Soldier Navigation and Health Recording System

Kshitij Gupta, SanjanaDesarda, Siddharth Dumka
Student, IT Department, SVKM's NMIMS MPSTME, Shirpur, India

Ms. PratikshaMeshram
Asso. Professor. Information Technology, MPSTME, NMIMSShirpur, India

***Abstract*—**In the present period adversary fighting is a significant factor in any country's security. The national security for the most part relies upon armed force (ground), naval force (ocean), aviation based armed forces (air). The significant and imperative job is played by the troopers. There are numerous worries with respect to the wellbeing of these fighters. The protection branch of nation must be viable for the security of that nation. This framework will be valuable for warriors, who include in missions or in exceptional tasks. This framework empowers GPS (Global situating frameworks) following of these officers. It is conceivable by M-Health. The M-wellbeing can be characterized as versatile processing, clinical sensors and correspondence advances for human services. Right now, sensors are joined to the assortment of fighters. This is actualized with an individual server for complete versatility. This individual server will give the availability to the server at the base station utilizing a remote association. Each warrior additionally has a GSM (Global framework for Mobile correspondence) module which empowers the correspondence with the base station if there should be an occurrence of wounds. When some other warrior enters the foe lines it is extremely hard for the military base station to think about the area just as the wellbeing status everything being equal. In our venture we have thought of a thought of following fighter just as to give status of the trooper during the war.

Keywords: IOT, Arduino board, GPS, GSM, Biomedical sensors, Health monitoring.

I. INTRODUCTION

Trooper is continually confronting demise. He never evadesduty. He battles in most troublesome landscapes, on slopes and mountain, in fields and backwoods. The resistance of the nation is his essential strategic. The job of officer in shielding the wildernesses of his unobtrusiveland is exceptional. He lives and bites the dust for the NATION. It is our duty to support our trooper. That is the reason we are presenting this venture which will be very valuable for giving wellbeing status of the officers and give clinical assistance to them at basic circumstance in front line.

In our framework we are fundamentally concentrating on Soldier's wellbeing as far as his pulses and his body temperature. On the off chance that trooper gets harmed and becomes oblivious by discharge or because of some other explanation, at that point his heart thumps begin expanding or diminishing step by step. Right now circumstance where the data about current heart rascal rate turns into the fundamental piece of officer, this task develops out as best to recognize the specialists at server site with the right and quick data. In the event that heart beat either increments above basic level or diminishes beneath the basic level, a message is consequently sent to server with the assistance of GSM modem.

GPS tracker will give the present area of the fighter which will be valuable for finding warrior's area and giving clinical assistance as right on time as conceivable. In the event that on the off chance that warrior is harmed, at that point by utilizing the GSM modem connected to the gadget a SMS will be sent to medical clinics in the region or to the base station to give assistance.

The objective of this undertaking is to build up a minimal effort, low force, dependable, non-meddlesome and non-obtrusive indications of wellbeing status. To follow the area of the trooper. To follow the area of the fighter i.e. longitudes and latitudes.

The technique embraced for this venture is to utilize non-intrusive sensors to gauge pulse and body temperature. Signal moulding circuits are planned to channel and enhance signs to give wanted yield. All the parts utilized in the circuit are low fueled and modest. The obtained information is continuous what's more, is sent through ADC and into Micro controller. [2]

II. OVERVIEW OF THE SYSTEMS

Here the Over viewpoint of the structure is appeared and clarified quickly.

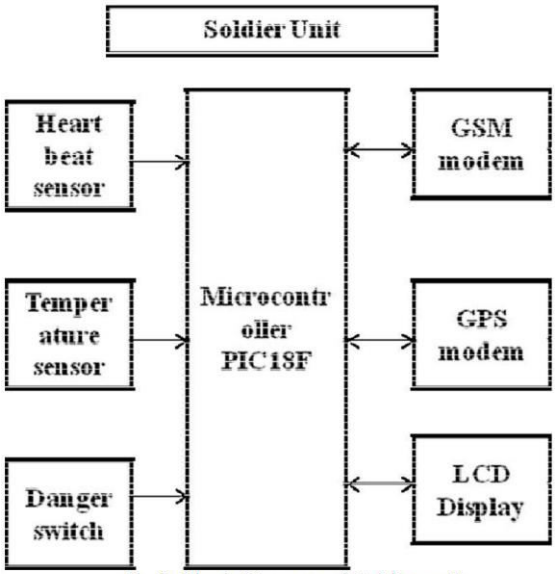

Fig.1: Block Diagram of Soldier unit

Fig.1 Shows the square chart of the trooper unit which incorporates the following squares.

A. Heart beat sensor
- The Heart Beat sensor gives a straightforward method to consider the heart's capacity.
- This sensor screens the progression of blood through the finger.
- As the heart powers blood through the veins in the finger, the measure of blood in the finger changes with time.
- The sensor sparkles a light flap (little High splendid LED) through the finger and measures the light transmitted to the LDR.
- The signal acquired from the LDR is intensified by the speaker and will be sifted and given to the ADC.

B. Temperature sensor
- The Temperature can be distinguished with the assistance of a temperature sensor LM35.
- The LM arrangement are exactness coordinated circuit temperature sensors, whose yield voltage is straightly corresponding to the Celsius (Centigrade) temperature.

Station which when squeezed promptly will caution Base station and therefore won't hang tight for heart thumps to leave the typical range.

III. MATHEMATICAL MODELING AND SYSTEMS DESIGN

A. Heart beat sensor

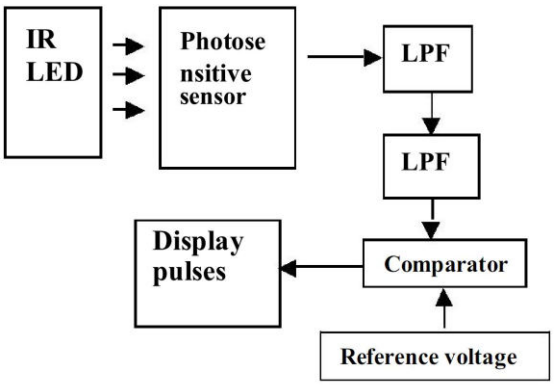

Fig.2: Block diagram of heart beat sensor.

C. Microcontroller (PIC18F)
- It continually screens the signs from the sensors and if any variety from the standard like the heartbeat extended or lessened or the internal heat level ascents or falls then the information got from these sensors and the territory information got from the GPS modem is sent as the message to a central zone with the help of a GSM modem.
- The sequential port of the smallscale controller is associated with the GSM and GPS modem.

D. GSM Modem

- The GSM MODEM is utilized to give the data of the officer like the heartbeat rate and the internal heat level to a remote area.
- It resembles an adaptable which requires a SIM card for its movement anyway the upside of GSM modem over flexible is that it has a successive accessibility that can be clearly connected with the Micro controller for sending the AT(Attention) orders for sending SMS

E. GPS modem

- The location of the trooper can be followed with the assistance of a GPS MODEM.
- The GPS modem gets the signs from the satellite and computes the Latitude and Longitude of the area of fighter and sends it to the controller as the sequential information.

F. LCD Unit

The LCD shows the heartbeat rate and the temperature, current date, time and area of warrior.

G. Danger switch

Threat switch that helps in cautioning the Base Deference voltage Fig.2 is the square outline of heart beat sensor which incorporates IR LED, photosensitive sensor and show and activity of above square graph is clarified underneath

Operation:

The frameworks comprise of an infrared (IR) LED, a photograph transistor sensor, both high and low-pass channels, just as a speaker, comparator and yield LED. An oscilloscope is incorporated to show the sign

From the outset, the IR-LED is used to illuminate an individual finger with infrared light. The light power is balanced by beat changes inside the finger before striking the photo transistor. The sensor by then changes over the changing light force into a relative voltage containing two sections a tremendous DC off-set contrasting with the typical light power similarly as a bit of varying sign achieved by evolving beat.

The voltage signal is then adhered to a high pass procedure to empty the DC part and a while later light is escalated. Low-pass isolating is then applied to oust any high repeat clatter before giving the indication on an oscilloscope. Finally, the sign is appeared differently in relation to a reference voltage using a voltage comparator, and a yield LED is edified if the voltage signal is more critical than the perfect edge, indicating a heartbeat.

The rectangular pulses which we get from this technique are applied to the counter pin of the little scope controller. Counter of the Micro controller counts the amount of pulses for term 5 sec. copies it by 12 and shows as a heartbeat rate for every minute considering the way that in order to get the results in bpm (throbs each minute).

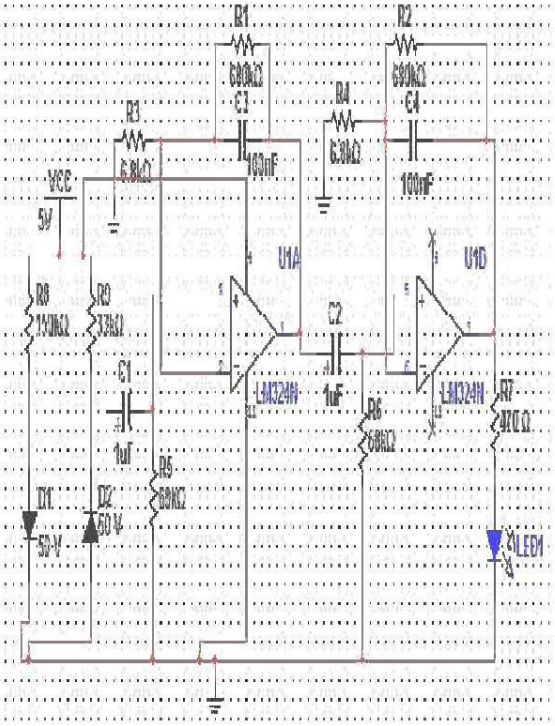

Fig.3: Circuit diagram of Heartbeat sensor

H. Selection of LED

Since the discovery of heart thumps incorporates identification of light changes through the finger, this procedure includes methods for catching the light varieties with incredible exactness. Subsequently the wellspring of light should be with the end goal that light goes through the finger productively. Making location simpler. Henceforth we are utilizing the IR LED, otherwise called IR transmitter.

I. LM35 Sensor

- The LM35 are Precision facilitated circuit temperature sensor whose yield voltage is straightforwardly proportional to 0 C.
- LM35 temperature sensor related with pin 6 VIN gives constant temperature in basic structure.
- When When low to high heartbeat is applied to littler scope controller PIC18F which has inbuilt ADC.
- When it adequately changes over the value, it sends the thwart to the scaled down scale controller. Little scope controller thusly by and by executes ISR (A meddle with organization routine (ISR) is an item plan that hardware summons considering a meddle. Is Rs take a gander at a prevent and conclude how to manage it. ISRs handle the meddle, and a while later profit a savvy barge in for regard.) where it examines the changed over a motivating force in ADC by sending High to low heartbeat to stick 2 RD.
- 1°C climb in temperature grows voltage by 10mV.
- The LM35 thus has an advantage their straight temperature sensor adjusted in Kelvin, as the user is not required to deduct a colossal constant voltage from its output to acquire advantageous centigrade scaling minimal effort is guaranteed by cutting alignment at water level.
- The limit of LM35 in this endeavor is to screen the inside warmth level. J. MAX232-Level convertor.

J. MAX232-Level convertor

- MAX232 is used for level change to change over TTL voltage level to CMOS voltage level.
- The MAX232 is an composed circuit that changes over signs from a RS-232 successive port to signals sensible for use in TTL flawless progressed
  Basis circuits.
- The MAX232 is a twofold driver/gatherer. The MAX232 changes over the information given by the GSM and GPS modem and is given to the microcontroller.

K. GPS modem

- The GPS unit contains a GPS module alongside a GPS recipient reception apparatus.
- The module capacities as indicated by its constructed and the receiving wire gets the data from the GPS satellite in NMEA (National Marine Electronics Association) group. This information is then sent to the miniaturized scale controller wherein it is decoded to the necessary arrangement and sent further.
- The GPS module continuously transmits serial data (RS232 protocol) in the form of sentences according to NMEA standards.
- The scope, longitude, time, date and speed estimations of the beneficiary are contained in the GPRMC sentence as given in the accompanying model (likewise allude NMEA position for different sentences). Right now, values are extricated from the GPRMC sentence and are shown on LCD.

L. General NMEA Format:

- The general NMEA (National Marine Electronics Association) the position comprises of an ASCII string commencing with a $ character.

IV. FLOW CHART

The flow graph of GPS and GSM are being clarified and appeared in Fig.4 and Fig.5

A. Flow chart of GPS

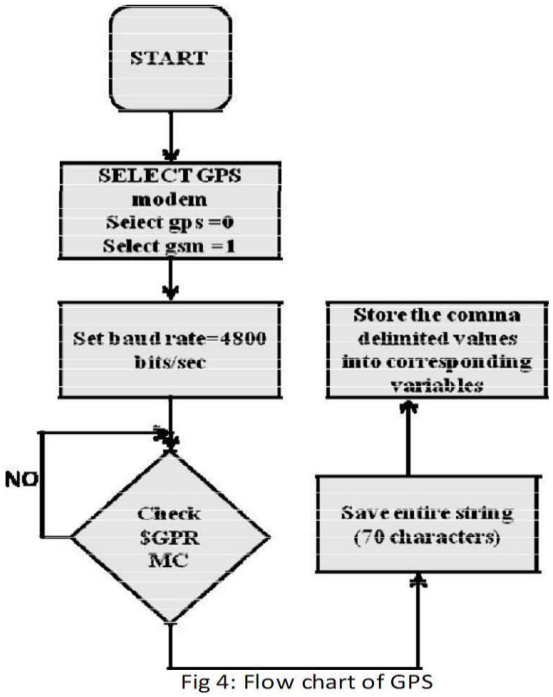

Fig 4: Flow chart of GPS

Fig.4 shows flow graph of GPS module which incorporates the calculation of GPS framewrok.[1]

- Start
- Select the GPS modem
- Set the baud rate as 4800 bits/sec
- Check whether you have received the $GPRMC message
- From the comma delimited GPRMC sentenced, latitude, longitude, date, time, speed values are extracted by finding the respective comma positions.

B. Flow chart of GSM

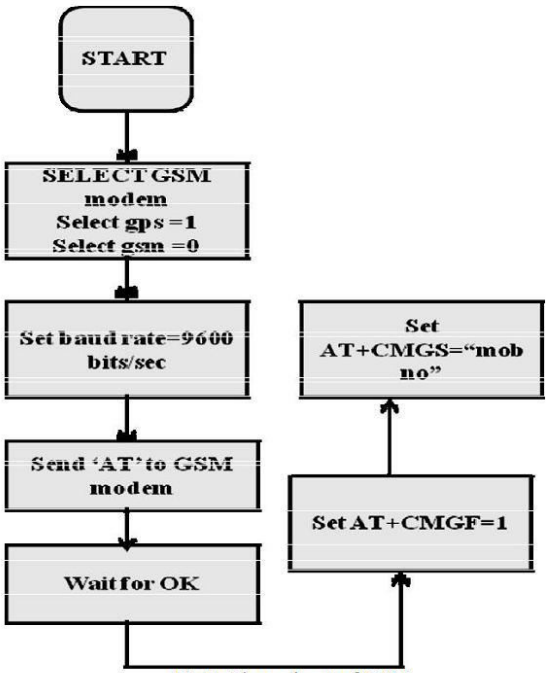

Fig 5: Flow chart of GSM

Fig.5 shows flow graph of GSM module which incorporates the calculation of GSM system.

- Start
- Select GSM modem.
- Set the baud rate as 9600 bits/sec.
- Send 'AT' to GSM modem to check whether it is working.
- Wait for 'Ok'
- Send the message to the base station mobile number using AT commands.

V. RESULT

We have accomplished the heart beat pulses appeared in fig.6 and likewise the heart beat counter and temperature estimation utilizing LM35 sensor shown in Fig.8.

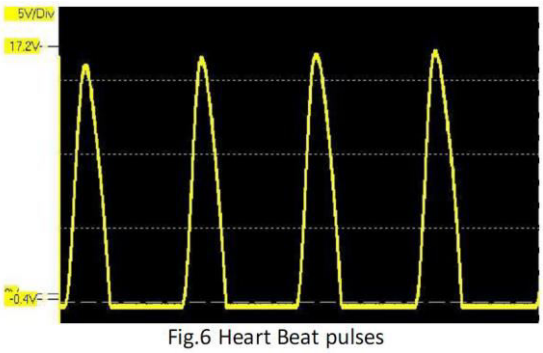

Fig.6 Heart Beat pulses

Fig.6 are the Pulses of Heart beat sensor acquired from the circuit graph given in Fig.3.

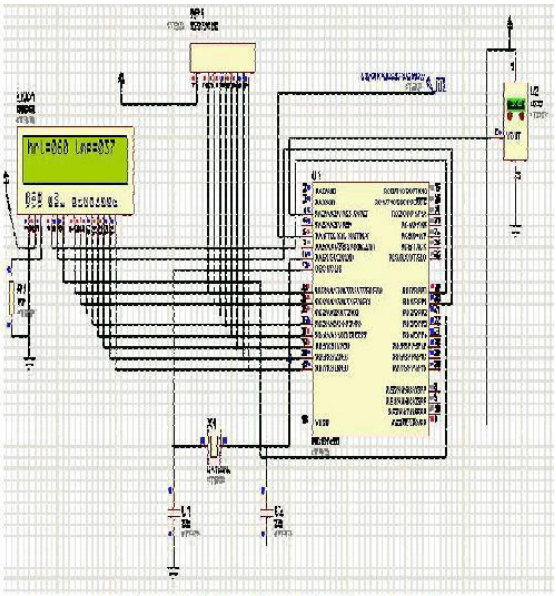

Fig.7 : Heart beat and temperature sensor counter.

Fig 7 shows the tallying of Heart beat pulse and it gauges the temperature utilizing LM35 sensor and the readings are appeared in the LCD Display.

CONCLUSION

This challenge assessments an IoT based totally system for the health tracking and monitoring of the infantrymen. Biomedical sensors provide heartbeat, frame temperature, and environmental parameters of each soldier to control room. This generation can be helpful to offer the accurate region of lacking soldier in critical circumstance and conquer the drawback of soldiers missing in movement. The addressing system is also useful to improve the communique between soldier to soldier in an emergency state of affairs and provide proper navigation to manipulate room. Thus, we can finish that this device will act as a lifeguard to the army personnel of all over the globe. In destiny, a transportable handheld sensor tool with extra sensing alternatives can be developed to aid the squaddies. In

addition to that, Grove gasoline sensors can be located which measures oxygen concentration in the environment, medical instruction can be given to the squaddies to conquer the scenario, Zigbee technology may be used for extending the variety of network for communication.

ACKNOWLEDGMENT

We take this opportunity to thank our project guide, Ms. PratikshaMeshram for her guidance and support throughout the course duration. Her efforts to clear our concepts and to help us code the entire algorithm were valuable for the development of this project. Her role as a project coordinator helped us to meet all our deadlines.

REFERENCES

[1]Akshita V. Armarkar, Deepika J. Punekar, Mrunali V. Kapse, SwetaKumari, Jayshree A. Shelke,"Soldier Health and Position Tracking System ", IJESC, 2017.

[2] Mr.PatilAkshay, Mr.ShelakeBalaji, Mr.PinjariRaju, Ms.Mirajkar P.P.," GPS Based Soldier Tracking and Health Monitoring", International Research Journal of Engineering and Technology (IRJET), 2017.

[3] MusaleMegha, WaghMadhuri, TambeSupriya, GaikwadAjit&Prof.Chidre.S.R, "soldier health and position tracking system", International journal of engineering researches and management studies (IJERMS), 2017.

[4] Monika V. Bhivarkar,Anuja G. Asole, P. B. Domkondwar, "IOT and GPS Based Soldier Position Tracking and Health Monitoring System", International Journal of Emerging Technologies in Engineering Research (IJETER), 2018.

[5] Deepa J, Ranjini, Sharanya Raj, Dr.Parameshachari B D, "Soldier Health and Position Tracking System using GPS and GSM Modem", International Journal of Engineering Research & Technology (IJERT), 2018.

[6] Kiran V. Burade , Akhilesh P. Deshmukh, Krutika S. Mankar, Ankush D. Mendhekar, Rajendra B. Khule," Soldier Monitoring System using Zigbee", International journal of research in engineerning, science and management(IJRESM),2019

[7]] R. Archana, S. Indira "Soldier Monitoring and Health Indication System" International Journal of Science and Research (IJSR), (2013)

[8]Abrarshaikh, MangeshKorde, AkshaySonwane, MayurGadekar, Prof. Sarita Patil, IOT enabled soldier health and location tracking system, International Journal of Computer Engineering and Applications, 2018

[9] EktaMadhyan, Mahesh Kadam, "A Unique Health Care Monitoring System Using Sensors and ZigBee Technology", International Journal of Advanced Research in Computer Science and Software Engineering, ISSN: 2277-128X, Volume 4, Issue 6, June 2014

[10] Srijani M., Koustabh D. Soumya K. Patient Health Management System using Health Monitoring Architecture. Advance Computing Conference (IACC), 2014 IEEE International, 2014.

[11] R. Archana, S. Indira, Soldier Monitoring and Health Indication System, International Journal of Science and Research (IJSR),2014

[12]PalvePramod, "GPS Based Advanced Soldier Tracking With Emergency Messages & Communication System", International Journal of Advance Research in Computer Science and Management Studies, 2014