Dual Temperature Monitoring and Control Using IOT

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Abstract— In most of the industrial and domestic applications temperature monitoring is important and many problems can occur due to lack of proper temperature monitoring system. In this project we will monitor and regulate temperature of our room by the help DS18B20 temperature sensor along with node mcu. Monitoring temperature is important for many operations like in any industries where heaters or cooler are used, heat or cool up to a certain temperature is required. In this project we are using IoT based temperature monitoring system that can be access data anywhere and anytime through the internet. The model will continuously monitor the temperature condition of the room and the data can be monitored and regulate at anytime and anywhere from the internet. Whenever the temperature of room crosses the predefined set limits, cooler or heater will on according to that. IoT web based temperature monitoring is one type of temperature reorder that monitors a temperature in a room and stores the data into a database and display the current temperature on LCD and also in Blynk Mobile app. This model can be used in various processes like in automotive industries, air conditioning, power plant and other industries that need the data to be saved and analyzed.

Keywords: Dual Temperature Monitoring, IOT, LCD

I. INTRODUCTION

The project proposes an efficient implementation for IoT (Internet of Things) used for monitoring and controlling the room temperature via World Wide Web. Home automation system uses the portable devices as a user interface. They can communicate with home automation network through an Internet gateway, by means of low power communication protocols like Zigbee, Wi-Fi etc. This project aims at controlling room temperature via android app using Wi-Fi as communication protocol and node MCU as server system.

NodeMCU is an open source IoT platform. The user here will move directly with the system through a android based interface over the web, whereas room temperature is remotely controlled through easy user interface. The server will be interfaced with relay hardware circuits that control the device for controlling the temperature. The server communicates with the microcontroller and if the temperature sense by the DS18B20 precious temperature sensor exceed the limits then the controlling device will be switch ON through the relay.

A. IC Temperature sensor

An IC Temperature Sensor is a two terminal integrated circuit temperature transducer that produces an output current proportional to absolute temperature. The sensor package is small with a low thermal mass and a fast response time. The most common temperature range is -55 to 150°C (-58 to 302°F). The solid state sensor output can be analog or digital.

B. Voltage Output IC Sensors

- Typically 10mV per degree C with nominal output correlated to 0K, 25°C.
- Some sensors have an offset at 0°C so that they can be used and read below 0°C without having to use a negative power supply.
- Non-linearity typically less than 1°C across their temperature range.

C. Current Output IC Sensors

- Nominal Output: 298 µA at 25°C
- 1 µA output per °C

D. Digital Output IC Sensors

- Have built in A-D Converters
- The number of digits in the A-D converter provides the resolution
- 10 Bit plus sign provides temperature resolved in increments of 0.25°C
- 12 Bit plus sign provides temperature resolved in increments of 0.0625°C

E. Where are IC Sensors used?

- On circuit boards to monitor and control temperature.
- In computers to control CPU temperature.
- In telecommunications applications (cell phones & PDA™).
- In some industrial immersion applications.

F. Strengths and Weaknesses of IC Sensors Strengths:

- Analog or Digital outputs available
- Low cost
- Direct voltage, current or digital output needing no additional circuitry
- Linear output, no curve fitting
- Direct reading of temperature (1.000 = 100C and 298ÂµA = 298K or 25°C) on some analog devices
- Various communication interfaces

G. Weaknesses:

- Narrow temperature range: -55 to 150°C Max
- Wider interchangeability than most RTDs and thermistors
- Wide variation in accuracy between different models
- Small package sizes can be a barrier to low cost applications in some immersion designs

II. LITERATURE REVIEW

The system proposed in [1] describes the system prototypes of continuous online monitoring of distribution transformer using IOT (internet of things). In this proposed real-time framework a voltage transformer, a current transformer and a lm35 temperature sensor for monitoring voltage, current,

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temperature respectively. These three analog values are taken in multiplexing mode connected to a programmable microcontroller arduino. Then the values are then sent directly through a wifi module under tcpip protocol to a dedicated ip that displays the data in real time chart form in any web connected pc / laptop/mobile for display. The real time data is also seen at the sending end upon an android app interfaced to the microcontroller.

The supply of power is given through step down transformer 230/12v, which steps down the voltage to12v ac. This is converted to dc using a bridge rectifier and it is then regulated to +5v using a voltage regulator 7805 which is required for the operation of the arduino, 3.3 volt for the wifi unit and other component.

The system [2] proposes a Domestic Room Temperature Monitor and Regulate with the help of IoT which provides us with the information about Temperature and Humidity in a domestic environment. There are various types of sensors present in the prototype, using which the parameters can be measured. It can be used to monitor the temperature or humidity of a particular Room or a Place. The Proposed system continuously sends the data to the cloud to monitor the data from anywhere. For local monitoring, system uses a LCD to display the room temperature and humidity at that instant dynamically. The brain of the prototype is the ESP8266 based Wi-Fi module node mcu (12E).Temperature and Humidity sensor (DHT11) is connected to the node mcu. Whenever these values exceed a chosen threshold limit for each a notification is given to the user mobile through SMS. Based on the notification user can regulate the room temperature remotely using the Google assistant which is controlled through Artificial Intelligence. This system is effectively monitors and dynamically controls using voice and text commands.

III. Features of DS18B20 Temperature Sensor

- Unique 1-Wire® Interface Requires Only One Port Pin for Communication
- Each Device has a Unique 64-Bit Serial Code Stored in an On-BoardROM
- Multidrop Capability Simplifies Distributed Temperature-Sensing Applications
- Requires No External Components
- Can Be Powered from Data Line; Power Supply Range is 3.0V to 5.5V
- Measures Temperatures from -55°C to +125°C (-67°F to +257°F)
- ±0.5°C Accuracy from -10°C to +85°C
- Thermometer Resolution is User Selectable from 9 to 12 Bits
- Converts Temperature to 12-Bit Digital Word in 750ms (Max)
- User-Definable Nonvolatile (NV) Alarm Settings
- Alarm Search Command Identifies and Addresses Devices Whose Temperature is Outside Programmed Limits (Temperature Alarm Condition)
- Available in 8-Pin SO (150 mils), 8-Pin µSOP, and 3-Pin TO-92 Packages
- Software Compatible with the DS1822
- Applications Include Thermostatic Controls, Industrial Systems, Consumer Products, Thermometers, or Any Thermally Sensitive System

IV. Pin Configurations

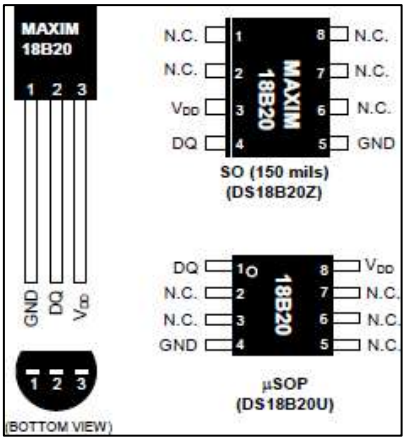

Fig. 1: Pin description of DS18B20

V. Result

The experimental model was made according to the circuit diagram and the results were as expected. The blink app and the OLED show the temperature of the room as soon as it is connected to the wifi. After proper monitoring it switch on cooler or heater according to the situation.

VI. Conclusion

Here we developed a circuit which will regulate and monitor the temperature of a room using IOT. It also limits the problem due to lack of proper temperature monitoring system in industries and home. It consists mainly following parts wifi device, NodeMcu, OLED, temperature sensor (DS18B20). First it needs to be check whether our module is connected to wifi or not. If it is connected, it will directly show the temperature on OLED as well as on mobile. It continuously monitors the temperature of a room. Whenever the temperature crosses the predefined set limits heater or cooler will be on according to the condition.

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