

Health and Position Monitoring System for Soldier

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Abstract- The paper reports the designing of Health and position monitoring system for soldier during warfare time and general surveillance too. In this system, the GPS and GSM module is used to track the exact location of soldier, along with that temperature, heartbeat and pulse rate sensor is also been used to track the health condition of the soldier and provide an essential aid during emergency. Hence, with the use of microcontroller, it is a very cost effective and essential system for saving human life on the battlefield.

Key Words: GPS and GSM module, monitoring system, pulse rate sensor, microcontroller

1. INTRODUCTION

Indian army is one of the strongest army in the world, hence the safety of troops and soldiers standing on the borders of our landmass is first and foremost priority of our Nation. Sometimes, the lack of resources for providing the information can be dangerous as it has been seen in Kargil war too in 1999. The less availability of information leads to the destruction of our resources and loss of human lives too. To avoid these kind of situation, the use of technological advancement in military is now at its peak. There are various kinds of UAV devices seen nowadays used by technically developed countries for their soldiers. Previously used technologies are outdated and uses outdated technology which needs continuous surveillance and the performance is also not as expected. The project proves to be very beneficial in determining the health status of the soldier. The heartbeat, which is very much important for determining the health status of a person is easily been calculated by this system and if found inappropriate, the data would be send directly to the control station and is informed about the same. Another important feature i.e. measurement of temperature sensor is also very much beneficial for determining health status. If the soldier is suffering from fever, then it would be also detected and informed at the control station about the same.

2. THE LIETERATURE SURVEY

Lots of efforts have been put across to build up this system by teammates. The system works on the GPS/GSM module. Using it, the exact location of the soldier can be traced and can be sent to the control station of the Army. The message is sent on the device on the control station providing the latitude and longitude value of the location of the soldier.

- (A) System that monitors the health of the soldier, Navigation system is used for two way short message communication. Author P.kumar, G.Rasika,. Abstract: The proposed system consists of wearable equipments, sensors and modules. This helps in basic life guarding of soldier at a very low cost.
- (B) Tracking of location of soldier to ensure safety of soldier. Author H. Kedar, K. Patil. Abstract: The base station can trace the exact location of soldier during the time of battlefield also using the GPS module mounted in the device.
- (C) Design and implementation of Biomedical sensors to ensure health condition of the soldier. Author Pavithra G N, Manu M, Priya B C. Abstract: The health status can be checked using the temperature, heartbeat, BMP sensors.

3. PROPOSED SYSTEM

The proposed system consist of microcontroller along with temperature sensor, Heartbeat sensor, regulator, Buzzer, LCD, GPS, GSM modem. The microcontroller used control all the signals and activities in the soldier unit.

The overview of the system is shown below and explained briefly:

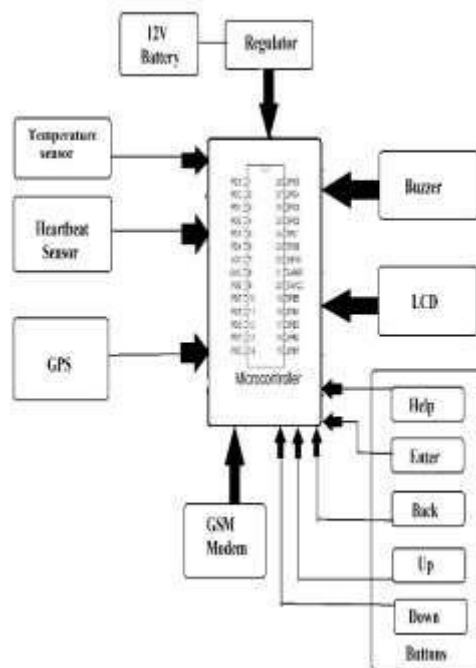


Fig -1: Block diagram of Proposed System

a. The Algorithm

- A. The GPS module calculates the exact location of the system and sends it to the control station of the battlefield.
- B. The message is been sent to the control station showing the latitude and longitude values of the system.
- C. The temperature sensor calculates the temperature of the soldier and if the value is above the satisfying condition, then it will inform to the control station.

b. Hardware Description

• Heartbeat sensor

The heartbeat sensor measures the heartbeat rate of the soldier and if it is above the controlling value, it will send the message to the control unit. The control unit sends the message through wireless media to the control station. The control station is being informed about the same issue. This sensor is also very much beneficial for having a continuous check on the health status of the soldier during warfare or normal days.



Fig -2: Heartbeat pulses

- Temperature Sensor : LM35

LM 35 measures the temperature value of the body of the soldier. If found that the temperature is not adequate, then it will send the signal to the controlling unit and the controller will send it to the control station of the battlefield. Here LM35 temperature sensor is been used whose range is around $s \geq 60$. The normal temperature of the human body is around 37c.

- Control Room Unit

The measuring devices are connected through microcontroller. Wi-Fi module has unique IP address through which the database of the device of each soldier can be monitored at the control station. The control room unit is very much beneficial for the transmit of data i.e. health status, exact location of the soldier at the time of warfare.

4. HARDWARE AND SOFTWARE REQUIREMENTS:

4.1. Hardware:

The Arduino Development Board consists of many components that together makes it work. Here are some of those main component blocks that help in its functioning:

- Microcontroller: This is the heart of the development board, which works as a mini computer and can receive as well as send information or command to the peripheral devices connected to it. The microcontroller used differs from board to board; it also has its own various specifications.
- External Power Supply: This power supply is used to power the Arduino development board with a regulated voltage ranging from 9 – 12 volts.
- Analog Pins: There are some analog input pins ranging from A0 – A7 (typical). These pins are used for the analog input / output. The no. of analog pins also varies from board to board.



Fig -3: GPS Reciever

- Digital I/O Pins: There are some digital input pins also ranging from 2 to 16 (typical). These pins are used for the digital input / output. The no. of these digital pins also varies from board to board.
- Power and GND Pins: There are pins on the development board that provide 3.3, 5 volts and ground through them

4.2. Software:

The program code written for Arduino is known as a sketch. The software used for developing such sketches for an Arduino is commonly known as the Arduino IDE. This IDE contains the following parts in it:

- Text editor: This is where the simplified code can be written using a simplified version of C++ programming language.
- Message area: It displays error and also gives a feedback on saving and exporting the code.

- Text: The console displays text output by the Arduino environment including complete error messages and other information
- Console Toolbar: This toolbar contains various buttons like Verify, Upload, New, Open, Save and Serial Monitor. On the bottom right hand corner of the window there displays the Development Board and the Serial Port in use.

5. FLOW CHART

The flow chart of GPS and GSM is shown in the figure below:

5.1. Flow chart of GPS:

The Flow chart shows the working procedure of the GPS system in Firstly, it will check the request of GSM. If found valid, it will ON the GPS request and accordingly sends the data or either stores it in the SD card.

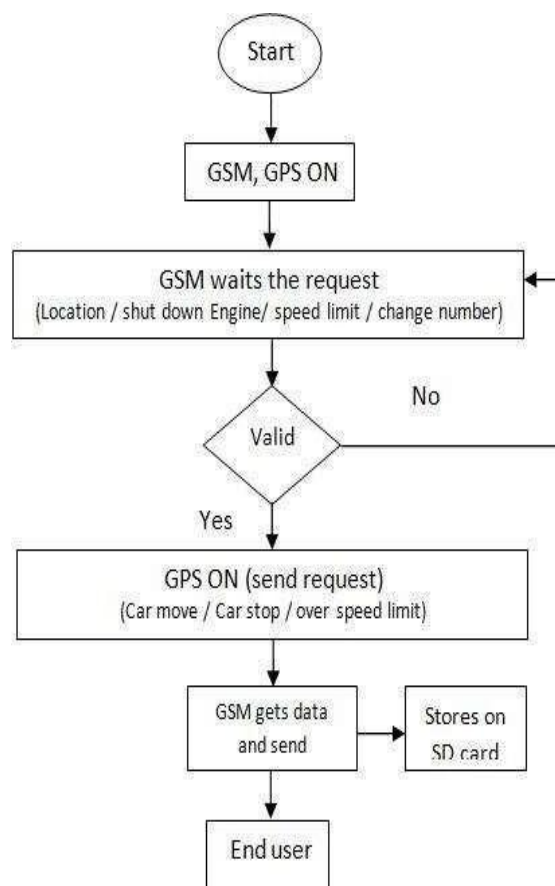


Fig -4: Flow Chart of GPS system

5.1. Flow chart of GSM

The flow chart of GSM module is shown. GSM stands for global system for mobile communication. It is used the sent the location coordinates of the soldier to the control station of the battlefield.

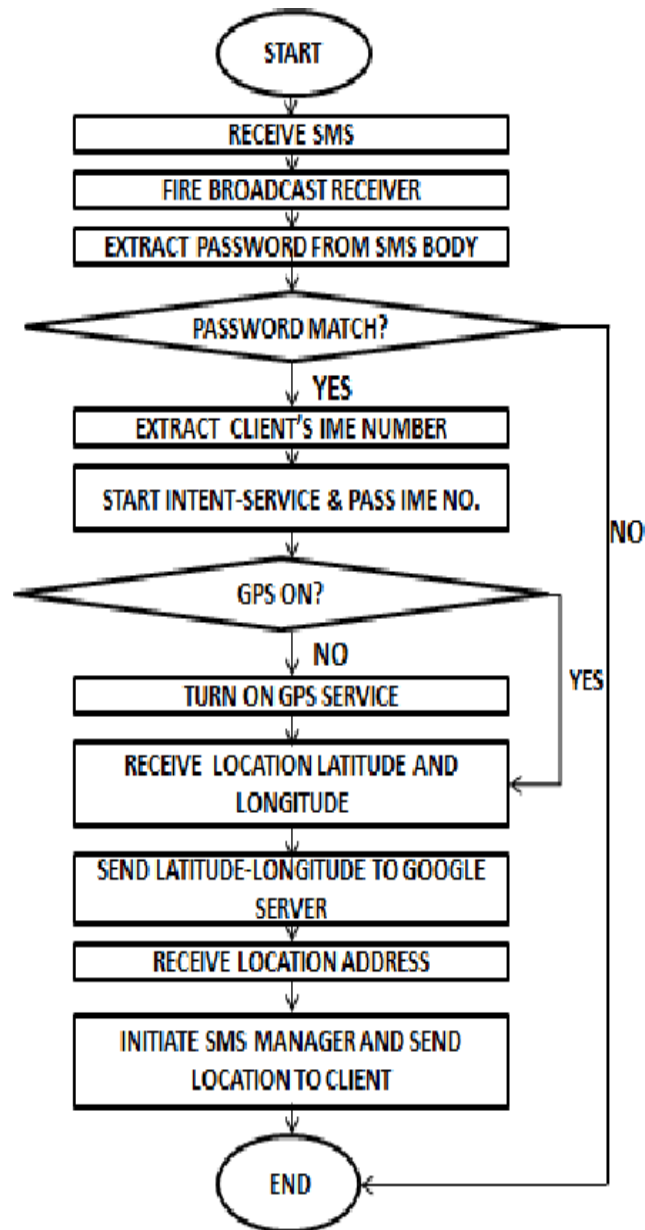


Fig -5: Flow Chart of GSM system

6. RESULT AND DISCUSSION

The output of the project showing the reading of temperature, BPM, latitude and longitude. This information is being useful regarding the health condition of the soldier in the battlefield. If the radings shown in the LCD screen is higher than the permissible limit, the necessary first aid is been given to the soldier at the instant.



Fig -6: Display of Output in LCD screen

The above output shown in the LCD screen contains the information of pulse rate and the temperature of the soldier. The output shown in the mobile screen or Desktop at the base station in the form of text message is shown below:



Fig -7: Display of Output in mobile screen

7. CONCLUSION

The paper reports an wireless system for the health and position monitoring system for the soldier using microcontroller, GPS/GSM module. The system is consisting of varios biomedical sensors to analyse the medical status of the soldier. According to the medical status of the soldier, the necessary aid can be provided to the soldier during war time.

Thus it is a cost-effective and an useful device to monitor the location of our soldier and their medical conditions. Thus this real time information using wireless technology is very much beneficial for the security of out nation and saving the human life and our soldiers.

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