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Research Paper

Prevention of Overheating of Electronic Devices Using IoT Based Temperature Controlled Fan

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ABSTRACT:-*Now-a-days the usage of electronic devices became more and more popular. This usage of electronic device for long time in-turn leads to increase in the temperature of the device which makes the device overheat. Overheating causes internal damage to the corresponding device and hence reduces the life time of the device. So, to control the heat and protect the electronic device from overheating, an IoT based temperature Controlled fan is proposed. The main objective is to detect the temperature of the device when in use using temperature sensor and automatically making the fan ON and OFF based on the measured temperature. When the temperature is greater than the set value or the threshold value, the fan will be in ON condition by which the high temperature of the device gets reduced. An Arduino board is used to implement this. Making the electronic device free from overheating, decreases the chance of damage done and increase the life-time of the device.*

KEYWORDS: *Overheating, Temperature, IoT, Arduino*

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I. INTRODUCTION

This paper presents an idea to prevent the failure of electronic components due to overheating. Usage of electronic devices has increased these days and became very much common. Using electronic devices for longer time and due to any faults in the internal circuitry, the device gets overheated. Because of overheating, internally the electronic device gets damaged which stops the working operation of the device.

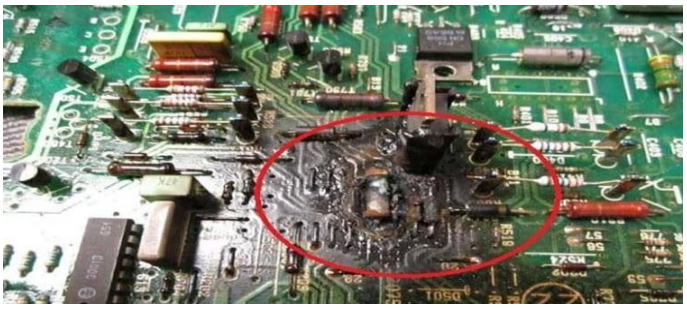

Fig.1: Damaged Internal Structure of the Electronic Device due to Overheating

This proposed design prevents the devices from overheating by automatic fan rotation [1] when the temperature of the electronic device is high which makes the device cool down and work efficiently. With this, the damage done to the device can be prevented which in-turn improves the life-time of the device.

II. RELATED WORKS

Shwetha S Baligar et al. discussed about the fan speed controlled by using Pulse Width Modulation and Arduino board according to the temperature and Humidity Sensor (DHT11). PWM technique is found to be the best technique for controlling the fan speed using the detected temperature. The speed of the fan depends on the temperature and there is no need for regulating the fan speed manually again and again [3].

M. Senthil Vadivu et al. proposed a system based on fan control. System works effectively by sensing the changes in temperature around us. This will be highly useful for physically challenged and senior citizen people. This work can be extended for industrial purpose in future [4].

Anurag Busha et al. stated that overcharging has been a major concern for users. Many accidents have been reported where not only the device but the user has been harmed as well. This model overcomes all the myths and fear regarding the overcharging of the phone and it eliminates the need for the manual operation of switching [5].

III. PROPOSED MODEL

The life span of the electronic devices might be decreased due to overheat. So, in order to improve the working operation & efficiency and to prevent the electronic devices from overheating, this system is proposed. The temperature of the device is detected with the help of temperature sensor. If the detected temperature is higher than the set value, automatically the fan gets turn ON. Otherwise the fan turns OFF. This complete operation is done automatically with an indication through audio-visual system. Thus, the electronic devices can be protected from internal damage which leads to increase in the life-time of the device.

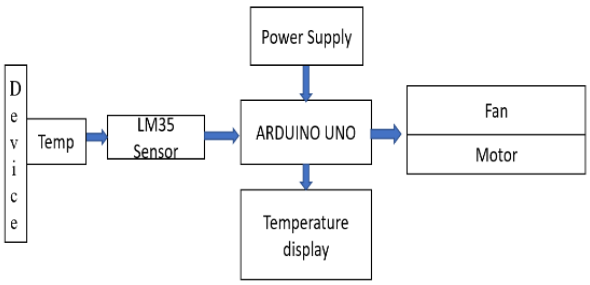

Fig.2: Block Diagram of the Proposed System

IV. EXPERIMENTAL SET-UP

In this we have used Arduino Uno[2][12]. It is a kind of microcontroller board based on ATmega328. A temperature sensor LM35 is used to detect the temperature of the electronic device. The DC fan turns ON/OFF automatically based on the detected temperature. Buzzer, Red LED and Green LED provides audio-visual indication respectively. Figure 3 shows the experimental setup of the proposed method.

V. WORKING PRINCIPLE

Temperature sensor detects the temperature of the electronic device. When the detected temperature is greater than the set value or fixed value (Here the set/fixed value is the temperature which is set to a fixed value in the program which is 35^{o}), an indication is given through red LED and the buzzer sounds. Under this condition, the fan turns ON automatically.

When the detected temperature of the electronic device is less than the set/fixed value, green LED glows indicating that the device is under normal condition. Buzzer does not sound and the fan remains in OFF condition.

VI. RESULTS AND DISCUSSIONS

Simulation results of detected temperature of the electronic device are shown in the figure 4. The values are displayed on the serial monitor which is a part of the Arduino IDE software. Fan turns ON/OFF automatically depending on the detected temperature.

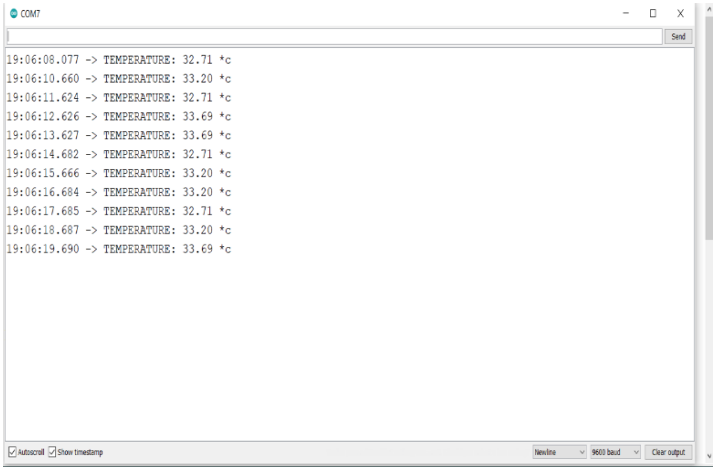

Fig.4: Serial Monitor showing the values of Detected Temperature of the Electronic Device.

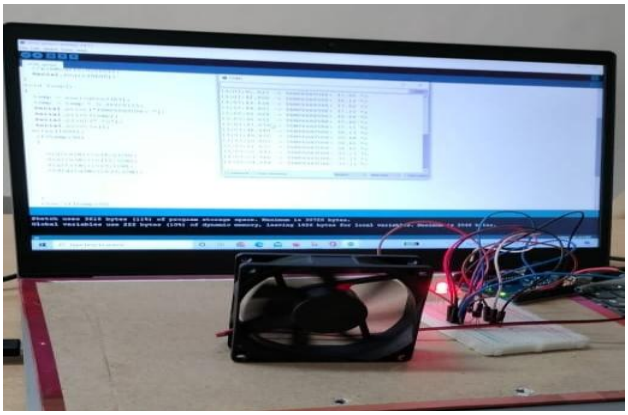

Fig.5: Fan turns ON and Indication is given through RED LED when the detected temperature is greater than the set temperature

Figure 5 shows the detection and indication when the temperature exceeds the set temperature. An indication is given through red LED and buzzer. Automatically fan turns ON which makes the device to operate under normal condition. Figure 6 shows the detection and indication when the temperature is less than the set temperature. Under this normal condition, an indication is given through green LED and the buzzer does not sound.

Fig.6: Indication through GREEN LED when the temperature is less than the set temperature. Fan turns OFF

VII. CONCLUSION

By implementing this system, we can avoid the devices from overheating when the temperature is greater than the set or fixed value which increases the life time and efficiency of the electronic devices. Preventive action is prevention of overheating and providing safety to electronic devices and reducing the internal damage done.

FUTURE SCOPE

Making the fan speed dependent on the temperature. Speed of the fan will be in proportionate with the temperature.
Adding a voice controlled command system.
Data can be sent to a remote location using mobile.

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