ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 7, March 2018

AUTOMATIC SMART HEALTH MONITORING SYSTEM IN HOSPITAL FOR PATIENT

S.Sangeetha[1], V.Sangeetha[2], M.Soniyagandhi[3], N.Usha priya[4].
Assistant professor[1], UG scholars[2,3,4]

Abstract

In a hospital health care monitoring system it is necessary to constantly monitor the patient physiological parameters. This project present a monitoring system that the capability to monitor physiological parameters such as blood pressure, heart rate and glucose to control their health condition. In this system, a sensors has attached on patient body to collect all the signals from the wireless sensors and send them to the doctor/user. This system can detect the abnormal condition, issue an alarm to the user and send a SMS to the doctor/user.

The major advantage of its system can perform few sensors. It is use to measure heartbeat, glucose, pressure level from the patient body and also use GSM technology is use to communicate large coverage area. The output is display by using LCD. When abnormal condition is occurred the medicine is injected to the patient body by using relay.

Keywords: GlobalSystemMobile communication,

Sensor system,emergency consumption.

1.Introduction

Technology has always been there to simplify and makes the human life much easier. It affected the various areas of life; the medical field is one of them. It benefits from the technology in different ways; now it is easier to diagnose internal diseases using some digital devices. The healthcare sector is going through a huge change, with digital capabilities changing the way doctors interact with their patients. Nowadays, patients have the tools to view their key vitals themselves and help doctors to have immediate access to patient data on-the-go.

Generally it is very hard to find the abnormalities in the heart beat count of a patient. The average count of 25 years old ranges from 140 to 170 beats/minute, whereas in 60 years old people, it ranges from 115 to 140 beats /minute. Patients are not satisfied with the treatment which doctors normally use for finding the heartbeat count. So there should be a device to track the internal changes in the human body. There are different types of instruments are available in the market to track internal body changes, but there are some limitations due to their heavy cost, maintenance, instrument size and the patient's mobility Here is a device namely wireless health

monitoring system used to overcome this problem like easy to use, small in size, light weight and portable. This

device uses a heartbeat sensor to track the patient's heart beat count and also abnormalities.

The exact number and type of physiological signals to be measured, processed, and reported, depends on end-user application and may include many physiological sensors(ECG, EMG, EEG, SPO2…).

In addition to these sensors, a WBASN for health monitoring may include sensors that can help to determine the user's location, discriminate among the user's states (e.g., lying ,sitting, walking, running), or estimate the type and level of theuser's physical activity.

In this paper, we describe new Mobile HealthMonitoring system architecture, it uses a wireless body area networks (WBASN) to collect and send data to the cloudserver through GPRS/UMTS.

Body sensor network systems can help people by providing healthcare services such as medical monitoring, memory enhancement, medical data access, and communication with the healthcare provider in emergency situations through the SMS by using GSM .Continuous health monitoring. will increase detection of emergency conditions in at risk patients. Not only the patient, but also their families will benefit

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 7, March 2018

from these. Also, these systems provide useful methods to remotely acquire and monitor the physiological signals without the need of interruption of the patient's normal life, thus improving life quality.

Although present systems allow continuous monitoring of patient vital signs, these systems require the sensors to be placed,over patient body. and limit the patient to his bed. But now, there is relation between the sensors and the bedside equipment due to the wireless devices and wireless networks. These systems do not require the patient to be limited to his bed and allow him to move around but requires being within a specific distance from the bedside monitor. Out of this range, it is not possible to collect data.

Automatic Wireless Health Monitoring System in Hospitals for Patients: Automatic wireless health monitoring system is a very significant system for keep monitoring constantly. Nowadays in hospitals, keep monitoring of every single patient is not quite easy due to lack of hospitals employees and for this reason, so many patients have been died every year. This have become ambiguous problem of every hospital. Here we have proposed a prototype system that is called automatic smart health monitoring system in hospitals for patients. It has made with the help of pic microcontroller 16F877A, heart beat sensor,pressure sensor,glucose sensor .

This system would be keep monitoring the patient's body constantly and then displays this, to relative doctor's LCD display through GSM communication system. This automatic smart health monitoring system is less costly, more reliable and consume less power as compared the other systems.

2.SYSTEM ARCHITECTURE

Automatic smart health monitoring system in hospital for patient contains heartbeat sensor, glucose sensor, pressure sensor, GSM.

A person's heartbeat is the sound of the valves in his/hers heart contracting or expanding as they force blood from one region to another. The number of times beats per minute (BPM). Is the heartbeat rate and the beat of the heart can be flat in any artery that lies close to the skin in the pulse.

CGM (continuous Glucose Monitor) is a way to measure glucose level in real time throughout the day and night. A tiny electrode call a glucose is inserted under the skin to measure glucose level in tissue fluid. It is connected to a transmitter that sends the information via wireless radio frequency to a monitoring and display device.

With the steam age came the demand for pressure measuring instruments. Bourdon tubes or bellows, where mechanical displacements were transferred to an indicating pointer were the first pressure instruments, and are still inuse today.

Pressure metrology is the technology of transducing pressure into an electrical quantity. Normally, a diaphragm construction is used with strain gauges either bonded to , or diffused into it, acting as resistive elements. Under the pressure-induced strain, the resistive values change.In capacitive technology, the pressure diaphragm is one plate of a capacitor that changes its value under pressure-induced displacement.

A power supply is an hardware component that supplies component in a computer with power. the power supply converts a 110-115 or 220-230 volt alternating current(AC) into a steady low stage voltage direct current (DC) usable by the computer and rated by the number of watts it generates 12v power supply is common power supplies.12v dc output is obtained from 120v ac or 240v ac input.

flash screen LCD and plasma screens work in a completely different way. In a plasma, each pixel is a tiny fluorescent lamp switched on or off electronically. In an LCD television, the pixels are switched on or off electronically using liquid crystals to rotate polarized light.

A buzzer or beeper is an audio signalling device. Which may be mechanical, electromechanical or piezoelectric(piezo for

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 7, March 2018

short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of users input. Such as a mouse click or keystroke.

Relays are switches that open and close circuits electromechanically orelectronically. Relays control one electrical circuit by opening and closing contacts in another circuit. When relay is normally open (NO) there is an open contact, When the relay is not energized. This Board can be used to Control Solonoids,Motors etc.Input Logic -5v level from MUC.

GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

Mobile services based on GSM technology were first launched in Finland in 1991. Today, more than 690 mobile networks provide GSM services across 213 countries and GSM represents 82.4% of all global mobile connections. According to GSM World, there are now more than 2 billion GSM users worldwide. GSM World references China as "the largest single GSM market, with more than 370 million users, followed by Russia with 145 million, India with 83 million and the USA with 78 million users."

Since many GSM network operators have roaming agreements with foreign operators, users can often continue to use their mobile phones when they travel to other countries. Simcards (Subscriber Identity Module) holding home network access configurations may be switched to those will metered local access, significantly reducing roaming costs while experiencing no reductions in service.GSM, together with other technologies, is part of the evolution of wireless mobile telemmunications that includes High-Speed Circuit-Switched Data (HSCSD), General Packet Radio System (GPRS), Enhanced Data GSM Environment (EDGE), and Universal Mobile Telecommunications Service (UMTS).

GSM (Global System for Mobile Communications) is a second-generation digital mobile telephone standard using a variation of Time Division Multiple Access (TDMA). It is the most widely used of the three digital wireless telephone technologies - CDMA (Code Division Multiple Access), GSM and TDMA. GSM digitizes and compresses voice data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900, 1800 or 1,900MHz frequency bands.

GSM was initially developed as a pan-European collaboration, intended to enable mobile roaming between member countries. As at March 2003, GSM digital wireless services were offered in some form in over 193 countries. In June 2002, about 69% of all digital mobile subscriptions in the world used GSM phones on GSM networks.

The GSM network can be divided into three broad parts

- The subscriber carries the mobile station
- The base station subsystem controls the radio link with the mobile station
- The network subsystem performs the switching of calls between the mobile users and other mobile and fixed network users

The mobile station consists of the mobile equipment, i.e. the handset, and a smart card called the Subscriber Identity Module (SIM). The SIM provides personal mobility, so that the user can have access to subscribed services irrespective of a specific terminal. By inserting the SIM card into another GSM terminal, the user is able to receive and make calls from that terminal, and receive other subscribed services.

The mobile equipment is uniquely identified by the International Mobile Equipment Identity

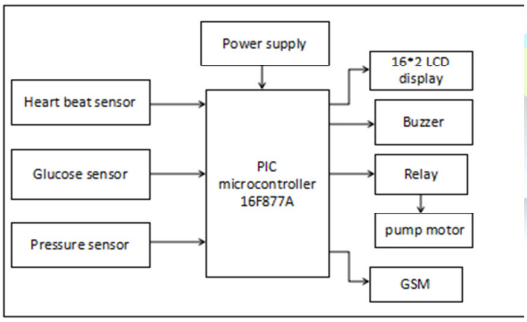
ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 7, March 2018

(IMEI). The SIM card contains the International Mobile Subscriber Identity (IMSI) used to identify the subscriber to the system, a secret key for authentication and other information. The IMEI and the IMSI are independent, thereby allowing personal mobility. The SIM card may be protected against unauthorised use by a password or personal identity number.

The base station subsystem is composed of two parts, the base transceiver station and the base station controller. These communicate across a standardised "Abis" interface, allowing operation between components made by different suppliers.

The base transceiver station houses the radio transceivers that define a cell and handles the radio-link protocols with the mobile station. In a large urban area, there will potentially be a large number of base transceiver stations deployed, thus the requirements for a base transceiver station are ruggedness, reliability, portability and minimum cost. The base station controller manages the radio resources for one or more base transceiver stations. It is the connection between the mobile station and the mobile services switching center.



The central component of the network subsystem is the mobile services switching center. This acts like a normal switching node of the PSTN (Public Switched Telephone Network) or ISDN (Integrated Services Digital Network) and connects the mobile signal to these fixed networks. It additionally provides all the functionality needed to handle a mobile subscriber, such as registration, authentication, location updating, handovers and call routing to a roaming subscriber.

Since radio spectrum is a limited resource shared by all users, a method must be devised to divide up the bandwidth among as many users as possible. The method chosen by GSM is a combination of Time and Frequency Division Multiple Access (TDMA/FDMA). The FDMA part involves the division by frequency of the (maximum) 25MHz bandwidth into 124 carrier frequencies spaced 200kHz apart. One or more carrier frequencies are assigned to each base station.

Each of these carrier frequencies is then divided in time, using a TDMA scheme. The fundamental unit of time in this TDMA scheme is called a burst period and it lasts 15/26 milliseconds (ms) (or approximately 0.577ms). Eight burst periods are grouped into a TDMA frame (120/26ms, or approximately 4.615ms), which forms the basic unit for the definition of logical channels. One physical channel is one burst period per TDMA frame.

Channels are defined by the number and position of their corresponding burst periods. All these definitions are cyclical, and the entire pattern repeats approximately every three hours. Channels can be divided into dedicated channels, which are allocated to a mobile station, and common channels, which are used by mobile stations in idle mode.

GSM is a digital system, so speech, which is inherently analog, has to be digitised. The GSM group studied several speech coding algorithms on the basis of subjective speech quality and complexity (which is related to cost, processing delay and power consumption once implemented) before arriving at the choice of a Regular Pulse Excited - Linear Predictive Coder (RPE-LPC) with a long term predictor loop. Basically, information from previous samples, which does not change very quickly, is used to predict the current sample.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 7, March 2018

The coefficients of the linear combination of the previous samples, plus an encoded form of the residual, the difference between the predicted and actual sample, represent the signal. Speech is divided into 20 (ms) samples, each of which is encoded as 260 bits, giving a total bit rate of 13kbps (kilobits per second). This is the so-called full-rate speech coding. Recently, an enhanced full-rate (EFR) speech coding algorithm has been implemented by some North American GSM1900 operators. This is said to provide improved speech quality using the existing 13kbps bit rate.

GSM, together with other technologies, is part of an evolution of wireless mobile tele communication that includes High-Speed Circuit-Switched Data (HSCSD), General Packet Radio System (GPRS), Enhanced Data GSM Environment (EDGE), and Universal Mobile Telecommunications Service (UMTS).

Implementation

The main goal of this project to design a smart health monitoring, namely automatic smart health monitoring system. The main goal of this project is to monitor the pressure, heartbeat, sugar level of the patient's body and display the same to the doctor using GSM technology. In hospitals, the heart beat of a patient's body need to be monitored constantly, which is generally made by the staff members of the hospital.They notice the heart beat of the patient's body constantly and keeps a record of it.

This automatic smart health monitoring system in hospitals for patients works on the principle of heartbeat, glucose, pressure sensing is whole system consists of two units one is transmitting unit and second one is receiving unit. Both have separate power supply and LCD display. The transmitting unit is placed near the patient and its leads are connected to the patient's body.

Transmitting unit sense the patient's body through the heart beat sensor gives the digital output to microcontroller in the form of voltages. The microcontroller which is its intelligent control unit, it compares the current heart beat value to previous heart beat value, if it is same then it does not change the output value, similarly if it is change then change the output value. After that, microcontroller sends this change value to GSM transmitter through the decoder and displays this change value at LCD display.

Similarly, the receiving unit receives this change value through receiver and sends this value to microcontroller, then microcontroller displays this change value at receiving unit LCD display. Because the receiving unit is placed near to the doctor or any other related person then he can easily know the heart beat of any patient body without going towards him. Then the patient could be easily treat according to his heart beat.

Smart Health Surveillance system is to measure and display the Electrocardiogram (ECG) and heart beat of patient's body continuously and also to communicate to the doctor. The system measures ECG using infrared sensor and the heart beat at oral and wrist of the patient using heart beat sensors. Microcontroller, receives the data from the sensors, displays the same and communicates to the web server automatically.

In the existing system, patient's vital parameters are obtained and the obtained values are entered into database and then uploaded into a web-based server manually. The existing system has no alert signal, during abnormal condition to the surrounding and to the doctor. The proposed system consists of a visualization module of the server program, which displays the recorded signals on devices used by doctors at the receiver end. It also gives a buzzer or an alarm in case of abnormal condition of the patient.

And relay is switch to on the pump motor the medicine is inject to the patient. when heart beat value is low or exceed the reference value.

In this concern, this paper is to design a microcontroller based automatic health monitoring system. Another advantage of this proposed

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 7, March 2018

system is, in a hospital either the nurse or the doctor has to move physically from one person to another for health check, which may not be possible to monitor their conditions continuously. Thus, for any critical situation, the nurses or doctors to be present near the patient to check the person's health at that moment.

This may be a strain for the doctors who have to take care of a numerous patients in the hospital. In order to keep in track of critical health conditions, this automatic health surveillance is used. To send the tracked signals and data of patient ECG, glucose, pressure to doctor and in case of emergency an alarming signal GSM is used.

Conclusion

The design and implementation of a smart health monitoring system is presented in this paper. The system acquires the patient's vital parameters such as heart rate value, glucose and pressure of the body at important positions. The system displays the patient's real-time data and these values are entered into the database automatically and communicated to the doctor's using GSM module, which is not available in the existing systems.

It continuously monitoring and informs the health condition of a patient to a doctor and care taker. The system provides instant remedy by injecting medicine. when abnormal condition is occurs the medicine is inject to the patient body. The major advantage of the system can perform few sensors.it is used to measure heart beat glucose pressure level from the patient body and also used GSM technology. It is used to communicate large coverage area compare the existing system.

References

[1] T. Guelzim, M. S. Obaidat, and B. Sadoun, ``Introduction and overviewof key enabling technologies for smart cities and homes," in *Smart Cities Homes*. Cambridge, MA, USA: Morgan Kaufmann, 2016, pp. 1_16.

[2] T. K. L. Hui, R. S. Sherratt, and D. D. Sánchez, ``Major requirements for building smart homes in smart cities based on Internet of Things technologies," *Future Generat. Comput. Syst.*, to be published, doi: http://dx.doi.org/10.1016/j.future.2016.10.026.

[3] M. S. Hossain, ``Patient state recognition system for healthcare using speech and facial expressions," *J. Med. Syst.*, vol. 40, p. 272, Dec. 2016.

[4] M. S. Hossain and A. El Saddik, ``A biologically inspired multimedia content repurposing system in heterogeneous environments," *Multimedia Syst.*, vol. 14, no. 3, pp. 135_143, Aug. 2008.

[5] S. Kumar and S. K. Singh, ``Monitoring of pet animal in smart cities using animal biometrics," *Future Generat. Comput. Syst.*, to be published. [Online]. Available: http://dx.doi.org/10.1016/j.future.2016.12.006.

[6] M. S. Hossain, ``Patient status monitoring for smart home healthcare".