

# Real Time Health Monitoring Using GPRS Technology

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## Abstract

Advances in sensor technology, personal mobile devices, and wireless broadband communications are enabling the development of an integrated personal mobile health monitoring system that can provide patients with a useful tool to assess their own health and manage their personal health information anytime and anywhere. Personal mobile devices, such as PDAs and mobile phones, are becoming more powerful integrated information management tools and play a major role in many people's lives. Here I focus on designing a Mobile health-monitoring system for people who stay alone at home or suffering from Heart Disease. This system presents a complete unified and mobile platform based connectivity solution for unobtrusive health monitoring. Developing a hardware which will sense heart rate and temperature of a patient, using Bluetooth modem all information lively transmitted to smart phone, from smart phone all information transmitted to server using GPRS. At server the received data compared with the standard threshold minimum and maximum value. The normal range of heart rate is 60 to 135 and the temperature of the patient is said to be normal above 95°F and below 104°F. If at all the rate increases above 145 or decreases below 55, it may be fatal and if it crossed this threshold limit then SMS will be sent to the relative of patient and Doctors along with measured values.

The build-in GPS further provides the position information of the monitored person. The remote server not only collects *physiological measurements but also tracks the position of the monitored person in real time.*

For transmitting data from Smartphone to the server using GPRS, here we need to create a website on data will be continuously transmitted from Smartphone to the website and from website data will be downloaded continuously on the server.

Thus the system helps in tracking down the patient without getting the patient into any sort of communication. Undue mishaps can be avoided within the golden hours after a patient is struck with a heart attack.

**Keywords:** *Telemedicine*

## 1. Introduction

### 1.1 Telemedicine

The concept of the project taken from Telemedicine. It is a rapidly developing application of clinical medicine where medical information is transferred through interactive audiovisual media for the purpose of consulting, and sometimes remote medical procedures or examinations.

Telemedicine may be as simple as two health professionals discussing a case over the telephone, or as complex as using satellite technology and videoconferencing equipment to conduct a real-time consultation between medical specialists in two different countries. Telemedicine generally refers to the use of communications and information technologies for the delivery of clinical care.

Care at a distance (also called *in absentia* care), is an old practice which was often conducted via post. There has been a long and successful history of *in absentia* health care which, thanks to modern communication technology, has evolved into what we know as modern telemedicine.

In its early manifestations, African villagers used smoke signals to warn people to stay away from the village in case of serious disease. In the early 1900s, people living in remote areas in Australia used two-way radios, powered by a dynamo driven by a set of bicycle pedals, to communicate with the Royal Flying Doctor Service of Australia.

The terms e-health and telehealth are at times wrongly interchanged with telemedicine. Like the terms "medicine" and "health care", telemedicine often refers only to the provision of clinical services while the term telehealth can refer to clinical and non-clinical services such as medical education, administration, and research. The term e-health is often, particularly in the UK and Europe, used as an umbrella term that includes telehealth, electronic medical records, and other

components of health IT. Telemedicine can be broken into three main categories: **store-and-forward**, **mobile monitoring** and **interactive** services. Our project deals with remote Monitoring using mobile phone.

## 1.2 Remote Monitoring System

### What is Remote Monitoring?

Remote monitoring, also known as self-monitoring/testing, enables medical professionals to monitor a patient remotely using various technological devices. This method is primarily used for managing chronic diseases or specific conditions, such as heart disease, diabetes mellitus, or asthma. These services can provide comparable health outcomes to traditional in-person patient encounters, supply greater satisfaction to patients, and may be cost-effective.

In remote monitoring, sensors are used to capture and transmit biometric data. For example, a heartbeat and temperature transmits that data to a specialist. This could be done in either real time or the data could be stored and then forwarded.

Examples of remote monitoring include:

- Home-based nocturnal dialysis
- Cardiac and multi-parameter monitoring of remote ICUs
- Home telehealth
- Disease management

So a Remote Patient Monitoring System helps to continuously monitor important parameters of a patient like heart beat, temperature etc, with the help of sensors which track these parameters and sends a signal to the concern person in case of some abnormality in these parameters.

## 2. THE EXISTING SYSTEM

Currently the system used for patient monitoring is the fixed monitoring system which can be used only when the patient is on bed. The available systems are huge in size and only available in the hospitals in ICU.



Fig .1 existing system

There are many emergency response services striving hard to save the lives of people during emergencies. Firms like “TOPSLINE” have initiated with services providing security to the victims falling prey to untimely situations. Though they are successful at times, But sometimes they fail to race against time to reach the victim.

Also all the current system provide monitoring of the patient when they are on bed , but there is no system as such that can provide monitoring of the patient when he is mobile or not hospitalized. Also there is no automatic system that can regularly provide important data about the patient when he or she is mobile.

## 3. THE PROPOSED SYSTEM

System would constantly monitor important body parameters like temperature , heartbeat and would compare it against a predetermined value set and if these values cross a particular limit it would automatically alert the doctor and relatives of the patient via a SMS. In such case the patient will get a very quick medical help and also would save time and energy of the relatives who neither would have to be with them all the time. Also by using GPS technology the exact location of the patient

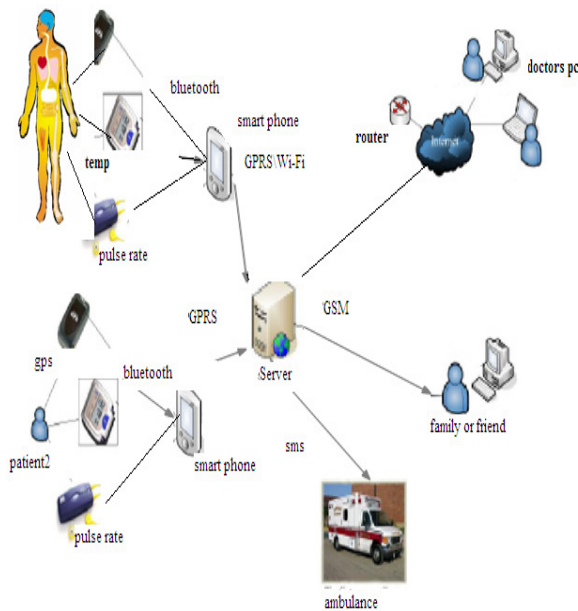


Fig 2 Proposed system

can be determined. Here sensors, and the smart phone collects/displays the Physiological data and also transmits data to the remote Server through wireless technology like GSM, Wi-Fi, GPRS etc .here this can keep record of all the mobiles which are connected to the system.

#### 4. FEATURES

Our project is a model which incorporates sensors to measure parameters like body temperature, heart beat rate, and transfer it to the patients mobile phone which has a software that contains predefined limits of both the parameters and continuous monitoring of those parameters is carried out. The link between the patient who has to carry a circuit with him and his mobile phone is done via a Bluetooth Module. Once there is any sort of deviation in the parameters, then the patients mobile will immediately send a SMS to a predefined Number(Doctor) containing the value of the parameter which has deviated along with the patients GPS co-ordinates.

The GPS Co-ordinates will be send only if the patients phone is a GPS enabled Phone. The Doctor then using the co-ordinates can track the patient's exact location using software on his PC.

Another feature is that the doctor can also access the patient's mobile phone camera to click photos with it using his PC. So that can give him some

idea of the patients surrounding as well as his condition.

#### 5. WHY THESE PARAMETERS?

As the statistics revealed earlier that Heart Attack causes the most number of Deaths in the world, it was decided that have Heart Beat Monitoring as one of the Parameters.

Below it is explained as to How Heart Beat is monitored:-

- The heart beat rate of the patient is constantly monitored.
- The normal range of heart rate is 60 to 135.
- If at all the rate increases above 145 or decreases below 55, it may be fatal.
- The sensor records the data and constantly sends the parameter to patients mobile via Bluetooth.
- If the parameter(s) deviate from the standard range, it will indicate the doctor via a message consisting parameters of the patient.

Also High/Low Body Temperature can cause such illness that can prove Fatal. It plays a very important part in maintaining Blood Pressure etc.

- Below it is explained as to How Body Temperature is monitored:-
- The temperature of the patient is said to be normal above 95°F and below 104°F.
- If the temperature falls below 95°F, that means the blood circulation has fallen below reqd. level and hence it may prove fatal.
- As soon as the temperature falls below 95°F the doctor is notified via SMS.

#### 6. TEMPERATURE

Body temperature is lower in the morning than it is in late afternoon and evening. Temperature can vary with other factors, such as exercise, drinking hot or cold fluids, sitting in a cold room, fighting an infection, and by the accuracy and type of thermometer used.

The normal core body temperature of a healthy, resting adult human being is stated to be at 98.6 degrees Fahrenheit or 37.0 degrees Celsius.

#### SENSORS

The sensors for Heart Beat and Body Temperature will be mounted on a board along with the other required things like AVR ATmega 32 IC, Bluetooth

module,crystal oscillator etc which the patient will have to carry.

**1)BLUETOOTH LINK**

The link will be established between the patient's Bluetooth Enabled Mobile Phone and the Sensors

circuit via a Bluetooth Module which will be mounted on the Sensor Ckt. This helps in continuous monitoring



### 7. SYSTEM DIAGRAM

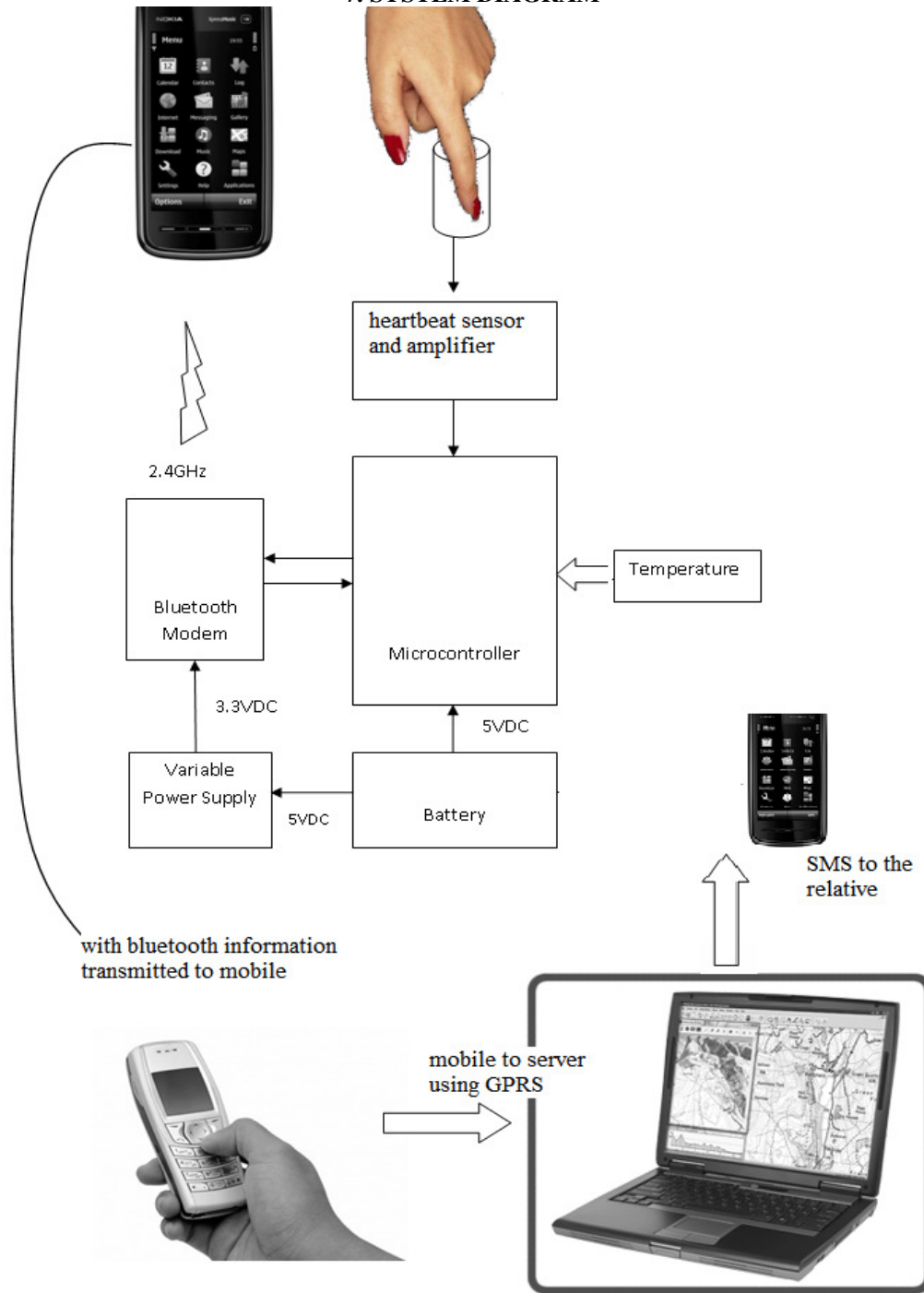


Fig .3 SYSTEM DIAGRAM

### III) WEBSITE FOR UPLOADING DATA FROM MOBILE

Here we are creating new website for uploading data from mobile continuously using GPRS, on website we need do programming which will receive and store data. On request from server data will transmitted to the server on specific interval. New website will acts like third party in GPRS Communication.

### IV) HOSPITAL SERVER

Data from website loaded in hospital server continuously, also and live gps location shown on Google map. The software will be programmed in such a way that in case of variations of the parameters from upper or lower limit, it will immediately send the Reading via SMS to the Doctor Mobile. The Doctor's obile will also receive the GPS co-ordinates of the patient. GSM module is present on the

### 8. Results

server

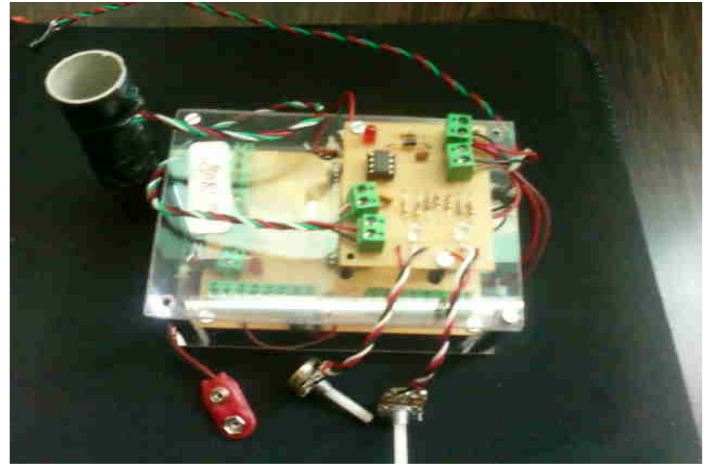


Fig 4. Complete circuit to read heartbeat and temperature.

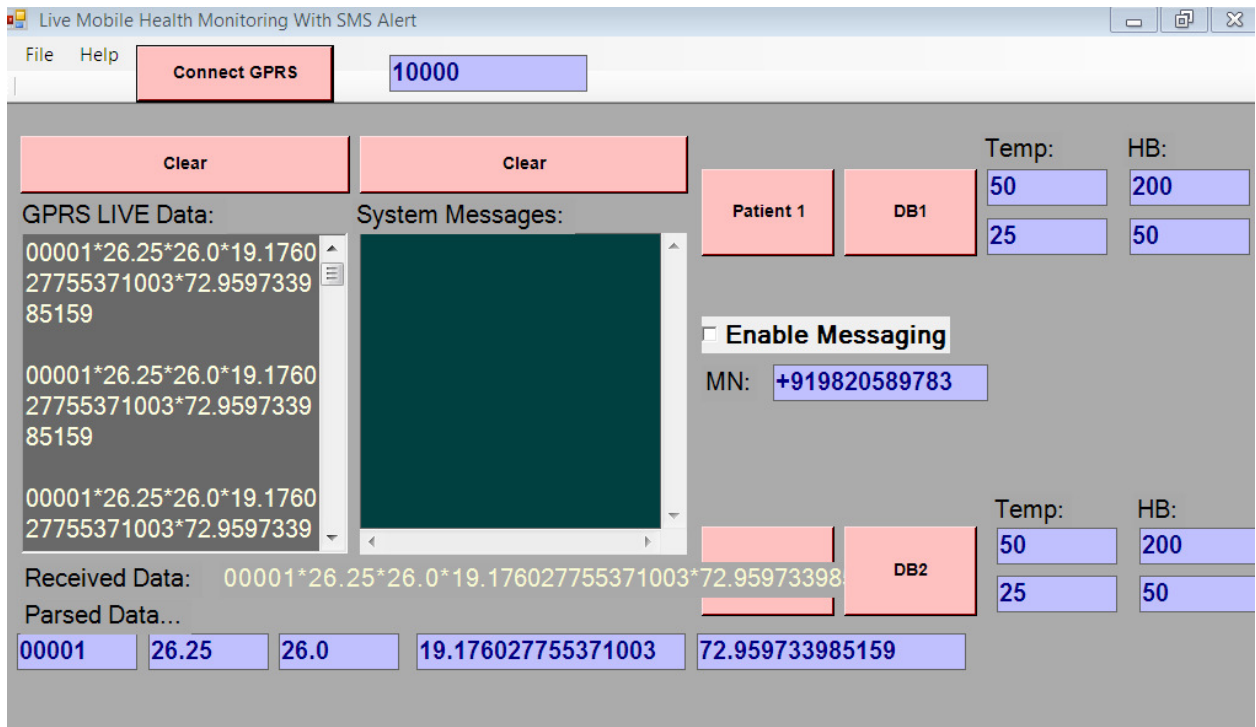


Fig .5 live data transmission of patient on server using GPRS this information will be collected.



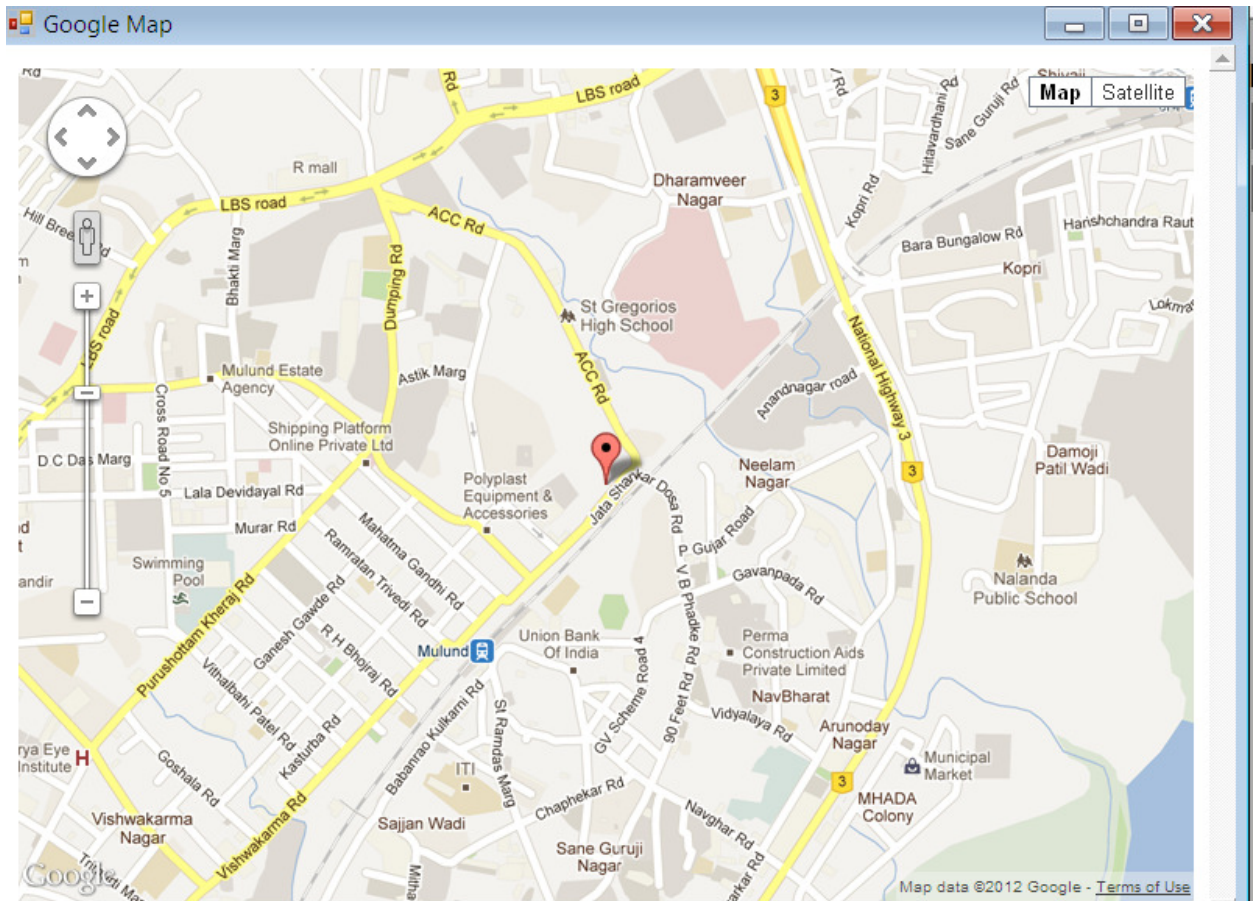


Fig .6 GPS Position locator.

The results shown in this chapter proves that developed system is used to Monitor the health of the patients lively as GPRS technology used to transmit data from smartphone to the server, patients can be any where in the world data will be transmitted to the server ,incase of the emergency if it crosses higher or lower threshold limit sms will be activated from server end to preassigned number and location of the patient is shown on the google map on server end.

## 9.CONCLUSION

- The most important part of the project is that it monitors a moving patient rather than a stationary or a bedridden patient.

- This system ensures that the patient receives medical attention in the nick of time before it is too late.
- Continuous monitoring of health and cost effective disease management is the only way to ensure economic viability of the healthcare system. This paper presents an integrated health monitoring mobile platform for connected.

## 10.ADVANTAGES

- The staying of specialist is eliminated.
- It is a multipurpose so that overall conditions are easily measured.
- Easy to operate.
- Compare with compact sensor it gives better performance.
- Modern technologies have developed that promotes comfortable and better life which is disease free.

- PREVENTION IS BETTER THAN CURE

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