that one nurse or doctor is essential to attend each patient in different wards. So the patient could not be continuously monitored so following problem formulation is evolved as follows:-

- The traditional medical test instruments in large sizes.
- Patient couldn’t be found in time & helped in time.
- Time consuming patient monitoring
- Human attention is required for each patient.
- Limited availability of medical instruments.
- Continuous monitoring was not possible.

- Most of the patient died due to lack of experts & machines.

The purpose of this study was to find out the needs of medical doctors concerning wireless patient monitoring. The system processes data using plug-in analysis components that can be easily composed into plans using a graphical programming environment.

4. METHODOLOGY

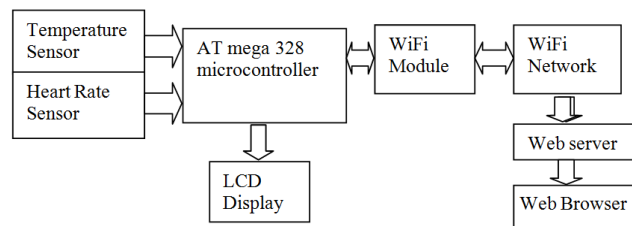


Fig. Block Diagram of Health Monitoring System

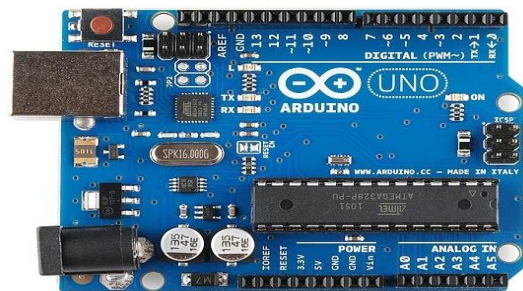


Fig : Arduino microcontroller

ARDUINO : Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

TEMPERATURE SENSOR : Temperature sensor is a device which senses variations in temperature across it. LM35 is a basic temperature sensor that can be used for experimental purpose.It give the readings in centigrade(degree Celsius) and Fahrenheit .

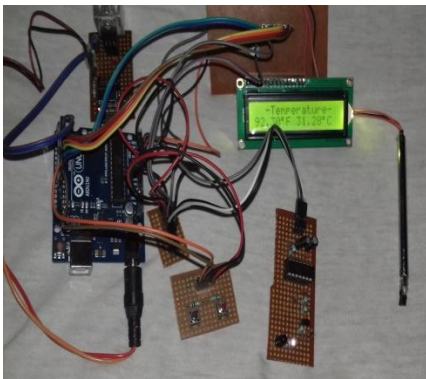


Fig : Snapshot of Proposed System for reading of LM35

HEART RATE SENSOR : Heart rate is a very vital health parameter that is directly related to the soundness of the human cardiovascular system. While the heart is beating, it is actually pumping blood throughout the body, and that makes the blood volume inside the finger artery to change too. This fluctuation of blood can be detected through an optical sensing mechanism placed around the fingertip.

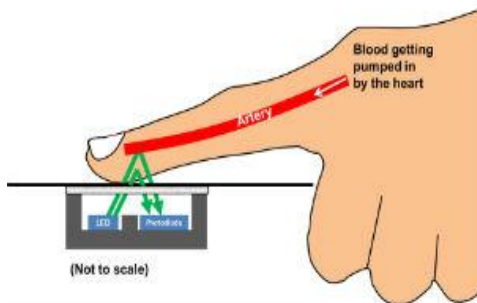


Fig : Working of Heart rate sensor

LCD DISPLAY : The lcd used is 16 * 2 lcd means it can display 16 characters per line and there are 2 such lines which is connected to microcontroller . It shows the output of all sensors.



Fig : LCD Display

WIFI MODULE : The Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. Wi-fi module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a Wi-Fi Shield offers. The applications of ESP8266 are Smart power plugs, Home automation Wi-Fi location-aware devices, Industrial wireless control, and Security ID tags.

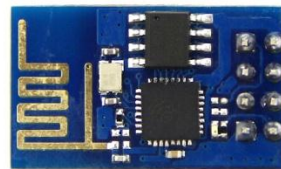


Fig : Wifi Module

FEATURES OF WIFI MODULE

- 802.11 b/g/n protocol
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLL, regulators, and power management units
- +19.5dBm output power in 802.11b mode
- Integrated temperature sensor
- Supports antenna diversity
- Power down leakage current of < 10uA
- Integrated low power 32-bit CPU could be used as application processor
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)

5. HARDWARE REQUIREMENTS

- Heart rate sensor
- Temperature sensor
- Atmega 328 microcontroller - Arduino
- Wifi module
- LCD Display

6. SOFTWARE REQUIREMENTS

- Embedded C coding

7. BENEFITS

- Continuous monitoring : It can be used in hospitals on operated patients for monitoring their vital parameters.
- Record Keeping : This system contains GUI which maintains the history of patients.
- Increased Efficiency : The number of nurses required for keeping a check on patients can be reduced to large extent.
- More accurate : Chance of human error in checking health parameters are also reduced.

8. FUTURE SCOPE

In addition to above sensors some other sensors can also be added in future such as ECG sensor.

This system can also be developed as an application of Health Monitoring System in future.

It is likely that doctors and nurses would want to be mobile. When they visit a patient they could have a tablet PC with all the current charts and data for that particular patient ready. The architecture for supporting this could be designed in different ways, but the main parts that have to be realized would be

- An infrastructure for the monitoring devices to push their data into, for example a server with database.
- An infrastructure for the mobile devices to get the data.
- It could also be realized in such way that the monitoring device stores all the data and applications needing data connected directly to the monitoring device

9. APPLICATIONS

- The staying of specialist is eliminated.
- It is multipurpose so that overall conditions are easily measured.
- Easy to operate.
- Compare with compact sensors it gives better performance.
- Easy and reliable for doctors.
- Increases efficiency.

10. CONCLUSION

This paper presents the health monitoring system using embedded system. Features associated with it are need of doctors are less, easy to operate, multipurpose system used to measure the different parameters. With its potential use in the hospitals and home healthcare fields, wireless sensor networks have an important role in improving the lives of patients.

11. REFERENCES

- [1] R. Babu, K. Jayashree, "A survey on the role of IoT and cloud m health care", International Journal of Scientific Engineering and Technology Research, vol. 04, no. 12, pp. 2217-2219, May 2015.

[2] V.Ramya, Anuradha Kumari, "Embedded Intensive Health Care Unit", David Bracewell, et al.(Eds):AIAA 2011, CS & IT 03, pp.169-176,2011

[3] S.Joephine Selvarani, "Online Health Monitoring System", International Journal on computer science and engineering, Vol.3 no. 4 April 2011

[4] Marci Meingast, Tanay Roosta, Shankar Sastry, "Security & Privacy issues with health care information technology", IEEE 2006