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SOLDIER HEALTH MONITORING AND TRACKING SYSTEM

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ABSTRACT

In present scenario, nations security has become important constrain. During war, tactics is main factor in any country's security. The nation's security mainly depends on army (ground), navy (sea) and air-force (air). Of which army soldiers plays a crucial role and there are many concerns regarding safety of soldiers. As soon as any soldier enters any remote area it is very vital for the army base station to know the location as well as the health status of him. This paper focuses on tracking the soldier as well as monitoring the health status of the soldier. By using the location sent by GPS, the base station can know aboutthe position of soldier (Latitude and Longitude) and also health can be monitored by parameters sent by GSM with the help of bio-sensors.

Keywords-Biomedical sensors, GPS, Tracking, GSM

1. INTRODUCTION

In this technological era, every domain is trying to improve in their respective fields and military forces are no exception for it .To protect any nation the infantry soldiers of future will be one of the most technologically advance forces in the world. All over the world a lot of research is going on to develop the technologies for the soldiers safety and nations security is prioritize. The soldier has to face many challenges like loss in war, low ammunition, health issues, crossing borders, travelling in the remote areas etc. So in these situations to get help soldier has to communicate with base station or there should be some facility to guide him. To overcome these difficulties GPS can be used to get the location of the soldier and bio-sensors can be used to get the information about his health. This information will be sent to base station. Base station will be able to provide necessary help to soldier. In addition to this fixed question keys can be provided to the soldier which will allow him to send message to thebase station. Here google map can be used to display the locations of soldiers. With the help of google map it is possible to know the current location of each soldier which is displayed onsingle screen.

2. LITERATURE SURVEY

1]"Soldier Position Tracking and Health Monitoring System:(March 2018)"--

Priyanka R. Pawar1, Abhijeet B. Desai

Their project efficiently keeps a check on the health status of the soldier, and his precise location to equip him with necessarymedical treatments as soon as possible. Soldier's tracking is done by using GPS and Wi-Fi module, which is used to provide wireless communication system. For monitoring the health parameters of soldier they used bio medical sensors such as temperature sensor and heart beat sensor. An oxygen level sensor is used to monitor atmospheric oxygen so if any climatic changes, the soldiers will be equipped accordingly.

2] "GPS Based Soldier Tracking and HealthMonitoring: (March 2017)" --

Mr.Patil Akshay, Mr. Shelake Balaji, Mr. Pinjari Raju, Ms.Mirajkar P

Their project has come up with an idea of tracking the soldier as well as to give the health status of the soldier during the war, which enables the army personnel to plan the war strategies. Also the soldier can ask for directions to the army base unit in case he feels that he is lost. By using the location sent by the GPS, the base station can guide the soldier to safe area. The system composes of two parts, which are portable remote soldier unit and the monitoring centre.

3] "IOT Based Soldier Navigation and Health Monitoring System: (2017)"--

Krutika Patil, Omkar Kumbhar, Sakshi Basangar, Priyanka Bagul

They proposed an efficient system which has an application of tracking the soldier's location and health parameters during the war, which also invokes the military or army officers to plan the war strategies. Base station gets location of soldier from GPS and communication takes place through the Zigbee modules. An important service of the base station is to guide the soldier on correct path if he is lost in the battlefield. The base station can access the current status of the soldier which is displayed on the PC and this system uses The IOT. Using various biomedical sensor health parameters of soldier's are observed, the position and orientation of soldier is trapped using GPS.

4]"IoT-based Healthcare Monitoring System for War Soldiers using Machine Learning: (2018)"

Aashay Gondalia, Dhruv Dixit, Shubham Parashar, Vijayanand Raghava, Animesh Sengupta

In this paper bio medical sensors and monitoring devices are integrated with the soldiers. The integrated components must be light weight package and must provide desired result without requiring much power. One of the fundamental challenges in military operations lies that the soldiers are not able to communicate with control unit. In addition, the proper navigation between soldiers plays an important role for careful planning and co-ordination. So, the proposed work focuses on tracking the location of soldier which is useful for control room station to know the exact location of soldier and accordingly they will guide them. Control unit gets location of soldier using GPS. It is necessary for the base station to guide the soldier on correct path if he lost in the battlefield. This paper will be useful for the soldiers, who involve in special operations or missions. Smart Bio medical sensors including Heartbeat sensor, ECG module, Temperature & Humidity sensor, Vibration sensor, bomb detector, etc are attached to the jacket of soldiers. These are implanted with the soldier for complete mobility. This system will provide

connectivity to the server at the base station using a wireless connection. The data collected at the base station can be used for further prediction using K-Means Clustering algorithm. This may help the control station to know about the situation at the mission field.

3. OBJECTIVES

- To monitor continuous heartbeat rate of soldiers.
- To get the location status of soldiers.
- To establish communication between person at the control room and soldiers.
- Thermoelectric unit to warm up the soldier's body in extreme cold condition.
- Detect any obstacle or object approaching towards the soldier's head.

4. PROPOSED SYSTEM

The whole system is divided in to two parts i.e. soldier unit and base unit. Soldier unit is placed on the soldier's jacket which is divided into different parts i.e. biomedical sensors, Emergency keys, GPS and GSM unit,warm up unit. Army base unit is at base station which is nothing but a mobile on which all the information received from soldier unit can be displayed through SMS. The block diagram consist of anARM processor, GPS, GSM. Piezo electric plates are used to generate the required power to operate the entire model. As Piezo electric plates are fixed to the soldier shoes, pressure will be developed when the soldier walks; as a result these piezo electric plates will convert pressure to electrical energy and store it in to battery. This stored energy is used for operating the entire device. Supersonic sensors are implemented in the soldier's helmet which detects any obstacle/object approaching towards the soldier's head.

Soldier unit:

This unit is placed in the soldier's jacket.

1) Biomedical sensors: To monitor the health status of soldier. Temperature sensor is used to measure the body temperature and pulse rate sensor is used to measure the pulse rate of soldiers.

2) Piezo electric plates: Power supply for the proposed system will be generated using piezo electric plates which will be stored in the battery.

3) GPS Receiver: The GPS module is used to obtain the location of soldier i.e. longitude and latitude values.

4)GSM Modem: The GSM unit sends SMS to the army base camp which contains the health parameters and the location of soldiers.

5)Emergency switch: The soldier can press the push button in case of emergency situation.

6) Thermoelectric unit: It is used to warm up the soldier's body in extreme cold condition.

7) Supersonic sensor: Detects any obstacle/object which approaches towards the soldier's head.

Base unit: Upon receiving the SMS from the soldier, the LCD shows the soldier's location based on the GPS co-ordinates and it will also display the heartbeat pulse rate and body temperature of the soldier. In this way the army officials can keep a track of all their soldiers.

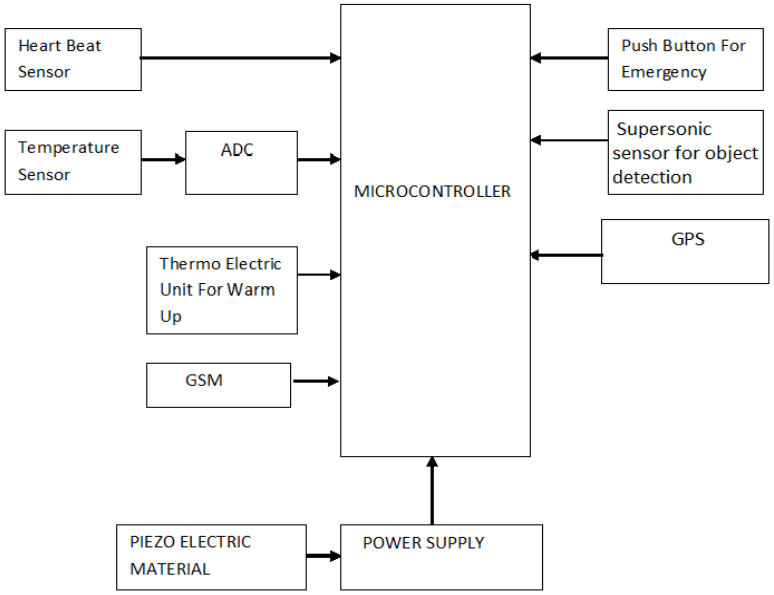

Fig. 1: Block diagram of soldier's unit

Fig. 2: Block diagram of base unit

5. EXPERIMENTAL RESULT

The soldier's body parameters such as heartbeat, temperature and soldier's location (latitude and longitude) is received on the mobile via SMS.

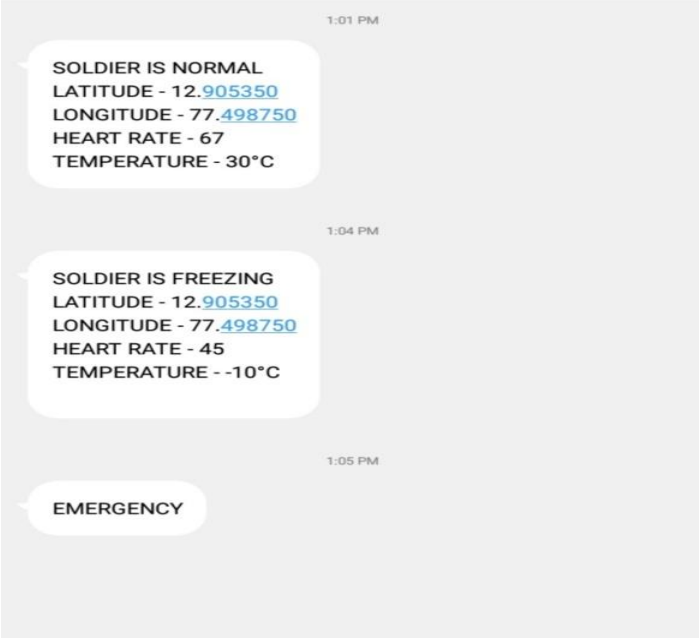

Fig. 3: SMS displaying health status and position of soldier on mobile in various conditions

a) Soldier in freezing conditionb) Soldier in normal condition

c) Emergency button is pressed

6. CONCLUSION

In military operations, one of the fundamental challenges is that the soldiers are not able to communicate with control room and sometimes not even with the other soldier. The protection of the country is primary mission for soldiers. So, there is concern regarding the safety for real Heroes. Several types of instruments have always been designed with the advent in technology to ensure safety and tracking of soldier.This system can be helpful to provide the accurate location of missing soldier in critical condition and overcome thedrawback of soldiers missing in action. The proposed system is also helpful to improve the communication between soldier to control room in emergency situation and provide proper navigation to control room.

7. FUTURE SCOPE

In future, a portable handheld sensor device with more sensing options may be developed to aid the soldiers. In addition to that, grove gas sensors can be placed which measures oxygen concentration in environment, medical instruction can be given to the soldiers to overcome the situation, ZigBee technology can be used for extending the range of network for communication.

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