

SOLDIER SITUATION PURSUING AND STRENGTH MONITORING SYSTEM BASED ON IOT

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ABSTARCT:In today's world the security of the nation is depends upon the enemies' warfare and so the safety of the soldiers is considered as vital role in it. The security of any nation depends on military, army, air-force & navy of country and the backbone of all these forces are our soldier. one of the fundamental charges in military operations lies in that soldier not able to communicate with control room station. In this project the exact location and health status parameter of soldier can be sent to be base station in real time so that the appropriate action can be taken in case of crisis. GPS is used to log the longitude and latitude so that direction can be known easily. Here to find the health status of the soldier we are using the body temperature sensor to measure the temperature of body as well as heart beat rate to measure heart beat rate of soldier. The IoT makes the entire monitoring process fast, efficient and the decisions can be taken in less amount of time[4]. So by using these equipments we are trying to implement the basic life gurdng system for soldier in low cost and high reliability. So by using these equipments we are trying to implement the basic life guarding system for soldier in low cost and high reliability

INDEX TERMS –Internet Of Things, Gsm, Gps, Longitude, Latitude.

1. INTRODUCTION

The nation's security is monitored and kept by army, navy and air-force. There are many concerns regarding the safety of the soldier.

Soldiers in battlefield often lose their lives due to lack of connectivity, it is very vital for the army base station to know the location as well as health status of all soldiers. To avoid life-threatening situations, it is helpful to continuously monitor soldiers suffering from harsh conditions. The Wireless Sensor Network (WSN) plays a crucial role in health monitoring, since it enables us to connect sensors to collect soldiers' health and environmental data and process it to prevent critical events. Major research is being done by some of the world's largest militaries like Russian and U.S. Army to build wearable embedded device which could monitor the physical and environmental factors of soldiers, like in TALOS Exoskeleton (Tactical Assault Light Operator Suit) project which involves 56 corporations, 16 governments agencies, 13 universities, and 10 national laboratory for research and development purpose [1]. In-depth analysis regarding smart wearable clothing has been provided by Scataglini et al. [2], about the application and importance of smart wearable clothing in the Army. A comprehensive survey has been provided by Islam et al. [3] which provides information regarding the impact of IoT on e-health monitoring, monitored parameters and provided services. Existing IoT-based health monitoring systems suffer from three main constraints. First, they often make use of relatively high cost communication links, such as 3G/4G [4, 5]. Second, they typically do not deal with data privacy issues [6, 7]. Third, most of them do not analyze monitored health parameters to prevent critical situations [6, 7].

In this paper, we propose an IoT-based health monitoring approach that addresses above mentioned issues. Ahmed et al. [6] have proposed an architecture for e-health monitoring systems. The authors [8-10], had discussed about various wearable, portable, light weighted and small sized sensors that have been developed in order to monitor physiological parameters of the human. The Body Sensor Network (BSN) consists of many biomedical and physiological sensors which can be placed on human body for health monitoring in real time. GSM is used for communication which may not be useful at places with high altitude or in remote areas where network connectivity would be a big challenge. A message is sent after regular intervals containing the health status of the soldier using GSM. In paper [11], authors implemented monitoring system including data privacy using blockchain which is an important factor, but the use of GSM can be troublesome in the war-field. Another IOT-based system is described in the paper [12] which uses the Wi-Fi module to communicate with control room, which can be costly in terms of power consumption. Gondalia et al. [13] described the system that tracks the location and monitors the health of the soldiers. The data collected from sensors will be transmitted wirelessly using ZigBee module among the fellow soldiers. Furthermore, LoRaWAN network has been proposed to be used between the squadron leader and the control unit in high altitude warzones where cellular network coverage is either absent or does not allow data transmission. Mdhaffar et al. [14], has proposed, IoT-based Health Monitoring via LoRaWAN in which collected medical sensor data is sent to an analysis module LoRaWAN (Long Range Wide Area Network) network infrastructure. Power consumption of their monitoring system is claimed to be ten times lower than other long-range cellular solutions, such as GPRS/3G/4G. Previously, similar work has been done by our group using Arduino [15], but due to limited processing power of Arduino and lacking USB port for camera and microphone connection, we have used Raspberry Pi to overcome the abovementioned controller constraints. In our model, the collected data is processed by Raspberry Pi and then sent to the base module by a low-cost, low-power, long range and

secure communication links provided by a LoRa communication. The transmitted data is analyzed to detect, predict and prevent crisis situations by generating and executing adequate treatment plans. Base module receives images and audio recording clip whenever emergency situation is detected by robust and stable algorithm on the bases of data acquired from the sensors. All this will help the base station to get a better understanding of the situation and will help to create more informed and efficient strategy to overcome the situation

2. OVERVIEW

This paper has an idea of tracking the soldier and navigation between soldier-to-soldier such as knowing their speed, distance, and height as well as health status of them during the war, which enables the army personnel to plan the war strategies. This system enables GPS (Global positioning systems) tracking of these soldiers. It is possible by M-Health. The M-health can be defined as mobile computing, medical sensors and communication technologies for health care. This device will improve, not only for the host, but also for placed together/correctly arranged military personnel who will exchange information using wireless networks. One of the basic challenges in military operations lays that the soldiers are not able to Communicate with control room station.

3. LITERATURE REVIEW

- Soldier Health and Position Tracking System, Akshita V. Armarkar , Deepika J. Puneekar , Mrunali V. Kapse, Sweta Kumari, Jayshree A. Shelk, International Journal of Engineering Science and Computing, March 2017 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.
- IOT Based Soldier Navigation and Health Monitoring System, KrutikaPatil,

OmkarKumbhar, SakshiBasangar, PriyankaBagul, International Journal of Electrical, Electronics and Computer Systems (IJEECS) ISSN (Online): 2347-2820, Volume -5, Issue-1, 2017 This system uses GPS module and wireless body area sensor network to record all parameters in real time and send it to the base station. The different types of sensors used in this system are the humidity sensor, temperature sensor and pulse sensor which help in deciding the health status of that particular army official. This is a wearable technology which is the most important factor of this project.

- Gps Based Soldier Tracking And Health Indication System, Shruti Nikam, SupriyaPatil, PrajktaPowar, V.S.Bendre, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 3, March 2013 In this paper we 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 Highspeed, short-range, soldier-to-soldier wireless communications to relay information on situational awareness, GPS navigation, Bio-medical sensors, Wireless communication.
- Health monitoring and tracking system for soldiers using Internet of Things(IoT), Niket Patii ; Brijesh Iyer, 2017 International Conference on Computing, Communication and Automation (ICCCA), IEEE. The paper reports an Internet of Thing (IoT) based health monitoring and tracking system for soldiers. The proposed system can be mounted on the soldier's body to track their health status and current location using GPS. These information will be transmitted to the control room through IoT. The proposed system comprise of tiny wearable physiological equipment's, sensors, transmission modules. Hence, with the use of the proposed equipment, it is possible to implement a low cost

mechanism to protect the valuable human life on the battlefield.

- GPS And IoT Based Soldier Tracking & Health Indication System, Jasvinder Singh Chhabra, AkshayChhajed, ShamleePandita, SuchitaWagh, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 06 June-2017 Continuous Communication is Possible: Soldiers can communicate anywhere using RF,DS-SS,FH-SS which can help soldier to communicate among their squad members whenever in need. • Less complex circuit and power consumption. Use of ARM processor and low power requiring peripherals reduce overall power usage of system. Modules used are smaller in size and also lightweight so that they can be carried around. • 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.

4.EXISTING SYSTEM:

In the existing system, 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.

We therefore use two simple parameters temperature and Heart Beat of the soldier, which does not require too complex circuits and can be easily fitted into a small device that can be carried by the soldier

5.PROPOSED SYSTEM

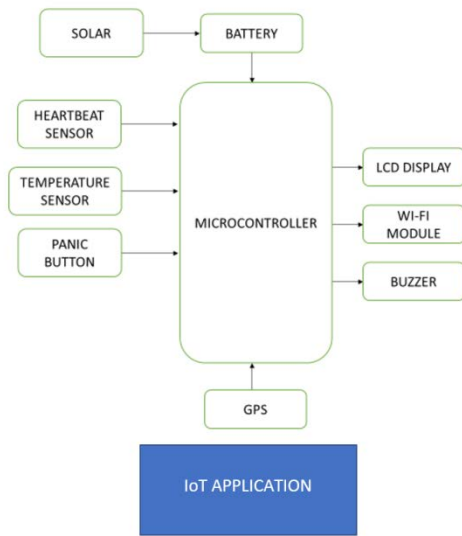
The proposed system consists of a temperature sensor to measure the temperature of the body, heartbeat sensor to measure the heartbeat. If any of these parameters go beyond the threshold limit, the buzzer will beep and the information is updated over the Web Application through the Wi-Fi Module. If the soldier is in danger, he can press the panic button to send his location through a GPS

Module. All this set up is powered up by a battery which is charged by the solar power.

ADVANTAGES:

1. Easy to use.
2. Low Cost.
3. Alerts the patients to take their medications at the right time.

6.IMPLEMENTATION



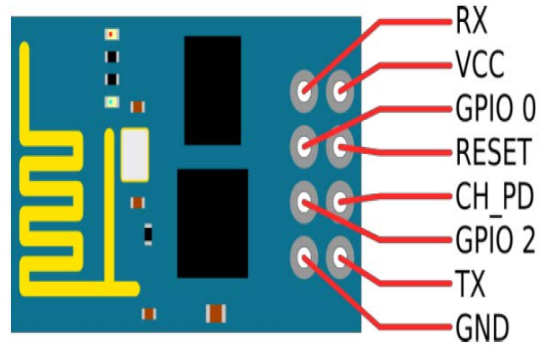
The block diagram of soldier position tracking and health monitoring system with environmental analysis is shown in above fig. It consists of two units soldier unit and base station unit. As it requires high speed communication it is intended to use Atmega 328 processor. Biosensors such as body temperature 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. RF Transceiver gets the latitude and longitude of other soldier unit and calculates distance, speed and height between them. 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.

ARDUINO-UNO BOARD:



The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

WI-FI MODULE-ESP8266:



The ESP8266 is a low-cost Wi-Fi chip with full TCP/IP stack and MCU (microcontroller unit) capability. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. The ESP8285 is an ESP8266 with 1 MB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi. The successor to these microcontroller chips is the ESP32.

CONCLUSION

Soldiers can continuously communicate anywhere with the base station using RF, DS-SS, FH-SS which can help soldier to communicate among their squad members whenever in need. Use of 328 controller and low power requiring peripherals reduce overall power usage of system. Modules used are smaller in size and also lightweight so that they

can be carried around easily. 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. 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.

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