

IOT BASED SOLDIER HEALTH AND POSITION TRACKING SYSTEM

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Abstract— In present era, safety of the soldiers which are the first line of defense has become an important concern. This issue can be solved with the help of our device “ISHP”. The aim of this project is to create a device which is attached to soldiers and look their health status and location. For Health relating we can use sensors like heart rate, Humidity and Temperature sensors. We are using GPS which gives us the latitude and longitude to find the exact location of soldiers. GSM Module is used for sending message through internet. We also use Accelerometer sensor for positioning. A new feature is added with the help of Wi-Fi module i.e. ESP8266, which enables internet. With the help of internet, the data of soldier is sent to web server. This web server can be accessed from anywhere in the world with just internet connectivity. The web server we are using is Thing Speak. In this web server the data is updated in every 15 seconds. We also going to use an emergency button and if soldier press that a message is send to the base unit along with location. We also using Liquid-crystal display (LCD) for seeing any changes in health of soldiers. The system is very much beneficial for military which can see the data and prompt action can be taken if required.

Keywords—GPS, GSM, Thing Speak, Sensor

I. INTRODUCTION

In today's world enemy warfare is important factor in nation security. The main aim of the project is to Track the Soldier Health Status and Positioning. During any kind of emergency to a soldier, he can press the emergency button. As soon as the buzzer is pressed by the soldier a message is sent to the base unit with the health status and Position of soldier. This will alert the base unit and they will take necessary action. In this project we are using Internet of Things (IOT) technology. We are going to use Wi-Fi module which helps us to connect through internet and send the various messages as well as data to the base unit. This whole system is connected with Arduino Nano board.

GPS and GSM are also used to find the location of soldier and send it to the unit. The programing part is done in embedded C language. Arduino is used to describe the system requirement in providing real-time response. This device would be highly impactful once it's ready for implementation. It can be used by soldier anywhere to make sure that they're safe

and sound. This system can help soldier be more confident and carefree when they step out to a battlefield. In the upcoming era, it will surely play a major role by providing soldier a safe environment in all situations. In the existing world when technology is at its peak, it will be important to upgrade the device as per the circumstances that a soldier might face. Thus, it is necessary to update the device soon by adding a feature of adding the ammunition left. It is also necessary to cover the sensor of the device to provide proper protection to our device as well. This device has features for both day to day safety as well as real time emergencies too. Thus, it can be made as an ultimate tool of all times. With further research and innovation, this project can be made even more impactful. Thus, we will be able to reduce the impact on the life of soldier and will ensure that they are safe and sound whenever they go to the battlefield. Our device “ISHP” has a great potential to help the soldiers by the technologies used in it. This project suggests a new technology to monitoring soldier Health and Positioning. The focus of this project is to develop a system for soldiers which get lost in the battlefield. We have designed a device that has a wide range of features and functionality and can be used by military for help in emergency situations. The device can easily be fitted to soldier’s body.

II. RELATED WORK

The author in [1] propose a low-cost embedded system for soldier’s assistance. The health is monitored with the help of different bio-sensor and the data collected is proceed using robust and steady algo. For communication to the base station, they are using low range (LORA) module. The information can be used to send up to 700 mt at 2400 baud rate and could be increase further.

The author in [2] focused on providing four-module architecture comprises of IOT module (IOT-M), Data Processing Module (DP-M), context- aware module (CA-M) as well as decision making module(DM-M) for storing and processing numerous sensor data. This system provides good results with high accuracy, scalability, network latency, and low reaction time.

The author in [3] proposed to execute a brilliant patient administration, observing and following interaction which is able to use in emergency clinics. The framework will make special ID numbers for each understanding. This ID is then connected to all chronicles of the patient's crucial signs and saved during an information base for additional investigation and authentic interview. The framework will give continuous patient observing during a crisis and basic consideration unit in a medical clinic. It likewise cautions emergency clinic staff if any change is identified. Radio-recurrence recognizable proof (RFID) innovation is used to follow patients by creating an interesting ID.

The author in [4] fundamentally separate the equipment and utilized Wi-Mon programming to gather the information from various sensors. This data gives the idea of patient reality in any sickness like Dengue. Assortment of extraordinary data like temperature, beat rate, ECG, oxygen immersion and circulatory strain are utilized as a base material to take a gander at the health with the exactness of Wi-Mon programming.

The author in [5] point of this IOMT-based wellbeing checking framework i.e., Bio sense wellbeing 1.0, working model for continuous essential measurement of patient and send

information to specialists by means of thing speak.com. The gadget is completely tried on 50+ live understanding in different nursing home and clinics with exact pace of 90% contrasted with existing wellbeing observing framework.

The author in [6] they proposed a system which is focused to solve the issue of monitoring comatose patient's state by monitoring heart-beat, respiratory rate & eyelids status. This total system is created to send the information to Android App on the phone on which application is created to indicate different readings measured.

The author in [7] point is to joined the long reach and low force utilization attributes of LoRaWAN and ZigBee. GSM are don't proposed for correspondence. They gathered information and uploade on the cloud for additional information investigation utilizing a K-Means Clustering calculation.

The author in [8] proposed a model with a GSM module associated with a Raspberry Pi and gather to different wellbeing observing sensors. This framework zeroed in on straightforwardly move of wellbeing information in type of direct messages on the telephone of doctor.

They expected to make it convenient and subsequently to diminish the heap inside the medical clinics for patient checking.

The author in [9] propose a model on IOT based wellbeing observing movable framework for the estimation of the Heart rate and muscle to fat ratio with the assistance of LPC 2129 Arm Processor Development Board. With this proposed time span is saved of patients, to limit the visit to specialist to check the medical issue. Acclimatizing innovation like WI-FI grants remote transmission. Patient's information is ship off the net worker, through which they will screen the boundaries utilizing page anyplace inside the world utilizing keen gadgets.

The author in [10] introduced a model that is compelled to work just on transmission of Electrocardiographic signals through zigbee remotely. By associate diverse sensor to various hubs inside the body, they gathered a progression of information which is in simple structure and made a web application for showing the readings per to the patients.

III. HARDWARE REQUIREMENT

- **Arduino Uno**



Fig. 1: Arduino Uno

Arduino is an open-source equipment and any one can subtleties of plan. The gadget works between 1.8 to 5.5 volts. It is a solitary chip microcontroller. The gadget accomplishes throughput by 1 MIPS for each MHz.

- **Heartbeat Sensor**

Heartbeat sensor information is extremely helpful for deciding the wellbeing status of an individual. The sensor module could be a fitting and play beat sensor for Arduino. It associates a pulse sensor with enhancement and clamor retraction hardware making it quick and simple to get dependable heartbeat readings. It gives power with 4 mA current draw at 5V. To utilize it we can cut the heartbeat sensor to ear cartilage or fingertip

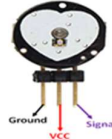


Fig. 2: Heartbeat Sensor

- **Wifi Module**

The Wi-Fi Module is an independent SOC with coordinated TCP/IP convention stack that can give any microcontroller admittance to your Wi-Fi organization. It is either equipped for facilitating an application or offloading all Wi-Fi organizing capacities from another application processor. Every WIFI module comes pre-customized with an AT order set firmware, which implies we can essentially connect this to your Arduino gadget and get as much Wi- Fi-capacity as a WiFi Shield offers.

- **DTH11**

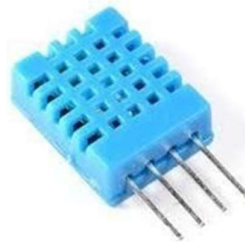


Fig. 3: DTH11 Sensor

The DHT11 is a super minimal effort advanced humidity and temperature sensor. It utilizes a capacitive stickiness sensor and a thermistor to quantify the encompassing air, and gives an advanced sign on the information pin.

- **GPS Module**

GPS represents Global Positioning System. It is a space- based worldwide route satellite framework which gives us area and time data in all climate condition and at whenever and anyplace on the planet.

- **GSM Module**

GSM represents Global System for Mobile correspondences. It is world's most utilized cell innovation. Cell phones utilize a telephone administration transporter's GSM network by finding for cell phone towers in the space close by. GSM module is a breakout board. It can speak with arduino with the assistance of AT orders. This module upholds programming power on and reset.

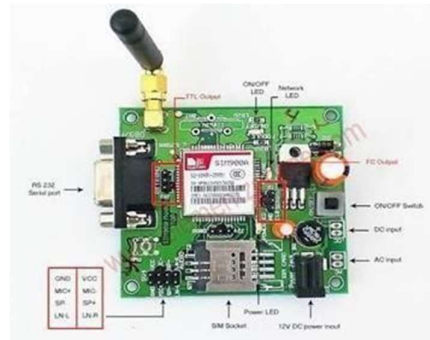


Fig. 4: GSM module



Fig. 5: Wifi module

IV. Working Principle

The principle point of this project is to discover the specific area of the soldier who got harmed in war zone. This GSM based soldier health and position track the specific area of a trooper as far as its longitude and scope. This information is taken care of to the Arduino, which is interfaced to a GSM modem. The Arduino recovers the specific area subtleties from the GPS and sends a SMS to the base unit with the assistance of GSM modem. A LCD show is associated with the Arduino for checking the information got prior to being sent over GSM. This undertaking will be valuable to armed force base station to monitor their soldiers. We are additionally going to gather continuous information with the assistance of Thing Speak. The Value in things peak will be refreshed each 15 second. We additionally have crisis button if an officer press that than a message is ship off base unit with area. The circuit arrangement is appeared in Fig. 6.

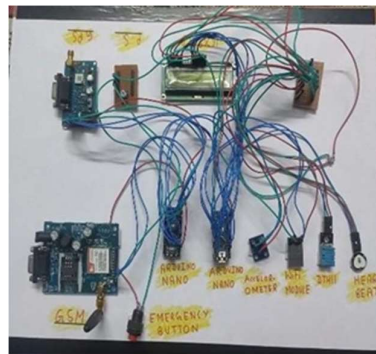


Fig. 6: Circuit Diagram

We used GPS to trace the location of the soldier, DHT11 and Heartbeat Sensor to screen the health status of the warrior and GSM to bring communication among fighter and specialists. First power supply is given to Arduino then GPS and GSM module are going to be initiated. The temperature sensor and heartbeat sensor measure temperature (in Celsius) and heartbeat (in BPM) of the soldier respectively. If any of the four parameters exceed its threshold value i.e. temperature(t) exceeds 40 and heartbeat

(t) exceeds 105, humidity exceeds 85 and accelerometer exceed 400. If any of the four parameters exceed its threshold value i.e. temperature(t) exceeds 40 and heartbeat (t) exceeds 105, humidity exceeds 85 and accelerometer exceed 400. Then GPS tracks the exact location of the soldier and sends an alert message to the base unit by using GSM module. We also use thing Speak to gather real time data.

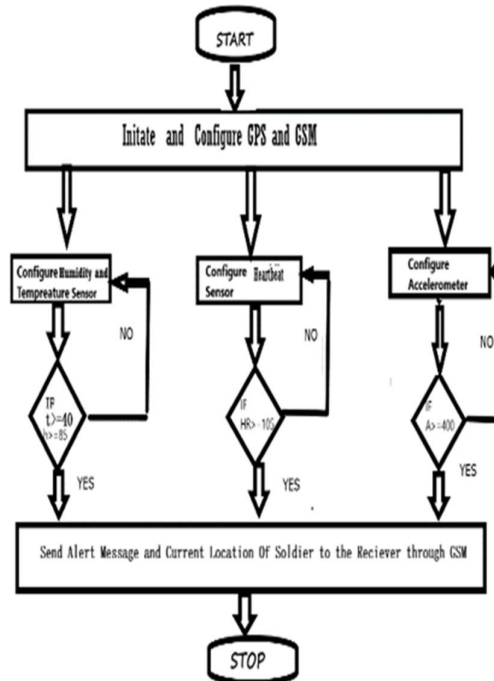


Fig. 7: Flow Chart

V. RESULT

The body parameters (temperature, heartbeat, humidity, and accelerometer) deviates from the given limit esteems, an alarm message is ship off base unit alongside the area of the officer.

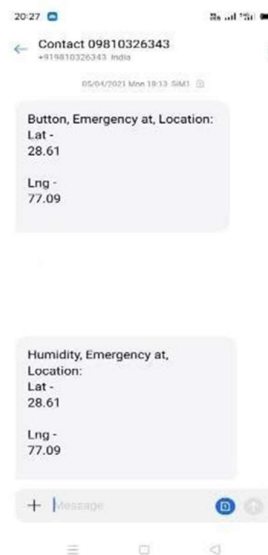


Fig. 8: Result after pressing emergency button & humidity increase beyond threshold value

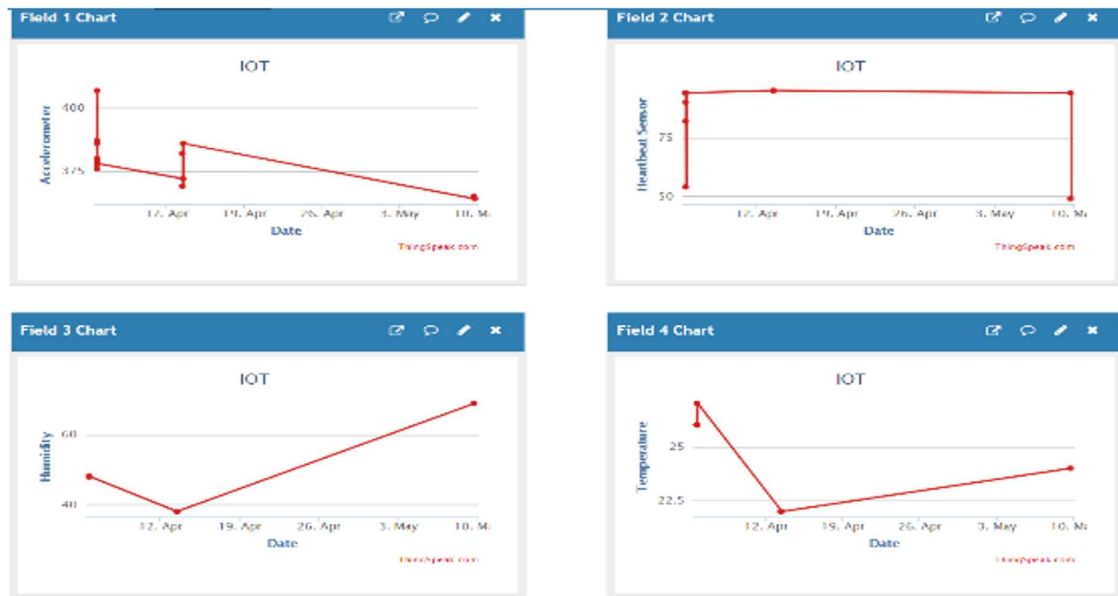


Fig. 9: Result of Real Time Data from thing Speak

VI. CONCLUSION

From the above implementation we have concluded that the correspondence issue between the warriors and base unit is beat utilizing GSM. The area and health status are found with the assistance of GPS and different sensor and with the assistance of GSM module we can send all data to the base unit so unit will make an essential move. Through thing Speak we can continuously monitor the heath parameter of soldier. Using this system, we can minimum the casualties of battle. This model gives power to the defense system of country.

VII. Future Enhancement

The good thing, we noted that there is plenty of possibility to make enhancements in this project. We are going to make our device water-proof and fire resistant by using an isolation spray. Thus, this friendly device may be also used if we've a rainy season or fire like situation occur. The betterment of base station unit can even be done by making proper GUI at base station PC and officials at base station may send feedback or any order to soldiers via base unit. Prototype are often further calibrated into a whole market product which can be made with chips and utility hardware. We will also develop this system by inter connection camera to the module that take photos and videos of the area, so that tracking will become easier.

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