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Tracking of ambulance in rural areas in emergency situations using GPS and GSM

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ABSTRACT

This program accomplishes two major purposes. The first task is to track the patient carrying ambulance and then the second purpose is to relay the small print of patient information to the hospital or doctor using a GSM device. Using this project, we will figure out where the ambulance is placed and at the approximate time of arrival of a patient. An SMS containing the location and approximate arrival time values is sent to every designated person in hospital to a Doctor's cell phone. This knowledge will then be used to intimate Doctor about the location of an ambulance and the time of arrival. Using these guidelines, doctor will do all the arrangements required for patient care. This uses IOT monitoring technology to view position. Upon getting SMS hospital, its personnel will brace for the proper diagnosis and procedures of the patient to come.

Keywords— *Microcontroller, GPS Modem, GSM Modem*

1. INTRODUCTION

In this rural life transportation is not very common. A lot of accidents occur in these remote areas constantly. Hence the need for emergency management is being established. To overcome these kinds of problems a program using GPS and GSM technology needs to be developed and the framework is implemented in the subsequent research study.

1.1 Forms of issues that we are facing:

(a) Someone is confused about what to do in an accident (when the car is lost) condition or the vehicle gets any repair.
(b) If one is unsure of the precise instructions for reaching destination.

This method overcomes all these issues by providing direct medical care to critically ill patients, and victims of collisions need a mechanism for transmitting information about the location of the car. A centralized control system is required in both hospitals and will provide all the necessary information about the injured vehicle of the accident and the location of the ambulance. The doctor must have good understanding of the patient's physical and neurological state, so that the correct decision can be made on medication administration and location for travel. Hence there is a contact obligation between ambulance personnel and hence the control station. Sometimes the needs are fulfilled by using an emergency network that transmits position information and patient status uniquely across parameters such as pulse rate and temperature etc. To relay patient status the device may have biomedical sensors. All systems are connected through wireless communication which transmits information and data to each other. Also, with this, the use of GPS and GSM for higher communication links will encourage and pace system response. Monitoring is often required during emergency patient evacuation and this saves precious reaction time. Devices must be interfaced with Wireless RF Board to relay weak signals. Using these guidelines system during transportation will be a great benefit to patient emergency services. Thanks to interfacing biomedical devices, ambulance is intelligent. This technique also has the Global Positioning System (GPS) which, among other essential details, can obtain the coordinates from the satellites. Tracking system is, at times, extremely critical.

2. OVERVIEW

2.1 Block Diagram of System

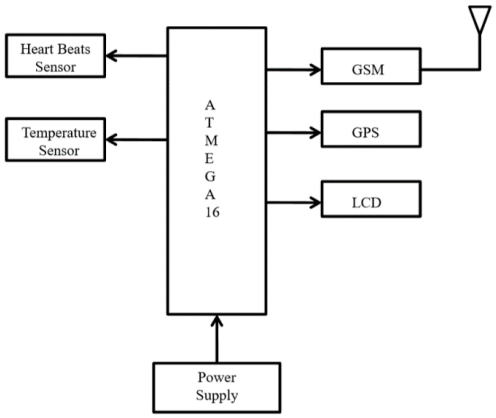

Fig. 1: Block diagram

2.1.1. Heartbeat Sensor: Pulse sensor works under the idea that blood pulses for every pulse in the human body. We used both a Red LED and an LDR. Patient must place their finger between these two elements. Red light is transmitted to LDR from the

patient's eye. So, blood is flowing with each pulse. This would allow the light level to fluctuate. The pulse system used in this project works on the. For every rhythm it gives off strong pulses. It runs on pure 5-volt DC. It operates on the theory of regulation of sunlight through blood supply into each pulse through finger t. Heartbeat sensor is meant to deliver temperature beat digital output when a finger is positioned on it. When the beat detector in the middle operates, the beat LED pulses with each pulse in unison.

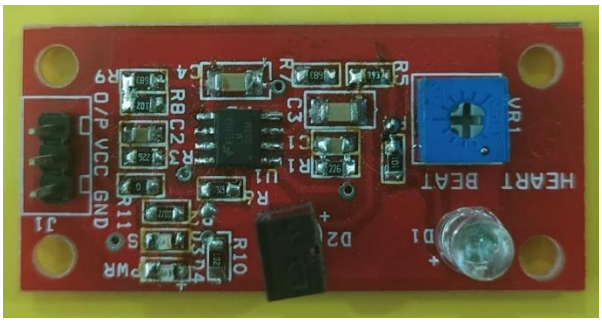

Fig. 2: Heartbeat Sensor

2.1.2. Temperature Sensor: The following example shows the Sensor Temperature. We used temperature sensor to light up the heat in the blood of the patient. It is an analog variant of a temperature sensor. It provides variable output voltage based on the received / sensed temperature differences. This may help you detect variations in the patient's temperature. Figure displays pin diagram for sequence LM35. Different integrated circuit temperature sensors are the LM35 series, whose output voltage is always linearly proportional to stage. The LM35 also has an advantage on linear temperature sensors measured in ° Kelvin, as it is not mandatory for the user to remove an outsized constant voltage from its output to achieve a reasonable Centigrade scaling. This LM35 series needs no external changes. Trimming and tuning at water level ensure low cost. This series of LM35's for low output impedance, linear output and correct inherent calibration system is easy to interpret or track circuitry. It can also be found in single power sources, or in Plus and Minus streams.

Fig. 3: Temperature Sensor

2.2 Microcontroller

The figure shows the Pin diagram of the microcontroller and is the main component of the system as it interfaces with all input and output devices and governs the operation of the system. Microcontroller ATmega16 is to be used. This is followed by the varied functions of Microcontroller ATmega16 as an 8-bit high-performance microcontroller of Atmel's Mega AVR package with low power consumption.

Atmega16 is based on improved RISC architecture with 131 successful instructions (Reduced Instruction Set Computing, Learn More about RISC and CISC Architecture). ATmega16 has 16 KB of programmable non-volatile storage, 1 KB of static RAM and 512 Bytes EEPROM. Non-volatile storage and EEPROM performance levels are 10,000 and 100,000, and ATmega16 can be a 40-pin microcontroller, respectively.

Features:

- Two8-bit Timer / Separate Presales and Match Modes counters.
- Independent Presales 16-bit timer / counter, comparison,8-channel Four PWM Lines, 10-bit ADC Byte-oriented Two-wire Serial Interface.
- I / O and 32 Blocks of programmable I / O.

2.3 Global System for Mobile Communication (GSM)

Global Mobile Communication System (GSM) which is a wireless mobile telephone system that is widely used in Europe and elsewhere. GSM uses a multi-access time division (MAT) version and is the most distributed of the three existing wireless mobile networks (TDMA, GSM, which are CDMA). GSM digitizes compressed data and then transfers two other user data to a server.

Fig. 4: GSM Module

2.4 Global Positioning System (GPS)

The Global Positioning System (GPS) is a network of satellite navigation consisting of a U.S. Defense department set up 24 orbital satellite networks. GPS works 24 hours a day, at every time, everywhere in the world. Using GPS doesn't cost registration or setup. Distance= Velocity* The pulse speed of GPS here is around 300,000Km / s of light. GPS updates happen regularly. GPS transmissions occur at frequencies of 1575.42 and 1227.60 MHz, all within the L band. Signal the Global Relay Positioning Systems to land sites. GPS receiver deliberately collects and doesn't relay satellite signals.

At least 24 GPS satellites continue to operate, plus a few spare parts. Spacecraft owned by the U.S. Department of Defense, rotating for 12 hours (two loops a day) at an altitude of about 11,500 miles going approximately 2000 mph. The ground stations are used specifically to track the orbit of a satellite. The accuracy of a given GPS position is dependent upon the device or receiver. Many mobile apps feature GPS. Many types of receivers use a system known as Differential GPS (DGPS) to achieve much greater precision. DGPS requires an external receiver mounted at a nearby established spot. Observations given by the stationary receiver are used to correct the locations reported by the roving instruments, providing high precision. The below diagram shows the GPS modem, with the satellite uses GPS modem to collect data. So, then it sends this bunch of data to Microcontroller as a serial communication. When the ambulance travels from the patient's home to the hospital, the ambulance location will change, and the microcontroller will differ, and those changes will be given to Microcontroller.

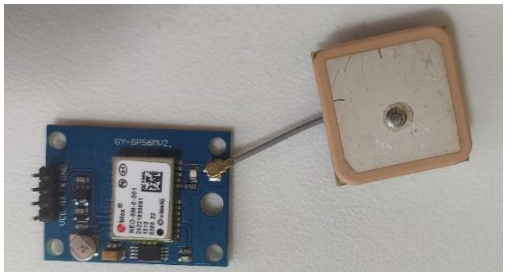

Fig. 5: GPS Module

3. CIRCUIT DESCRIPTION

This section displays a circuit diagram for emergency tracking and a device for managing patient safety. The program is focused on GSM and GPS systems to improve the current hospital network, minimize the patient care staff ' burden and maximize the patient's productivity explicitly intended to deliver improved treatment and faster cure.

The definition of each section is as follows: A GSM and GPS network consists of a description of the transmitter component of the health care management system. Minimizing and lightweight wireless sensors are required for the sensors on the body to keep the moment of the patient alive. These instruments are pulse detectors, and temperature is a essential prerequisite for a patient. The temperature sensor used here is an advanced precision model, the LM35. The LM35 is used for room temperature measurements. The second cardiac bit sensor, whose output is attached to the ADC1 pin of the microcontroller. The button inserted emergency key. LCD of PA7 which is connected to port B. Now the sensed or collected sensor data is to be transmitted to two to matching process control unit.

GSM is necessary for ambulance tracking systems because usually only location information can be obtained from GPS app. Therefore, any other communication device, such as GSM, must send this location information to the central control center.

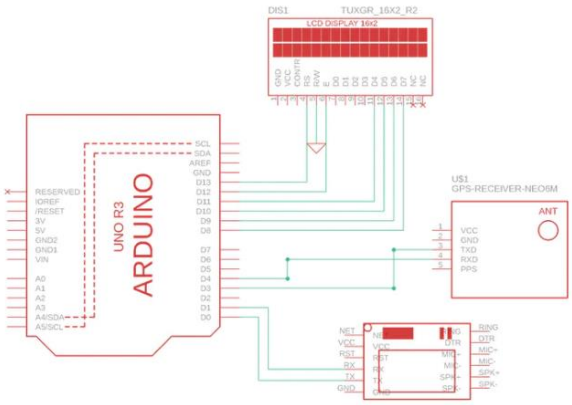

Fig. 6: Circuit Diagram

Figure above displays the receiver circuit diagram for ambulance tracking and the health monitoring system for patients. information received by the GSM module is transmitted, as shown, wirelessly via the other GSM module on the receiver section. MAX232 GSM module is used to transfer data to the Computer. This is intended to transfer tension on.

3.1 Flow Chart

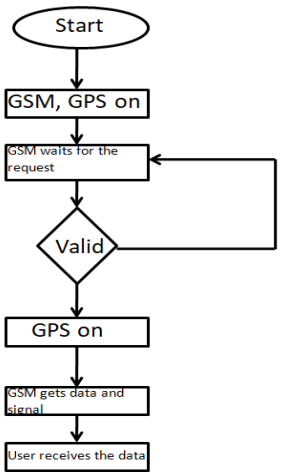

Fig. 7: Flow chart

4. ADVANTAGES

(a) The primary advantage of the "Ambulance Tracking with Patient Safety Monitoring System" is that SMS can transmit data on patient health over a longer distance, using GSM technology. With this support the doctor will have all the necessary details ready in hand when the patient enters the hospital.

(b) Using GPS technology, it is possible to track the exact ambulance coordinates. And then, you can find out distance from the hospital. We can therefore get / control estimated time to reach the hospital for the ambulance.

(c) Since this system is completely automatic it needs no human intervention. This system gathers protection parameter, longitude and latitude values and automatically sends SMS after a certain time interval.

5. DISADVANTAGES

(a) In every ambulance, we can't implement the GPS & GSM, it leads to expensive outcomes.

(b) We cannot plan the many more for the patient who is in very serious condition.

6. APPLICATIONS

(a) This project, as the name implies, sees its key application for hospital ambulance monitoring as well as recognizing the values of the safety criteria of the patient.

(b) Many branches and companies rely for their own private ambulances. Such ambulances prove to be compassionate and lifesaving to any employee or patient after an accident. Via the patient health management system, it is also possible to use ambulance monitoring in these sectors to assess where the accident is bringing the injured person to the hospital.

(c) Ambulance monitoring device may also be used in national parks or in nature reserves to protect endangered species or rare animals. When these animals suffer an accident or

