TELEMEDICINE BASED HEALTH MONITORING APPROACH USING GPS MODULE

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Abstract: It is essential for medical professionals to keep track and organize their patient's medical records. Keeping this information is not an easy job especially with a voluminous number of records and other documents that have to be filed, usually in rows of labeled folders in file cabinets. This project proposes project the utilization of a telemedicine framework that addresses this dilemma. The project makes use of web services and a mobile application as the client in accessing and entering patient information. With mobile phones, medical practitioners can take advantage of its technological capacity and geographically extend their practice to be of service to more patients by bringing this to remote areas such as barrios in the provinces despite the absence of broadband internet connection, essential for web services a pivotal element of the project infrastructure.

Advanced technologies of the 20th century, such as the internet and mobile communication, have made human lives easier. The combination of these two technologies yields wireless multimedia networks, the extension of which are mobile telemedicine systems. We would like to emphasize on the point that the R&D process of these mobile telemedicine systems is similar to that of pharmaceuticals.

IndexTerms **- Tele-SMS, DB9, ARM, RISC, CISC, GSM, GPS.**

I. INTRODUCTION

Mobile telemedicine is one of the advanced technologies of the 21st century. It can be used to provide auxiliary medical services and has accordingly been used in emergency situations, mobile hospitals, personal healthcare, and in rapidly alerting doctors to a patients' disease, rehabilitation, etc. By exploiting the advantages of wireless multimedia communication, such as current high utility, convenience, high data transmission rates, high Mobile telemedicine is one of the advanced technologies of the 21st century. It can be used to provide auxiliary medical services and has accordingly been used in emergency situations, mobile hospitals, personal healthcare, and in rapidly alerting doctors to a patients' disease, rehabilitation, etc.

By exploiting the advantages of wireless multimedia communication, such as current various utilities, convenience, high data transmission rates, and high availability of network reach. Accident victim can be aided to reach to the emergency clinic as fast as possible. This enables the physician in the clinic to assess the patient's physiological condition in advance and arrange for emergency medical resources well in time, which could decrease the actual time required for treating the patient

II PROBLEM STATEMENT

Monitor the health status of patient by using sensors and providing data to Doctor in case of emergency situation.

III SYSTEM ARCHITECTURE

3.1 Block Diagram

In this project the client and Hospital have to register to use this service, and the information will be stored in Database. After register the client have to implement hardware in their car like vibration sensor which is monitored by microcontroller and if any anomaly is found location of the car is acquired using GPS and potential accident information is sent to nearest hospital based on current location of the car.

3.2 Principle of Operation

When the car meet with an accident the sensor will first detect the impact and if the impact is more than the threshold then it will send some information to the Microcontroller which in turn communicates with GPS to acquire the location, then system will send client Id and location to server using GSM modem. The server will then find the location of the nearby registered Hospital depending upon the information sent by the GSM and then send the information to the hospital about the accident along with the phone no. of the client and its location as shown in fig1. Hospital will send the ambulance to the spot. The ambulance can be equipped with certain medical instruments and the GPRS enabled mobile with high quality of camera. The continuous streaming of video will be sent to the Hospital PC through mobile and according to that the doctor will guide the physician and also they

will arrange the necessary step to be taken in the Hospital as shown in fig2.2. In this project we will also keep the information of patient in the database like blood group, allergies, etc.

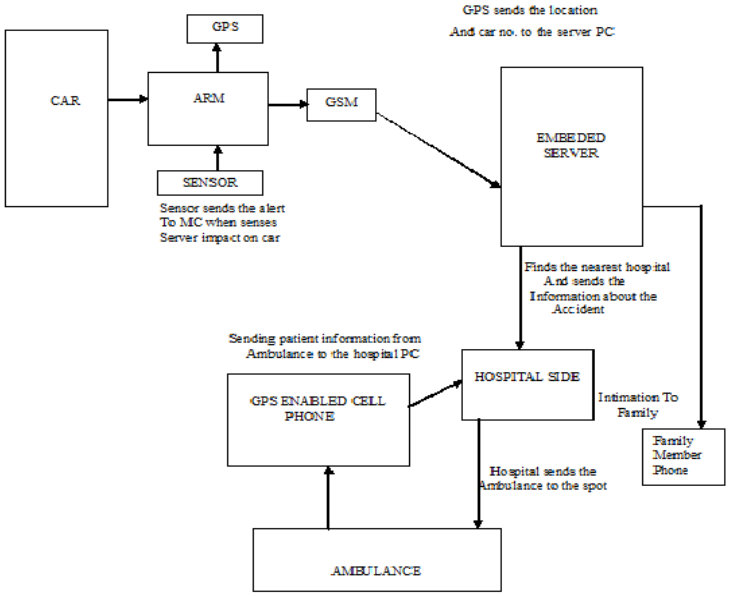

Fig1: Block Diagram of Mobile Telemedicine

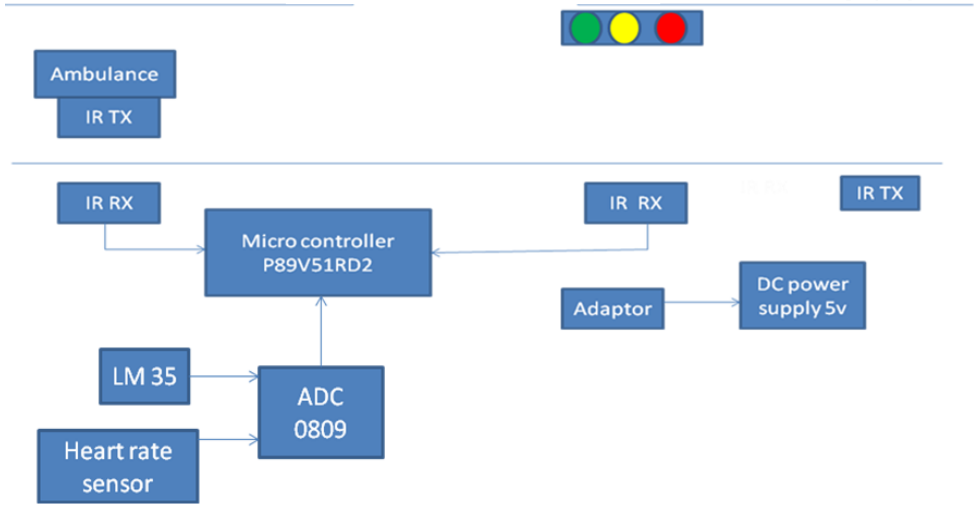

Fig2: Traffic Signal Section.

3.3 Architecture Overview:

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, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core.

Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory.

The ARM7TDMI-S processor also employs a unique architectural strategy known as 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.

The ARM7TDMI-S processor has two instruction sets:

a) The standard 32-bit ARM set.

b) A 16-bit Thumb set.

The Thumb set's 16-bit instruction length allows it to approach twice the density of standard ARM code while retaining most of the ARM's performance advantage over a traditional 16-bit processor using 16-bit registers. This is possible because Thumb code operates on the same 32-bit register set as ARM code. Thumb code is able to provide up to 65 % of the code size of ARM, and 160 % of the performance of an equivalent ARM processor connected to a 16-bit memory system. The particular flash implementation in the LPC2141/42/44/46/48 allows for full speed execution also in ARM mode. It is recommended to program performance critical and short code sections (such as interrupt service routines and DSP algorithms) in ARM mode. The impact on the overall code size will be minimal but the speed can be increased by 30% over Thumb mode.

3.4 Interfacing the GSM Module with ARM

A SIM card is inserted to the GSM module. After checking as shown in the steps above, RS232 cable is directly connected between DB9 of the module and the DB9 on the controller port. This establishes the serial communication between them as shown in fig3 The GSM commands embedded in the controller takes care to communicate with the GSM Module via RS232 cable-MAX232-Serial I/O pins of the Controller as shown.

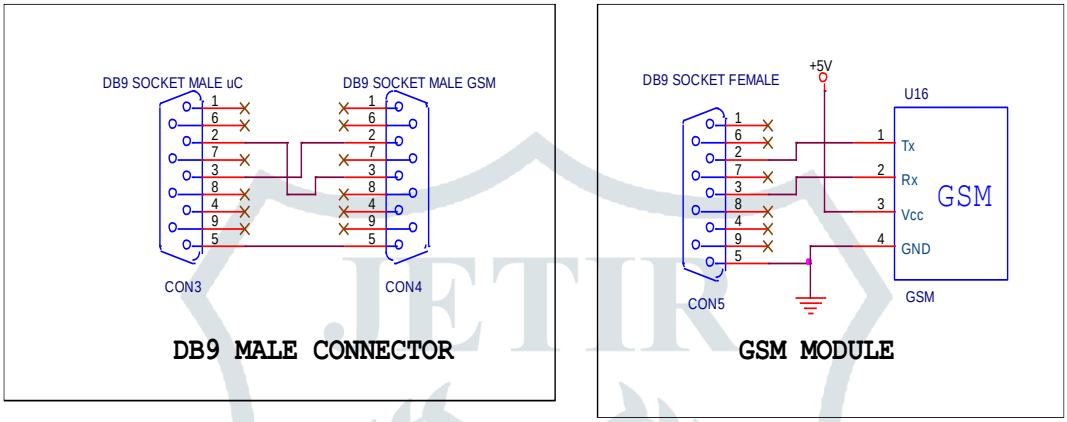

Fig3: DB9 and GSM module connection

3.5 GSM Flow Chart

3.5.1 Sending SMS Messages from a microcontroller using a GSM Modem

A GSM modem is a wireless modem that works with GSM wireless networks. A wireless modem is similar to a dial-up modem. The main difference is that a wireless modem transmits data through a wireless network whereas a dial-up modem transmits data through a copper telephone line. Most mobile phones can be used as a wireless modem. To send SMS messages, first place a valid SIM card into a GSM modem, which is then connected to microcontroller by RS232 cable. After connecting a GSM modem to a microcontroller, you can control the GSM modem by sending instructions to it. The instructions used for controlling the GSM modem are called AT commands. GSM modems support a common set of standard AT commands. In addition to this common set of standard AT commands, GSM modems support an extended set of AT commands. One use of the extended AT commands is to control the sending and receiving of SMS messages. A GSM flow chart shown in below fig4.

3.6. GPS Module Flow Chart

3.6.1 GPS Tracking System

Monitoring the location of a truck, car or any moving vehicle using the GPS system. Widely deployed to keep track of truck fleets, vehicle tracking ensures that the vehicles are being used properly and that they can be recovered in the event they are stole as shown. GPS tracking in real time. The fig5 shows the flow chart for GPS module. First read the UART data from ports. Then check for the GPGGA data, GPGGA is global positioning geographical information. It gives the longitude and latitude values of position. Then read the location and enable the interrupt. Sent these read information about the vehicle location to the owner number using GSM mobile communication. Display the acknowledgement using LCD display. When the pre-determined key is pressed, it means accident is happened and automatically the message will be sent to the owner number.

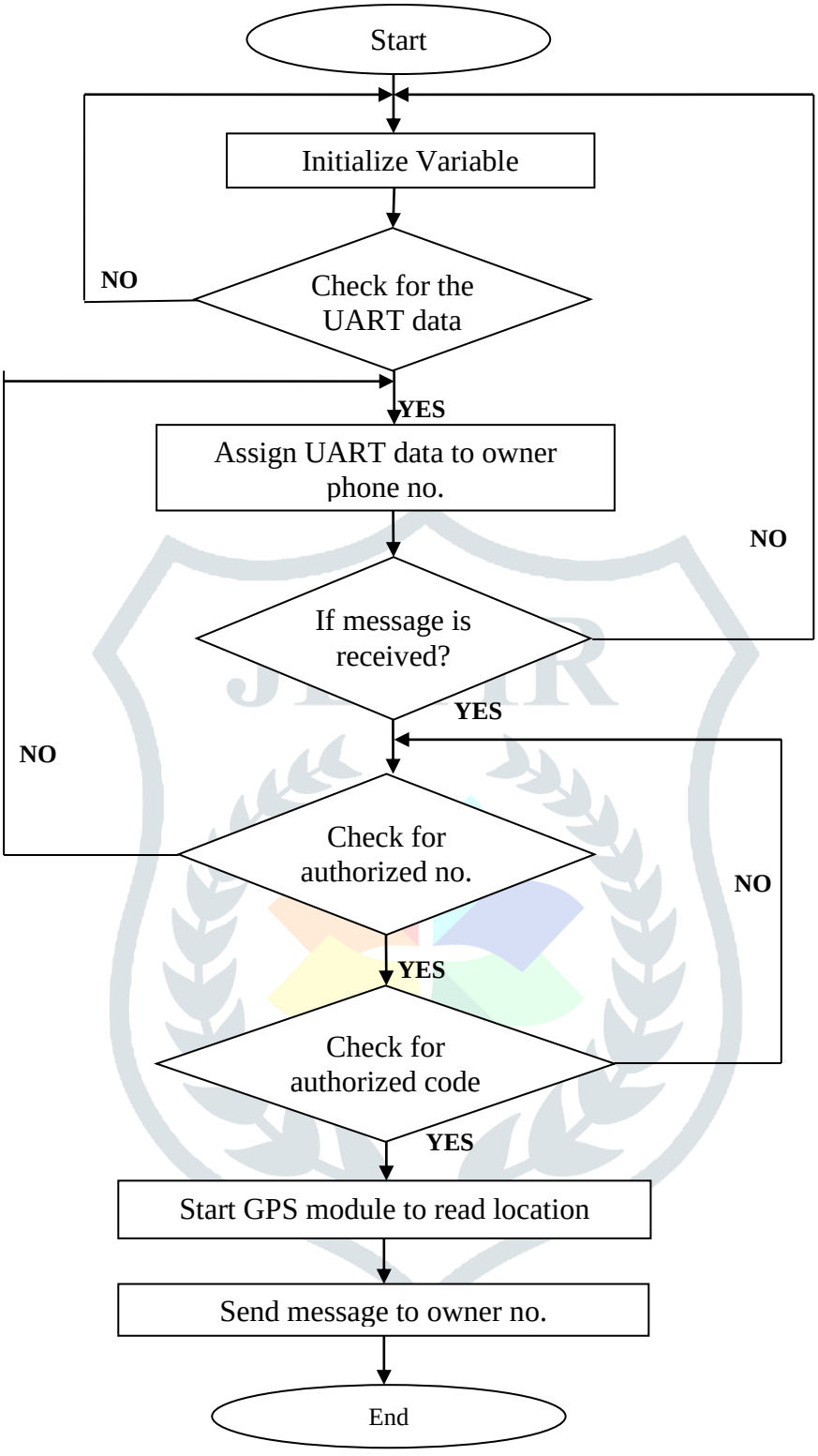

Fig4 GSM Flow Chart.

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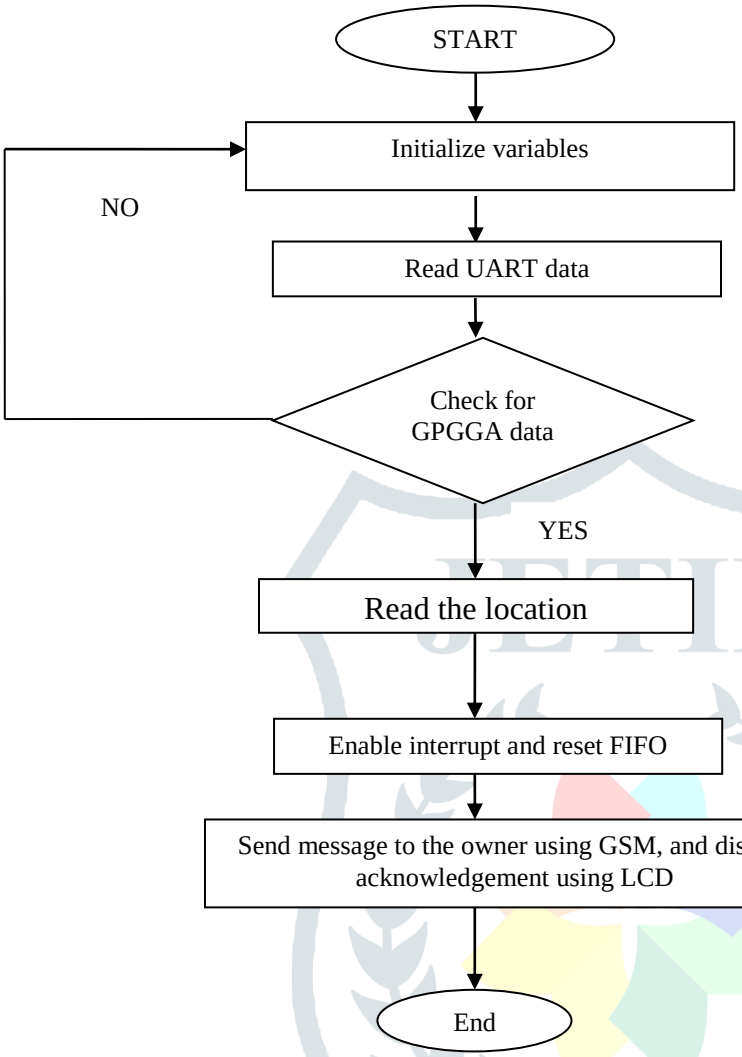
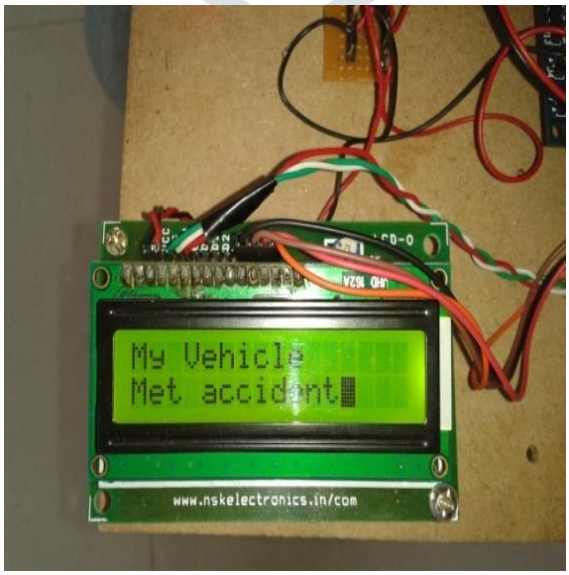


Fig5. GPS Flow Chart.

IV. EXPERIMENTAL RESULTS

EXPERIMENTAL OBSERVATIONS

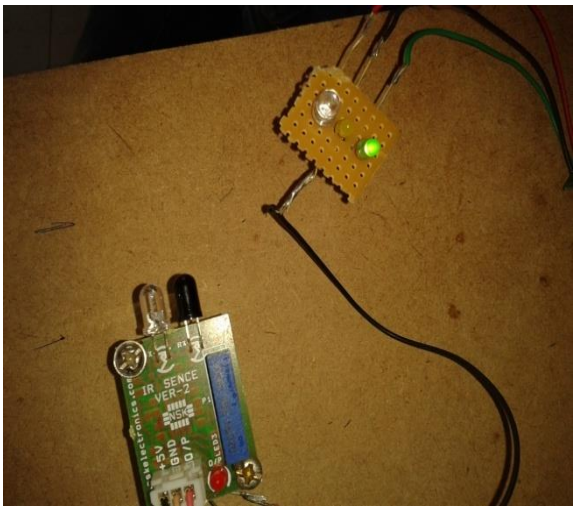


Case 1: Accident detection.

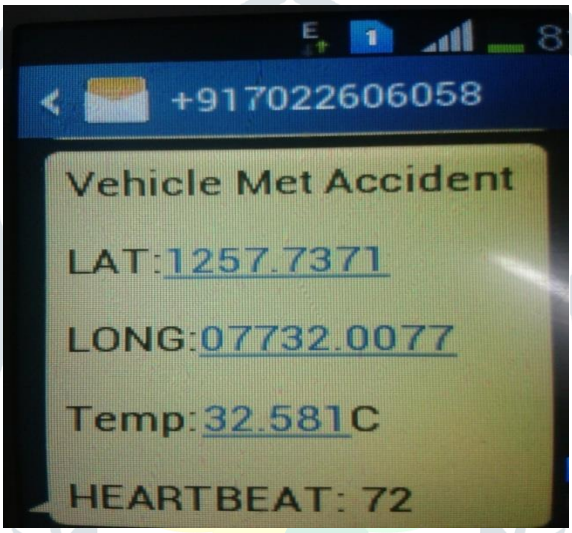
Case 2: Accident location Values.

Case 3: Temperature display.

Case 4: Heart Beat display.



Case 5: Automatic Traffic clearance.



Case 6: Parameters transmission (SMS).

V. CONCLUSION

The proposed wireless telemedicine system presents easy to build system possible. In this project, we realized that the WTS model can be upgraded to a more advanced more portable and less expensive system. It is efficient model in the sense that it uses mobility capabilities like SMS for alerting the ambulance. By this model it is possible to keep track and organize their medical records. By exploiting the advantage of wireless multimedia communication such as current various utilities, convenience, high data transmission rates, and high data transmission, and high availability of network reach.

5.1 Future Enhancement

We can replace mobile with high resolution camera in the ambulance. We can use 3G wireless communication in place of GPRS for better performance. We can send some more information like X-Ray data of patient, blood pressure, ECG, etc.

REFERENCES

[1] "A New type of automatic alarming Device to rescue accident injured in time" by Fengyuam Jia hongyan Wang.

[2] "Automatic accident detection via embedded GSM message interface with sensor technology" By C.Vidya Lakshmi, J.R.Balakrishnan.

[3] "A Communication server for Telemedicine applications" (IEE) by J.Bai.B.Hu.YZhang and D.Ye.

[4] "Design of Telemedicine system using Mobile telephone", IEE, vol.5, no.1, March 2001.

[5] ARM-System developer guide by Andrew.N.Sloss.

[6] The 8051 microcontroller by I. Scott MacKenzie, Raphael C.-W. Phan.

[7] C and the 8051 by Thomas W. Schultz

[8] www.keil.com/c51/

[9] *http://en.wikipedia.org/wiki/*