Design of Embedded System Based Patient Healthcare Monitoring and Tracking Systems

F.Anish[1], N.A.Ahelesh[2], A.Ans Ajith[3], C.U.Aldus Bibin[4], R.Shibu[5]

[1,2,3,4]U.G Student, Dept. of Electrical and Electronics Engineering,

Assistant Professor, Dept. of Electrical and Electronics Engineering,

Udaya School of Engineering, Vellamodi

ABSTRACT:

Now a Day taking care of patients is very tough task. Making Health care Monitoring system very easy way to monitor the patient. In this method we can easily find out the Blood Pressure, Body Temperature and pressure of the patient by there medical report. we know that now a day a peoples are mainly Affected by Heart Attack. using this monitoring system we can easily find out the Heart Beat. If any changes in the Heart Beat Of the patient the changes will be Immediately goes through the way of SMS to the doctor or the Relatives. This method is mainly based On GSM and GPS.

By using this method we can easily find out any changes in Heart Beat and Body Temperature at any time. It is an intelligent medical service .Particular Sensor is used for the particular work. Microcontroller is use to collect and gather all the information's to the patient's health condition. A small sms will send to the doctor's mobile with location. Using this method we can help the patients at anytime and anywhere.

Introduction:

Based on the analysis of worldwide data of the global burden of hypertension heart diseases [4], According to the worldly population almost 1 billion of peoples where affected by High Blood Pressure. The problems like High Blood Pressure and Heart Failure are increasing day by day[5].In this 25% of peoples die because of Heart Failures the information's are [6].90% of young peoples affected by High Blood Pressure and Heart Failures. Hypertension was ranked 13th in the leading global causes of death for all ages [7].The map shows the causes of this diseases based on worldwide.
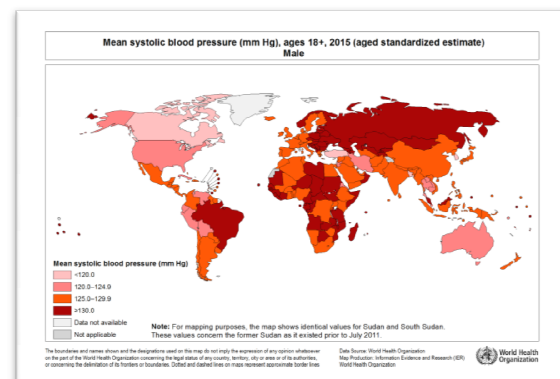

Fig: 1

Body tired, Hypertension and high Blood Pressure are the causes for the disease. The main reason for this disease is eating unhealthy foods. These are the research made by this century.

This shows that the young stage death is increased.

Sarwant Singh [1] has identified some key aspects that define a smart city Shown in
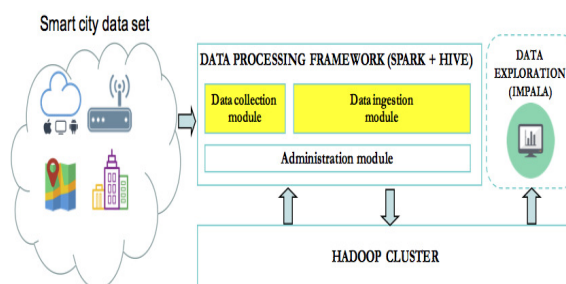
fig 2.Smart city concept: Smart governance: Smart Buildings: Smart Infrastructure: Smart Energy: Smart Technology: Smart Citizen: Smart Mobility and Smart Healthcare. In this paper propose a system architecture for smart healthcare based on GSM and GPS technologies.

Based on this method Patient and Doctor Communication is very well. Using this GSM and GPS we can make a very good medical process. Using GSM can get the worldly contact at ant where and at any time. By this GPS we can easily find out the location.
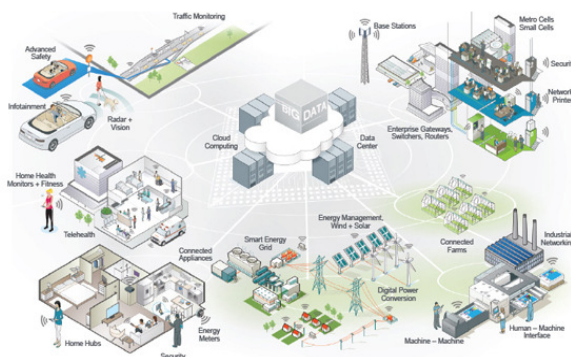

Fig: 2

In a Smart City method we should have different technological contacts. Good internet facilities and Broad cities. But they are not limited to local Departments, information systems, Schools, Libraries, Transportation Systems, Hospitals, Power Plants, Water Supply Networks, Waste management, Law enforcement and other Community Service. City life and multimedia facilities will be bitterly provided here. Smart city into the next level of development mainly it includes Storage, Multi-energy Networks, Smart Devices adn new business modules.[14]

Charles Dickens portrayed the 18thcentury as a tale of two cities; the 21stcentury, though, will be a tale of Smart Cities.

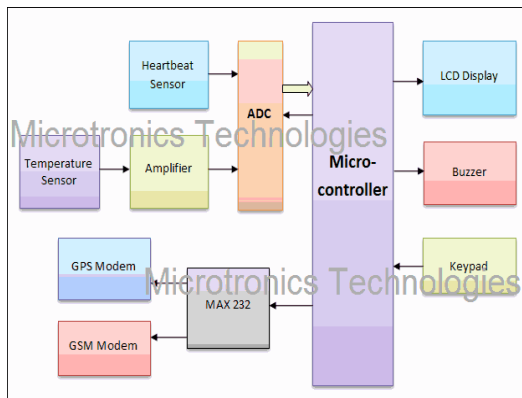Based on Frost & Sullivan's study on "Strategic Opportunity Analysis of the

Global Smart City Market" published in 2013.

RELATED WORK:

Monitoring Heart Beat, Blood Pressure, Body Temperature checked and it wii be displayed in mobile phones or computer with the use of wireless network.

St-Denis designed Life Line project. He introduced this method which was only displayed ine computer. Getting information from this an suitable graph was drawned from this method we can find out the changes of human body in the week end [2]. Eli-Hartion is a man who introduced about checking the Glucose Level of blood [9].
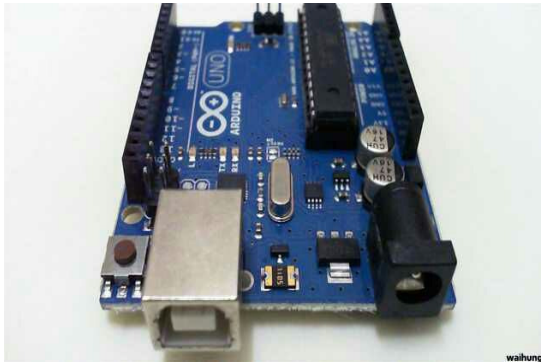
Block Diagram:

Implementation:

Microcontroller:

A microcontroller is a small computer on a single integrated circuit. In modern terminology, it is a System on a chip or SoC. A microcontroller contains one or more CPUs along with memory and programmable input/output peripherals. Program memory in the form of Ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips. Despite this however, many of the most popular microcontrollers in use today are in fact based on older microprocessor chips which are now deemed obsolete for use in personal computers - good examples being the Zilog Z80 and the MOS Technology 6502.

It is the core part of the SEB design; the microcontroller acts as the brain of the smart board that is holding the main board flow chart logic. However, there are many microcontrollers available in market and can perform well the main board logic such as PIC, Beagle-Bone, and Arduino. For the sake of demonstration proposes the choice falls on Arduino Uno according to its specifications and simplicity of use. Arduino Uno as depicted in Figure 5 this board is based on ATmega32 microcontroller, which has a set of 14 input/output digital pins, where 6 out of 14 can be used as a PWM output pins, also, the microcontroller board has 6 analog inputs, a ceramic resonant of 16 MHz, an USB interface, a DC power jack, a reset button, and ICSP header. The USB interface, simplifies the connection of the microcontroller with the computer, also the USB can be a power supplier for the microcontroller board [12].

Fig : Arduino Microcontroller.

GPS/GPRS/GSM MODULE V3.0:

This is a GPS/GPRS/GSM shield from DFRobot. This shield with a Quad-band GSM/GPRS engine works on frequencies EGSM 900MHz/DCS 1800MHz and GSM850 MHz/PCS 1900MHz. It also supports GPS technology for satellite navigation. It's possible for your robot and control system to send messages and use the GSM network. It is controlled via AT commands (GSM07.07, 07.05 and SIMCOM enhanced AT Commands). And the design of this shield allows you to drive the GSM & GPS function directly with the computer and the Arduino Board. It includes a high-gain SMD antenna for GPS & GSM. This GPS/GPRS/GSM shield uses an embedded SIM908 chip from SIMCom. Featuring an industry-standard interface and GPS function, the combination of both technologies allows goods, vehicles and people to be tracked seamlessly at any location and anytime with signal coverage [13].

Fig: GPS/GPRS/GSM MODULE V3.0

Heart Beat pulse Sensor:

Checking the heart beat is not a easy task, but it is very important and difficult work. When it will use a particular sensor to measure the Heart Beat. It accurately show the heart beat. It works in 3 to 5v. We can fix this sensor in the finger or chest of the patient.
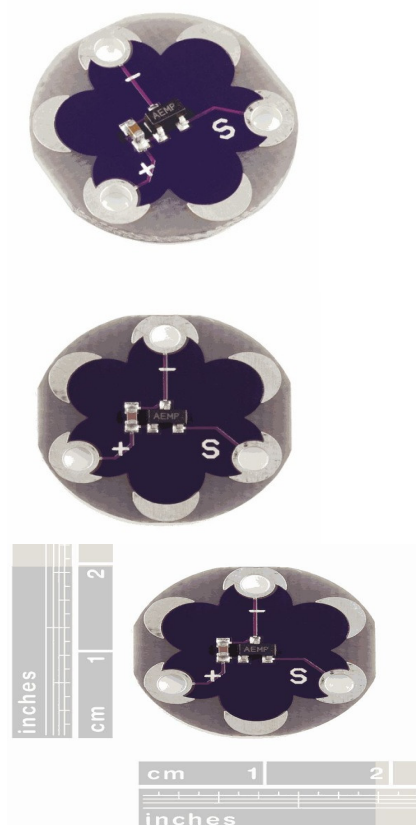
Heart Beat is very important one. This sensor will show the changes in the heart beat and it immediately shows the changes in Heart Beat. Using this sensor the heart beat will be easily found out.
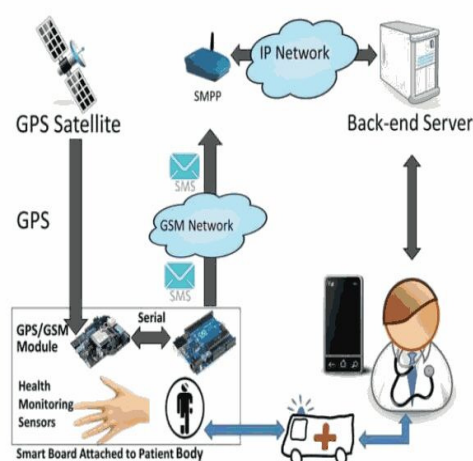
Human Body Temperature Sensor:

Detecting temperature changes has become easier using MCP9700 which is a small thermostat type temperature sensor. The output will be 0.5V at 0 degrees C, 0.75V at 25 C, and 10mV per degree C. This sensor is used to check the Body Temperature. This accurately shows the changes of the body temperature. The common Human Body Temperature is 97 F. If the body Temperature become high from this range the sensor will be alert the Microcontroller.
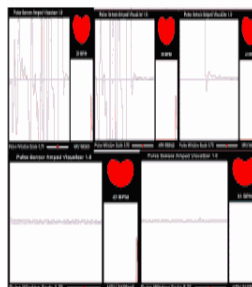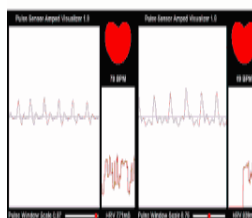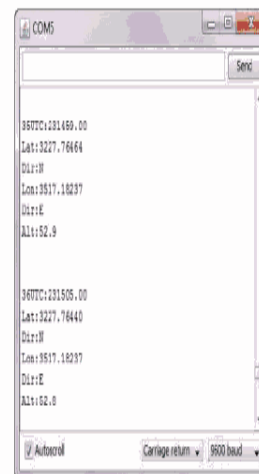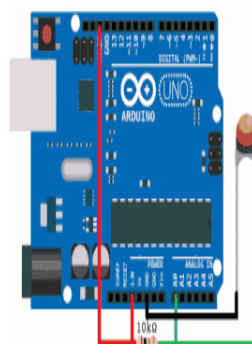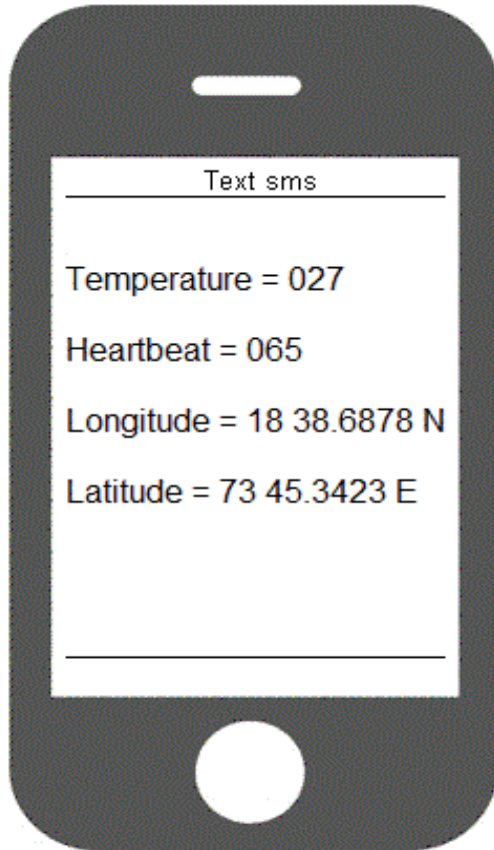

Fig: Temperature Sensor

Fig: Proposed System Module

Advantages:

1. **Multi-uses and services by making some modification on the software, many diseases and illnesses like Alzheimer, mental and motion patients could be benefited from this system.**
2. **Accurate in scanning, clear in monitoring, intelligent in decision making and reliable in communications are achievable.**
3. **It is very use full method because it save the human life when they are in critical condition.**
4. **Also it saves the times and gives accurate details of the place.**
5. **Now a day the Heart Diseases are increasing. so using this method we can save the patients.**

Result:

Fig: Mobile Sms

Fig: Location at Patient

This method until show the Temperature ,Pressure and the heart beat of a patient to the sudden variations and also it informs their relatives or their personal doctor at sms. A well functioning system proto type hardware components: Lilypad Temperature sensor.Pulse sensor , GPS/GPRS/GSM MODULE V3.0 and the arduino integrated together to perform a healthy system.

CONCLUSION:

Aim of Smart City concepts is to provide better life to society and provide innovative and creative solutions in each of the eight pillars of smart city. Healthcare field is one of most delicate and important fields to be developed and enhanced by Smart systems designed to present sustainable medical interventions at manner time where the smart system should be simple, low energy consumption and real time feedback. The system designed experimented and shown in the paper

grantee to improve the quality of health services and to reduce the total cost in healthcare by avoiding unnecessary hospitalisations and ensuring that those who need urgent care get it sooner. It is a system which can measure heartbeat rate and body temperature and communicate them in cases of extraordinary behaviours to supervision medical entities using GSM, GPS and web technologies to deliver immediate actions to rescue patients life with potentiality in the future to add other vital factors measurements according to available sensor in the market which can achieve the objective of providing are liable effective application for real time health monitoring and tracking.

In this project when the patient will be affected at any problem to the sms will be sent to the doctor mobile phone. The doctor locate the place at the use of GPRS at few minutes. To save the patient. In future, the system's potentiality can be improved by addition of other vital factors measurements according to available sensor in the market. It can also be achieved the objective of providing a reliable effective application for real time health monitoring and tracking.

It is a system which can measure heartbeat rate and body temperature and communicate them in cases of extraordinary behaviours to supervision medical entities using GSM and to deliver immediate actions to rescue patient's life.

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