iJETRM
International Journal of Engineering Technology Research & Management

TEMPERATURE MONITORING SYSTEM

Amit kumar,
Md Kaushar Iqbal,
Digvijay Singh,
Sivam Kumar
Department of Computer Science Engineering, Dr.A.P.J Abdul Kalam Technical University,
Jankipuram, Lucknow-226031,Uttar Pradesh -India

ABSTRACT
This project is a part of internshala internet of things. In this we consider the cooling chamber of pharmaceutical industry as one of the real time problem. Our approach is to detect variation in temperature range and anomaly in value when someone open the chamber. To solve this we consider the refrigerator as cooling chamber and going to work on it.

INTRODUCTION

This project is based on IoT technology which is very good for accuracy. In this project we use IoT for Temperature sensing, which will sense temperature and when it exceeds a certain temperature or falls from a certain temperature it will send an email or a sms to the responsive person.
Today, most of the products that we produce have a very crucial factor affecting them, temperature. Starting from the traditional crops to the artificial ones in food industries, from drugs to chemicals manufactured in the pharmaceutical industries, all of them need the right amount of temperature to be maintained for manufacture which is why the monitoring of temperature constantly is an indispensable part of these sectors.
Our homes too have a thermostat installed which monitor and regulate the temperature. Maintaining the right temperature is required for having a healthy growth of plants in a greenhouse. If the right temperature is not maintained, the plants will die.
Sending an Email using Mailgun services and a SMS using Twilio services when temperature is not within the prescribed range so that early action can be taken and when fridge is opened (Using Z-score Analysis i.e. when anomaly in temperature graph is detected) and alarm through the buzzer and LED light.

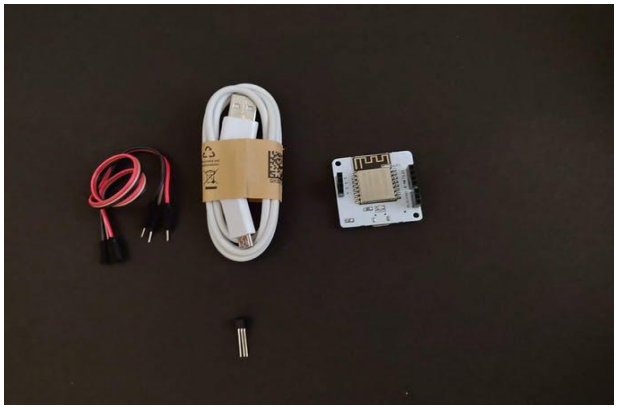
.

METHODOLOGY

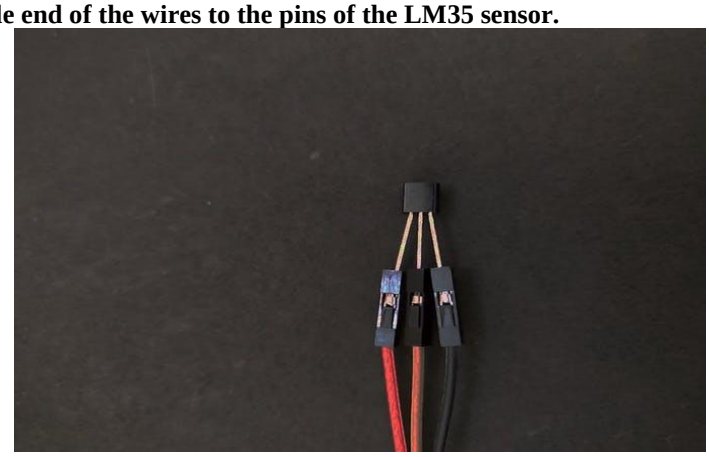
Sensing a temperature is an easy task but predicting it is smart work. We build a smart model which can predict the temperature before its fall or rise which can make an important impact. This will happen because of machine learning. We used anomaly detection techniques for this .
Step 1: Take three male to female wires of three different colors. Different colors will help us avoiding confusion.

You will also require the Bolt WiFi module and LM35 sensor.

iJETRM
International Journal of Engineering Technology Research & Management



Step 2: **Plug the female end of the wires to the pins of the LM35 sensor.**



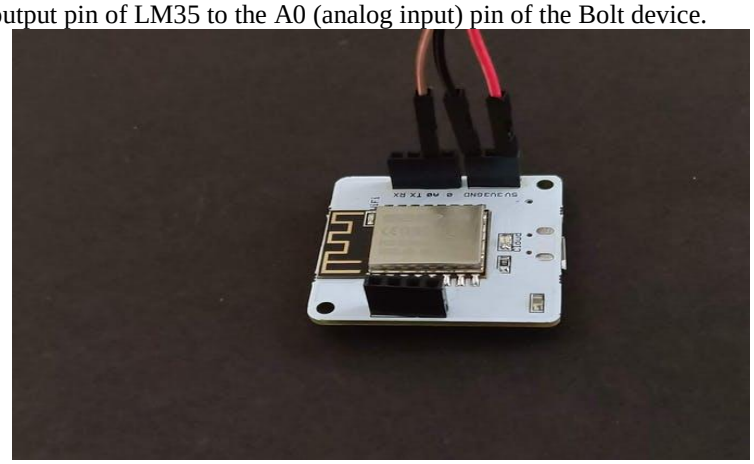
Connecting LM35 to jumper wires

Step 3: Now we need to connect these ends of the LM35 sensor to the corresponding end of the Bolt WiFi module.

Connect the VCC pin of LM35 to 5V pin of the Bolt device.

Connect the GND pin of LM35 to the GND pin of the Bolt device.

Connect the analog output pin of LM35 to the A0 (analog input) pin of the Bolt device.

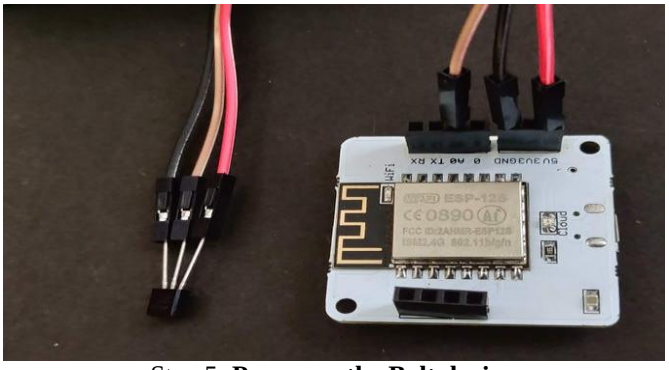


Step 4: Review your circuit connection.

The colours will help you identify if you have connected the correct wire to the pins of the LM35 and Bolt WiFi module.

Here is how it will look.

iJETRM
International Journal of Engineering Technology Research & Management



Step 5: **Power on the Bolt device**

Now your circuit is ready.
In the next step, we will be to work on the software and cloud configuration.
Part B: Connect your Bolt device to the Bolt Cloud

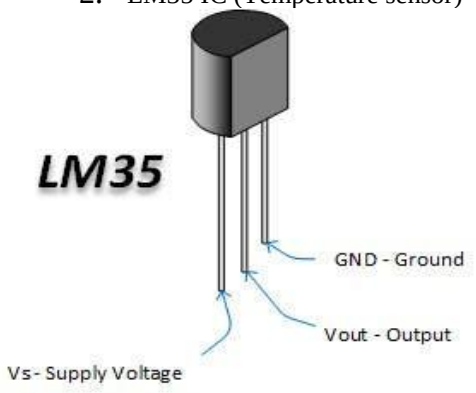
Skip this step, if you already know how to connect your Bolt device to the Bolt Cloud. To check if it is connected to Cloud, have a look at the green coloured Cloud LED on the Bolt WiFi module. It should be glowing.
Follow the steps in this project to set up the device and to connect your Bolt device to the Bolt Cloud.:
Setting Up the Bolt WiFi Module
Yes. I am aware that we have repeated this step. But we realised that many users tend to miss out on this step so wanted to be double sure about it. Now that our Bolt is active, we are just a step away from completing the system.
Part C: Collecting and visualising the data (Plotting Graph) on the Bolt Cloud
Now we need to visualise the temperature data on the Bolt Cloud. For this create an account on cloud.boltiot.com if you have not already.

Components :

1. Bolt WiFi Module

iJETRM
International Journal of Engineering Technology Research & Management

2. LM35 IC (Temperature sensor)



Connect the pins as given in the table below.

LM35 Pin	Corresponding Bolt WiFi Module Pin	Comment
Vs Supply Voltage	5V	LM35 sensor operates at 5V
Vout - Output	A0	Since the output is analog and A0 is the only pin on Bolt WiFi module that can read an analog input.
GND Ground	GND Ground	The ground pin of the LM35 to be connected to the ground pin of Bolt WiFi module.

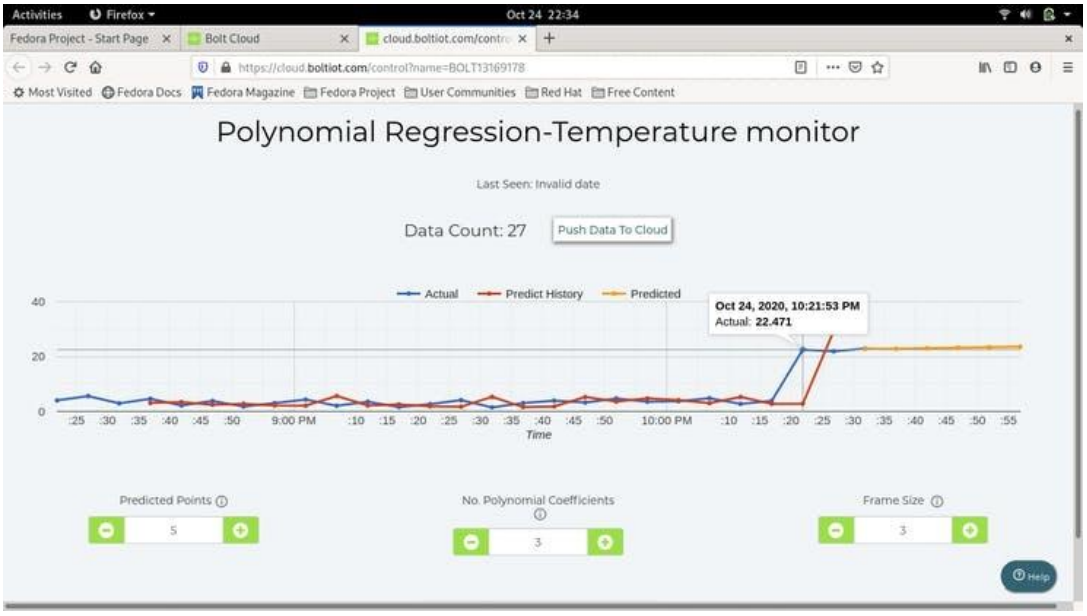
.

RESULTS AND DISCUSSION

Let's assume the good temperature for a special product is 15-18 deg. Now assume the temperature is at 16 and it starts going up like 16.2, 16.7,16.9…. So now our system is active and detects that temperature is going up and can predict by its previous result that it will not stop automatically and should alert the authority for that and then it will send email, sms or lights up LED or blow up the buzzers(alarm system).
The final output of prediction chart in bolt cloud gives the prediction of next 20 minutes of temperature range. And the python code output detect and alert the change in temperature and an anomaly in the temperature when the door is opened by mail ,SMS and alarm by LED light and buzzer. As the result of this project

iJETRM
International Journal of Engineering Technology Research & Management

pharmaceutical companies keep their tablets in better condition to avoid destroying ,major loss and can able to obey all the government rules perfectly.



CONCLUSION

The conclusion is we are not building a new thing but we are building a better thing. We used all the new technologies like ML. IoT and Internet, This will surely help the industry and human benign for making better and perfect product.

REFERENCES

1. Bolt iot,
2. Bolt : IoT Platform (boltiot.com)
3. Temperature monitoring system using LM35 (Temperature sensor) (boltiot.com)