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Research paper

Operating IR Emitters using Internet Based Teleoperation

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Abstract

As we all know that we are slowly moving toward automation and automation is one of the trending topics. So, basically in this design we will be operating the IR emitter using internet based teleoperation. The system will get commands from the raspberry pi and it will control the IR transmitter, according to the input values, set by the user. In this design raspberry pi forms the processing part, which firstly receive the input values from the Wi-Fi connected device and sends it to the IR emitter which emits IR radiation. It is absorbed by a metal (i.e. thermometer) and gets heated. If the melting point of the metal is satisfied, by using a driver element (i.e. resistor), it is maintained constantly. We can change the input values from the Wi-Fi connected device according to the type of metal used.

Keywords: *Raspberry pi, IR transmitter, Thermometer*.

1.Introduction

IR emitter is one of the most commonly used components due to its cost effectiveness and low power consumption advantages. It is widely used in many industrial applications. It is one of the most sensible solutions to offer a comfortable and energy efficient. In Industries IR emitters are manually operated. So, automation is done to overcome the demerits caused in the manual method. This paper results in the automation of IR emitters where there is no manual work is not needed. So by the usage of Raspberry pi can automatically fix the input values, given by the user. The input values given by the user are changed in the Wi-Fi connected device.

2. Proposed system

The raspberry pi is the heart of the design. It accepts the input from the Wi-Fi connected device in which the input value is set by the user. The radiation levels are controlled by damping the required parameters that is being required by the user. Resistor is used to produce delay when the melting point of the metal is satisfied, and to maintain the temperature of the constantly. The above description can be shown in fig. 1

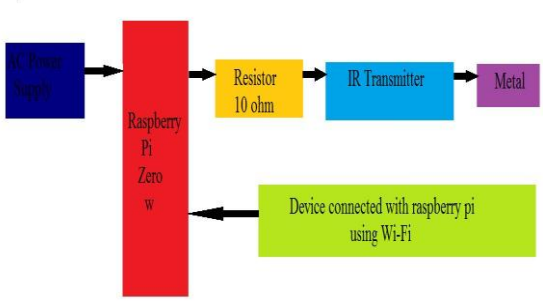

Fig -1: Block Diagram

2.1. Raspberry pi zero

A microcontroller is a computer system on a chip. It has many electronic circuits built into it, which can decode written instructions and convert them into electric signals. The microcontroller will the step through these instructions and execute them one by one. As a example of this, a microcontroller can be used to operate the IR emitters according to the input value given by the user. Raspberry pi is a microcontroller having 40 input/output pins in which 8th pin can be used as PWM. It has 1 GHz ARM processor as CPU and video core IV as GPU, a USB connection, a power jack and a reset button. The above description can be seen in fig. 2.

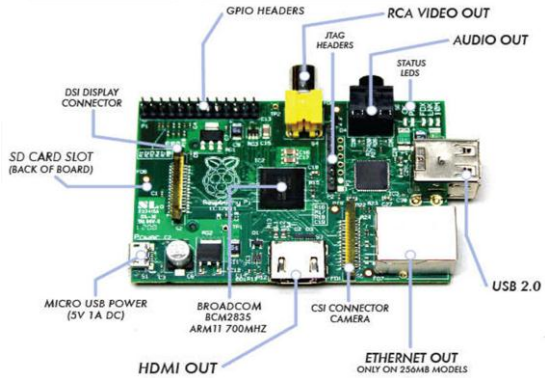

Fig -2: Raspberry pi Controller Board

2.2 IR Transmitter (NE555)

IR transmitter is used to control any device wirelessly, means remotely. An LED present in the transmitter circuit emits infrared light, means it emits light in the infrared frequency. IR rays are invisible to human eyes having wavelength as 700nm-1mm. It consumes 20mA current and 3 watts power. It has three pins, Ground, Vs (power), and OUTPUT pin. In this design, a series of

IR transmitters is used to emit infrared radiation onto the metal to get the fixed melting point. The above description can be seen in fig. 3.

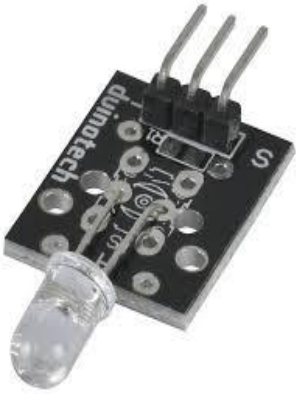

Fig -3: IR Transmitter

2.3 Mercury Thermometer (Metal)

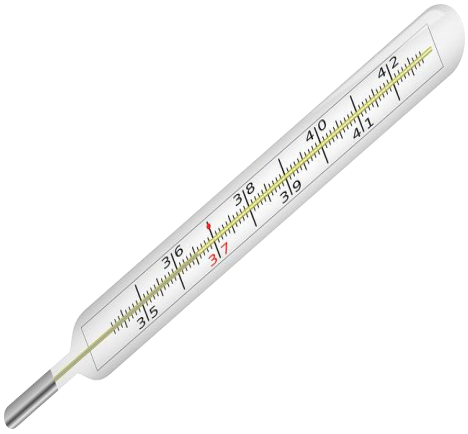

Fig. 3: Mercury Thermometer

Mercury thermometer consists of a glass tube filled with mercury and a standard temperature scale is marked on the tube. With changes in temperature, the mercury expands or contracts and thus temperature can be measured from the scale. Mercury thermometers are used in households, laboratory purposes and industrial applications. In this design, for the demo purpose we are using mercury based application (thermometer) as a metal because, it has low melting point (-38.9°C) when compared to other metals.

3. Experimental Results:

Fig. 4: Experimental output of Internet Based Teleoperation

In this module, first is connecting the laptop with Wi-Fi and match the IP address with the Raspberry pi microcontroller board. After that, switch on the power supply and the micro controller will turn ON and receives the commands from the coding section. IR Transmitters will emit the radiation according to the commands given. The temperature variation will be measured by using Thermometer.

4. Conclusion

This work elaborates the design and construction of IR emitter using internet based teleoperation to operate the IR transmitter automatically. Besides, the microcontroller had been used to operate the IR transmitter, raspberry pi was successfully programmed using python software to fix the temperature value and frequency value required to achieve the melting point of the metal. Moreover, when the melting point is achieved temperature is maintained constantly by using driver circuit (resistor). As conclusion, the system which designed in this work was perform any kind of input value and can be classified as automatic control.

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