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IOT-Based PM System Integrated with Additional Life-Saving Parameters

Mamatha K.R¹, Siva Ganesh.K², Harish.R³, Syed Asif.Y⁴, Ashiq M.S⁵

Assistant Professor, Department of Biomedical Engineering, Dhaanish Ahmed Institute of Technology, Coimbatore, Tamilnadu, India¹

U.G. Student, Department of Biomedical Engineering, Dhaanish Ahmed Institute of Technology, Coimbatore, Tamilnadu, India^{2,3,4,5}

ABSTRACT: In the modern world, the Internet of Things, is playing a major role in healthcare and almost all fields not only for sensor devices but also in communication. Smart devices and wireless sensor networks are used for real-time analysis of various health parameters of patients, and the design and implementation of an e-health monitoring network system are done. The main aim is to develop a set of modules that can facilitate the diagnosis for the doctors through telemonitoring of patients. These sensors are used to sense the data and then that data will be sent to the server using the Wi-Fi module. The patients are monitored by the doctor in real time based on the data received through the server. For any future obstacles and easy access and processing for planning and prediction, this architecture is used to store the medical history of the patient on the cloud and hence for monitoring a single patient particularly at home as well as in hospitals and public healthcare units. Here we proposed an integrated methodology of monitoring the health parameters along with the detection of myocardial infarctions by providing in a collected manner using IOT.

KEYWORDS: Wireless Sensor Networks, Internet of Things, Wi-Fi Module, Healthcare.

I. INTRODUCTION

In recent days we have seen a rising growth in variable sensors and various devices are available for personal healthcare, fitness, and activity awareness. There are many clinical applications in remote healthcare monitoring systems for restoring patient data and organizing clinical access to patient's health information. Internet serves many purposes like education, finance, business, industries, entertainment, social networking, shopping, and e-commerce with the development of the world, Health monitoring system is used in every field such as hospital, home care unit, and sports. This health monitoring system is used to chronicle the diseases of patients who have daily check-ups. Different biomedical sensors are used for monitoring the health condition which are integrated into a single system on a chip. If any varied change takes place it is notified. This notification would help to take appropriate action at an instance time. This would save patients from the future health problem which would arise. This would also help the patient's concerned doctor to take appropriate action at the proper time.

II. RELATED WORK

This paper presents an Internet of Things (IoT) based portable patient monitoring system that can be fixed to the remote patient without requiring the patient to be constrained by wires and remain in bed for the whole day. Furthermore, the device can measure and display the health status of a patient which is vital and needed for better healthcare [1].

Transmits the parameters wirelessly through Wi-Fi module technology. The transmitted data is displayed on the PC. The given data gets updated in the database continuously. The database with the help of an Android application fetches all the updated data and displays it on the doctor side personal mobile. This tells the doctor the current status of the patient in real-time. If any parameter of a particular patient goes beyond a pre-assigned threshold value, then an automatic notification will send to the doctor's mobile using an Android mobile application [2].

This paper describes the portable mechanical ventilator that is used for the worst conditions such as COVID-19 and in far remote places with limited available resources. The ventilator takes air inside BVM and presses the valve of the common bag valve (BVM) with the arm, removing the need for a personal BVM user. The prototype is made of a wooden sheet, imitation 10.04 x 10.04 x 14.5 inches (255 x 255 x 368.3mm), and a weight of 4.3 kg. It is driven by a



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Wiper Motor of Skoda Octavia with 14-watt power rated 13.5 V voltage and features an adjustable discharge of oxygen[3].

A ventilator with low cost, efficient, and automatic air delivery ventilator with alarm and PEEP. This system natively supports pressure-control, spontaneous inhalation, and exhalation monitoring, and key alarms specified by regulatory agencies are included. Anyone can operate it with no need to study or train in ventilation rules like ICU ventilators [4]. A general overview of heart attacks and current techniques was established in this paper. Moreover, a review of the significant machine learning techniques for heart attack prediction accessible in the literature is briefly given. Decision Tree, Logistic Regression, SVM, Naive Bayes, Random Forest, KNN, and XG Boost Classifier are the machine learning methods mentioned. Based on the braced features, the algorithms are compared [5].

III. METHODOLOGY

In this project, the methodology is being developed to help doctors and guardians to monitor the patient’s health and status remotely. The system is designed as a monitoring system among healthcare systems as it prioritizes connection involving sensors that measure to observe the condition of a patient. Our proposed system is to integrate features of the ventilator, cardiac arrest prediction system, and medical injector into the patient monitoring system along with sensing pulse rate, blood oxygen level, temperature, humidity, and ECG using Arduino and recorded data is transmitted & stored via the IOT platform. Development of this project will focus on the data recording and monitoring system of the sensor which will be displayed on the Blyn application. Arduino is used as a central platform for the monitoring system. Measuring and reading from the sensor will be sent to the cloud system through Wi-Fi which is an integrated platform.

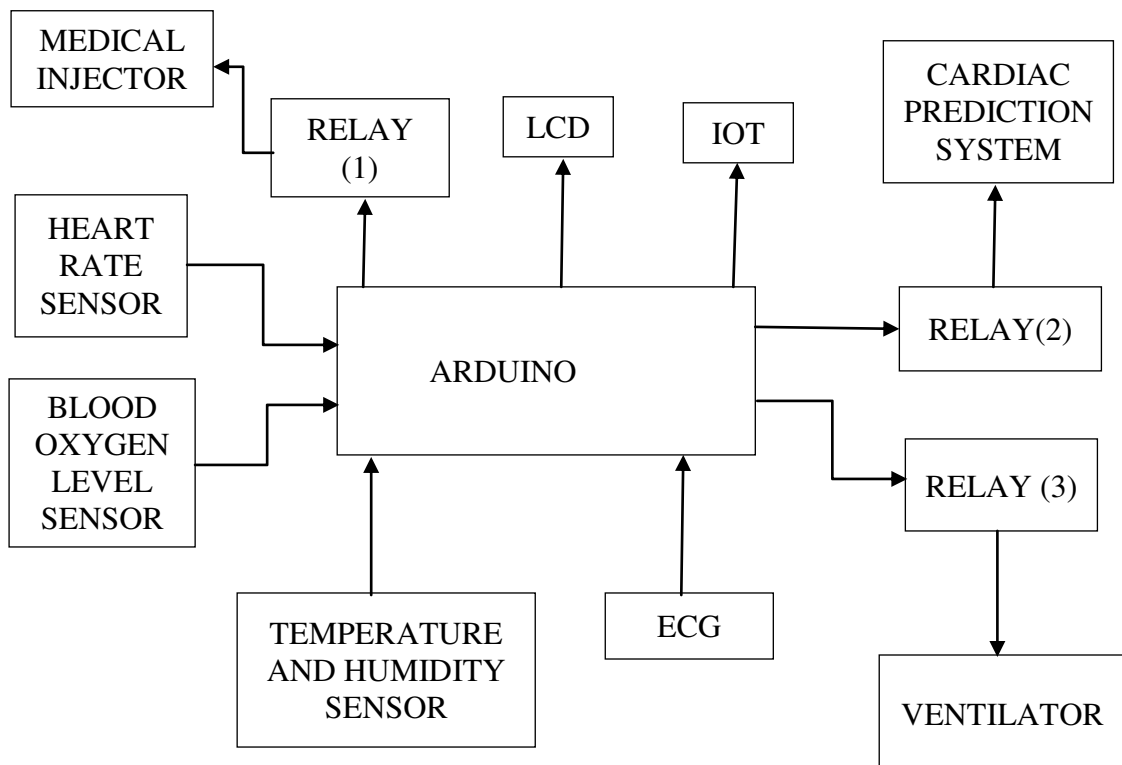


Fig. 1. Block diagram of the proposed system

COMPONENTS:

Arduino:

Arduino is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller.

Temperature & humidity sensor:

DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability, and cost-effectiveness.

IOT Using Node MCU V3:

The best way to develop quickly an IoT application with fewer Integrated circuits to add is to choose this circuit “NodeMCU”. It is an open-source firmware and development kit that plays a vital role in designing a proper IoT product using a few script lines. The module is mainly based on ESP8266, a low-cost Wi-Fi microchip incorporating a full TCP/IP stack and microcontroller capability.

Relay:

The relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field that attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch to a second circuit which can be completely separate from the first.

IV. EXPERIMENTAL RESULTS

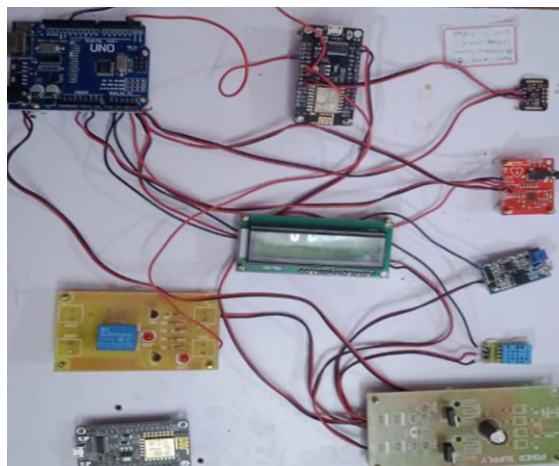


Fig. 2. Experimental setup obtained finally

V. CONCLUSION

Thus we have implemented the combined technology of a patient monitoring system with a ventilator and medical injector. This technique is also designed to measure the heart rate, temperature, and humidity of the patient's body. The transmission of data via IoT will help in the perfect monitoring of the patient. The cardiac arrest prediction system plays a major role in patients with heart diseases. In the future, this technique can be enhanced for measuring more parameters.



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