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Soldier Health Monitoring and Position Tracking System Using GPS & GSM Modem

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ABSTRACT: In enemy territory soldiers not only have to deal with the physical threat, but also with stress and fatigue caused by protracted operations or lack of sleep. So for the security purpose we need a tool for remote soldier performance and health monitoring. So in this project a tool is implemented using biosensors for health monitoring purpose. Also a GPS system is used in order to track the location of soldier. Additionally a GSM modem is also used to make the system wirelessly compatible. Any abnormalities in the readings of wireless body area sensor network (WBASNs) is considered as a trigger for GSM to establish the connection between the soldier and base unit and send current location and health status to the receiver. By using all this equipements we had tried to implement the basic guarding system for the soldier.

KEYWORDS: Arduino Uno, GPS Modem, GSM Modem, Heartbeat Sensor, Temperature Sensor

I. INTRODUCTION

The nation's security is monitored and kept by army, navy and air-force. The important and vital role is of soldiers who sacrifice their life for their country. There are many concerns regarding the safety of the soldier. Soldiers entering the enemy lines often lose their lives due to lack of connectivity, it is very vital for the army base station to known the location as well as health status of all soldiers. 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 as soon as possible.

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.

So this paper focuses on tracking the location of soldier from GPS, which is useful for control room station to know the exact location of soldier and accordingly they will guide them and it is for Highspeed, short range, soldier-to-soldier wireless communications to relay information on situational awareness with Bio-medical sensors, GPS navigation.

II. METHODOLOGY

1.Arduino Uno:



Figure 1.Arduino Uno



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Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

2.Temperature Sensor(LM 35):



Figure 2. Temperature Sensor

LM35 is a precession Integrated circuit Temperature sensor, whose output voltage varies, based on the temperature around it. It is a small and cheap IC which can be used to measure temperature anywhere between -55°C to 150°C. It can easily be interfaced with any Microcontroller that has ADC function or any development platform like Arduino.

3. Heartbeat Sensor:



Figure 3. Heartbeat Sensor

An alternate name of this sensor is heartbeat sensor or heart rate sensor. The working of this sensor can be done by connecting it from the fingertip or human ear to Arduino board. So that heart rate can be easily calculated. The pulse sensor includes a 24 inches color code cable, ear clip, Velcro Dots-2, transparent stickers-3, etc

4.GSM Modem:



Figure 4. GSM Modem



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A **GSM modem** or **GSM module** is a hardware device that **uses GSM** mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network.

5.GPS Modem:



Figure 5.GSM Modem

The Global Positioning System (**GPS**) is a satellite based navigation system that provides location andtime **information**. The system is freely accessible to anyone with a **GPS receiver** and unobstructed line of sight to at least four of **GPS** satellites.

6.LCD Display:



Figure 6.LCD Display

An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits

7.Push Button(Danger Switch):



Figure 7 .Push Button

It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed.Usually illuminates a light on the appropriate button or control panel, and



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sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.

III.RELATED WORK



Figure 8. Block Diagram

The block diagram of soldier position tracking and health monitoring system with environmental analysis is shown in above fig. It consists of two units soldier unit and base station unit. As it requires high speed communication it is intended to use Arduino uno. Biosensors such as body temperature and heart beat sensor is integrated to processor to monitor the health status. The GPS receiver is used to log the location (longitude and latitude) of soldier, which is stored in microcontroller memory.GPS Receiver receives and compares the signal from orbiting GPS satellite to determine geographic position. Using keypad we can send messages to other unit. It also sends the information to the army base station containing the health parameter and the location of soldier. At Army Base Station unit it gets the details of soldier unit through GPS receiver, the soldier location and health status displayed on system at base station using software. This is a wearable technology which is the most important factor of this project.

IV.EXPERIMENTAL RESULTS

The result is as shown below. A message is send on the registered number confirming about GSM and GPS configuration. Later as the normal body parameters deviates an alert message is send to base station along with the precise location of the soldier.



Figure 9. Implementation



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Figure 10. Output

V.CONCLUSION

The proposed system is an effective security and safety system which is made by integrating the advancements in wireless and embedded technology. It helps for a successful secret mission. This system can be used in critical conditions. Security and safety for soldiers: GPS tracks position of soldier anywhere on globe and also health system monitors soldier's vital health parameters which provides security and safety for soldiers.

VI.FUTURE SCOPE

- This system can provide more safety to the soldier by adding health sensor and a pressure sensor. By using this sensor base station can monitor the physical status of soldier.
- > They can be given medical instruction to soldier to overcome those problem.
- We can dial an emergency call if the soldier health parameters crosses threshold value or soldier co-ordinates goes out of a certain / pre-decidedtrack.

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