

PERSONAL HEATING AND COOLING DEVICE USING PELTIER MODULE

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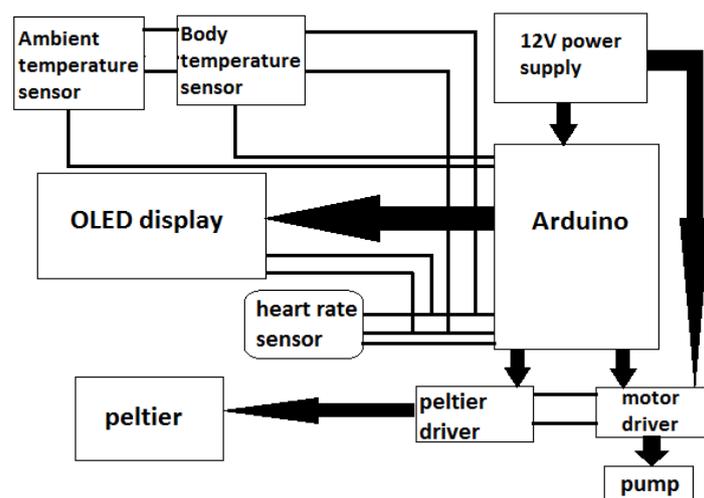
ABSTRACT: Environment encounters continuous changes in temperature. Everybody knows what it is like to be in a room where half the occupants are freezing in sweaters and the other half are sweating in short sleeves. The device proposed by this system solves that by individually regulating body temperatures and saving loads of money on energy cost. It can also measure the wearer's body temperature and pulse rate. The basic idea of this project is to use sensors which detect body temperature and adjust accordingly that is the device works by sending cooling or warming waves to the thermoreceptors on the skin surface providing heat or coolness to meet the wearer's personal thermal needs without affecting the overall temperature. In conventional cooling systems there is a lot of emission of gases which are harmful to the environment and often lead to severe problems like global warming. This system is environment and user friendly. Another secondary feature of the system is heart rate monitoring and informing the user incase of abnormal heart rate.

Keywords: peltier module, temperature sensor, heart rate

2. INTRODUCTION

The proposed system is a thermoelectric bracelet that regulates the wearer's body temperature. If something cold is put on a human body at constant temperature, it acclimates and no longer perceives it as cold. The human skin quickly adapts to constants but it is very sensitive to minute, rapid changes in temperature. Local warmth or cold gives a body wide sensation of thermal comfort. By continuously introducing the sudden influx of cold or heat the body is essentially tricked into feeling cold or hot without changing its core temperature. The feeling is similar to dipping toes in the cold water on a hot day. The thermoelectric device produces heating or cooling that takes the form of a heat sink which then creates a temperature difference across the thermoelectric cooler. Thermoelectric devices are solid-state devices that are capable of producing three effects without any intermediary fluids or processes. With modern techniques, we can now produce thermoelectric modules that deliver efficient solid state heat-emitting for both cooling and heating.

3. PROPOSED SYSTEM ARCHITECTURE:



Detailed information of the different modules used in the project is further explained. The different modules are:



(I) Politer module:

This phenomenon involves heating or cooling of the junction of two thermoelectric materials (bismuth and telluride) by passing current through the junction. During operation, direct current flows through the module causing heat to be transferred from one side to the other. Thus it creates a cold and hot side. If the direction of

Software Features

- Slave default Baud rate: 9600, Data bits:8, Stop bit:1,Parity:No parity.
- Auto-connect to the last device on power as default.
- Permit pairing device to connect as default.
- Auto-pairing PINCODE:”1234” as default



(V)OLED Display Module:

OLED (Organic Light Emitting Diodes) is a flat light emitting technology, made by placing a series of organic thin films between two conductors. When electrical current is applied, a bright light is emitted. OLEDs are emissive display that do not require a backlight and so are thinner and more efficient than LCD displays (which do require a white backlight).

(VI)Motor driver circuit: A motor driver is a little current amplifier, the function of motor driver is to take a low current control signal and then turn it into higher current signal that can drive the motor. One of the applications of motor driver is relay and solenoid switching. Driver circuit is basically an amplifier circuit. In the system proposed arduino can't supply enough current to the peltier module.

(VII)Pump:



Pump is used to pump coolant. The pump used in the system proposed is a Micro DC 3-6V Micro Submersible Mini Water Pump. This is a low cost, small size pump motor, we need to connect tube pipes to the motor outlet, submerge it in water and power it. The water level should always be higher than the motor. Dry run may damage the motor due to heating and it will also produce noise.Its specifications are as follows:

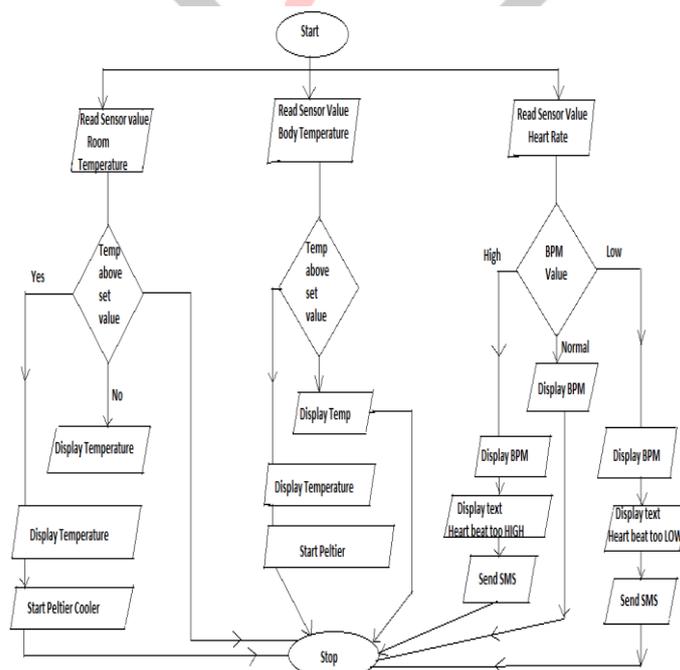
1. Operating voltage: 3v to 6v
- 2.DC Power consumption: 0.4W to 1.5W
3. Rate of flow: 80 - 120L/hr Lift: 1.1m MAX.
4. Type: submersible
- 5.Dimension: 45 x 24 x 30 (LxHxB) MM



(VIII)Heart rate sensor:

The front side of the sensor is the side that makes contact with the skin. On the front there is a small round hole, which is where led shines through from the back, and there is also little square just under the led. The square is an ambient light sensor. Pulse sensor is a well-designed plug-and-play heart rate sensor for arduino. They are easy to use. The sensor clips onto fingertip or can be placed on wrist and plugs right into arduino with some jumper cable. Thus we get. the pulse reading

4.FLOWCHART OF THE PROPOSED SYSTEM



5. FUTURE SCOPE

Device can be made fully portable and compact in size by using lithium polymer batteries. Global system for mobile communication (GSM) can be used for long distance pulse rate transmission. The device can be used for extreme weather conditions.

6. CONCLUSION

By sensing different temperature using LM35 temperature sensor a comparison was made to the set point thus giving an output of the differences. TEC12705 peltier block was used to provide heat or coolness required by the wearer according to the difference between ambient and body temperature. Thus the regulation of the temperature using peltier block was done for human usage. This paper also focuses on the heart rate monitoring and alert which is able to monitor the heart beat rate condition of wearer. This is a very efficient system, provides great flexibility and serves as a great improvement over other conventional systems

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