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TEMPERATURE-CONTROLLED BODY SUITS MONITORING SYSTEM USING IOT

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Abstract

The Temperature-Controlled Monitoring System, features with specific sensors that adjust the temperature automatically based on the user's preferences. People may plan a trip without having to bring additional blankets or clothing in urgency. In the Travel Circumstances, both very cold and very hot temperatures can be hazardous to health. By regulating body heat using the Peltier crystal in most jackets in accordance with the temperature recorded by the LM35 temperature sensor in the frame, it is practical to use a low-cost way to protect irreplaceable human lives on the battlefield. The newest all-weather equipment provides even more control by interposing intelligent technology between premium layers. The ambient temperature is tracked by this system using a temperature sensor, which then sends the data to an IoT module (ESP8266-12E) NODE MCU. This mechanical is tremendously beneficial to the military, mine employees, and regular citizens. The IoT module handles the logical processes, and the Peltier system uses the signals to collect heat/cool. It is possible to expand the system to enable device-to-device communication. Utilizing IoT technology will allow more adaptable with climatic conditions while automatically collecting environmental data.

***Keywords:* Peltier crystal, Temperature sensor LM35, IoT Module (ESP 8266-12E), Node MCU, Relay Circuit**

INTRODUCTION

Since medical exploration has advanced, body temperature monitoring has been a source of company. The necessity to continuously check a case's gut body temperature arises from a variety of diseases. Because a mortal commodity takes perpetual concentration, demerits still can be and the situation will not invariably be under control. As the number of infected people rises daily and the burden for all sanitarium employees increases, the global epidemic effects demands further concentration. The paper's introductory conception is also workable in a wide range of artificial settings. The pretensions of these operations following these points It can be exercised by people who are exposed to the scorching summer sunshine like the Army man or the artificial worker whose work terrain is frequently a high- temperature bone The suit can be exercised to cover the temperature and moisture of the cases in hospitals. The suit can also be exercised for old people who are vulnerable to temperature revise. Legionaries usually face extreme Cold and Hot conditions. The being system is a heating/ cooling sheath, in which the stoner can control the temperature through controls and thermo- electric bias that are bedded in the suit. The functionality of the suit is, formerly turned on; the device displays the temperature of the within of the suit in an exposition allowing the stoner to control the internal temperature of the suit (Adarsh K S, 2016).

The existing system is a heating/cooling jacket, in which the user can control the temperature through controls and thermo-electric devices that are embedded in the suit. The functionality of the suit is, once turned on; the device displays the temperature of the inside of the suit in an LCD display allowing the user to control the internal temperature of the suit (Bendre, 2017).

PROFFERED SYSTEM

The proffered system is an improved result for monitoring and lives reciting the temperature of the nonidentical legionnaires in special locales. The real- time data from the detectors are stored in a pall garcon and dispatch is transferred to the predefined donors to allow them pierce the data ever over the internet When travelling in nonidentical climatic conditions, the dimension of temperature reaches over safe position also the donors can take immediate action to warn people to be careful with appreciation to army man at martial manpower. The proffered system is aimed grounded on a temperature detector ESP8266 Wi- Fi module (R. Kabilan, 2022). The main characteristics of this proposed system are low cost, low power consumption because of the self-powered device, high accuracy, and user friendly.

METHODOLOGY

Temperature Sensor [LM_35] LM 35 is a precision integrated-circuit temperature sensor whose output voltage is linearly proportional to temperature. This sensor is used to collect information on body temperature and sends the signals to the Arduino board and the same is displayed on LCD. The development board equips the ESP-12E module containing an ESP8266 chip having Tensilicaxtensa 32-bit LX106 RISC microprocessor which operates at 80 to 160 MHz adjustable clock frequency and supports RTOS. This makes the ESP8266 Node MCU even more versatile. Thermoelectric coolers (TEC or Peltier) TEC1-12706 12V 92W create a temperature differential on each side (Lim, 2019). One side gets hot and the other side gets

cool. Therefore, can be used to either warm something up or cool something down, depending on which side is used can also use temperature differential to generate electricity. The thermoelectric cooling (TEC) module is a semiconductor-based electronic component that functions as a small heat pump (S. Han, Jul. 2020). By applying a DC power source to a TEC, heat will be transferred from one side of the module to the other. It creates a cold and hot side. Various hardware and software components are employed to accomplish various operations Software is used to show output and to develop approaches. Fig 1 shows the block diagram of temperature control.

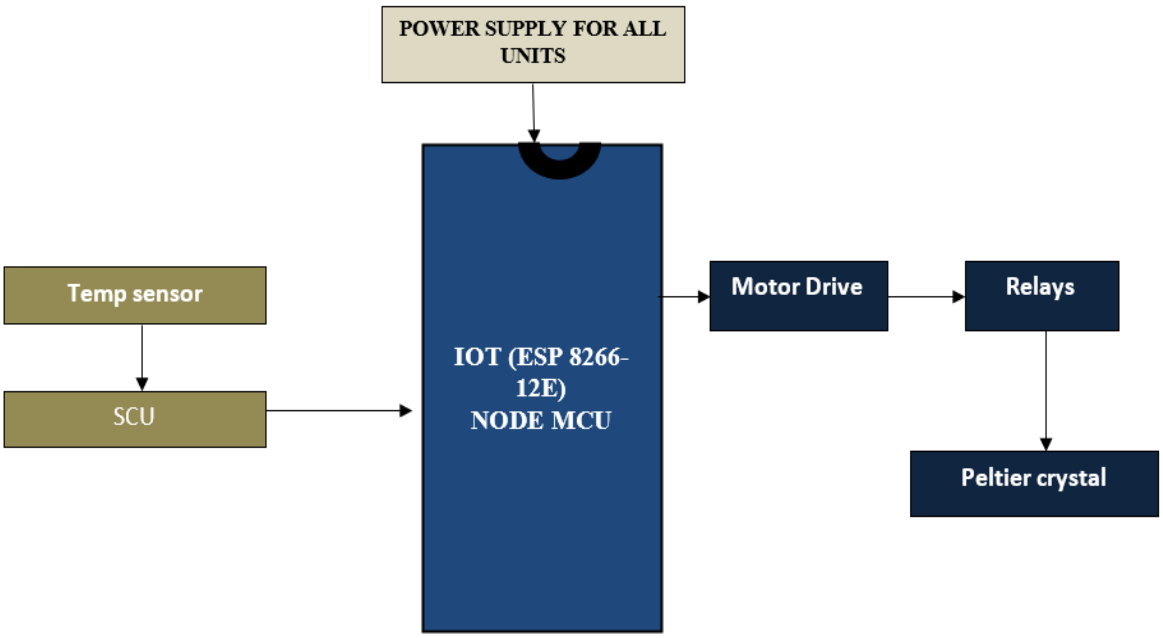

Fig 1 Block Diagram

Components and Experiments

1. IoT Module (ESP 8266-12E NODE MCU)

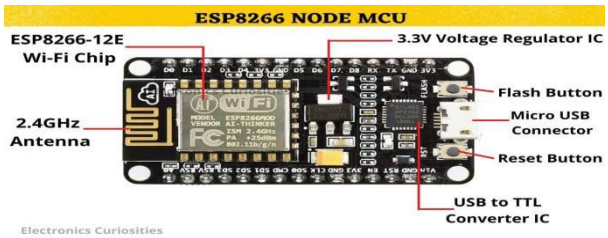

Fig 2 IoT Module (ESP 8266-12E NODE MCU)

Node MCU is an IoT Module based on the ESP8266 WIFI chip Module. The ESP8266 Node MCU CP2102 board has ESP8266 which is a highly integrated chip designed for the needs of the new IoT-connected world (S. A. Abainza, 21-Nov-2020) (S. Han, Jul. 2020).

2. Temperature Sensor

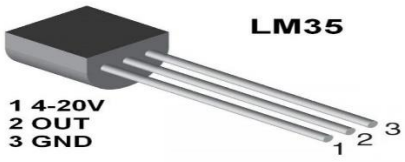

Fig 3 Temperature sensor

Temperature sensors are devices that detect and measure coldness and heat and convert it into electrical signals. LM35 is a type of commonly used temperature sensor that can be used to measure temperature with an electrical output compared to the temperature in (° C).

3. Driver & Relay Circuit

Relay is used for switching purpose.two relay model used in this mechanism.

4. Peltier Crystal

One side gets hot and the other side gets cool. The Peltier module (thermo- electric cooler) operates based on the Peltier effect.

Fig 4 Peltier Crystal

5. Power Supply / Battery Supply

This component consists of two windings, namely primary and secondary windings where primary can be designed using a less-gauge wire with more number of turns as it is used for carrying low-current high-voltage power, and the secondary winding using a high-gauge wire with less number of turns as it is used for carrying high-current low-voltage power (Christopher, 2020).

6. Transformer and Connecting Wires

Generally, Transformers works on the principle of Faraday's laws of electromagnetic induction. 12V AC V can be converted into 12V DC using bridge rectifier (Juliana). There are different types of rectifiers, such as half-wave rectifier, full-wave rectifier and bridge rectifier. Due to the advantages of the bridge rectifier over the half and full wave rectifier, the bridge rectifier is frequently used for converting AC to DC.

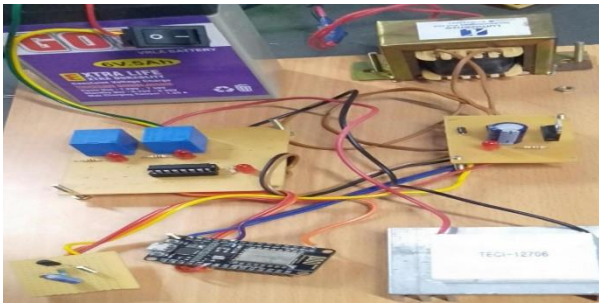

Fig 5 Components used in the Proposed Hardware

RESULTS AND DISCUSSIONS

A program written with the IDE for Arduino is called a sketch. Sketches are saved on the development computer as text files with the Pre-version 1.0 of the Arduino Software (IDE) saved sketches as files ending in pde. Using certain code structuring guidelines, the Arduino IDE supports the languages C and C++. The coding for temperature measurement makes up the majority of the code. Arduino programming with the Cayenne software used to display the output. The following code window, explains temperature readings work in this code, and what circumstances must be met for the result to appear.

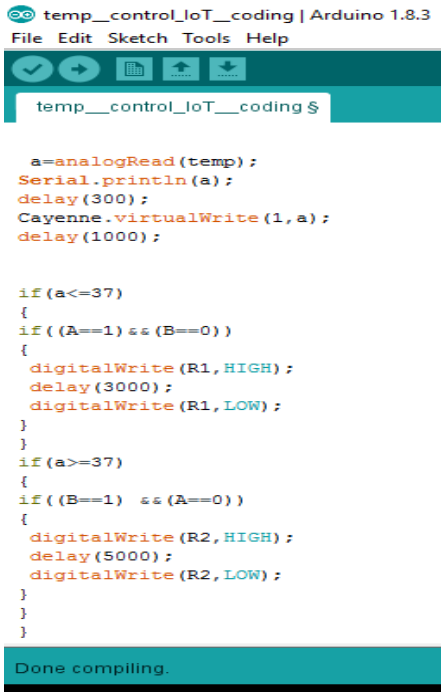

Fig 6 Programming in Arduino IDE

Temperature Sensor [LM_35] LM 35 is a precision integrated-circuit temperature sensor whose output voltage is linearly proportional to temperature. This sensor is used to collect information on body temperature and sends the signals to the Arduino board that will display the temperature output when the code has been executed. Temperature sensor gathers data about one's own body temperature or the surroundings around them, senses the temperature, the temperature is very from surroundings and displays the results on the Cayenne app.

Fig 7 Temperature sensing data

Fig 8 Results of the temperature-measurement system

The results of the temperature measurement are gathered under various ambient temperatures. The graph represents temperature changes, and this measurement is utilize to regulate the heat and cool produced by a peltier crystal in order to automatically offer both heat and cold.

CONCLUSION

Think that soldiers are essential to properly securing our nation day and night. Also, troops are essential to the overall wellbeing of the nation. So created an E-Uniform to better protect and insure our brave Troops. This paper has significant implications for our daily lives. It can also be used in a number of industrial application domains. The specially designed E-uniforms are particularly beneficial for military objectives, unlike the weather conditions for soldiers and other citizens. The temperature is just one of the numerous things that have an impact on our health and productivity at work. Everyone planning to venture outdoors must be ready to withstand the weather, whether it's a dry hot condition or a chilling coldness. Extreme weather conditions can cause major health issues like acute mountain sickness and heat stroke. There is a limit to how many layers of clothing can be placed on our bodies, thus dressing

appropriately for the season can only protect us to a certain extent. The smart IoT temperature control body suits provides a solution for coping with weather extremes by keeping the user's body temperature at an ideal level in relation to the outside temperature, monitoring. There are two ways to employ this body suit mechanism in both the summer and the winter. If the weather outside is too hot or too cold, the cooling or heating system will turn on. Temperature-controlled body suits monitoring system is more beneficial for army and civilian.

FUTURE SCOPE

For future expansion, this technique is made to be readily worn and powered by a tiny portable solar panel, making it more environmentally friendly. It is created for the client's own liking designs such as headscarves, army uniforms, and thermal t-shirts for future expansion. Using solar panels for sensing the nodes, results in constant power production with less maintenance with regard to monitoring the user's heart rate, and alerting the user via a mobile application. Add humidity sensors, raindrop sensors, and other devices for effective operation so that this temperature-controlled body suit mechanism may be worn in all weather and seasons to shield us from overheating and over cooling. This system is user-friendly and serves as an effective short-term solution that enables people to deal with abrupt changes in the weather.

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