Wearable Health Monitoring Smart Gloves

Sahil D Jaiswal[1], Dr.N.N.Kasat[2]

[1]M.E., Electronics and Telecommunication, Sant Gadge Baba Amravati University

[2]Guide, Department of Electronics and Telecommunication Engineering, Sipna College of Engineering and Technology Amravati, Amravati-444701

Abstract: Internet of Things (IoT) envisions a future in which anything/anyone/any service can be linked by means of appropriate information and communication technologies which will bring technological revolution in the fields of domestics, smart homes, healthcare systems, goods monitoring and logistics. This project presents the applications of IoT and addresses some essential parameters and characteristics of each of the applications of IoT. In this project, we have deeply explored the role of IoT in healthcare to observer the following parameter such as heart pulse rate, body pressure, temperature and posture delivery and its technological aspects that make it a reality and examine the possibility of diagnosing patients health. A cloud based conceptual framework has been proposed which will be beneficial to the healthcare industry implementing IoT healthcare solutions with the help of android application.

Index Terms—Internet of Things; Cloud Computing; Healthcare

INTRODUCTION

Biomedical field serves as the boon for human society. But in today's rashly running world people careless about their health. Cases of heart attacks and deaths due to lack of help are increasing. For this purpose personal medi-kits are best solution. Few years ago, there was joint family system hence patients were able to get medical help within time. But nowadays one may lost his life because of not getting proper help within time. For such heart patients this kit gives indication to their doctors and they immediately get medical help. Whenever beat rate of person exceeds more than 72pulse/min., doctor get immediate indication and help will be sent as fast as can.

Cardiovascular diseases are often very critical and serious condition, the change is so rapid, the one attack can bring about great suffering to patients, and even lead to syncope or sudden death. Especially coronary heart disease, cardiomyopathy, and arrhythmia history, family history of sudden cardiac death, heart transplantation and other medical conditions, history, the disease has a sudden, random, high rate characteristics of sudden death, usually after the acute onset of symptoms within 1 hour may cause death and malignant ventricular fibrillation within 12 minutes and even cause sudden death in patients suffering from serious heart disease in patients with the above mentioned is attack patients.

OBJECTIVES

- The objective of our system is to continuously monitor the patient's health parameter and displaying to LCD screen.
- If parameter crosses the threshold limit an alarm is sent to Dr as an precaution.
- In case of emergency buzzer will sound which alerts the family member to avoid upcoming emergency situations.

LITERATURE REVIEW

The analysis of project papers related to heart rate monitoring and patient monitoring is done in this section of the paper.

Bansal et al. [2018] implemented Photo plethysmography

(PPG) method for real time heart rate measurement. It is implemented using simple infrared transmitter and receiver circuit Arduino UNO board has been used for calculating heart rate and the same is displayed on LCD. Raspberry Pi is used as an lot gateway for sending SMS and emails through Message Queuing Telemetry Transport (MOT) protocol.

Majumder et al. [2018] described that this project is aimed at monitoring physical parameters such as blood pressure, heart rate and body temperature of the patients in a remote location. It consists of IR transmitter and receiver, LM35, MPXV5050GP, Data Acquisition Unit, Arduino and Bluetooth. The system communicates with the devices through Bluetooth and also the communication password is protected.

Pawar [2014] implemented this project that focuses more on the rural patients who need healthcare facility achieved using GSM module, which sends the calculated heart beat from the sensor to the doctors through SMS. As availability of doctors in government hospitals, especially of rural areas are deficit, in this case, it is important to bring the idea of wireless patient monitoring system where doctors can monitor the patients from rural areas.

Mohana and Aradhya [2015] suggested the study which states that heart rate and music are closely related. Pulse sensor circuit is used to obtain the beats per minute (bpm). The calculated bpm is sent to Arduino Ethernet Shield's web server. Arduino is connected to the Audioshield, which plays music for the patient according to the calculated bpm, for example if the heart rate is low then it will play up

tempo music and if the heart rate is high it will play slow melodious music. It uses SD card module, DAC, PWM, Arduino, Ethernet shield. TCP protocol for the entire setup.

Paliwal et al. [2016] proposed this project which is designed for obtaining heart rate and heart rate variability using smart phone camera. It is a different concept where a video is firstly recorded by placing left index finger on camera lens and then the PPG signal extracted from the video are used for obtaining heart beat and Heart Rate Variability (HRV) using Fourier Transformation. As the early detection of these, heart rate parameters can save the life of patients, so real-time monitoring is important, which is described in this paper using photoplethysmography technique.

Block Diagram:
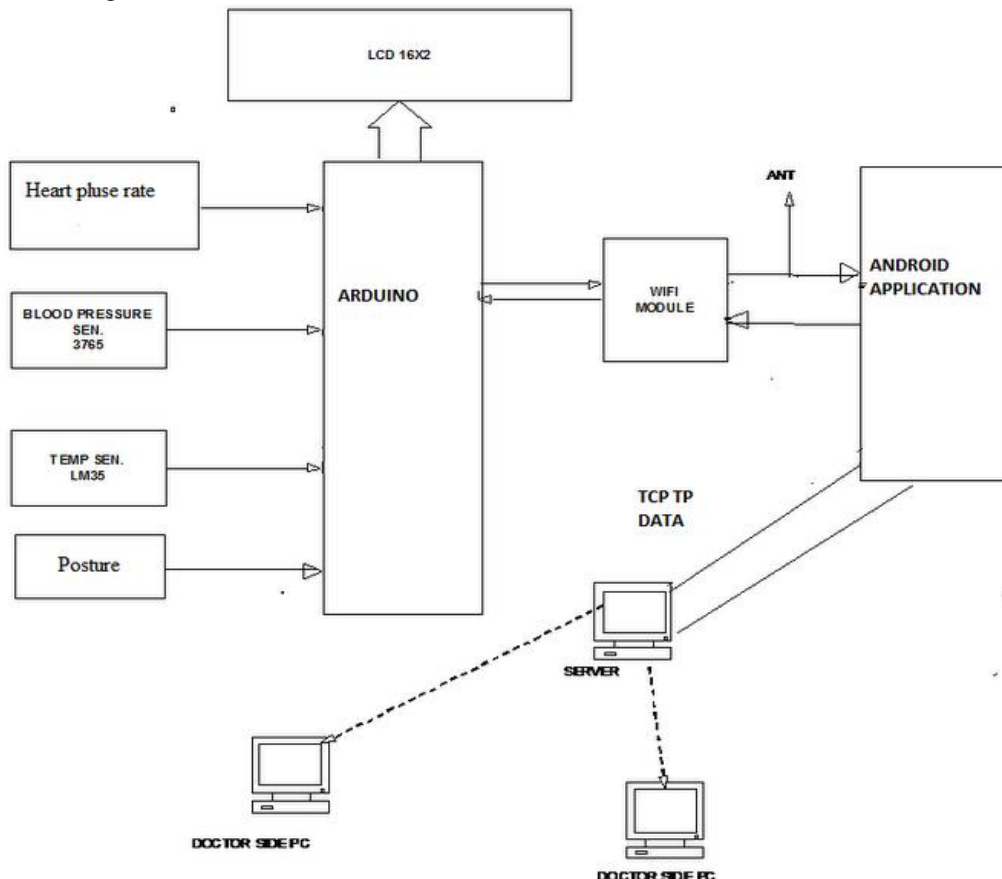
SYSTEM METHODOLOGY

3.1 System Overview

The prototype consists of various hardware as well as software interlinked together to execute the function of data acquisition, data transmission, data processing and data representation. Data acquisition is done through pulse sensor, temperature sensor,

switches and buttons. Data transmission is done through wires, RF module, wireless-Fidelity (Wi-Fi) module. Data processing is done by ATMEGA 328 microcontroller and data representation is done on LCD display, BLYNK platform and Android smartphone. All of these hardware are integrated on the gloves. The fitted micro-switches help to reset the system during any failures. The sole purpose of

the algorithm and our system is to simplify the computer interface for disabled patients.

3.2 Hardware

Heart Sensor: Heart rate sensor is an optical device, which is used to monitor the amount of changes in the volume of blood flowing in the blood vessels. Here, we use LM358, a low power operational amplifier consisting of a bright LED light of red colour and a light detector to detect the light modulation by blood when the blood flows through the blood vessels, the fingers become more opaque so that the detector gets less light and thus produces a variable electrical pulse, which is BPM (Beats Per Minutes) in common language. It is placed in the fingertip of a person. Temperature Sensor: LM35 is used to measure the temperature. It is a series of precision integrated circuit in which output voltage is linearly proportional to temperature in degree Celsius. Main advantage of LM35 is that it is linear, i.e., 10mv/°C which means for every degree rise in temperature, the output of LM35 will rise by 10 mv.

ATmega 328: The ATmega328 is an 8-bit and 28-AVR single- chip micro controller created by Atmel Corporation, the mega AVR family. It has flash type program memory of 32 kilo bytes. It has a modified Harvard architecture 8-bit RISC processor core. It is used in Arduino UNO board and it supports SPI Protocol.

3.3 Software

Blynk: Blynk is a cloud platform which is designed for lot and used to control the hardware through android and IOS device. It can monitor, store and display the data.

Embedded C: Embedded C programming language is extended version of Clanguage to support the enhanced microprocessor features. It has some additional header file, which may vary from controller to controller. Arduino IDE is a tool used to write an upload code to the Arduino.

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