

SMART SAFETY JACKET FOR ARMY

Snehal Bhaskar Gaikwad

Department of Electrical Engineering, Shivaji University Kolhapur, India

Pallavi Prakash Patil

Department of Electrical Engineering, Shivaji University Kolhapur, India

Pradnya Chandrakant Sangar

Department of Electrical Engineering, Shivaji University Kolhapur, India

Srushti Deepak Patil

Department of Electrical Engineering, Shivaji University Kolhapur, India

Prof. Bongale Gaurav Ashok

Department of Electrical Engineering, Talsande, Kolhapur, India

ABSTRACT

As we all know that climate condition is changing continuously, the winter and summer season are getting much colder and warm, especially in northern region and western region of India. That's why we develop a smart safety jacket for ARMY by using GPS, IOT, Different Sensors, control media device in the jacket. The smart safety Jacket aim for providing good health monitoring and track the position of sensor.

Keyword: climate, components, jacket, sensor, smart, season, Army

I.INTRODUCTION

In current world situations, defending our nation from external and internal threats is the most important factor and depends on the army force. Every year many army personnel suffer from different injuries during the battle and no help can be provided at the needed time. The army suffers a lot due to the unavailability of information of injuries to its personnel which may increase the death/permanent disability toll. With the help of many advanced technologies coming into implementation, we can provide safety to the army personnel. It is necessary to develop a system in order to get the location and vital health status of the soldiers which can be tracked in real time. Soldier's location can be tracked using GPS and Wi-Fi module, which is used to provide wireless communication system between soldier and base station. Health status of the soldier is monitored using bio medical sensors such as temperature sensor and heart beat sensor. Jacket will maintain body temperature to 37 degrees irrespective of atmospheric temperature so that soldier can survive at minus degree temperature also.

We are using technology of internet of things for the proposed system. IOT is simply the network of interconnected things/devices, which is embedded with sensors, software, network connectivity and necessary electronics that enables them to collect and exchange data making them responsive. Using IOT, the status of the soldier can be transferred from one place to another over the network. The IOT makes the entire monitoring process efficient, fast and the decision can be taken in very less time. Using GPS, the position and orientation of soldiers is obtained. This system enables GPS tracking of soldiers message which contains temperature, latitude and longitude as well as pulse rate of soldier.

Here we are using ATMEGA328p-pu which allows dynamic and faster control. Liquid crystal display (LCD) makes the system user-friendly. Here we are using LCD display for displaying the value of present and maximum voltage values which are present in the rechargeable battery. The aim of the project is to provide medical monitoring for solder in real time.

II PROPOSED WORK

During the battle time our soldiers are facing to more difficulties one of that they have to perform their duties in vary cold or very hot areas like Jammu and Kashmir, Rajasthan. To overcome from these weather condition, we are going to implement the system which gives normal temperature in any weather condition and detect the exact location of the solders by using IOT in case if the solders are injured then provide the necessary help at needed time.

Objective of these would be: -

- Semi-automatic temperature control jacket.
- Heartbeat and blood pressure monitoring.
- Wireless jacket status monitoring.
- Track the solders' exact location by using GPS.
- IOT are used for communication purpose.

III METODOLOGY

Literature Review:

To control the temperature, the Peltier plates are used for cooling and heating purpose. To monitoring health of respective person the sensors are implemented. To know the location the GPS tracking system is used. Using IOT, the status of the solder can be transferred from one place to another over the network. The health status of the soldier is monitored using bio medical sensors such as temperature sensor and heart beat sensor.

Design:

In this process we will design our proposed work in designing software.

Assembly And Installation:

1. We charge the battery to supply the system by using solar panel generation.
2. The supply from battery is gives to Peltier plate.
3. Peltier plate is installed for cooling and heating purpose.
4. Controller and biosensor for their operation also installed.
5. Node microcontroller is installed for controlling purpose.
6. The heart beat and blood pressure sensor are also installed for to monitoring the health of perspective person.
7. The output from this sensor are gives to the controller.
8. Controller sends this feedback to the IOT.
9. Using the IOT the health status of the solder can be transferred from one place to another over the network.
10. GPS tracker is also installed to finding the location this is also monitoring on IOT.

Testing and Modification:

Testing on Peltier plate will carry out on small prototype for the temperature control purpose.

The testing will carry out on different weather condition. If we require any modification or changes, we will conduct it after testing process.

Heat sink increase the heat flow away from a hot device.

A wind tunnel, air temperature and velocity sensor, thermocouples power supply are needed to heat sink.

To test the solar panel voltage output, put your solar panel in direct sunlight.

Heartbeat rate are monitoring using optical sensor.

IV SYSTEM ARCHITECTURE

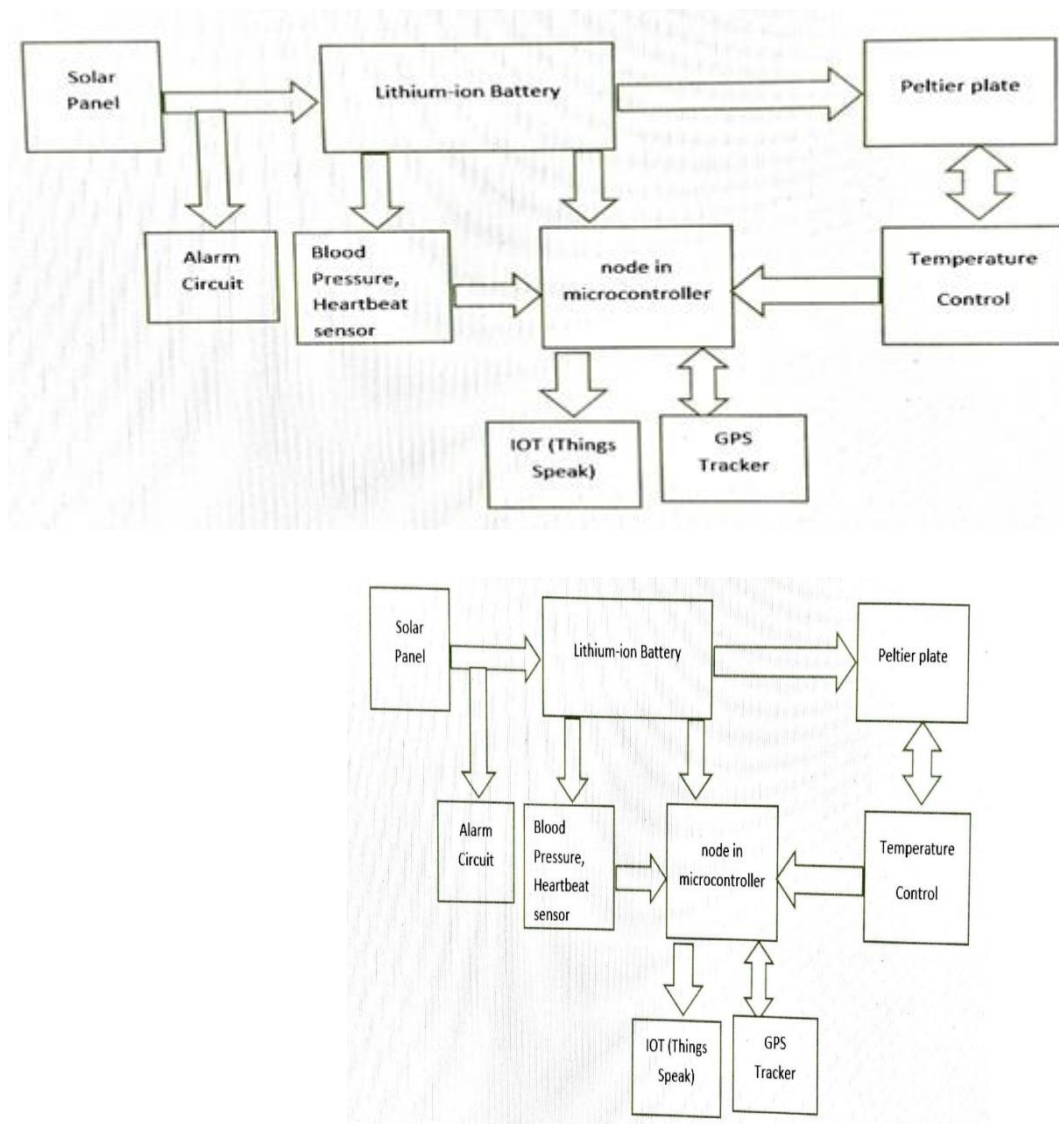


Fig.1 Block Diagram.

Firstly, we charge the battery to supply the system by using solar power generation. The solar plates are used for generation. This generated energy is given to the lithium-ion battery. After that the battery is charged. The supply from battery is given to Peltier plates, controller and biosensor for their

operation. The Peltier charges the temperature in normal body temperature. For the sensing the temperature sensor is used. This is controlled by node microcontroller. The heart beat and blood pressure sensor are used to monitor the health of the respective person. These signals are given to the controller and controller sends this feedback to the IOT. The GPS tracker is used to find the location this is also monitored on IOT.

Flowchart

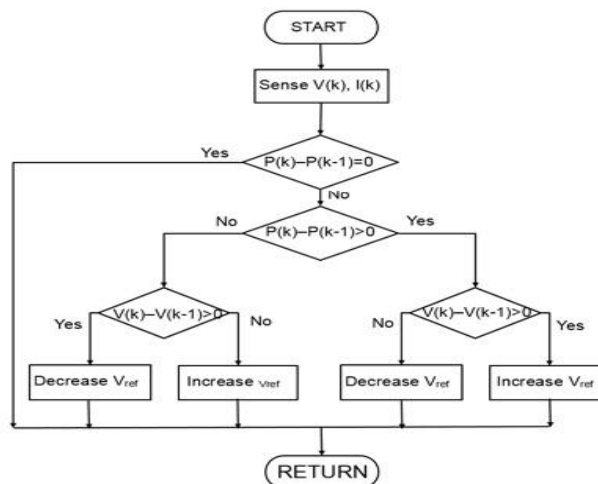


Fig.2 Flowchart of PV panel

In this technique, first of all the current and voltage of PV is sensed. This power is given by the reproduced of voltage and current of solar panel. The output power is increasing due to the PV current increases. So the reference current is also increased otherwise the reference current is decreased. If the output reduced with increasing solar panel current, the reference current is decreased by one step; otherwise, the reference current is increased by one step. If the power is increasing. The perturbation will be in the forward direction otherwise direction will be increased. Due to this continuous process PV panel is able to extract maximum power in any environmental condition.

REQUIRMENTS

Operating system- TrackG, Things speak

Technology: GPS, IOT

OPERATION

The working principle of the system starts with charge a battery by using solar energy source, after that temperature sensor detect the weather conditions. According to that if the temperature is raised out of a limit, then Peltier plate gets signal from temperature sensor and start cool the system up to the limit. And if the temperature is decreases below the normal body temperature, then temperature sensor gives signal to the Peltier plates then it increases the temperature up to the limits and gives signal to temperature sensor.

We can also detect the heartbeat and blood pressure of that respected person by using heartbeat sensor and blood pressure sensor. We can see this information on IOT (Things speak). In this way we can monitor all information on internet.

VI. RESULT ANALYSIS



Fig.3 Heartbeat of soldier



Fig. 4 Temperature of Soldier

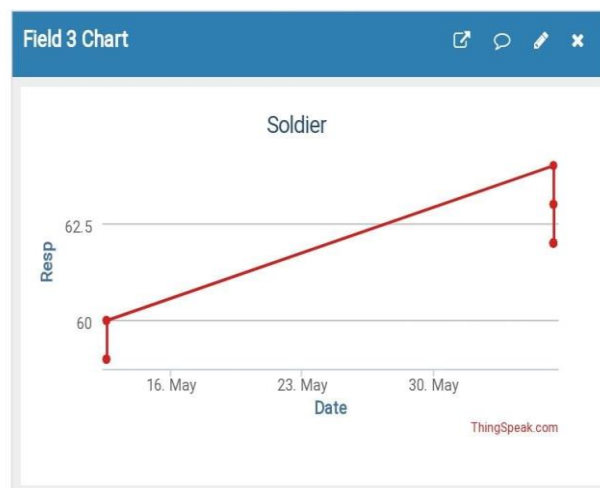


Fig. 5 Respirations of Soldier

Overall results in excel sheet Format

feeds

| | A | B | C | D | E |
|----|-------------|----------|--------|--------|--------|
| 1 | created_at | entry_id | field1 | field2 | field3 |
| 2 | 2022-05-11T | 1 | | 30 | |
| 3 | 2022-05-11T | 2 | | | 53 |
| 4 | 2022-05-11T | 3 | 3 | | |
| 5 | 2022-05-11T | 4 | | 30 | |
| 6 | 2022-05-11T | 5 | | | 53 |
| 7 | 2022-05-11T | 6 | 3 | | |
| 8 | 2022-05-11T | 7 | 3 | | |
| 9 | 2022-05-11T | 8 | | 31 | |
| 10 | 2022-05-11T | 9 | | | 50 |
| 11 | 2022-05-11T | 10 | 3 | | |
| 12 | 2022-05-11T | 11 | | 31 | |
| 13 | 2022-05-11T | 12 | | | 51 |
| 14 | 2022-05-11T | 13 | 3 | | |
| 15 | 2022-05-11T | 14 | | 31 | |
| 16 | 2022-05-11T | 15 | | | 51 |
| 17 | 2022-05-11T | 16 | 64 | | |
| 18 | 2022-05-11T | 17 | | 31 | |
| 19 | 2022-05-11T | 18 | | | 51 |
| 20 | 2022-05-11T | 19 | 307 | | |

VII CONCLUSION

Thus, we conclude that the multifunction jacket is suitable against weather condition. This is very effective and required to our soldiers and also other people who suffering from extra heat or cool weather conditions. It should maintain our body temperature normal and make us comfortable. Self-charging by using solar is more efficient in this system. Due to automatic it is very simple to get all health respective location information about the person.

VIII FUTURE SCOPE:

1. We can also operate the system by using software.
2. Life duration of battery should be exceeds.
3. Should implement more facilities for health condition detection.
4. Adding the security parameters for safety to ARMY.

REFERANCES

1. “Design and Testing of Cooling Jacket using Peltier Plate”, Muhammad Jahangir, M. Atiq Ur Rehman, Abdul Basit Awan, Raja Hamza Ali, IEEE 2019,
2. “Soldier Security and Health Monitoring”, Thanga Dharsni, Hanifa Zakir, Pradeep Naik, Mallikarjun, Raghu. IERJ2018.
3. “Health monitoring system using internet of things”, VaishnaviPatil, Sanjay Singh Thakur, VaibhavKshirsagar, Proceeding of the Second International Conference on Intelligent Computing and Control System (ICICCS 2018).
4. “Soldier Position Tracking with Health Monitoring System: A Review”, GatirKomalPralhad, Shaikh Mohammad Bilal Naseem, Vol.13 No.2 IJGDC 2020.
5. “Temperature Sensors”, Invented By American Samuel Langley (1878).
6. “Sound Alarm”, Evangelist Darcia L. Smith.