



Soldier Health and Position Tracking System

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ABSTRACT

Nowadays all nations keep its security at high priority. Wars are being fought for land, water and acquiring the position of most powerful nation. A country's arm forces consist of three professional uniformed services: the army, the navy, and the air force. Soldiers being the backbone of any armed force usually lose their lives due to lack of medical help when in emergency, also soldiers who are involved in missions or in special operations get straggled on war fields and lose contact with the authorities. To overcome this concerns we had build this project which, using wireless body area sensor network (WBANS) such as temperature sensor, heartbeat sensor etc. will monitor the health status of the soldier whenever required. Also using GPS we can track the soldier's exact location whenever required. Using oxygen level sensor we can also monitor the environmental condition, so authorities can provide essential aids. The communication is established between the soldiers and authorities via GSM. 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.

Keywords: *Barometric pressure sensor, GPS, GSM, WBASNs, ZigBee.*

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. India has already lost so many soldiers in warfields 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 casualties". 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.

II. LITERATURE REVIEW

During, wars and military search operations, soldiers gets injured and sometime becomes losses. To find soldiers and provide health monitoring, army base station and need GPS device for locating soldiers, WBASNs to sense health related parameters of soldiers and a wireless transceiver to transmit the data wirelessly. Hong Beng Lim, Di Ma, Bang Wang, ZbigniewKalbarczyk, Ravishankar k. Lyer, Kenneth L. Watkin has discussed on recent advantage in growing technology, and on various wearable, portable ,light weighted and small sized sensor that have been developed for monitoring of the human physiological parameters .The body sensor network (BSN) consists of many biomedical and physiological sensors such as blood pressure sensors , Electrocardiogram (ECG) sensor, electr dermal activity (EDA) sensor which can be placed on human body for health monitoring in real time [1]. Shruti Nikam, SupriyaPatil, Prajkta Power, V.S. Bendre [3] had presented an idea for the safety of soldiers. There are many instruments which can be used to view the health status of soldiers as well as ammunitions on them. The Bio sensor which consist of various types of small physiological sensors, transmission modules have great processing capabilities and can facilitates the low-Cost wearable solutions for health monitoring. Also as stated by Dinesh Kumar Jaiswar, Sanjana S Repal in their survey, P.S. Kurhe ,S.S Agrawal had introduced a system that gives ability to track the soldiers at any moment additionally ,the soldiers will be able to communicated with control room using GPS coordinate in their distress. The location tracking has great importance since World War II, when military forces realized its usefulness for navigation, positioning, targeting and fleet management. This system is reliable, energy efficient for remote soldier health monitoring and their location tracking. It is able to send the sensed and processed parameters of soldier in real time. It enables to army control room to monitor health parameters of soldiers like heart beat, body temperature, etc. using body sensor networks. The parameters of soldiers are measured continuously and wirelessly transmitted using GSM.

III. OVERVIEW OF THE SYSTEM A. Heart beat sensor

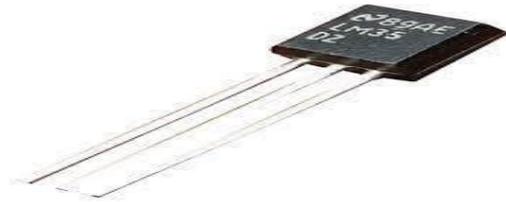


The sensor used in this project is pulse sensor-SEN-11574. Heart rate data can be really useful for determining the health status of a person. The pulse sensor amp is a plug and play heart rate sensor for arduino. It essentially combines a simple optical heart rate sensor with amplification and noise 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.

Temperature sensor



The LM35 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 using LM35 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.

GPS Modem



Neo 6 M GPS is a USRT 6 M module. It will be used to track the position of the soldier. It gets connected to at-most 32 satellite and will give the exact longitude and latitude readings. In this way it will track the exact position. While originally a military project, GPS is considered a dual-use technology, meaning it has significant military and civilian applications. It operates in the range -40 degree Celsius to 85 degree Celsius and at 2.7V-5V. Also it has a tracking and navigation sensitivity of -161 dBm.

GSM Modem



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).

Microcontroller ATmega328p



The ATmega328 is a single –chip microcontroller created by ATmega in the mega AVR family. The Atmel 8-bit RISC-based microcontroller combines 32kB ISP flash memory with readwhile-write capabilities, 1KB EEPROM, 2kB SRAM, 23 general purpose I/P lines, 32 general purpose working registers, three flexible timer/counter with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, 6-channel 10-bit A/D converter programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. *The device achieves throughput approaching 1 MIPS per MHz.*

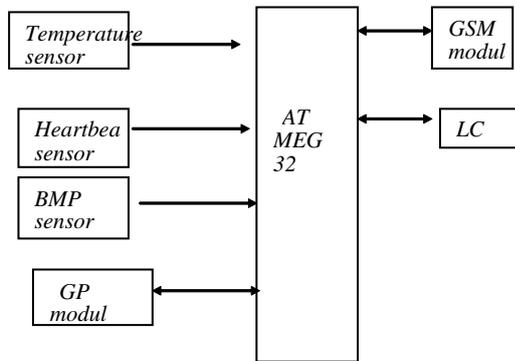
LCD Display



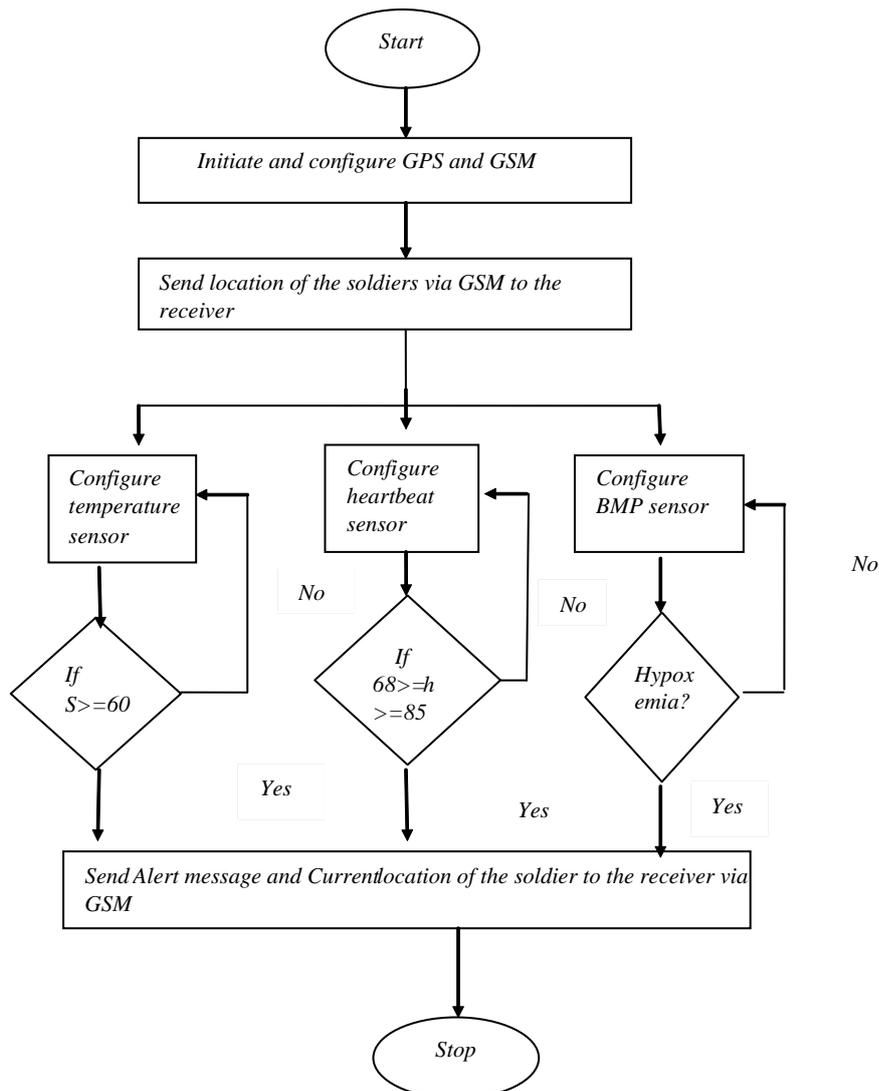
Alphanumeric displays are used in a wide range of application, include palmtop computer, word processor. Available as an optional extra is the serial LCD firmware, which allows serial control of the display. This option provides much easier connection and use of the LCD module. The firmware enables microcontroller to visually output user instruction or reading onto an LCD module. All LCD command are transmitted serially via a single microcontroller pin. The firmware can also be connected to the serial port of a computer.



IV. BLOCK DIAGRAM



V. FLOWCHART





VI. RESULT

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.



VII. 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.

REFERENCES

- [1]. SwetaShelar, Nikhil Patil, Manish Jain, Sayali Chaudhari, SmitaHande (8th March, 2015).” Soldier Tracking and Health Monitoring Systems”. Proceedings of 21st IRF International Conference, Pune India. ISBN :978-93-82702-75-7 pages: 8287.
- [2]. DineshwarJaiswar, Sanjana S. Repal (2015, July).”Real Time Tracking and Health Monitoring of Soldier using ZigBee Technology”. International Journal of Innovative Research in Science, Engineering and Technology: a Survey. Vol 4, Issue 7 pages 5560-5574.
- [3]. Shruti Nikam, Supriya Patil, Prajakta Powar, V.S.Bendre.”GPS Based Soldier Tracking and Health Indication System”. International Journal of Advanched Research in Electrical, Electronics and Instrumentation Engineering, Pune, Maharashtra, India. Vol 2, Issue 3.
- [4]. Pangavne S. M. , Choudhary Sohanlal& Pathak Bhavik (2015).”Real Time Soldier Tracking System”. IOSR Journal of Electronics and Communication Engineering (IOSR-JECE), Nashik, Maharashtra: pp. 21-24.