IOT Based Patient Monitoring System

R. Anitha[1], M. Balakrishnan[2], M. Chockalingam[3], S. Gowtham[4], B. Menakadevi[5]
[1, 2, 3, 4, 5] Sri Eshwar College Of Engineering

Abstract- *The healthcare system is going through a transformation in which continuous monitoring of inhabitants is possible even without hospitalization. Sensors detect abnormal and/or unforeseen situations by monitoring physiological parameters along with other symptoms. In this project it is possible to monitor various medical parameter such as human body temperature, heart beat rate per minute, blood pressure. These measured parameters are updated regularly by using IOT to required physician.*

Keywords- wearable sensor, patient monitoring system, IOT, LCD.

I. INTRODUCTION

The health problem is rising along with increasing population in the today's world. In hospitals, continuous monitoring is needed for heart attack, after major/minor operation, temperature related illness, physical disorders. But the 24x7 monitoring of patients is difficult and also leads to high cost. For elderly people who alone stay in home for long term monitoring without person is a complex situation. To overcome the situation without hospitalization for monitoring the patients using wearable sensors is used in this paper. Wearable sensors are popular in many applications such as entertainment, security, medical purposes. Wearable sensors are worn on the human body for temperature, pressure, heart beat, etc., In the medical field, sensor are collect the data about the person and send the information using wireless technology. This method reduces the health care cost of patients.

Problems in Existing System:

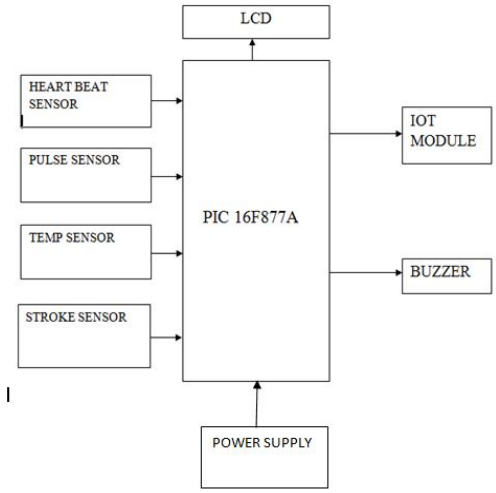
In existing health monitoring system Zig-bee is used to send the temperature, pressure and heartbeat rate to required physician in around 100 meters only and there should be additional availability of portable receiving the data by zig-bee.

Proposed System:

In the proposed system there is regular updating of the patient's measured details to the required physician's place. There is no need of addition portable device for receiving the data, In proposed system we can update with mobile or system using internet

The proposed system is to monitoring the patients continuously using wearable sensors. This system consists of many sensors such as temperature, pressure, heart beat, and stroke. The temperature sensor is used to measure the body temperature. The Pressure sensor is used to find the pressure level of a person. Heart beat sensor has calculated the pulse rate of the person. Data are collected and analyzed using PIC microcontroller. Based on the predefined values it compares and displays the information about the patients with stage in liquid crystal display using MP lab coding. If it exceeds that condition immediately send the information to the ambulance or doctor's mobile phone or relatives via sms using IOT module.

Block Diagram:



II. SENSOR DISCRIPTION

Temperature Sensor

LM35 sensor is used to measure the temperature of the human body. Body Temperature changes depend upon on the time to time and day to day, but no more than 1.0oC.For many diseases such as typhoid , viral fever etc.,. So it needs to monitor continuously the patients. It also used to self monitoring the patients easily. If the temperature level is too low, the patient needs medical emergency. Because too low temperature leads to death occur and also for high level. It is measured in degrees Celsius (OC).

Table – 1: Classification of temperature range

Category	Temperature Range (oC)
Hypothermia	<35.0
Normal	36.5 – 37.5
Hyperthermia	> 37.5 – 38.3
Stage 1 hypothermia	35-36
Stage 2 hypothermia	34 – 33
Stage 3 hypothermia	32
Hyperpyrexia	>=40.0 -41.5

The common symptoms of heat related diseases are Deterioration, Heat rash, Heat cramps, Dizziness, Heat exhaustion, Heat stroke requires medical emergency.

Pressure Sensor

The Pressure sensor is used to measure the systolic and the diastolic pressure level using the device. Systolic is the higher of the two number measures the pressure in the arteries when the heart beats. Diastolic is the lower of the two number measures in the arteries between heart beats. It is measured in millimeter mercury (mmHg). Blood pressure changes from minute to minute.

Category	Systolic/diastolic pressure (mmHg
Hypotension	< 90/60
Desired (normal	90-119 / 60-79
Prehypertension	120-139/80-89
Stage 1 hypertension	140-159/90-99
Stage 2 hypertension	160-179/100-109
Hypertensive	>= 180/>=110

The symptoms of the low blood pressure are Dizziness or lightheadedness, Fainting (syncope),Lack of concentration, Nausea, Depression, Thirst, Cold, Clammy, pale skin, Blurred vision, Rapid, shallow breathing, Fatigue.

Heart Beat Sensor

Heart beat sensor is used to measure the pulse rate of the heart in digital output. when a finger is placed on it. LED is used to detect the heart rate. The normal heart beat of the person is 78 bpm. It is measured based on the beats per minute. If the heart beats more than 100 BPM causes Tachycardia. If the heart beats less than 60 BPM causes Bradycardia. Figure 2 shows the information about the hear t rate of the person with time.

Stroke sensor

It is detect the movement of the body whether thew person is in normal or not. It is used to mechanical energy to electrical energy and pass the information to the controller.
Vibration detector

The sensor for vibration detection is a vibration detector (or shock sensor), the detector must have a mechanical displacement to generate the alarm signal; vibration detection equipment is not only best suitable for file cabinets, vaults, strongrooms, safes and Automated Teller Machines (ATM), confidential protection special objects, but also suitable for other systems in combination, to prevent intruders break in from wall. How to use the vibration detector in correct application is very important. It is often used to provide protection in a special object where protected area that with staff's activities.

There are two major detection methods for vibration detector; the one is mechanical detection, it works as a ON/OFF switch using the mechanical movement of metal contact, the other is acoustic sound detection. Compare to acoustic sound detection, adopts mechanical detection vibration detector only detect the true physic vibration with low false alarm. The vibration detector that is based on acoustic sound detection (with microphone), it may trigger false alarm by high noise from car, thunder in summer.

III. HARDWARE DISCRIPTION:

PIC Microcontroller:

PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complimentary metal oxide semiconductor) that uses separate bus for instruction

and data allowing simultaneous access of program and data memory.

The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques.

LCD:

A liquid crystal display (commonly abbreviated LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power.

IV. SOFTWARE DESCRIPTION

MPLAB IDE

MPLAB IDE is a software program that runs on windows operating system. It is used for developing the application for microchip microcontrollers and digital signal controllers. MPLAB provides a single integrated environment is used to develop the code for embedded microcontroller. So it is called as an integrated development environment. The features of MPLAB are comprehensive editor, project manager and design desktop. It is used for application development of embedded designs using Microchip PIC MCUs and dsPIC DSCs. The HI-TECH C compiler is used to build the embedded c coding in the MPLAB software.

V. CONLUSION

In this project, implemented the state-of-the-art patient's activity monitoring based on wearable sensors using IOT module. The physiological data are stored and published online. Hence, the healthcare professional can monitor their patients from a remote location at any time. The temperature ,heat beat rate, pressure, stroke sensor measured output will be display on LCD.

REFERENES

[1] K. Malhi, S. C. Mukhopadhyay, J. Schnepper, M. Haefke, and H. Ewald, "A Zigbee-based wearable physiological parameters moni-toring system," IEEE Sensors J., vol. 12, no. 3, pp. 423–430, Mar. 2012.

[2] P. A. Shaltis, A. T. Reisner, and H. H. Asada, "Cuffless blood pressure monitoring using hydrostatic pressure changes," IEEE Trans. Biomed. Eng., vol. 55, no. 6, pp. 1775–1777, Jun. 2008.

[3] T. Shany, S. J. Redmond, M. R. Narayanan, and N. H. Lovell, "Sensors-based wearable systems for monitoring of human movement and falls," IEEE Sensors J., vol. 12, no. 3, pp. 658–670, Mar. 2012.

[4] P. Salvo, F. Di Francesco, D. Costanzo, C. Ferrari, M. G. Trivella, and D. De Rossi, "A wearable sensor for measuring sweat rate," IEEE Sensors J., vol. 10, no. 10, pp. 1557–1558, Oct. 2010.

[5] Ziyu Lv, Feng Xia, Guowei Wu, Lin Yao, Zhikui Chen," iCare: A Mobile Health Monitoring System for the Elderly" School of Software, Dalian University of Technology Dalian 116620, China.

[6] Nagender Kumar Suryadevara, Subhas Chandra Mukhopadhyay, "Wireless Sensor Network Based Home Monitoring System for Wellness Determination of Elderly" IEEE Sensors Journal, Vol. 12, No. 6, June 2012.

[7] Amruta Chopade, Nitin Raut, "Remote Patient‟s Health Monitoring by Using Zigbee Protocol" International Journal of Advanced Research in Computer Science and Software Engineering Volume 4, Issue 8, August 2014.