

ICU Monitoring System

Rutuja Ravindra Choundaj¹, Tanvi Tatyaso Patil², Ms.S.B.Magdum³

Students^{1, 2}, Lecturer³

Department of Computer Engineering

Sharad Institute of Technology Polytechnic, Yadrav, Kolhapur, Maharashtra, India

Corresponding Author's Email: - tanvipatil29063@gmail.com²

Abstract

Recent century is full of technology; none field can't be remain without use of technology. Medical field is one of those fields. The most of the existing system of medical field is manual. The doctors have to do many works. Smart IoT based technologies can be employed for efficient health system. A smart IoT based ICU Monitoring System project is proposed for this motive. This system utilizes different types of sensors for collecting the data and that data can be viewed on android application or web browser.

Keywords: *Automation, Electro Cardiography Sensor, Electro Myography Sensor, IoT*

INTRODUCTION

Smart IOT based technologies can be in work for the systematic monitoring of a patient in the ICU. A smart IOT based ICU patient monitoring project is developed for this motive. The IOT connectivity and the digital controller are used to create a smart ICU Monitoring System. They system make use of heart rates and blood pressure sensors to monitor the necessary signs of a patient. If any of these necessary signs go beyond a certain limit, an alarm buzzer

and LED is turned in to notify the concerned personnel.

Cloud computing is on-demand assess, via the internet, to computing resources applications, servers (physical servers and virtual servers), data storage, development tools, networking capabilities, and more hosted at a remote data center managed by a cloud services provide.

LITERATURE SURVEY FOR PROBLEM IDENTIFICATION

In researchget.net publication it is said that, the automation that has been implemented in the field of Medical is not so efficient. Our project overcomes this all As it works efficiently as compared to humans. It performs medical health system related tasks. It can be implemented easily .It is an automatic Health System. It performs the task like measuring the accurate heart beats and muscle power. So it works itself without any human intervention. So basically our project reduces the workload on the doctors and medical staffs [1].

In Physiopedia website it is said that ICUs are vital for enhancing the survival of critically ill patients through the continuous monitoring. Continuous monitoring of patient ensures the patient safety. Early recognition of patient deterioration can be done through continuous monitoring the patient. Through continuous monitoring of vital sign problem can be identified well in advance. So to recognize an acute change in patient health first vital sign may be checked accurately [2].

In eric.org website it is explained that ICU Monitoring System provides real-time

measurement of monitored parameters and alarm notification. During this website it is also said that ICU Monitoring System must have monitor to live and display information and alarm system to alert doctors and medical staffs [3].

Chowdhary et. al proposed a system with a GSM module connected to a Raspberry Pi in an assembly of various health monitoring sensors. This system focused on directly transfer of health data in form of direct messages on the phone of Doctor. They aimed to make it transferable and hence to decrease the load of medical staffs and doctors for patient monitoring. They obtained the speed of 20 seconds per reading for refreshing the updated value and storing the data in the system [4].

Uddin et al. proposed a real-time tracking system which will understand in ICU. This system configures all the information with the help of body sensors in support of Arduino Uno and transfers it to an application. This app is useful in monitoring various frameworks in a very distinct range and connectivity. With the help of IoT Cloud and IoT protocols, they provide a varying range of transmission of information to the developed app [5].

Ashwini Gatte et.al. Proposed an IoT based fitness tracking system of aged persons within which he used different parameters of Body glucose, Blood Pressure, Heart Beat Rate as well activity monitoring etc., with the approach of Raspberry Pi. Gatte also used ECG (Electrocardiogram) sensor for heartbeat and other diseases. He also proposed different IoT based protocols which might be utilized in this kind of system [6].

Zia Uddin Ahmed and his team proposed this Iot Based structure for monitoring the wellbeing of the patients with the help of wearable biomedical devices. In this system, sensors are connected to microcontroller together with GSM module for sending information to the user or its family in an emergency situation. This system comprises of such a big amount of hardware devices which are directly connected to the body of patient. And this data is distributed in multiple sectors and this offers the user an opportunity to take data from multiple locations [7].

Naina Gupta et al. put ahead a structure which focus to resolve the problem of time wastage during the ambulatory services and in hospitals, they forces to send the information via GSM module connect

through the Bluetooth technology. Regular health check and monitoring the different body framework with the help of the different sensors attached to the body is the main focus. They focused on developing a small size wearable system which will transfer the information through GPRS to custom networks [8].

OBJECTIVE & SCOPE

Objective

1. The main objective of ICU monitoring is to give warning of early or dangerous deterioration

Scope

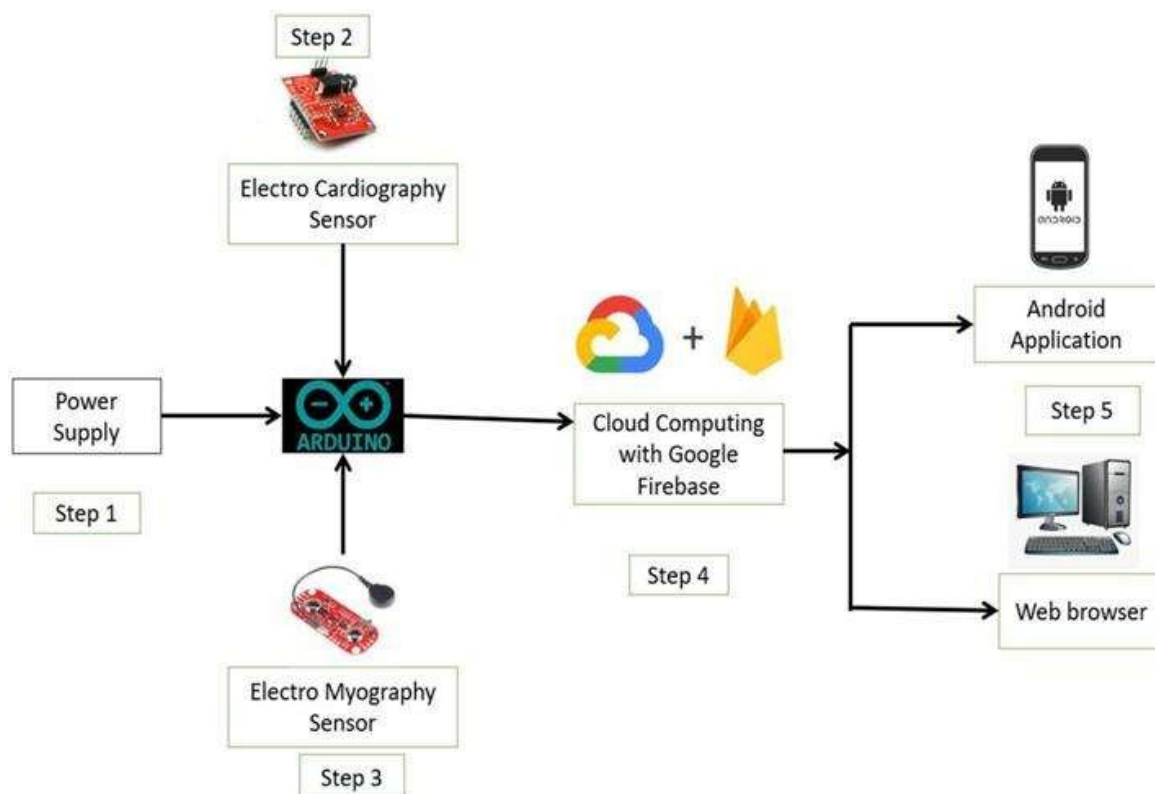
2. It can be applied in medical field to monitor the patients continuously.

SYSTEM DESIGN

ICU Monitoring System is an automatic Health System. It consist of ECG(Electro Cardiography Sensor) and EMG(Electro Myography Sensor). Arduino is a brain of a system. It works or gives input/output instructions to respected hardware and software. ECG stands for Electro Cardiography. It counts the heart beats of patient. EMG stands for Electro Myography.

It counts the muscle power of patient. The collected value of heart beats by ECG and the collected values of muscle power by EMG is stored on cloud and can be viewed on an android application.

In this system if heart beat increases bulb will glow and if value of muscle power increases buzzer will buzz. Cloud computing with Google Firebase is used to store the values of heart beat and muscle power.



Block Diagram: ICU Monitoring System

- **Step 1(Power Supply):** It provides Supply to your system.

Arduino: It is a brain of a system. It works or gives input/output instructions to respected hardware and software

- **Step 2(ECG):** It stands for Electro Cardiography. It counts the heart beats of patient. ECG electrodes are typically moist sensors, meaning that they need the use of a conductive gel to increase conductivity between skin and electrodes. The electrodes are attached to an ECG machine by lead

wires. The electrical activity of the heart is then measured, explained, and printed out. No electricity is sent into the body. Natural electrical impulses correlate decline of the different parts of the heart to keep blood flowing the way it should.

- **Step 3(EMG):** It stands for Electro Myography. It counts the muscle power of patient. Electromyography is a method used to take up signals generated by the nerves in target skeletal muscles. These signals are collected by electrodes and sensors and then transformed into a digital signal by an encoder. This signal is then processed and showed by a computer program.

- **Step 4(Cloud Computing with Google Firebase):** It is the delivery of computing services including servers, storage, database, networking, software analytics and intelligence over the internet.
- **Step 5(Android Applications and Web Browser):** It displays the information transferred by Cloud Computing. By using Android applications and web browser nurse, doctor, relatives and second doctor consultant can monitor patient.
- **Step 6(Alert System):** In case Patient Health is increased or decreased the blub glows according to the requirement of Alert System.

RESULT

Values of Muscle Power



Values of Heart Beat



CONCLUSION

This paper describes information about an automatic ICU Monitoring System. It helps the doctors and medical staff in the real time monitoring of patients and also work load on the doctors and medical staff is decreased. The technology used in ICU Monitoring System stands out with perfection. In this system transfer of data is fast, feasible and more importantly reliable.

ICU Monitoring System connects with advance IoT Health System Technology. It saves life of many people. ICU Monitoring System can overcome the shortage of staff members in medical field. So, in few years everything is going to fall under this super

technology. It will become easy for doctors and physicians to monitor patient's health through our system. We can make fully automatic system. And, finally I conclude.

REFERENCES

1. www.researchgate.net/publication/348930509_IoT_based_Smart_Healthcare_Monitoring_Systems_A_Literature_Review.
2. www.physiopedia.com/Monitoring_of_Patients_in_the_ICU.
3. www.ecri.org/search-results/member-

- preview/hdjournal/pages/evaluation-background-icu-physiologic-monitoring- systems.
4. KC Chowdary, KL Krishna, KL Prasad, K Thejesh. An Efficient Wireless Health Monitoring System, Proceedings of the Second International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC 2018) IEEE Xplore Part Number: CFP18OZV-ART; ISBN: 978-1-5386-1442- 6 .
5. MS Uddin, JB Alam, S Banu. Real Time Patient Monitoring System based on Internet of Things, International Conference on Advances in Electrical Engineering (ICAEE), Dhaka, Bangladesh, 9, 2017.
6. A Gutte, R Vadali. IoT Based Health Monitoring System Using Raspberry Pi," 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA), Pune, India, 2018,1-5,doi:10.1109/ICCUBEA.2018.8697681.
7. ZU Ahmed, MG Mortuza, MJ Uddin, MH Kabir, M Mahiuddin, MJ Hoque. Internet of Things Based Patient Health Monitoring System Using Wearable Biomedical Device, International Conference on Innovation in Engineering and Technology (IEEE), 12, 2018, ISBN: 978-1-5386-5229-9/18.
8. N Gupta, H Saeed, S Jha, M Chahande, S Pandey. IOT based health monitoring systems, International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), Amity Institute of Telecommunication Engineering and Management. Amity University Uttar Pradesh, Noida, India, 2017.