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Advanced Jacket for Military Defense and Social Welfare

Prof. T. H. Mohite[1], Desai Nipankar R R[2], Pattanashetti Y R[3], Hipparagi S S[4]
[1]*Associate professor Dept. ECE, Dr. J.J. Magdum College of Engineering, Jaysingpur, Maharashtra, India*
[2, 3]*Dept. of ECE, Dr. J.J. Magdum College of Engineering, Jaysingpur, Maharashtra, India*
[4]*Dr.J.J. Magdum College of Engineering, Jaysingpur, Maharashtra, India*

***Abstract:** As the climatic conditions are changing rapidly, the winters are getting much colder, especially in northern region and the western region of India. Since we developed a smart army jacket using control media devices such as, GPS, SENSORS in the jacket. The smart army jacket aims for providing reliable health monitoring as well as position tracking of soldier. Some of climatically conditions are led to unfortunate deaths of soldiers. This jacket can automatically sense the temperature inside, outside using temperature sensors. We are using coils for heating purpose and the temperature of the coil will depends on the outer temperature. GPS, the models used for communication purpose. Hence for monitoring the health and the heart rate of the soldier health monitoring equipment sensors are been establish in the jacket as well.*

In enemy territory soldiers not only have to deal with the physical threat, but also with stress and fatigue caused by protracted operations or lack of sleep. so for the security purpose we need a tool for remote soldier performance and health monitoring. so in this project a tool are implemented using bio medical sensors like heartbeat sensor, temperature sensor for health monitoring purpose by using the microcontroller.

DESIGN REQUIREMENTS

Atmega328p-pu, Temperature sensor, heartbeat sensor, oximeter sensor, GPS sensor, lcd panel, solar panel, Peltier plate, 12V battery.

PROJECT OBJECTIVE

1) Semi-automatic temperature control jacket.
2) Heartbeat and blood pressure monitoring.
3) Wireless jacket status monitoring.

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 solider 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 decisions can be taken in very less time. Using GPS, the position and orientation of soldier is obtained. This system enables GPS Tracking of soldier's message which contains temperature, latitude and longitude as well as pulse rate of soldier.

This jacket can also use in social welfare, such as covid -19 like situation so we can track covid related parameters such as temperature, oxygen level and pulse rate. This jacket will be helpful for doctors to track their patients in simple way. So we can use this jacket in future for pandemics like covid -19.

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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 Here displaying the values of present and maximum voltage values which are present in the rechargeable battery. The aim of the paper is to provide medical monitoring for soldier in real time. In other few projects, keypads are used to input some data by soldier which are not so useful and will make the system bulky in size. To overcome this part, we will use a panic button by which a soldier can request for medication from army base station within the wireless transmission and reception range.

II. LITERATURE REVIEW

A. *Paper 1*

This paper proposes a new idea based on Peltier effect and a Peltier plate with heat sinks and small Dc fans is used inside the jacket and the current of the Peltier module is controlled by lily pad controller. Additionally, a temperature sensor is used inside the jacket and this sensor has capability to measure both the humidity and temperature. Output of this sensor is attached with lily pad controller and an LCD is also connected with lily pad to display the results. The whole circuit is powered up using solar strip attached on the upper layer (back side) of the jacket and the amount of sunlight is directly proportional to the cooling inside the jacket as the power from the solar strip increases by increasing the amount of sunlight. While Peltier plate is not commonly used in applications like cooling a room or in large size refrigerators due its inefficiency, very small amount of power input is used for cooling purpose when current is too high. Whereas from results discussed in this paper one can use Peltier plate for cooling small size areas like a jacket or a mini refrigerator.

B. *Paper 2*

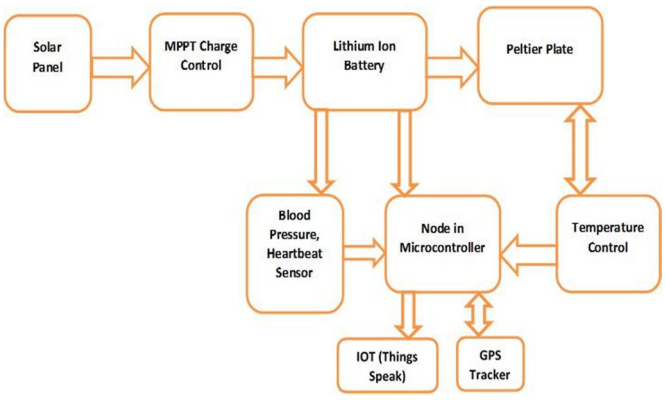
This paper proposes framework can be mounted on the warrior's body to track their wellbeing status and current area utilizing GPS. These data will be transmitted to the control room through distributed computing. The proposed frame work involves small wearable physiological equipment's, sensors, transmission modules. Consequently, with the utilization of the proposed hardware, it is conceivable to execute a minimal effort component to ensure the important human life on the war zone GSM is used which is irrelevant and excessive use of sensors unnecessarily.

C. *Paper 3*

This paper proposes an advanced perturbation and observation (P&O) algorithm for tracking the maximum power point (MPP) of a solar PV panel. Solar PV cells have a non-linear V-I characteristic with a distinct MPP which depends on environmental factors such as temperature and irradiation. In order to continuously harvest maximum power from the solar PV panel, it always has to be operated at its MPP. The proposed P&O algorithm can reduce the main drawbacks commonly related to the P&O algorithm. This is achieved with determining the short-circuit current before each perturbation and observation stage. The obtained simulation results are compared with MPPs achieved using the conventional P&O algorithm under various atmospheric conditions. The results show that the advanced P&O algorithm is better than the conventional P&O algorithms for tracking MPPs of solar PV panels. Additionally, it is simple and can be easily implemented in digital signal processor (DSP).

III. METHODOLOGY

A. *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 MPPT charge controller for maximum and constant power supply. After that the battery is charged. The supply from battery is given to Peltier plates, controller and biosensors for their operations.
The Peltier changes 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 heath of that 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.

B. Operation

The working principle of the system starts with charging 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 plates gets signal form 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 single to the Peltier plates then it increases the temperature up to the limits and gives single to temperature sensor.
We can also detect the heart beat and blood pressure of that respected person by using heart beat sensor and blood pressure sensor. We can see this information on IOT (things speak). In this way we can monitor all information on internet.

C. Advantages

1) Soldiers will be alerted regarding enemy Entry
2) Location of the soldier can be tracked and sent to control room if he is missed.
3) High range of security has been provided
4) Soldiers' health is monitored continuously.

IV. APLLICATIONS

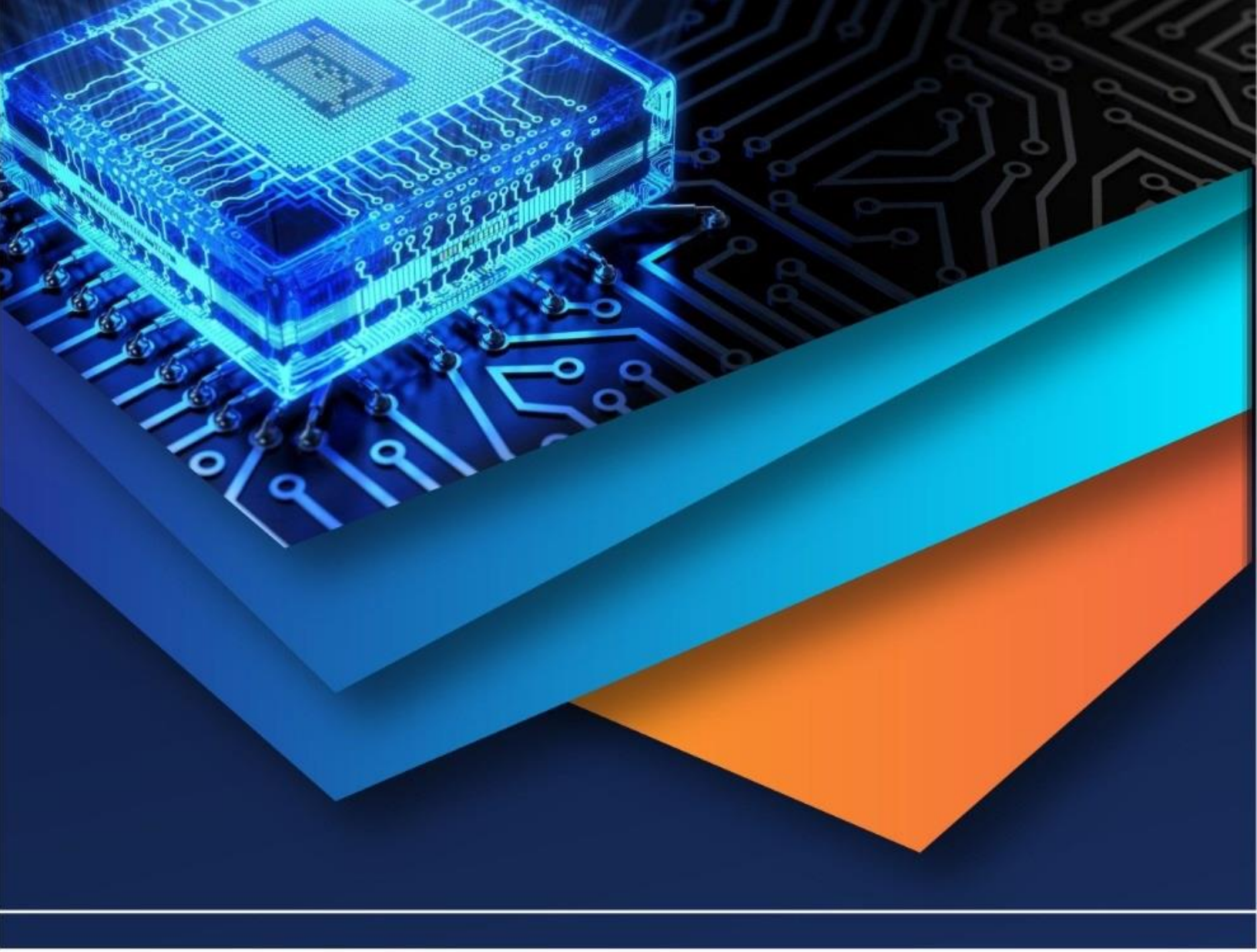
A. It can be used in the war fields.
B. It can be used in the Govt. related secured rooms and lockers.
C. The project can be used in all the Border security Forces.
D. It can be used in the war fields

V. CONCLUSION

Thus, we conclude that the multifunction jacket is suitable against weather conditions. 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 and respective location information about the person.

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