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Solar Based E-Uniform for Soldiers

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Abstract - *Solar-based E-Uniform furnished with better protection to the soldiers who are working in extreme weather. Solar Panels are wont to power up the interior circuitry of the E-uniform. A 12 V DC lead-acid rechargeable battery is employed for storing the energy. We are using a conventional battery charging unit also for giving supply to the circuitry. ATmega16a microcontroller is the heart of the circuit as it controls all the functions. The project is operated in two modes like summer mode and winter mode. By selecting the mode of operation, we are operating the system such it can drive the body temperature according to heater/cooler. The heater/cooler in turn will help us to provide a chilling or warming effect inside the uniform which helps the soldier to bear to any kind of external environment. The metal sensor will detect the metal-like bomb, any other planted weapon in-ground and intimate the soldier with a buzzer indication. The GSM is interfaced with the microcontroller and GPS is additionally interfaced such the tracking of the whole soldier is observed. And the location is messaged to the particular concerned person /dept. This Uniform will make the soldier work in any kind of environment without any stress or distraction.*

Key Words: **Microcontroller ATmega16a, Solar Panel, Rechargeable Battery, Temperature Sensor, Heartbeat Sensor, Peltier Plate, GSM, GPS.**

1. INTRODUCTION

Warriors are the Army's most imperative asset. Warriors assume an important part to make sure one's nation. The term warriors incorporate administration men and ladies from the military, Air Force, Navy, and Marine. While giving security to the country, they could challenge inconveniences in hot/frosty climate conditions. Both exceptionally hot and icy temperatures might be unsafe for well-being. This venture may be a solution for this circumstance. during this venture, an E-Uniform is planned which provides better security to the officers who are working in great climate conditions. A temperature sensor is employed to see the temperature whenever. The LM35 is a circuit temperature sensor, whose yield voltage is directly relative to the Celsius (Centigrade) temperature.

In this undertaking, we are getting to plan an E-Uniform which provides better assurance to the fighters who are working in amazing weather. This Uniform will make the trooper figure in any kind of environment. Here we are utilizing Solar Panels to regulate up the within the hardware of the E-uniform. A 12 V DC lead corrosive rechargeable battery is employed for putting away the vitality. We are utilizing a routine battery charging unit additionally to offer supply to the hardware. A temperature sensor and heartbeat sensor utilized for checking the wellbeing of the trooper in any circumstance. ATmega16a miniaturized scale controller is that the heart of the circuit because it controls all of the capacities.

The undertaking system is worked in two modes summer mode and winter mode. By selecting the tactic of operation, we are performing on the H-Bridge IC such it can drive the body radiator/cooler. The warmer/cooler thus will help us to offer chilling or warming impact inside the uniform which helps the officer to face any kind of outer environment and he can work proficiently without warmth stress or frosty anxiety. A 12 V DC lead corrosive rechargeable battery is employed for putting away the vitality. We are utilizing a standard battery charging unit likewise to offer supply to the hardware. A managed 5V, 500mA power supply is utilized by the conventional force source. 7805 three-terminal voltage controllers are utilized for voltage regulation. Span sort rectifier is used to amend the air-con yield of the optional 230/12V stage down transformer.

2. PROPOSED SYSTEM

After doing a lot of research and study some papers found out to be valuable resources for the development of the project. All contain different methodologies and techniques which are used to achieve efficient and user-friendly uniform for Soldiers.

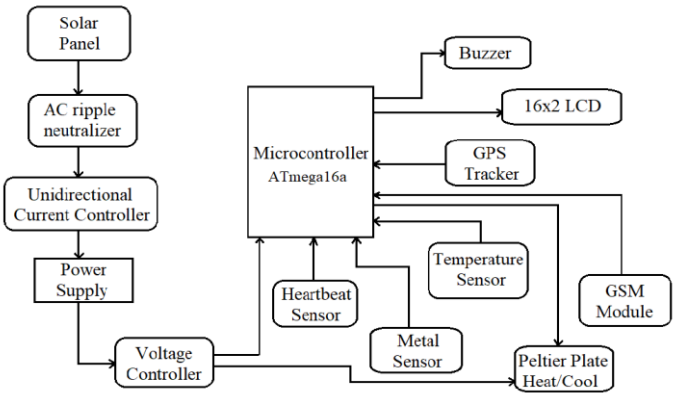

Fig. 2.1: Block Diagram

In this project, solar panels are used for charging a Lead Acid Battery (12V, 1.2 Amp hrs.), a Peltier thermoelectric device which when connected to the battery generates a cooling effect on one side, and heat is dissipated

on another side through the heat sink. A regulator 7805 is used to drive the internal cooling fan and LED. Here we are using Microcontroller (ATmega16a) that allows dynamic and faster control. Liquid crystal display (LCD) makes the system user-friendly. Here we are using an LCD display for displaying the variations in voltage values that are present in the rechargeable battery.

The system is operated in two modes summer mode and winter mode. By selecting the mode of operation, we are operating the system such it can drive the body temperature according to heater/cooler. The heater/cooler, in turn, will help us to provide a chilling or warming effect inside the uniform which helps the soldier to bear to any kind of external environment and he can work productively without heat stress or cold stress.

The metal sensor will detect the metal-like bomb, any other planted weapon in-ground and intimate the soldier with a buzzer indication. The GSM is interfaced with the microcontroller and GPS is additionally interfaced such the tracking of the whole soldier is observed. And the location is messaged to the particular concerned person /dept.

3. METHODOLOGY

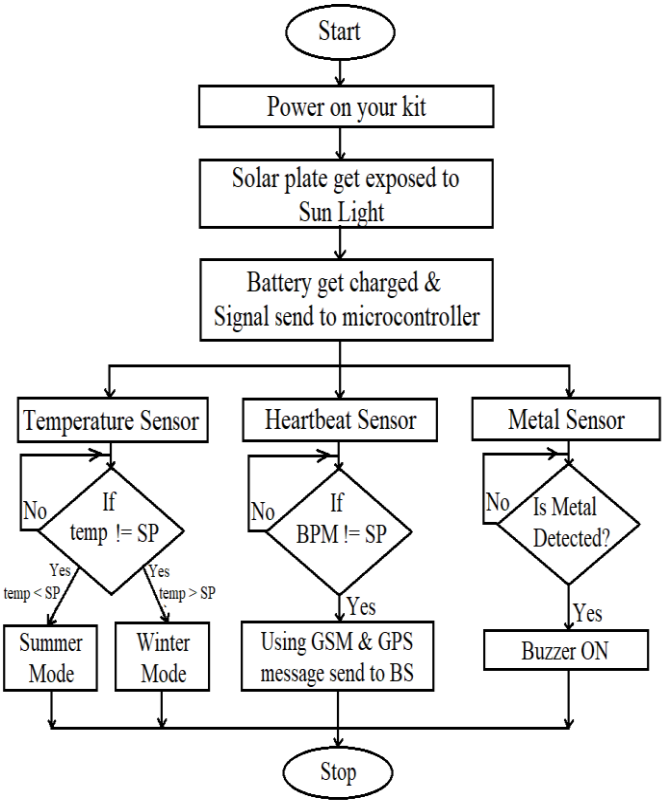

Fig. 3.1: Flow Chart

As we all know that the flowchart is a diagrammatic representation of the algorithm of any system Fig. 3.1 is the flowchart of the project in which you see that how one process initiates the other process.

4. SPECIFICATIONS

4.1 Peltier Plate

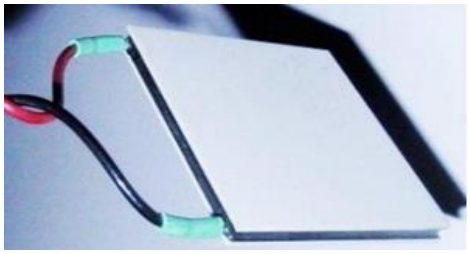

Fig. 4.1: Peltier Plate

The most common temperature control option for the AR rheometers is known as the Peltier Plate. The Peltier plates have a temperature range of -40 to 200 ºC with a typical heating rate of up to 20 ºC /min. and temperature accuracy of 0.1ºC. A PRT (platinum resistance thermometer) sensor positioned at the middle of the plate ensures accurate temperature measurement and control. A Peltier element (TEC) is used by the Peltier cooler for cooling purposes. Peltier coolers contain the Peltier element itself, and a strong heatsink/fan combination to chill the TEC.

Peltier Plate works on the Peltier effect. The effect which creates a temperature difference by transferring heat between two electrical junctions is called Peltier Effect. A voltage is applied across joined conductors to make an electrical current. When the present flows through the junctions of the 2 conductors, heat is removed at one junction and cooling occurs. Heat is deposited at the other junction. The main implementation of the Peltier effect is cooling. However, the Peltier effect also perhaps used for heating or control of temperature. In every case, a DC voltage is required.

4.2 Heartbeat Sensor

Fig. 4.2: Heartbeat sensor

The heartbeat sensor is intended to give an advanced yield of warmth beat when a finger is set on it. At the point when the heartbeat finder is working, the beat LED flashes as one with every heartbeat. This computerized yield can be associated with a microcontroller straightforwardly to gauge the Beats Per Minute (BPM) rate. It deals with the guideline of light by blood move through the finger at every heartbeat.

4.3 Metal Sensor

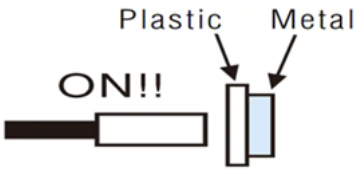

Fig. 4.3 Metal Sensor

Inductive proximity sensors can only detect metal targets. They do not expose non-metal targets such as plastic, wood, paper, and ceramic. Unlike photoelectric sensors, this allows inductive proximity sensors to detect a metal object through the opaque plastic.

5. ADVANTAGES

- Fit and overlook framework
- Operate and monitor from anywhere.
- This system can operate and be utilized from the natural power supply.
- We can take the precautions of soldiers and monitored it.
- This System is easy to use and Timeless.
- The system can give the alert of critical conditions.

6. APPLICATIONS

- Used in military applications.
- Used for scientists who are working in extreme weather conditions like in Antarctica.
- This uniform can be utilized for all the climatic applications.
- Soldiers can work in compelling climatic application.

7. CONCLUSIONS

Soldiers are one of the important factors in a country. Because they are the forces who protect our country day and night living behind sleep and rest. Solar-based E-Uniform provides better protection to the soldiers who add extreme weather. This Uniform made the soldier work in any kind of environment. So, he could work efficiently without heat stress or cold stress. The metal sensor will detect the metal-like bomb, any other planted weapon in-ground and intimate the soldier with a buzzer indication. The Heart rate sensor, GSM, and GPS are used to monitor the health of soldiers and track their location. If the climate condition is excessively hot then the cooling framework worked and if it is excessively cool then the warming framework worked. If this framework might come up short GPS located the position of troopers and send messages utilizing GSM to the control station.

Implementation of Such System will help us in various aspects. Majorly it will save a lot of soldier's lives and its side-effects (low commando at the border) will get reduced drastically. This project has a huge part in our everyday life. Also, it can be utilized as a part of different floods of industrial applications.

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