# IOT SYSTEM FOR MONITORING HEALTH AND TRACKING OF SOLDIER

Nilesh Rakhade

Information Technology
G H Raisoni College of
Engineering and
Management,Pune
Pune, India

Nilesh.rakhade.it@ghrcem.rai
soni.net

Lokesh Choudhary

Information Technology
G H Raisoni College of
Engineering and
Management,Pune
Pune, India

Lokesh.choudhary.it@ghrcem.rai
soni.net

Anjali Bhongade

Information Technology
G H Raisoni College of
Engineering and
Management,Pune
Pune, India

Anjali.bhongade.it@ghrcem.rai
soni.net

Sujit Dhanegaokar

Information Technology
G H Raisoni College of
Engineering and
Management,Pune
Pune, India

Sujit.dhanegaokar.it@ghrcem.rai
soni.net

Poonam Dhamal
Information Technology

G H Raisoni College of
Engineering and Management,
Pune

Pune,India

Poonam.dhamal@raisoni.net

*Abstract*— **Military Status and Tracking System the Medium Military and Trail System allows soldiers to track the current state of the Army and monitor their health, such as temperature and heart rate. The system also includes additional features to help the military manually seek help and send distress messages to the military when needed. GSM modems send latitude and longitude positions in the link with the help of the military, which can track the current military status. This system is very helpful in getting medical information from the military and providing immediate medical care and rescue.**

*Keywords: Arduino Board, GPS, GSM modem, Distress signals, Encryption, Decryption. Arduino Mega, GPS, Soldier, Tracking, Heart- Rate Sensor, Temperature Sensor.*

## Introduction

Indian soldiers are mainly known for their courage, in spite of scarce ammunitions and safety measures, they have many triumphs to their credits. All must be really concerned about the safety of the soldiers, so we have decided to build a project which will efficiently keep a check on the health status of the soldier, and his precise location to equip him with necessary medical treatments at ease. Soldier's tracking is done using GPS, and GSM is used to provide wireless communication system. For monitoring the health parameters of soldier, we are using bio medical sensors such as temperature sensor and heart beat sensor. An oxygen level sensor is used to monitor atmospheric oxygen so if there are any climatic changes the soldiers will be equipped accordingly.

*Proposed system:*

After considering the above technologies the tracking and health monitoring of soldier will be possible. Base station gets location of soldier from GPS. The base station can access the current status of the soldier which is displayed on the phone with the help of GSM and hence appropriate actions can be found.

## I. SYSTEM ANALYSIS

System analysis is the act, process of profession of studying an activity typically by mathematically means in order to define its goals or purposes and discover operation and procedures for accomplishing them most efficiently.

## II. HARDWARE REQUIREMENTS

The hardware requirements for the system are as follows
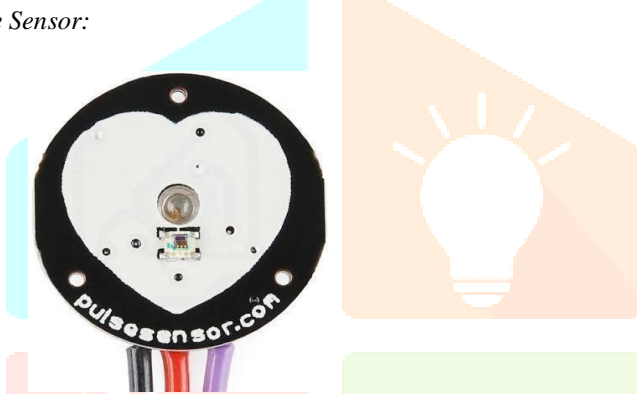a. *Pulse Sensor:*



Fig: Pulse sensor

The sensor used in this project is pulse sensor-SEN-11574. Heart rate data can be really useful for determining the health status of a person. The pulse sensor amped is a plug and play heart rate sensor for Arduino. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. It sips power with just 4 mA current draw at 5V. To use it simply clip the pulse sensor to earlobe or fingertip.

b. *Temperature Sensor*



Type T (copper constantan) thermocouples are suited for measurements in the range 200 to 350 degree Celsius. Often used as a differential measurement, since only copper wire touches the probes. This series are precision integrated- circuit temperature devices with an output voltage linearly- proportional to the centigrade temperature. The LM35 device has an advantage over linear temperature sensor calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. To find the health status of soldier base station should know the body temperature and pulse rate of the soldier. So, we are using LM35 body biosensor as it is a low-cost temperature sensor and it does not require signal conditioning. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. As the temperature increase above the specified value the GSM module will immediately alert the Base station and thus will not wait for heart beats to go out of the normal range.

c. *Power supply:*

The most important section in every electronic circuit is the power supply. For the proper working of all components an unaltered power supply is needed. The supply must be capable of providing the necessary power for each component. At the same time the protection from over voltage must be there. The basic step in the designing of any system is to design the power supply required for that system. The designing of power supply requires the total current that the system sinks from the supply and the voltage rating required for the different components. In this project work following power supplies is used: 1. 5V constant power supply for GPS, GSM Module and LCD section. 2. Constant voltage regulator LM7805. 3. Variable voltage regulator LM317 for ARM microcontroller LM317.

d. Arduino Board

The microcontroller is an integral part of all connected devices. The controller is a single chip computer with control panel, memory, and input / output components. The controller runs the programs stored in the program memory. This single chip is used in the automatic support system. The purpose of this section is to gather information about a soldier's heart rate, temperature, and location per minute. The information is sent to the source section. The ATmega328 is a single-processor processor that ATmega offers in the Mega AVR family. Atmel 8-bit RISC-based microcontrollers have 32kB ISP memory and read / write capacity, 1KB EEPROM, 2kB SRAM, 23-bit I / P line, 32-pin target, and 3 easy-to-use ports with mode of comparison. statistical connection., Internal and external interruption, USART program, a standard 2-wire serial interface, 6-bit programmable 6-channel A / D Monitor timer with built-in oscillator, and 5 software-selective power saving methods. The device operates from 1.8 to 5.5 volts.

*e.*    GPS Modem
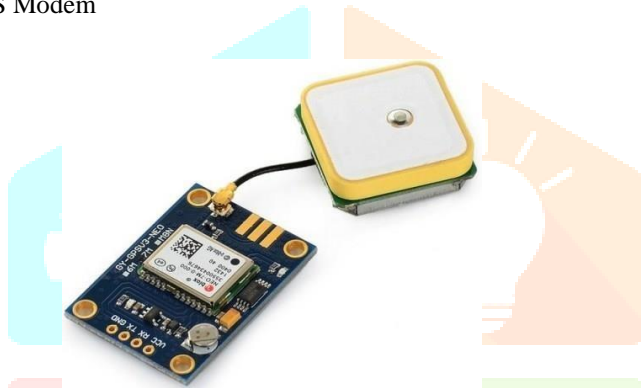


The Global Positioning System (GPS) is a space-provided satellite system that provides accurate location and time information at any time and in any part of the world, when four or more channels are not blocked for GPS satellite.

*f.*    GSM Modem



GSM Modem

GSM modem GSM modem GSM, or global cellular communication system, is the most widely used mobile technology in the world. The mobile phone uses the mobile phone service provider's GSM network to detect the local telephone tower. SIM900 Quad Band / SIM900 AD Band GSM / GPRS Module Breakouts and sub devices for GSM modules. Use AT commands to communicate with the driver (AT command GSM 07.07, 07.05 and SIMCOM improvements). This system supports software playback and reset. There are four bands of 850/900/1800 / 1900MHz and dual bands of 900 / 1900MHz. There are dual band 900 / 1900MHz and quad band 850/900/1800 / 1900MHz. There is an AT instruction to control and use 1.5 mA of power (suspend mode).

*g.*    Gas Sensor

A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Based on this voltage value the type and concentration of the gas can be estimated.
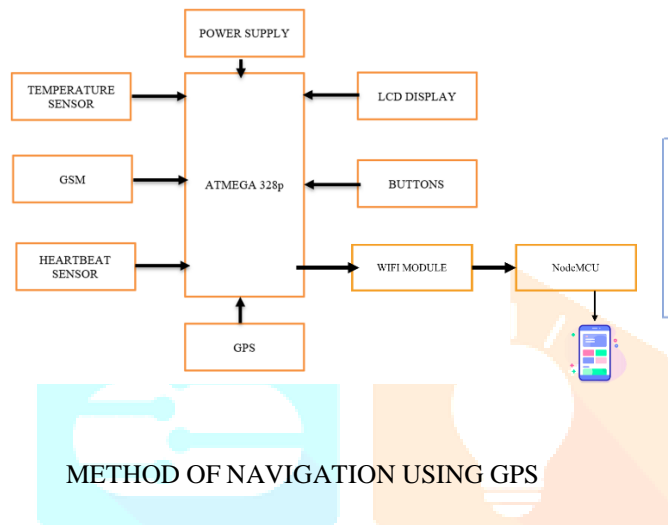


*h.*    NodeMCU

NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT based Applications.
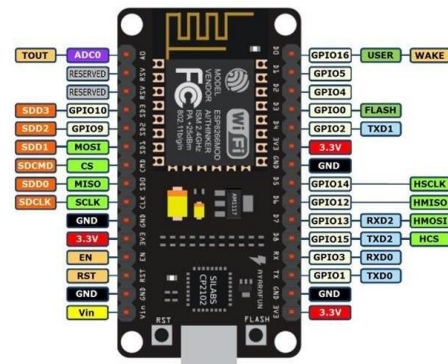
GSM Receiver Module:

The GP-20U7 is a small GPS receiver with a large GPS-in-one feature. The GP-20U7 offers full position, fast operation, and time reading in addition to high performance and monitoring capabilities. This GP-20U7 receiver is suitable for portable applications such as tablets, mobile phones, and other devices that require installation capabilities due to low power consumption.

be combined as a healthcare system. By measuring the future performance of these important signals and function extractions, real-time parameter collection can be done to provide real-time estimates of overall health status. Several military medical parameters need to be monitored, such as EKG, EEG, and brain maps. However, this requires complex circles and specialized medical services, so you can't take a soldier. The whole system will be good for these soldiers.
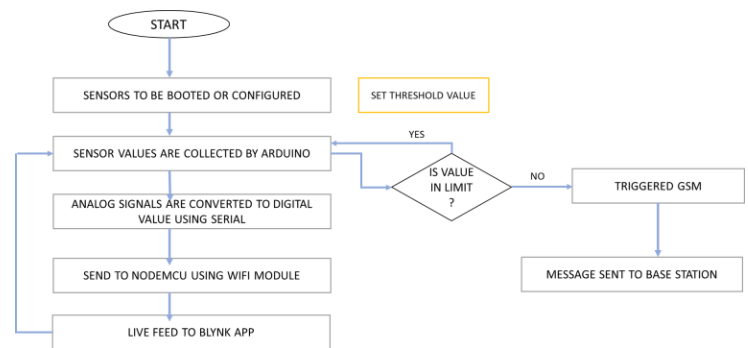
Flow chart



METHOD OF NAVIGATION USING GPS

For emergency management and military operations, a well-organized and balanced position with appropriate internal and external damage is an essential tool for increasing protection. The original GPS positioning method was first used to save fields. GPS tracker is used to determine the location and direction of rescuers and traps. Distance, altitude, and parallels between units are determined from mathematical correlations based on a series of techniques in a Geographical Information System using GPS data (GIS) from both sides. Use this technique to move between two troops. The data is sent by telephone via an RF transmitter. This group can make adjustments via wireless communication, helping the military know the situation. GPS positioning is a unique invention. Recipient data is sent to a special data system via this link. The National Electricity Regulatory Authority (NMEA) is committed to standardizing this system.

PHYSIOLOGICAL SIGNALS AND BIOSENSORS

As a result of new technological advances, many sensors have been developed that can be used to monitor the physical characteristics of the human body. In addition to standardized mathematical messages, a variety of predictive technologies are available that can

## III. SOFTWARE REQUIREMENTS

- Arduino IDE
- MC Programming Language: C

## VI. RESULT AND CONCLUSION

The results have been listed below. The registered number receives a message confirming the GSM and GPS settings. After that, if the normal physical parameters are missing, a warning message will be sent to the base station along with the exact location of the soldier. The following decisions can be made from the previous implementation. Military safety and security: GPS monitor the situation of the military in the world and health systems monitor critical environmental and health conditions to ensure the safety of soldiers. Reduces circuit complexity and reduces power consumption: Using a PIC controller and smaller components reduces system power consumption.

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