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Smart Military Jacket

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Abstract: ***In context to the national security, military personnel are involved in treacherous environment. Situations involving reconnaissance, espionage, border warfare, border security force etc. Soldiers toil in different terrains due to which their body temperature changes. Hence to tackle this problem, "SMART MILITARY JACKET" can be implemented. This system will be useful for soldiers who involve in special operations or missions. The data is obtained by providing certain threshold value. This data should be sent to the central command or the base, so the medium used here is GSM (Global system for mobile).Body temperature of a soldier is monitored with the help of a temperature sensor. Heartbeat of the soldier can be monitored by using a pulse sensor. The system also consists of some extra features using which the soldier can ask for a help by sending a distress signal to the military if he is in danger. A GPS tracking system is also attached to the jacket which helps in tracking the position of the soldier. This may help the control station to know about the soldier's location in real-time. To monitor the system, a control unit called ARDUINO is used. Hence this project aims at implementing the basic lifeguarding system for soldier in low cost and high reliability.***

Keywords: GSM, GPS, ARDUINO

I. INTRODUCTION

At times the Soldiers in the field during the winters and snow falls face the challenging time. During snow falls, seldom soldiers face the situation of getting stuck under the snow burrows. Recently, one of the great Indian Soldier Lance Naik Hanumanthappa Koppad, who was lost in an Avalanche and was stuck beneath the snow for more than 6 days. Such an incident led to the death of a brave soldier. In the present time our soldiers always encounter a deathly combat every day. Lot of debates indicated the necessity of advance techniques for tracking the moves and consistent monitoring of the health of soldiers on duty. In this regard the current work is an attempt to design equipment through which the base camp members can keep track of the location in any real time has motivated us to find a solution. The objective of the current work is to design equipment for measuring the pulse rate, body temperature and to track the position of the soldier. Such a monitoring helps the people at the base camp to get the information of the soldiers continuously. The pulse rate, temperature of the body and their position will be sent to the base with the help of GSM (global system for mobile) module which sends the signals to the base camp. The system includes an additional feature called as trigger button through which the soldier can ask for a help by sending a distress signal to the military if he is in danger.

II. METHODOLOGY

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. The methodology is the general research strategy that outlines the way in which research is to be undertaken and, among other things, identifies the methods to be used in it. These methods, described in the methodology, define the means or modes of data collection or, sometimes, how a specific result is to be calculated. Methodology does not define specific methods, even though much attention is given to the nature and kinds of processes to be followed in a particular procedure or to attain an objective.

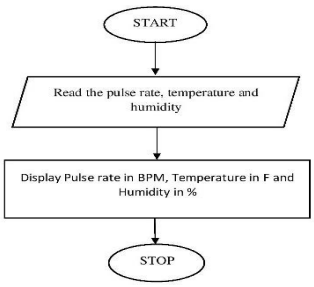

Fig. 1. Flowchart w.r.t Sensors

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The figure depicts the flowchart of the project. When the thumb or the index finger is placed on the pulse sensor it will sense the pulse rate and will be displayed on the LCD in BPM (bits per minute) along with the Temperature and Humidity of that location. The veins will have blood flow inside them only when the heart is pumping, so if we monitor the flow of blood we can monitor heart beat as well. If the flow of blood is detected then the ambient light sensor will pick up more light since they will be reflected by the blood, this minor change in received light is analysed over time to determine our heart beats The BPM value displayed on the LCD so that the soldier can monitor his heart's status in real time. The humidity sensor and thermistor is used to measure the temperature and spits out a digital signal on the data pin.

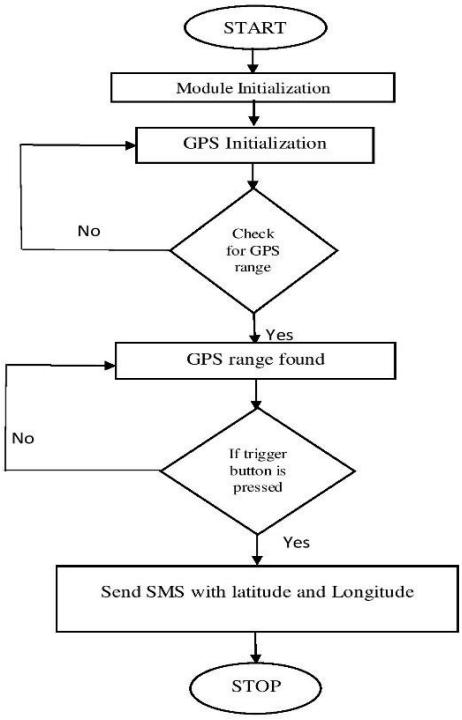

Fig. 1. Flowchart w.r.t GPS and GSM

Figure depicts the other flow chart of the project which starts with Module initialization in turn followed by the GPS initialization where GPS is based on trilateration mathematical principle. The GPS receiver takes the information from the satellite and uses the method of triangulation to determine the exact position after this GPS initialization it checks for the GPS range, if at all the range is found then latitude longitude will be displayed that is GPS receivers gives the quality of satellite geometry in terms of horizontal and vertical measurements which includes latitude, longitude.

On the later state if the GPS range is not found it will be in initialization state only. Once the trigger button is alerted the latitude and longitude will be displayed and the message will be sent to the base station, when soldiers are in trouble or in stress, they can manually ask for help by pressing the distress signal button. This signal is sent to the base station will be displayed on the mobile.

III. CONCLUSION

As intended, the proposed system is designed to solve the problem of missing soldiers by tracking their accurate location and informing the base station to take necessary actions. The system takes into account the parameters such as temperature, pulse rate to meticulously monitor the health of the soldiers in sync with the location to take the possible steps. In case of emergency, a trigger is provided to explicitly alert about the situation.

Upon the trigger signal a message is sent to the base station for further actions. Thus the original intention of the project is achieved by making use of the sensors such as Humidity sensor and Pulse sensor which are used for reading the temperature and pulse rate respectively. Our proposed system is well efficient to solve the problem at hand.

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IV. RESULTS

The temperature and humidity of the body is detected through DHT11 humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the temperature and the readings are displayed on the LCD display.

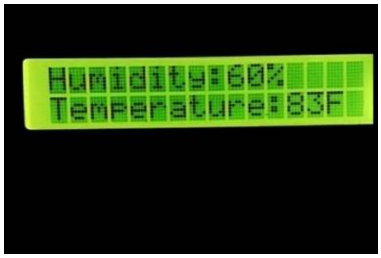

Fig : Humidity sensor.

Pulse sensors tell us about the pulse rate of the soldier in real time where pulse rate is equal to the heartbeat. The readings are displayed on the LCD display.

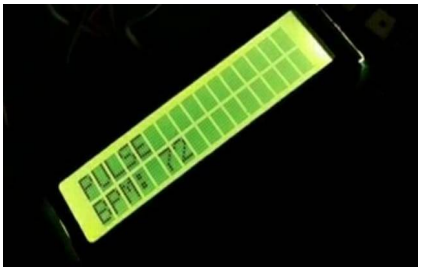

Fig : Pulse sensor

In case of emergency, the soldier presses the trigger button so that his current location is sent to the base station.

The GPS modem sends the latitude and longitude position of the soldierin a link pattern to the base station using GSMso they can track the current position of the soldier.

Fig : jacket with all the sensors attached.

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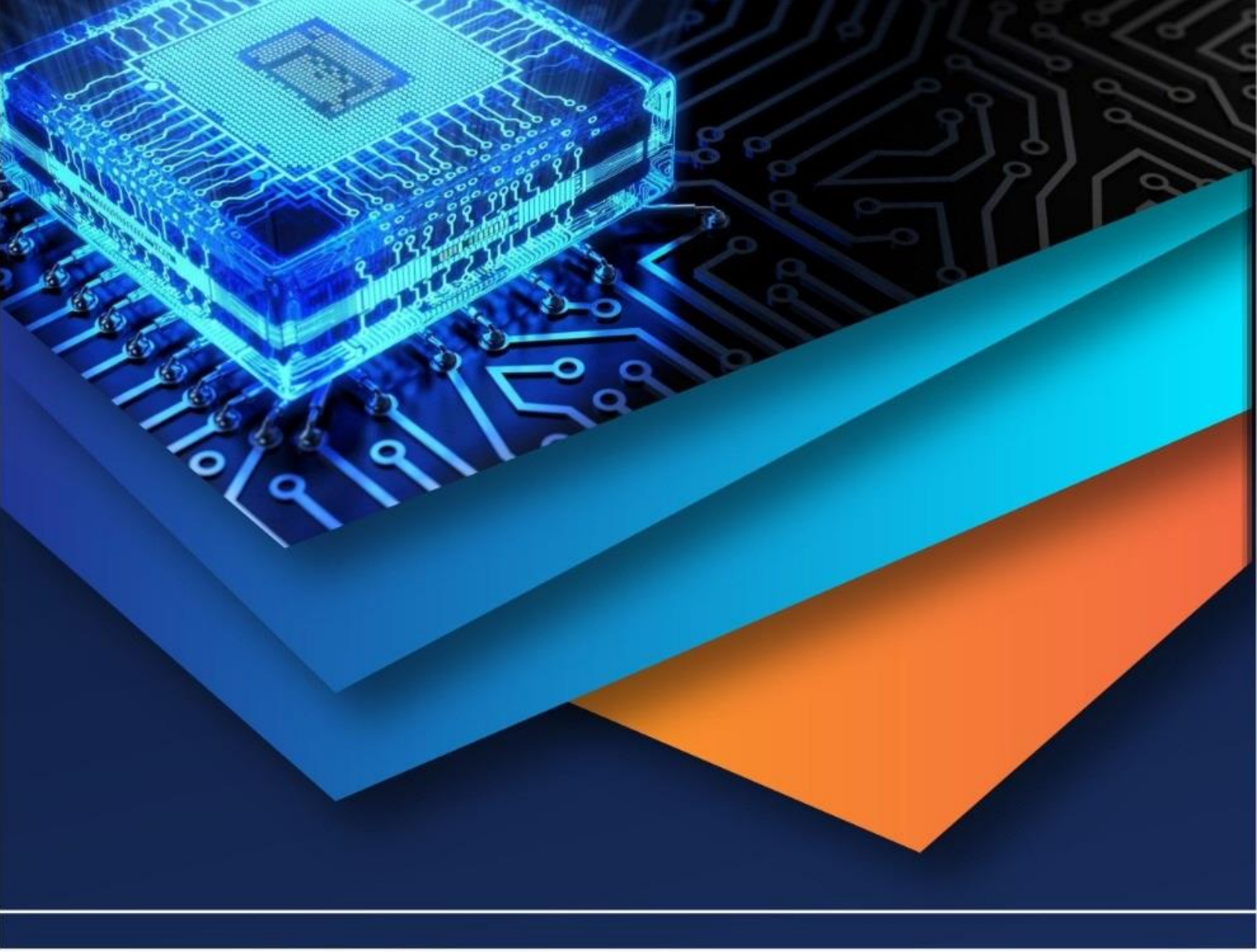

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