SOLDIERS HEALTH MONTORING AND TRACKING USINGGSM AND GPS

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Abstract- In enemy territory soldiers not only have to deal with the physical threat, but also with stress andfatigue 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 equipments we had tried to implement the basic guarding system for the soldier in low cost, light weighted, portable and precise device.

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. Thereare many concerns regarding the safety of the soldier. Soldiers entering the enemy lines often lose their livesdue to lack of connectivity, it is very vital for the armybase station to known the location as well as health status of all soldiers. India has already lost so many soldiers in war-fields as there was no proper health backup and connectivity between the soldiers on the war-fields and the officials at the army base stations. Recently on 29 September 2016, a military

confrontation between India and Pakistan began; Indian soldiers conducted a surgical strike against militant launch pads across the line of control in Pakistani-administered Azad Kashmir, and inflicted "significant causalities".

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 usedto 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 equippedaccordingly.

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 High- speed, short range, soldier-to-soldier wireless communications to relay information on situational awareness with Bio-medical sensors, GPS navigation.

II.   HARDWARE REQUIREMENTSThe
hardware requirements are as follows

A.   Arduino Uno

Fig. 1: Arduino Uno

Arduino is an open source, PC paraphernalia and programmed organization, endeavor, and client groupthat plans and produce microcontroller packs forconstructing programmed devices and intelligent object that can detect and control questions in the real world. The inception of the Arduino extend began at the Interaction Design Institute in Ivrea, Italy. The equipment reference plans are appropriated under a Creative Commons Attribution Share. The device operates between 1.8-5.5 volts. The ATmega328 is a single –chip microcontroller created by ATmega in the mega AVR family. The device achieves throughput approaching 1 MIPS per MHz.

B.   Heartbeat Sensor:

Fig. 2: Heartbeat Sensor

The sensor used in this project is pulse sensor-SEN-11574. Heart rate data can be really useful for determining the health status of a person. The pulse sensor amped is a plug and play heart rate sensor for Arduino. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. It sips power with just 4 mA current draw at 5V. To use it simply clip the pulse sensor to earlobe or fingertip.
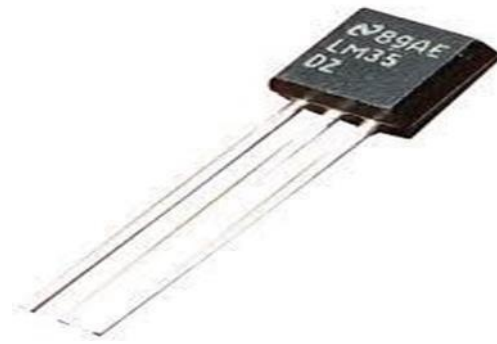
C.   Temperature Sensor

Fig. 3: Temperature Sensor

The LM 35 series are precision integrated-circuit temperature devices with an output voltage linearly-

proportional to the centigrade temperature. The LM35 device has an advantage over linear temperature sensor calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. To find the health status of soldier base station should know the body temperature and pulse rate of the soldier. So we are usingLM35 body biosensor as it is a low cost temperature sensor and it does not require signal conditioning. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. As the temperature increase above the specified value the GSM module will immediately alert the Base station and thus will not wait for heart beats to go out of the normal range.

D.   Power Supply

AC adapters are used with electrical devices that require power but do not contain internal componentsto derive the required voltage and power from mains power. The internal circuitry of an external power supply is very similar to the design that would be usedfor a built-in or internal supply. External power supplies are used both with equipment with no other source of power and with battery-powered equipment,where the supply, when plugged in, can sometimes charge the battery in addition to powering the equipment. Use of an external power supply allows portability of equipment powered either by mains or battery without the added bulk of internal power components, and makes it unnecessary to produce equipment for use only with a specified power source;the same device can be powered from 120 VAC or 230 VAC mains, vehicle or aircraft battery by using a different adapter. Another advantage of these designs can be increased safety; since the hazardous 120 or 240 volt mains power is transformed to a lower, safer

The Global Positioning System (GPS) is a space-based global navigation satellite system that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites.

E.   GSM Module

Fig. 5: GSM module

GSM, which stands for Global System for Mobile communications, reigns as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. GSM module is a breakout board and minimum system of SIM900 Quad-band/SIM900A Dual-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module supports software power on and reset. It has a quad-band 850/900/1800/1900 MHz and a dual-band 900/1900 MHz. It has control via AT commands, a very low power consumption of 1.5mA (sleep mode).

III.   WORKING PRINCIPLE

The main intention of this project is to find out the exact location of the injured solider in the war field. This GSM based solider health and position tracking system retrieves the exact location of a soldier in terms of its longitude and latitude. This data is fed to the Arduino, which is interfaced to a GSM modem. The Arduino retrieves the exact location details from the GPS and sends an SMS to the concerned authority over GSM modem. An LCD display is connected to the Arduino for crossing the data received before being sent over GSM. This project will be very useful

to army base station to keep track of their soldiers. The circuit setup is as shown in Fig. 6.
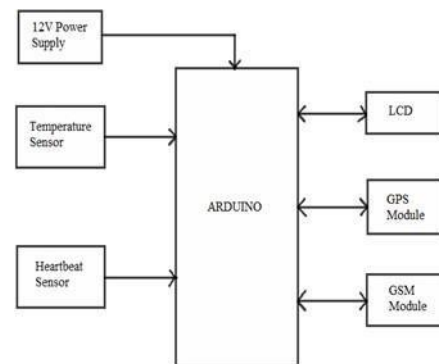

Fig. 6: Circuit Setup

Fig.7: Block Diagram

We used GPS to track the location of the soldier, Temperature Sensor (LM35) and Heartbeat Sensor (SEN11574) to monitor the health status of the soldier and GSM to bring communication between soldier and authorities.
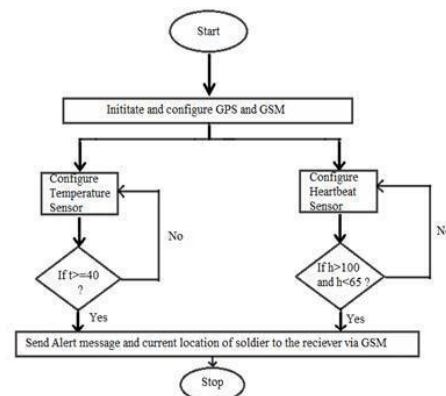

Fig. 8: Flow Chart

First power supply is given to Arduino then GPS and GSM modules will be initiated. The temperature

sensor and heartbeat sensor measure temperature (in Celsius) and heartbeat (in BPM) of the soldier respectively. If temperature (t) exceeds 40 and heartbeat (t) is not in between 65 and 100 then GPS tracks the exact location of the soldier and sends an alert message to the authority by using GSM module.

IV.   RESULTS

A message is send on the registered number confirming about GSM and GPS configuration. Later as the body parameters (temperature and heartbeat) deviates from the given threshold values, an alertmessage is send to base station along with the preciselocation of the soldier. The health status of soldier is shown in Fig.9.
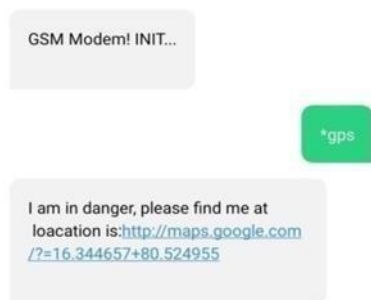

Fig.9: Result CONCLUSION

From the above implementation we have concluded that the communication hurdles between the soldiers and authorities at the base unit is overcome using GSM, the precise location and health parameters are known using GPS and wireless body area sensor network (WBASNs) respectively and with the GSM modem all information is send to the base station so that field commander will take necessary action. In order to bring real time solution for the problems beingfaced by soldiers in war filed, we can dial an emergency call by using advanced versions of GSM module, if the soldier health parameters crosses threshold value or soldier co-ordinates goes out of a certain / pre-decided track.

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