Remote Healthcare Monitoring System for Drivers Community Based On IOT

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Abstract – This Paper describes the wearable sensor network design for a low power healthcare real time processing and other application of IOT. IOT has variety of application domain. The IOT revolution is redesigning modern healthcare with promising technological, economical and social prospect. Using wireless technology physiological parameter of the patient can be transmitted at remote locations. In country like India some road accident may happen due to driver's poor health condition. If smart healthcare system is available at affordable cost it can be useful for driver's community to take some preventive measure and thus road accident reduced in some extends. The primary function of the system is to measure patient physiological parameter such as BP and heart rate. This paper mainly describes the transferring physiological parameter information to the cloud. Due to this method the remote base data transmission can be achieve successfully. Power can be optimized.

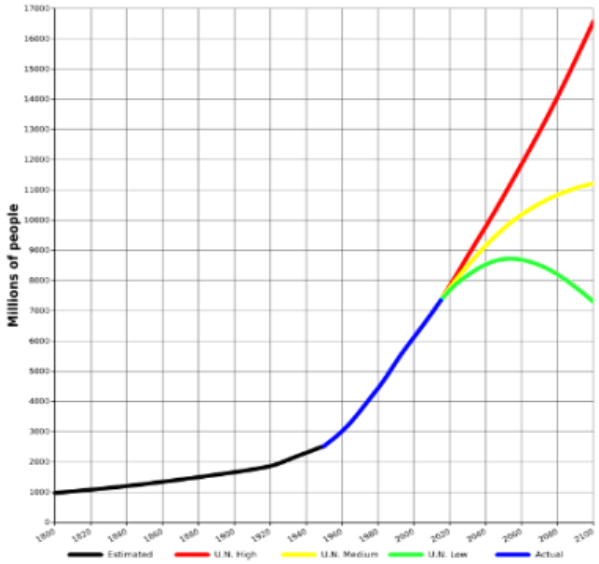
Index Terms – Physiological Sensor, Matab, WiFi connection, Smartphone, Internet of Things.

1. INTRODUCTION

The Internet of Things (IoT) is a concept reflecting a connected set of anyone, anything, anytime, anyplace, any service, and any network. The IoT provides appropriate solutions for a wide range of applications such as smart cities, traffic congestion, waste management, structural health, security, emergency services, logistics, retails, industrial control, and health care. Medical care and health care represent one of the most attractive application areas for the IoT[1].(IOT for healthcare).Patients and providers both stand to benefit from IOT carving out a bigger presence in healthcare. Some uses IOT are mobile medical applications or wearable devices that allow patients to capture their health data. Another area where smart technology could be an asset is coupled with home medication dispensers to automatically upload data to the cloud when medication isn't taken or any other indicators for which the care team should be alert.

Telehealth is emerging as a critical component of the healthcare crisis solution. Teleheath holds the promise to significantly impact some of the most challenging problems of our current healthcare system such as access to care, cost effective delivery, and distribution of limited providers. Telehealth can change the current paradigm of care and allow for improved access and improved health outcomes in cost effective ways.

In demography the word population in March 2016 estimated at 7.4 billion, a-time record high. The United Nations estimates it will further increase to 11.2 billion in the year 2100. The highest population growth rate- global population increases above 1.8% per year. So that word's healthcare cost is increasing and thus population is aging so there should be an alternative in the healthcare profession.



For this reason remote healthcare system must be required. Recently, interest in wireless systems for medical applications has been rapidly increasing. Portable device such as heart rate monitors, pulse oximeter, spirometer, and blood pressure monitors are essential instrument in intense care. Continuous and pervasive medical monitoring is now available with the present of wireless healthcare systems and telemedicine services. In emergency situations, real-time health parameter is crucial. With all of this potential, wireless system for medical application is now not only focused by healthcare provider and the government but also by researchers and industry.

Recently, interest in wireless systems for medical applications has been rapidly increasing. With a number of advantages over wired alternatives, including: ease of use, reduced risk of infection, reduced risk of failure, enhance mobility and low cost of care delivery, Wireless application bring for exciting possibilities for new application in medical market.

Portable device such as heart rate monitors, pulse oximeters, blood pressure monitors are essential instrument in intensive care. Traditionally, sensors for these instruments are attached to the patient by wires; and the patient sequentially become bed bound. In addition, whenever patient need to be moved, all monitoring device has to be disconnected and then reconnected later. Now a day's all these times consuming job could be terminated by wireless technology.[2]

There are different technologies used for the remote healthcare monitoring solutions. [4]Such as WiFi, WiMAX, IOT and other technologies. Out of these technologies Internet of Things are more promisingly used in recent days. The Internet of Things (IoT) is regarded as the next big thing in the global technological development after the Internet. The IoT is an intelligent network which connects all things to the Internet for information sensing, exchange and data computing. It expands the concepts of communication from human and human to human and things or things and things.[3] Internet connected devices have been introduced to patients in various forms. Weather data comes from fetal monitors, electrocardiograms, temperature monitors or blood glucose levels, tracking health information is vital for some patients.

This paper there is briefly discussing the base wireless technologies which current applications using IOT.

With the help of internet of things the real time data can able to communicate to the end users. It mainly consists of hardware and software is required for hardware support and program run.

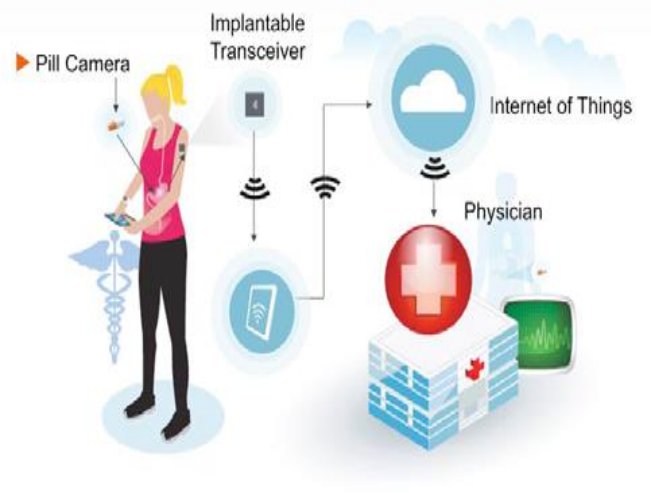


Fig 1: Remote patient monitoring

Remote healthcare monitoring system is operating in various sectors like patients, old age people, sport persons and driver's community. By taking the example of Driver's community, which continuously measure driver's Physical health condition and performing various experiments on the platform of remote healthcare monitoring systems. [5]. In developing country like India, some road accidents may happen due to the poor health condition of driver like heart stroke while driving, over stress due to continuous work, drowsiness etc.

If the remote healthcare system is available at affordable cost, it can be useful for driver's community to take some preventive measures and thus road accidents may be reduced and also driver's health status can be measured any time.

The system can measure the various parameters such as blood pressure, temperature, pulse rate, etc. and observe the criticality of drivers' health. Thus quality of healthcare profession can be increased one step ahead.

2. PROPOSED SYSTEM

The proposed system is continuously monitoring driver's health condition. It will check physiological parameter such as blood pressure, heart rate etc,[6] With the help of different physiological sensors. The sensors information is get transferred to the http server or cloud. With the help of internet of things whole data get transmitted to the end destination.

While dong the operation our main objective is to get power optimized system. The system which gets after designing should take less power as compare to other system. The block diagram of proposed system is given below.

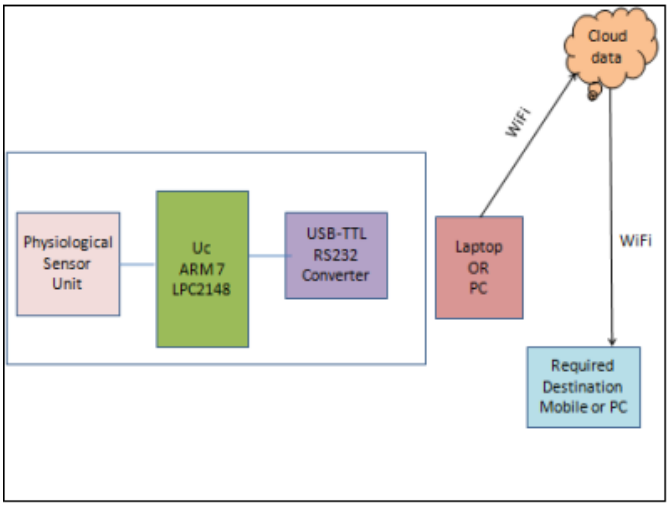


Fig 2. Block Diagram of Proposed System

The system consist of physiological sensor unit consist of blood pressure sensor and heart rate monitor which together calculate driver's health condition. This information is transferred to the microcontroller unit. ARM7 LPC2148 is used as a

microcontroller IC which converts analog sensor data into digital one. Serial USB connector is used to transmit data serially to the PC or Laptop. MATLAB15 software is needed for next operation. For the cloud based data transmission there is need to connect URL in main program which is performed in MATLAB. To perform further operation cloud based data transmission thingspeak software is needed.

Specific key is to be given in main program which is username and password in thingspeak URL. At last the driver's physiological data is available on cloud. Anytime anywhere this data can be accessed and output can get successfully.

3. STPES TO DESIGNING

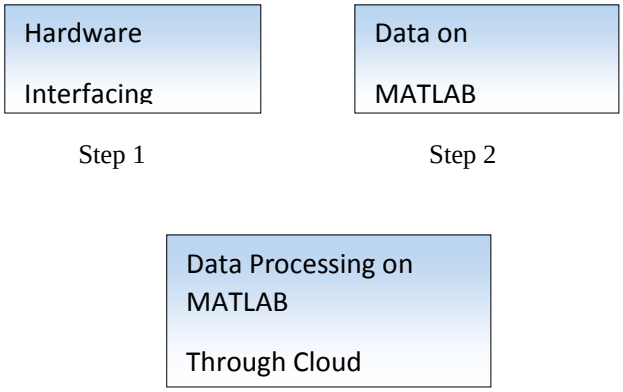


Fig3. Steps to design Process

In hardware interfacing main aim is to interface sensors, RS232 converter to the ARM& processor. It basically has two port i.e. port0 and port1 each port consist of 32 ins. The processor is programming through embedded C software (Keil Compiler) which is micro version 4.03. For starting section the board should be properly configure. It allows configuring other external device, sensor, etc. Boot loader allows you to upload new code in it without use of external hardware program.

After the process of hardware interfacing the next step is performed on laptop or PC. Install MATLAB15 software in it. Load the main program then run the program, in command window we get ready means kit is ready for next operation.

At this stage WiFi must be required. Switch on the BP sensor then instantly on the ARM7 kit. BP sensor takes reading by inflatable air bladder cuff.LED display show the B reading on ARM7 kit. With the help of WiFi main rogram is directly connected to cloud. By using "Thingspeak" driver's physiological value is available on cloud.

4. PROPOSED METHODOLOGY

The circuit in the system will continuously monitor driver's health condition with different physiological sensor. The details of the component are listed below.

1. ARM7TDMIS Processor:-

The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles. Pipeline techniques are employed so that all parts of the processing and memory systems operate continuously. THUMB, which makes it ideally suited to high-volume applications with memory restrictions or applications where code density is an issue. The key idea behind THUMB is that of a super-reduced instruction set.

ARM7TDMI-S processor has two instruction sets:

- The standard 32-bit ARM instruction set.
- A 16-bit THUMB instruction set.

It has 8 to 40 KB of on-chip static RAM and 32 to 512 KB of on-chip flash program memory. ARM7 processor consists of 128 bit wide interface/accelerator enables high speed 60 MHz operation. In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software

2. Blood Pressure Sensor MP3V5050

BP monitor or sphygmomanometer uses an inflatable air bladder cuff or a pressure sensor to measure blood pressure in an artery. High blood pressure (hypertension) can lead to serious problems like heart attack, stroke or kidney diseases etc. it does not show any symptoms so we need to check it regularly.

- Wrist BP Monitor:_

The wrist model is smaller & the entire unit wraps around the wrist. High pass filter the cuff pressure to obtain the oscillations in the cuff pressure in a function of time. Power by external is +5V DC. Its working voltage: +5V, 200mA regulated.

Basically there are two types of blood pressure.

- The first is the systolic pressure. It is the pressure against walls of the arteries is highest.
- The second is diastolic blood pressure. It means resting between beats and not pushing out any blood which is lowest.
- Normally Systolic less than 120 mmHg and diastolic less than 80 mmHg .

3. Heart Rate :-

Heart rate is the speed of the heartbeat measured by the number of contractions of the heart per minute. (bpm) Normal heart rate varies from person to person. A heart rate monitor is a personal monitoring device that allows one to measure one's heart rate in real time or record the heart rate for later study.

- the normal resting adult human heart rate ranges from 60-100 bpm. Tachycardia is a fast heart rate, defined as a above 100 bpm at rest.
- Bradycardia is a slow heart rate, defined a below 60 bpm at rest.

4. Internet Of Things (IOT)-

IOT is the internet of things which provide a gateway for sensor network and internet. [7]It performing basic function of translating between protocols used in internet and sensor network. These gateways have beneficial knowledge and constructive control over both the sensor network and the data to be transmitted through the Internet.

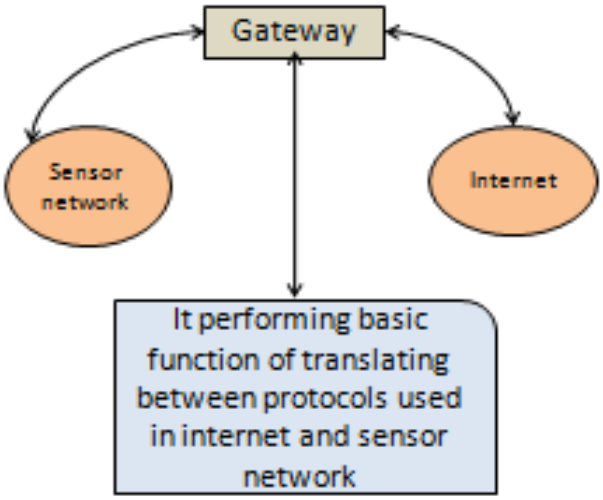


Figure3. Structure of Internet of Things

Gateway offer some high level services such as local storage, real-time local data processing, embedded data mining,

5. Thingspeak Software:-

Thingspeak is an open source Internet of Things(IOT) and retrieve data from things using the HTTP protocol over the Internet via Local area network. It enables the creation of sensor logging applications, location tracking application, and a social network of things with status update.Thingspeak is originally launched by ioBridge in 2010 as a service in support of IOT application. It has integrated support from the numerical computing software MATLAB from Math Work. It allowing thingspeak user to analyze and visualize uploaded data using Matlab without requiring the purchase of MATLAB license

This is the output of BP sensor and Heart Rate in the Thingspeak software.

Systolic and diastolic output.

Heart Rate

5. CONCLUSION

In this paper, a smart wireless healthcare monitoring system is continuously monitoring the driver's health condition The proposed healthcare monitoring system consists of physiological sensors and microprocessor unit (ARM7). ARM7 processor will automatically optimized the power because it operate at power down mode It monitors the health

status of driver's health and communicates the criticality of the driver's health to the to the destination. It uses the 3v to 3.6v power supply which is less than any other processor. As Arduino processor uses up to 5V power supply. Compare to ATMEGA it has higher flesh memory. In this system real time reading is obtained. The system is stand alone itself. Internet of Things uses to transmit data over cloud.

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