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SOLDIER POSITION TRACKING AND HEALTH MONITORING SYSTEM

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ABSTRACT:

The paper reports a health monitoring and tracking system for soldiers based on internet of things (IoT). The proposed system can be mounted on the soldier's body to track the health status and current location of the soldiers using GPS. The information obtained will be transmitted to the control room through IoT. The proposed system consists 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 soldier's life on the battlefield. During wars and military search operations, soldiers get injured and sometimes the connection will be lost. To find the soldiers and to provide the information about health of the soldier's army base station need Global Position System (GPS) device for locating soldiers, and a wireless transceiver to transmit the data wirelessly. Upon losing the connection in the battlefield it is necessary for the base station to guide the soldier. The base station can obtain the current status of the soldier which is displayed on the Personal Computer. The proposed system can be firmly fixed on the soldier's body to track their health status and current location using Global Positioning System (GPS). This information will be sent to the control room through Internet of Things.

Key words: GPS, GSM, Heartbeat Sensor, IOT.

1. 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 know 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 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. 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 are currently being conducted, such as the United States’ Future Force Warrior (FFW) and the United Kingdom’s Future Infantry Soldier Technology (FIST), with the aim of creating fully integrated combat systems. Alongside vast improvements in protective and weaponry subsystems, another major aspect of this technology will be the ability to provide information superiority at the operational edge of military networks by equipping the dismounted soldier with advanced visual, voice, and data communications. Helmet mounted visors, capable of displaying maps and real-time video from other squad members, ranges of physiological sensors display the heartbeat, body temperature, atmosphere pressure, surrounding oxygen level etc. These devices will improve awareness for collateral military personnel as well as who will exchange information using wireless networks along with host. 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.

2. RELATED STUDY:

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. Indian crowd are the third largest drove in the world with 1,200,255 active troops and 990,960 reserve troops. The soldiers will suffer a lot due to the unavailability of information of injuries to its personnel which increases death count. It is observed that the casualties are caused due to injuries rather than the direct assaults in the battlefield. The number can be minimized if the control room gets the real-time information about the health and location of the soldier. There are some issues regarding the safety of the soldiers. Knowledge of current location of soldiers, lack of continuous communication with the control room during the operations, lack of immediate medical attention and operations under different geographical conditions are the few safety issues. There is a necessity to develop a wearable technology which is less in size and dissipates very little power in the defense sector so that the location and the health parameters of the soldiers can be tracked in real time. By using this navigation

system, the base station can guide the soldier to reach the desired destination. This device will improve awareness not only for the host but also for collocated military personnel who will exchange information using wireless networks.

EXISTING SYSTEM:

In today's global scenario, enemy warfare is an important factor in any nation's security and safety. This vital role is played by the army soldiers. Along with the security comes concern about their safety. With recent advances in technology, various measures have been incorporated for monitoring of human physiological parameters. To achieve this, several body sensors are extensively used to continuously analyse their health condition in real-time environment. In addition to this, location of soldier is tracked using GPS. When any of the soldiers enters the enemy location, it is important for the base unit to know the location and the health condition of all soldiers. By using the location sent by the GPS, the base station can guide soldier to safe area & GSM will help to communicate the Soldier unit with Base unit. By receiving the exact location of soldiers it will help the soldiers to prepare war strategies and take

guidance from Base unit. The various Health Sensors such as Temperature sensor, Heart rate sensor will help to decide the health status of that particular soldier.

3. PROPOSED SYSTEM:

After considering the above technologies the tracking of soldieran navigation between soldier to soldier such as knowing their speed, distance, height as well as health status of them during the wa, which enables the army personal to plan the war strategies. Base station gets location of soldier from GPS. The base station can access the current status of the soldier which is displayed on the phone with the help of GSM and hence appropriate actions can be found. The proposed system is based on IoT concept and will be helpful in the real-time continuous monitoring of soldier's health parameters and location. Pulse rate, humidity with body temperature, and oxygen level in an environment can also be monitored along with the location of the soldiers. During last decades, technologies like RF transceiver, cable-based systems, walkie-talkie, Zig Bee and GSM based tracking systems were most commonly used methodologies for the tracking of soldier's life during war. However, all these

technologies suffered from one or more reasons like high installation cost, high noise, loss of signal, as well as the bulky nature. Hence, a wireless low cost and portable tracking system with high reliability is needed for the protection of valuable life of the soldiers in the battle field.

The proposed system not only performs the task of health monitoring but also does the tracking of soldiers using IoT. The control room can acquire the details about the position and orientation of soldier from GPS. Even in case of losing their direction, it is the responsibility of the GPS to guide the soldier in correct direction. The base station can access the current status of the soldier using IoT as the different tracking parameters of the soldier get transmitted via Wi-Fi module. These information will be stored on the Cloud and can be extracted on the PC of control room, as and when extracted. Based on these information, the authorities can initiate immediate action by deploying a medical, rescue team or any backup force for their help. Using various biomedical sensors, health parameters of a soldier is observed along with its surrounding environment condition observed. The proposed system is divided

into two unit i.e. Soldier unit and control room unit. LM35 temperature sensor, Pulse Rate sensor and oxygen level detector sensor for continuously monitoring health status of soldier. GPS is used to determine real time position and orientation. Data originating from sensors and GPS receiver is processed and collected using Arduino (ATmega328P) processor. The specific choice of processor is due to the facts that, as compared to the other data possessors used in existing system; Arduino board is a low cost and easily available with flexible interfacing capability. So ATmega328P better than other processors.

4. 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.



Fig.4.1. Hardware kit image.

Following conclusion can be retrieved from above implementation are:

Soldiers Security and safety: GPS tracks position of soldier anywhere on globe and also health system monitors soldier's vital health parameters and environmental situation which provide security and safety for soldiers.

Less complex circuit and less power consumption: Use of processor and low power requiring peripherals reduce overall power usage of system.



Fig.4.2. Output results.

5. CONCLUSION:

In military operations, one of the fundamental challenges is that the soldiers are not able to communicate with control room and sometimes not even with the other soldier. The protection of the country is primary mission for soldiers. So, there is

concern regarding the safety for real Heroes. Several types of instruments have always been designed with the advent in technology to ensure safety and tracking of soldier. But the one or more reason, all the systems might have some drawback. Hence by proposing a portable wireless real-time system based on IoT concept it can directly connect with the control room with a maximum distance. And by using Arduino based soldier unit it becomes less complex and portable. This system can be helpful to provide the accurate location of missing soldier in critical condition and overcome the drawback of soldiers missing in action. The proposed system is also helpful to improve the communication between soldier to soldier in emergency situation and provide proper navigation to control room.

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