Health Monitoring and Tracking of Soldier Using GPS

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Abstract-In today's world the security of the nation is depends up on the enemies' warfare and so the safety of the soldiers is considered as vital role in it. Concerning the soldiers safety there are many instruments to view their health status as well as ammunitions on the soldiers. In soldiers security, bio-sensors systems gives different types of small physiological sensors, Biomedical sensor , transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring. GPS used to log the longitude and latitude so that direction can be known easily. These devices are being added to weapons, firearms, and militaries such as the Israeli an Army which are exploring the possibility of embedding GPS devices into soldiers vests and uniforms so that field commanders can track their soldier's movements in real time.GSM module can be used for effective range of high-speed transmission, short-range and soldier-to-soldier wireless communications that will be required to relay information on situational awareness, tactical instructions, and covert surveillance related data during special operations reconnaissance and other missions .So by using these equipment's we are trying to implement the basic lifeguarding system for soldier in low cost and high reliability.

Index Terms- Tracking; GSM; GPS; Biomedical sensors.

1. BACKGROUND

1.1Existing Technologies

1. Wrist Watch for Mountaineers: The idea for our paper was taken from the wrist watch used by mountaineers. The watch displays position, direction, surrounding temperature, and it also acts as altimeter. Soldiers carry walkie-talkies, which are bulky. So we are developing an alternative system using headphones which will guide the soldier.
2. Radio Collars with GPS Tracking*:* Recently in the US and Australia some of the Indian students were forced to have a Radio Collar strapped to their ankles, so that their movements can be tracked by the officials. We use a similar technology which will display the soldier's current location on a map at the base station.
3. Tracking of Tigers*:* Recently India announced plans to use a new tiger tracking system in order to crack down on "lazy" wildlife guards. The new tracking system involves fitting tigers with radio collars. A GPRS (general packet radio service) device, along with the M-STRIPES software, will be used to track the movement of the tigers.

1.1.1 Microcontroller

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51in-system or by a conventional Nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed which provides a highly-flexible and cost-effective solution to many embedded control applications

1.1.2 Medical Parameters

There are a number of medical parameters of soldier that can be monitored, like ECG, EEG, Brain Mapping, etc. But these require complex circuitry and advanced medical facilities and hence they cannot be carried around by the soldier. The entire system would become bulky for the soldier.

1.1.3 Sensor Survey

There are a number of temperature sensors like thermister, thermocouple, RTD, but all these sensors require signal conditioning and are difficult to caliber. The signal conditioning for these sensors increases the size of the kit, hence these are not to be use.
1. LM35: It is a low cost temperature sensor and it does not require signal conditioning, calibration is also done by software. Hence LM35 may be use.

2. Heart Beat Sensor: Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

2. INTRODUCTION

The infantry soldier of tomorrow promises to be one of the most technologically advanced modern warfare has ever seen. Around the world, various research programs. The challenge was to integrate these piecemeal components into a lightweight package that could achieve the desired result without being too bulky and cumbersome or requiring too much power. Communicating with the base (control room) station become the fundamental challenges in military operations also the proper navigation between soldier's organizations plays important role for careful planning and co-ordination. So this paper focus 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 Also High-speed, short-range, soldier-to-soldier wireless communications to relay information on situational awareness, such as Bio-medical sensors, GPS navigation, Wireless communication.
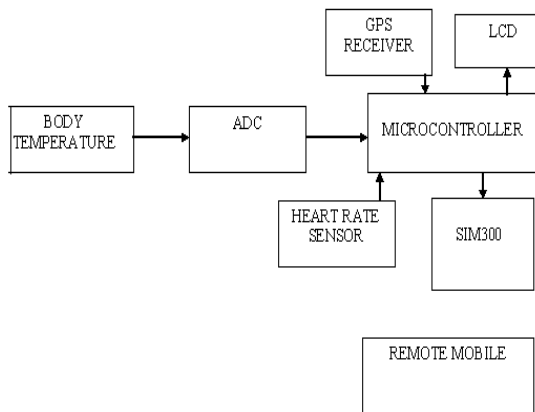
3.BLOCK DIAGRAM

Fig.1 Block Diagram of Soldier unit & Server unit

Fig.2 Soldier unit

Fig.3 Base unit

4. ALGORITHM

1. Power on
2. Initialize serial communication for 9600 baud
3. Initialize LCD
4. Display welcome message
5. Read data from GPS receiver and display on LCD
6. Read soldier body temperature status
7. Read soldier heart rate
8. Send GPS location, temperature status and heart rate to base station using GSM communication. Algorithm receiver side-
9. Receive data from sim300 display on pc screen.

4.1Soldier Unit

This paper has an idea of tracking the soldier and navigation between soldier to soldier such as knowing their speed, distance, height as well as health status of them during the war, which enables the army personnel to plan the war strategies. Base station gets location of soldier from GPS. It is necessary for the base station 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 hence can take immediate action by sending help for the soldier or sending backup for threat ahead.

Using various biomedical sensor health parameters of soldier's are observed, the position and orientation of soldier is trapped using GPS.
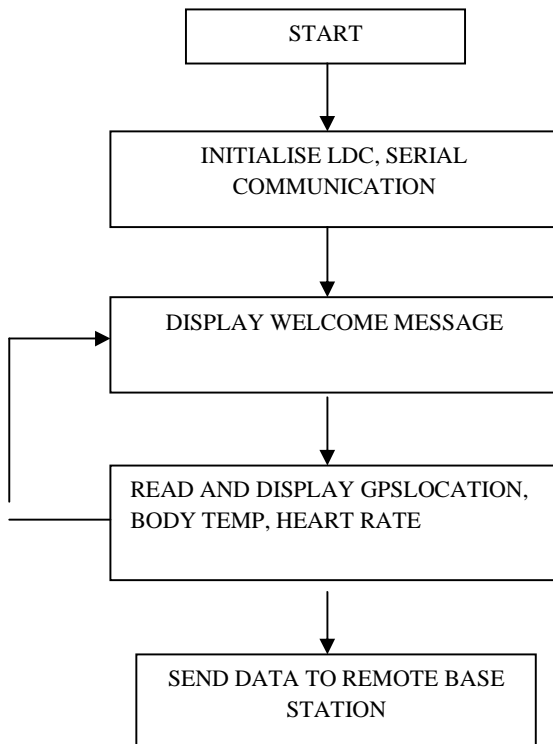
START

↓

INITIALISE LDC, SERIAL COMMUNICATION

↓

DISPLAY WELCOME MESSAGE

↓

READ AND DISPLAY GPSLOCATION, BODY TEMP, HEART RATE

↓

SEND DATA TO REMOTE BASE STATION

Fig. 4 Flow chart for soldier unit

3.2 Server Unit

This creates a data base that contains information about the soldier. Server is used to monitor the status of the soldier. And if there is any abnormality in the status of soldier it indicate a message
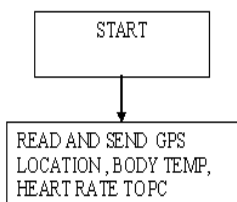
START

↓

READ AND SEND GPS LOCATION, BODY TEMP, HEART RATE TO PC

Fig.5 Flow chart for server unit

5. RESULT

Following conclusion can be retrieved from above implementation are:
1. Security and safety for soldiers: GPS tracks position of soldier anywhere on globe and also health system monitors soldier's vital health parameters which provide security and safety for soldiers.
2. Continuous Communication is Possible: Soldiers can communicate anywhere using GSM which can help soldier to communicate among their squad members whenever in need.
3. Less complex circuit and power consumption so in this way concept of tracking and navigation system is very useful for soldiers when they are on military field during war. And also for base station so that they can get real-time view of soldier's on field displayed on PC

6. CONCLUSION

The "SOLDIER TRACKING AND HEALTH MONITORING 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. The most significance in this is implementation of M-Health. By implementing this system we can improve the security of our country this also help to improve the safety of the soldier. This system also helps to provide real time video information. Using this system we can reduce casualties of war. It also helps to giving critical information's and warnings to the soldiers and can apply more of them to the current weak locations. This strengthens the defense system. Thus we can conclude that these kinds of devices are very helpful for ensuring security to the soldiers.

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