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IoT based Soldier Monitoring System with Automatic Temperature Adjust Suit

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ABSTRACT

Nowadays the world has uncertain and insecurity situation that means the war is cultivated in any time. At the same time the soldiers to join in army is very less. In this situation we have to protect or increase the soldier's life. To increase the soldier's life, we have a solution in embedded system. In this project we provide the special advanced techno suit for the army soldiers. While doing a war some people of soldiers are missed at that time the military base is confused about the soldier, he was dead or alive. For avoiding this problem, we found this suit. This suite is multi purposed suit. It is providing the location of soldier and injuries of the soldiers though IOT data base. IOT is a technology used for security purpose and they are used to safeguard the connected devices and networks in them, it also involves interconnecting computing devices by internet. Each thing is provided a unique identity and to automatically transfer data over internet. In some times the soldiers are stay in heavy winder and heat, for this problem we provide the automatic temperature control system. It reduces the body temperature will goes to high and vice versa goes low increase the temperature it will helps to maintain the body health of the soldiers. Thus, if a soldier is in any health trouble then with the help of sensor they are identified and they are regularly monitored by the IOT and the suits do it reversible temperature action.

Key words : Cloud storage, Heart beat Sensor, Peltier plate, Temperature Sensor.

1. INTRODUCTION

Indian military is the 3rd largest army in the world with more than 1,200,000 active troops and more than 990,000 reserve troops. The military face so much difficulties due to lack of communication and it may also increase the death rate since the location of the person is not known and the communication with the person is difficult. In [1], it is seen that most of the death are happened due to causalities caused in field rather than direct dead of soldiers. Detailed study shows the real time monitoring of the military people. People are moving towards the automation and they started to learn new technology due to small size and low cost the micro electro mechanical system inertial sensors are used in many fields.

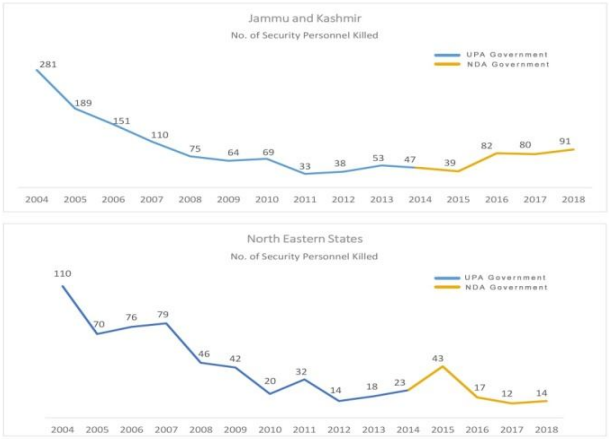

Figure 1: Person Killed

Thus as shown in Figure 1 the statistic report the death rate of security personnel is varying and thus they need to be saved most of the death occur due to lack of communication from the field personnel to the trope.

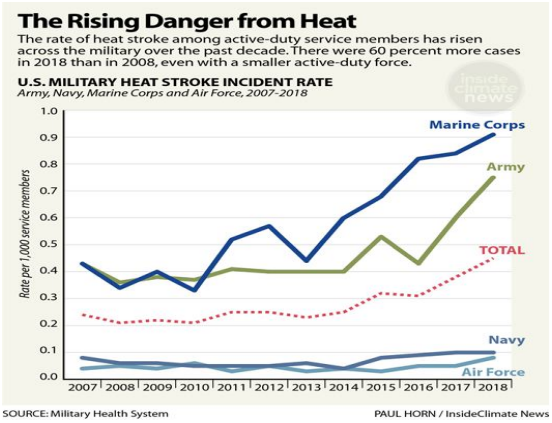

Figure 2: Rising Heat

In recent days, as shown in Figure 2 and In [2-3]the weather condition in the borders are at extreme heat or at extreme cold and they also lead to death and some may get affected by diseases and the suits which is worn by the people are very heavy since they carry lots of sensor and thus the solution provided by suits is to monitor the health and automatic temperature changer.

2. HEALTH MONITORING SYSTEM

Thus, the personnel in the field should be monitored regularly with the help of sensors as listed below

Cardio monitoring system
Activity monitoring system
Temperature monitoring system
Skin response monitoring system

2.1 Cardio Monitoring System

ECGs (Electrocardiogram s) is one of the approaches used for continuous recording and accurate measuring of the variation of potential of cardiac. As in [4], Nowadays the most widely used diagnostic instrument and it is used for more years and heart related problems are identified with the help of this method.

There are many diseases that are not life threatening, but some may from harmful disease like myocardial infection If it is not managed immediately leads to cardiac arrest.

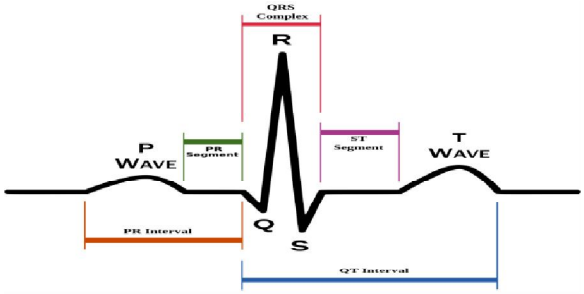

Figure 3: ECG Signal

Above Figure 3 shows a typical single cycle of ECG signal. The lead are fixed in the heart and which propose the ECG System has electrical activities along 12 specific spatial orientations are measured and it using ten Ag-AgCl electrodes.

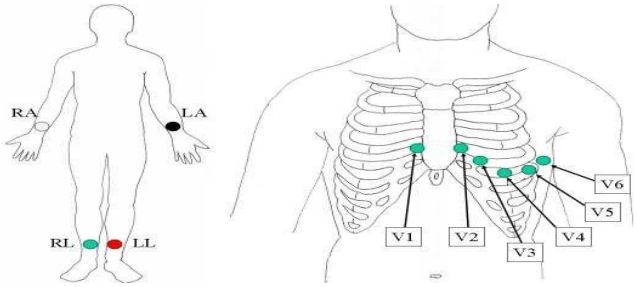

Figure 4: Standard of ECG

Above Figure 4 shows the electrodes in a standard of ECG system with 12 number of lead. The electrodes contain gel it is a conducting material which is located in the mid and it has a conduction medium which is placed in between the electrode and surface of skin. In skin, gel contains prospective irritant and toxin substance and is best fit for long time monitoring system. Only few electrodes were used in the ECG system.

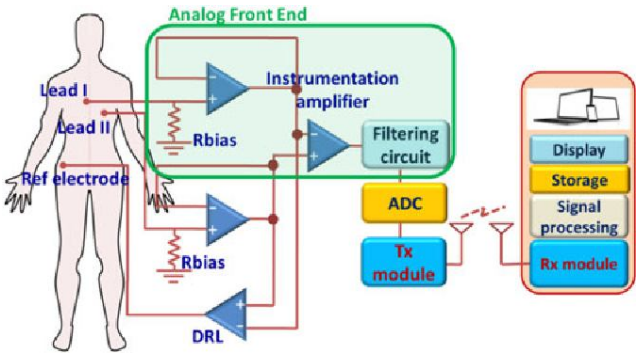

Figure 5: ECG Architecture

Above Figure 5shows the general architecture - ECG monitoring system. This system needs wearable and portal that should be used comfortably without causing changes in daily activities. Embedded textile electrodes such as ECG, R-R, HR which is used for monitoring. The electrode where made from conductive yarns it contain silver. While using gel, the electrodes are placed on the body which is an medium of electrode and it is used to improve the contact of skin.

2.2 Activity Monitoring System

Activity monitoring system is used to monitor the individual's physical function and motion of body which is used in re-habilitation. In [5], it's recorded has been that the individuals walking patterns. Walking has several joints such as hip, spine and joints. It involves muscles such as thigh, back muscles, calf muscles, around joint and several small muscles of foot.

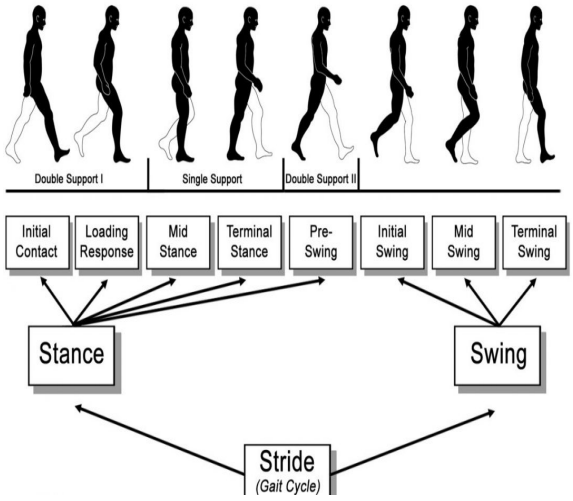

Figure 6: Walking style of human

Especially as in [6], A Typical human walking style event has perfect balance and position among the various parts of the human body, it is maintained by cerebellum. Ailing people walking differs from the normal people walking. They contain three different support and they are double support one, double
support two and single support and the walking style is monitored regularly and they are used to make them to move in a correct line and thus they are monitored by them and if any irregular movement is recognized then they are indicated to the monitoring system.

2.3 Temperature Monitoring System

Temperature is the most important symptoms that can get reflected in the health conditions of body. As shown in Figure 7 Temperature enhances malignancy and body infections. Only constant temperature is computed over a period of time not than a spot of check. It may copy the diagnosis.

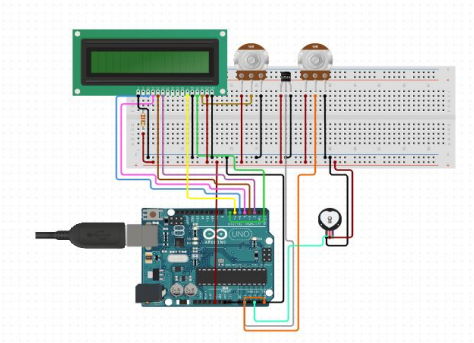

Figure 7: TMS

2.4 Skin Response Monitoring System

In [7] the Nervous System it is used to control and regulates body response of the body to the both stimuli whereas the internal and external. Figure 8 shows it was balanced by the function within some divisions like sympathetic and parasympathetic system. The parasympathetic nervous system is called to be “rest and digest system”. This system preserves and stores the energy of the human body. Otherwise the sympathetic system is referred to as fight or flight. This reaction is used for enhancing the output of metabolic system to external stimuli.

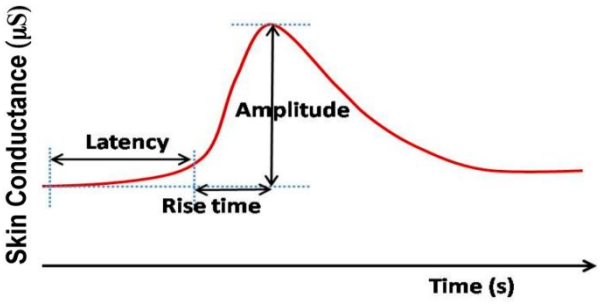

Figure 8: Nervous System Graph

3. TECHNOLOGY USED FOR COMMUNICATION

In [8], Communication play an important role in personnel life and thus some technology used for communication is listed

GPS technology
GSM technology
GIS technology

3.1 GSM Technology

GSM is known as global system of communication. It is used to initialize and compress the data. It operates at either 900 MHz or 1800 MHz frequency. It is a wireless network and it has low power, low cost and easy to use. It is mainly used for sending and receiving SMS. Initially the modem is connected to the computer and it act like mobile phone to provide connectivity. It operates in different bands in America they uses 850 MHz and 1900 MHz bands.
In [9-11], the researchers Gajjala Askok introduce Person health monitoring system, thus if the personnel is in normal health condition there is no indication to the monitor system if the range of the health varies slightly then the message is send automatically to the doctor and the location of the person is also informed to them thus they can reach them quickly. The researchers Suraj Kumar proposed a system called as Secured communication using the GSM, in Figure 9 which the personnel can voice record the message note and it is send to the monitor and thus the monitoring person should enter the four digit password and they can read the message to take respective action.

Figure 9: GSM

3.2 GPS Technology

Global Positioning System which is also called as the global navigation system made up of many number of satellites and it is also used for many civilian system. It is used to identify the exact location where the person or thing is kept. Some may include tracking the vehicle path and location of baby by kids. The mathematical term known as trilateration is the principle behind the GPS system. To compute the mathematical calculation, the GPS receiver need some basic information:
1) The location of at least 3 satellites
2) The distance between each of the satellites.

The GPS system is divided into two types as Passive GPS tracking system and Active GPS tracking system. In [12], Passive GPS tracking system is used to record the location and it is used store the memory of the box. After that the information can be downloaded later from memory card. Active GPS tracking system is a real time system and the

information is send to the cloud server. JA Security trackers are active that send the real time data to online portal and mobile application.

Figure 10 shows GPS was originally created by the United States they are used to create the military application. The system has been begun from the 1980s up to the late 1990s with the advent of consumer devices that make support it. It has become a multi-billion dollar with variety of products.

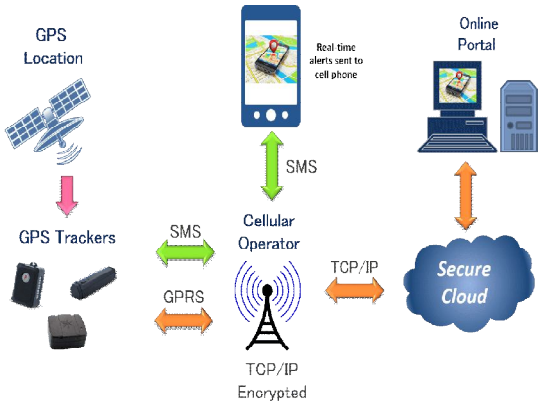

Figure 10: GPS Workflow

3.3. GIS Technology

As in [13-14], the geographic information technology which is mainly designed to record, store and publish all the different kinds of data which is related to geography. The specific portion of the spatial data is termed as geography or in other words, data which is said to the information related to the location of the world.

Figure 11 shows that Coupling those information and design those info in tabular form known as data attribute. It can be systematically said as extra feature. The exact location of the coffee shop is the info needed.

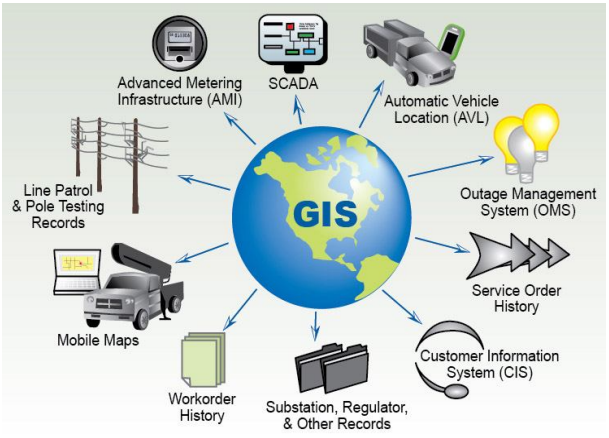

Figure 11: GIS Connectivity

4. CONCLUSION

It is clear that different techniques are used to monitor the health of the people to safe them in a right time and many communication techniques are used to transfer the data to them. We have various approaches by different researchers for soldier health monitoring system. This paper describes the problem happening in the soldier field and they are protected by using sensor, buzzers and GPS based technology. By implementing this project we can easily monitor the health condition of soldier and automatic temperature adjust suit.

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