

# GPS and IOT Based Soldier Tracking and Health Indication System

<sup>1</sup>Soumyalatha N, <sup>2</sup>Rakesh G S, <sup>3</sup>Rohul S, <sup>4</sup>Shaik Ibrahim, <sup>5</sup>Shirisha M D

<sup>1</sup>Professor, <sup>1,2,3,4,5</sup>School of C&IT, REVA University, Bangalore, India  
<sup>1</sup>soumyalathanaveen@reva.edu.in, <sup>2</sup>gsrakesh25@gmail.com, <sup>3</sup>rohul09120@gmail.com,  
<sup>4</sup>ibbu123shaik@gmail.com, <sup>5</sup>shirimd35@gmail.com

## Article Info

Volume 83

Page Number: 5009-5012

Publication Issue:

May - June 2020

## Abstract

The paper reports an Internet of Thing (IOT) based health monitoring and tracking system for soldiers. The proposed system can be mounted on the soldiers body to track their health status is wireless and track their current location through (GPS)global positioning system. So that directions can be easily found wirelessly. The security of the any nation depends on military, army, air-force and navy are main source of the country. Hence with the use of proposed equipment, it is possible to implement a low cost mechanism to protect the variable human life on the battlefield. The GPS is also inserted to track the exact location of the soldier and base station can guide the soldier. This device is fitted in the soldier army suit when he was in the battlefield with the firearms. The main aim of the project is to design and develop user friendly IOT based solution to the doctor in the real time environment.

## Article History

Article Received: 19 November 2019

Revised: 27 January 2020

Accepted: 24 February 2020

Publication: 16 May 2020

**Keywords:** GPS, GSM, heartbeat sensor, temperature sensor, vibration sensor, IOT

## 1. Introduction

The infantry soldier of tomorrow promises will be one of the most technologically advanced modern warfare has ever seen. The important role is so many soldiers who are ready to sacrifice their lives for their country. Soldiers are losing their lives when they will enter into enemy's land due to communication lack between base station and the soldier. Now a days the science and technology are rapidly improved very much with the new ideas, innovations and the advanced technology was adopted by government for defence service to provide some safety system to our soldiers. Soldiers facing a major problem in the battle field that for the issue of their health condition and they get lost in battlefield for this we proposed a system that with that help soldier can know their health status and their location has been watching in control room and in emergency the system will send a message to control unit about your health condition. This device is fitted in the soldier army suit when he was in the battlefield with the firearms. Then the soldier can be easily tracked. GSM module also used in this system that it can transmit the data with high speed to control unit. When connections will get lost in the battle field it is very

necessary to the control room to guide the soldier. Our proposed system is to reduce the cost, increase the quality of life, and enrich the users experience. There are many regarding to the safety of the soldier. So we have decided to make out a project for soldiers that they should be in connectivity with base station and also soldier to soldier and they focus on tracking the location of soldier from GPS, which it is very useful to base station to know the exact location of the soldier and from the base station they can guide them also. And in this we install high speed wireless communication system GSM that it use for soldier to soldier interact in short range and also sends an immediate message to the control room of the soldier situation. The main challenge was to integrate these components into a lightweight package. In this system the project plays an important role for soldiers that they can know health condition through biosensors in biosensors they are kind of sensors one is temperature and other one is heartbeat sensor and also a vibration sensor it is determine to the base station to know exact health status of the soldier. The GPS is also inserted to track the exact location of the soldier and base station can guide the soldier. In this project the exact location and health

parameters of soldier can be sent to the base station in real time so the immediate actions can be taken in case of emergency. This technology helps to minimise the rescue, time and searching for soldier from control unit. This is most important factor in this project that we have ready to build up. These devices will improve the awareness of military personal as well as who will also communicate with the wireless networks with hosts. Soldier navigation between soldiers organization plays important role for careful planning and co-operation.

### Motivation

Due to lack of soldiers losing their life in the battle field without proper communication and guidelines from the control unit. The main problem is control unit cannot locate the exact location of the soldier and it become difficulty to the war strategies. So from this situation motivated ourselves to solve this problem with the help of IOT. Our motivation is to help the army forces by this technology.

## 2. Literature Survey

This project consists the idea of tracking and continues monitoring of soldier's health when ever and where ever needed. This paper[1] has used the M Health tracking system consisting of Microcontroller,MAX232,GSM,PC

server, biological sensors like Temperature sensor, heart beat sensor.

This paper[2] has used the ZigBee Module to transmit the data collected from sensors and the LoRaWAN Module has been used to further transmit the data to destination/control room. Some of the modules used in this Paper are Airdiuno, GPS, GSM, ECG, ZigBee Module, LoRaWAN, sensors etc.

This paper[3] has proposed the module which has used WiFi module instead of GSM to transmit the data to the destination. The modules used in this paper are GPS, sensors, Arduino Microcontroller, WiFi module etc.

This paper[4] has proposed the module with the help of ESP8266 WiFi chip which is a low cost and less power consuming chip. this module has used the GPS, GSM,ESP8266,Arduino Micrcontroller,x16 LCD display etc.

This paper[5] has proposed the module to transmit the data using ZigBee Wifi module and the tracking of soldier is done by GPS Module. Data is processed by K-means clustering to assess the conditions of the soldiers surroundings.x16 LCD has been used to display the readings of the soldiers which has been recorded from the sensors in digital form. This data has been converted from Analog to Digital using converter.

Table 1:

Reference	Microcontroller	GSM	WiFi	Heartbeat senses	Temperature sensor	Vibrate sensor
Jasvinder et al[1]	MAX232	Yes	Yes	Yes	Yes	No
Akshay Gondalia[2]	Aurdino	No	Yes	Yes	Yes	No
Abaar Saikh[3]	Aurdino	No	Yes	Yes	Yes	no
Monika v[4]	Aurdino	Yes	Yes	Yes	Yes	No
Bindhu [5]	Aurdino	No	Yes	Yes	Yes	No
Our propesd System	Aurdino	Yes	Yes	Yes	Yes	yes

## 3. Proposed System

This proposed system is not only performs the important task of health monitoring but also useful to track the soldiers using IOT. The control room can get the details about the position and orientation of soldier from GPS. Not only the direction and the control people can monitor soldier health parameters. Technology to provide the accurate location of missing soldier in critical condition and overcome the drawback of soldiers missing in action.

### A. Methodology

Our proposed model is consisting of Arduino board with modules embedded in it. The modules are GSM, GPS, ESP32, Wi-Fi module, Biological Sensors like Heart rate

sensor, Temperature Sensor, X16 LCD Display, Keyboard etc.

Arduino board can be powered on by USB portal cable or charger of a smart phone etc. The board is

powered on by connecting USB cable of the computer. ESP32 microcontroller, Wi-Fi module, Biological sensors are powered up.

The data collected from the Soldiers body is transmitted through Cloud by the transmitter placed on the Arduino board. The X16 Display embedded on the Arduino board is used to display all these data. The GSM is used to transmit this data to the control room.GPS on the Arduino board gives the exact and accurate location of the soldier.

ESP32 is a less cost WiFi module which makes our job easy with TCP/IP capabilities. This enables the connection to the WiFi network.

### B. Pseudo Code

In this section we have written pseudo code for gps location based module.

```
{
  Serial.print(F("Location: "));
  if (gps.location.isValid())
  {
    Serial.print(gps.location.lat(), 7);
    Serial.print(F(", "));
    latt=(gps.location.lat(), 7);
    longi=(gps.location.lng(), 7);
    lcd.setCursor(0,1);
    lcd.print(gps.location.lat(),4);
  }
}
```

### C. Flow Chart

A flowchart is a visual representation of the sequence of steps and decisions needed to perform a process. Each step in the sequence is noted within a diagram shape. Steps are linked by connecting lines and directional arrows.

Here is the Flowchart of Soldier unit and base Unit.

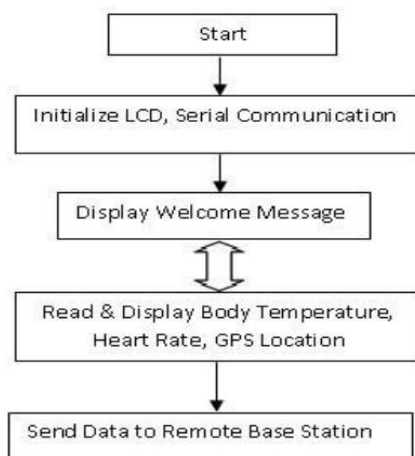


Figure 1: Flowchart of soldier and base unit

### D. Block Diagram

The below figure represents the diagram of the soldier tracking and health indication system.

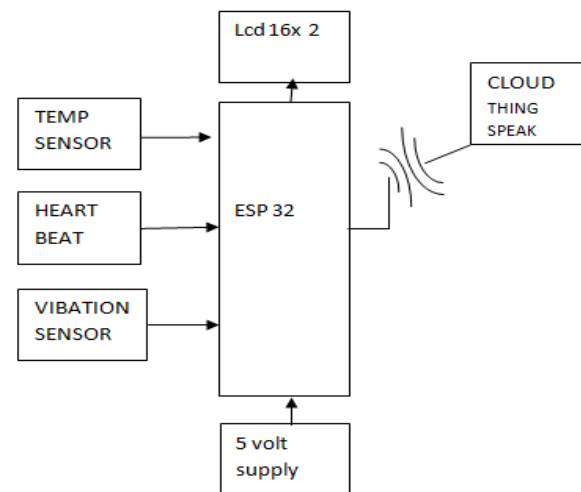


Figure 2: Block Diagram of the proposed system

### 4. Result

The program developed and implemented using aurdino software, according to the mentioned algorithm has been compiled and loaded to the microcontroller board successfully. The bio sensors can successfully detect the pulses, heartbeat, temperature and vibration at close proximity. GPS tracks and it ill show the location of soldier.

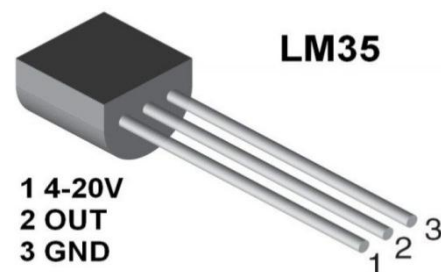


Figure 3: Temperature sensor



Figure 4: circuit board

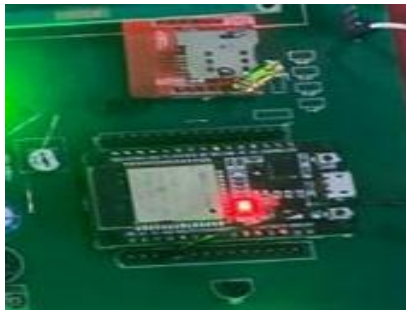


Figure 5: ESP32 Microcontroller

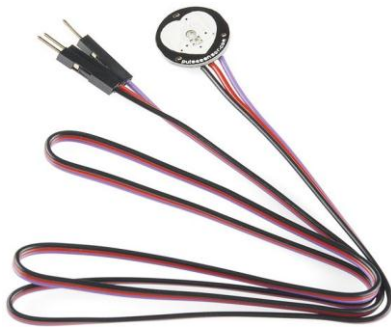


Figure 6: Heartbeat sensor

## 5. Conclusion

The project reports an IOT based system for the health monitoring and tracking of the soldiers. Through this Proposed System, we are able to send/transmit data which is recorded from the sensors embedded in the system through wireless network to the control room .The system will help to know the location of the soldier and monitoring the health condition of the soldiers and displaying the suitable message/advice through LED display on the proposed system.

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