PROJECT REPORT

PROJECT TITLE : SMART AGRICULTURE SYSTEM BASED ON IOT- SB44294

PROJECT ID : SPS_PRO_101

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DURATION : 16.2 DAYS

PROJECT MANAGER : VAISHNAVI KSHIRSAGAR

CONTENTS

1.INTRODUCTION

1.1OVERVIEW

This report presents design ,manufacturing,simulations conducted by the project team who had worked in the field of IOT.The team has worked for strengthening concepts related to IOT.The project has used various software likewise IBM Watson Platform,node-red,Python,IBM IOT Sensor Simulator ,Open Weather to build an application.

1.2PURPOSE

The objective of the project team is to build an application based on smart agriculture system.This application gives real time weather data of any place,controlling of the motors and helps farmers in their work to grow good crops and increase the production.

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

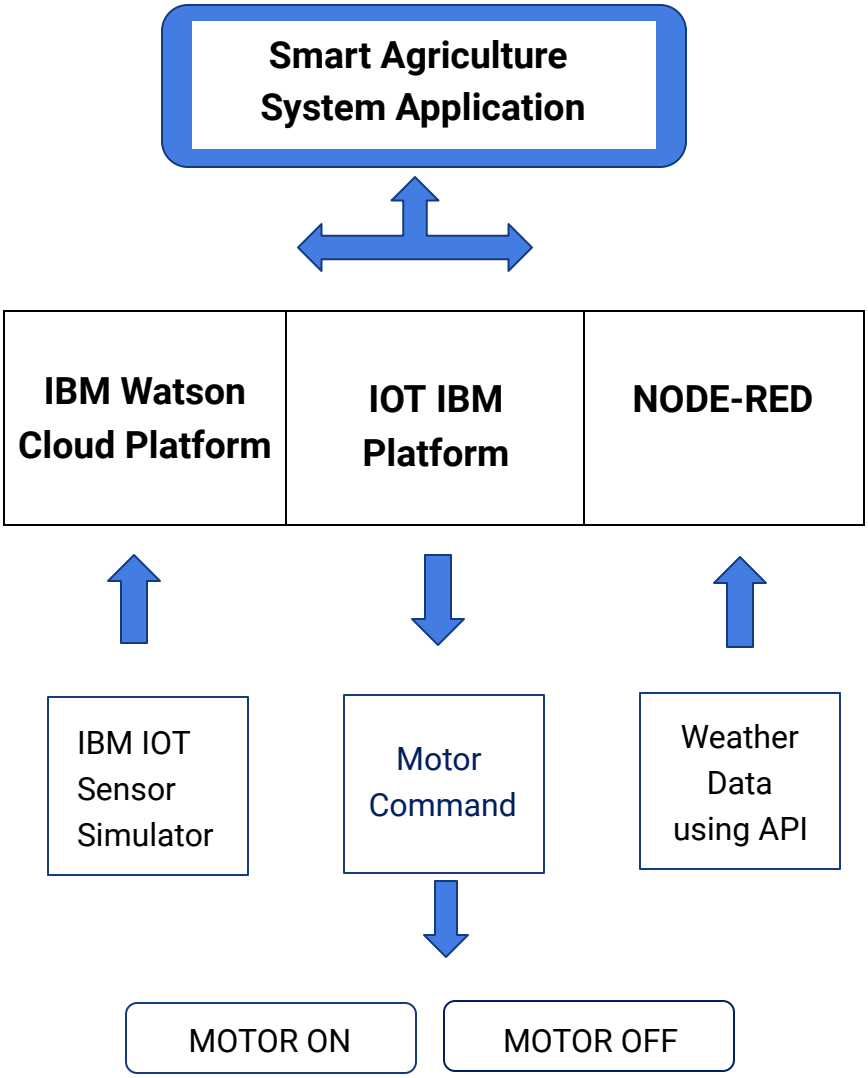
1. Today's constantly changing environmental conditions are not so good to yield the good crop.
2. Farmers have to look if their land has moisture in the right amount or not.
3. Because of lack of workforce farmers are not able to monitor the water given in the right amount to the growing field of crops.

2.2 PROPOSED SOLUTION

1. Build an application to give real time weather data to people who are working in the field of farming
2. To give farmers an information related to the soil moisture,temperature & humidity through a mobile application .
3. Create motor controlling option to water the plants where it can be monitored from any place even thoUgh farmer is not present near the crop.

3.THEOROTICAL ANALYSIS

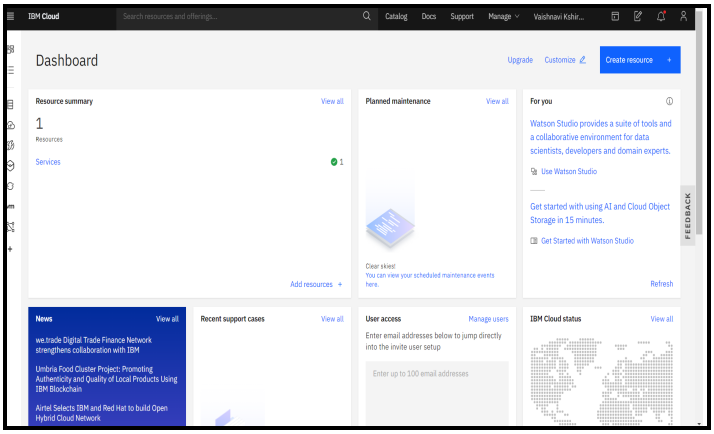
3.1 BLOCK DIAGRAM

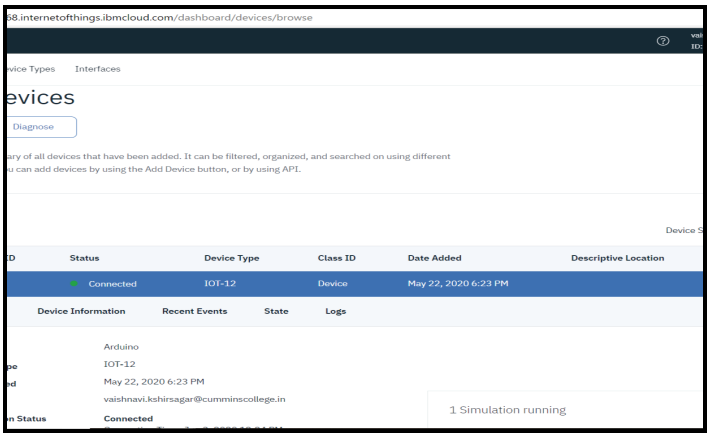


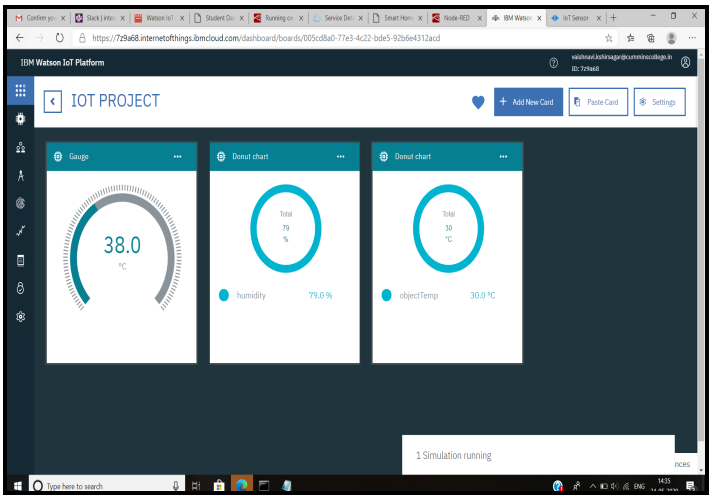
3.2 SOFTWARE DESIGNING

IBM CLOUD

- IBM Cloud provides a lot of services which are more reliable ,easily accessible and cost effective.
- Under PAAS, Interenet Of Things platform is used to build an application.
- Device has been created under IBM Watson IOT Platform and the simulations are done to represent temperature,humidity & object temperature values on the board after creating the cards by giving the required credentials to it.

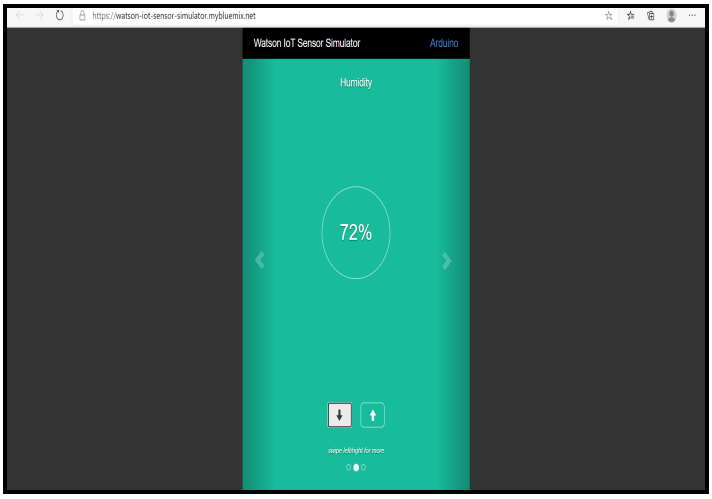






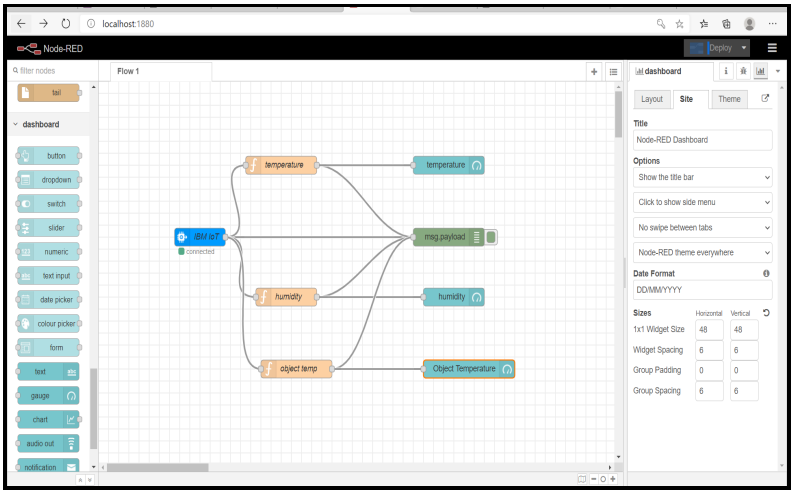
Watson IOT Sensor Simulator

- Watson IOT device simulator is a software that is used to connect and simulate the devices without any physical interaction.Its very useful because it can connect to any device and it is easy to operate.
- By giving the credentials of the device the sensor will starts its simulation



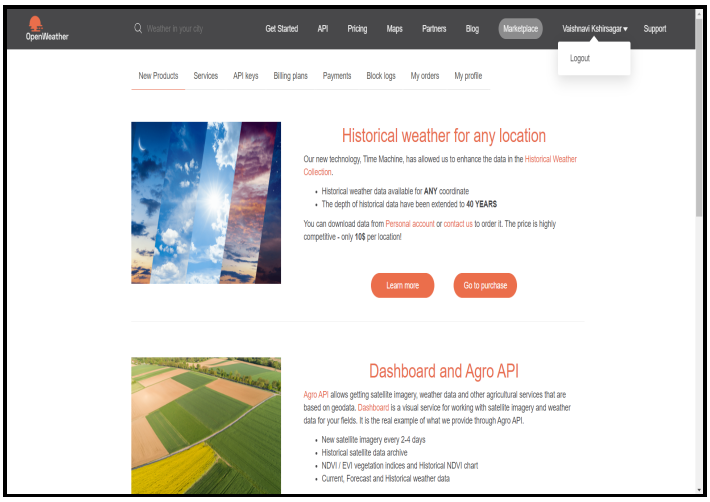
Node-red

- Node-red is a workflow based virtual programming tool that is relying a lot on input /output with json as data exchange format which is developed by IBM.
- Installing Node-red locally gives you access to the flow editor.
- For connecting the device you have to install IBM nodes in the Node-red and configure it .



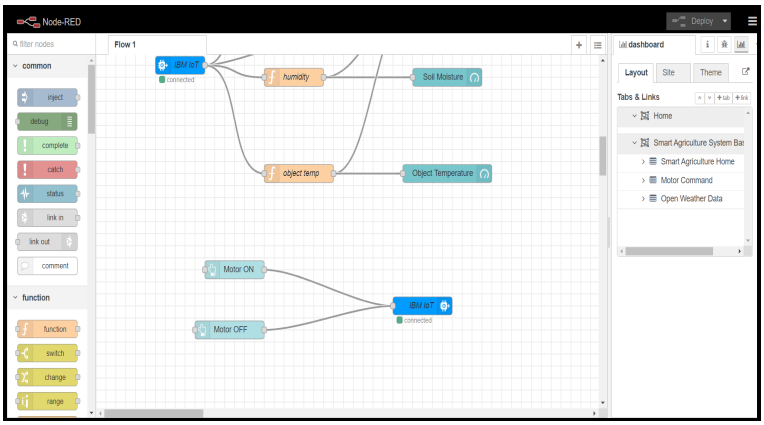
OPEN WEATHER MAP

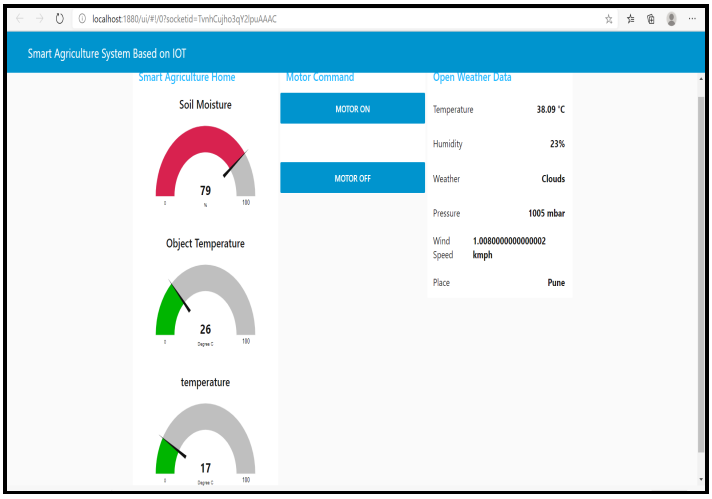
- Open Weather Map platform is a simple & fast and provides current weather forecasting data locally includes over 2,00,000 cities which is available in JSON, XML, or HTML format.
- Create your account in Open Weather Map and configure it ,it will give you a API.
- You can access the weather forecasting data bu using that API key for any application



User Interface

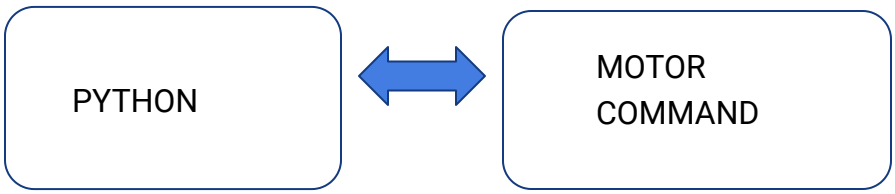
- The user interface (UI) in the industrial design field of human-computer interaction, is the space where interactions between humans and machines occur.
- Install the dashboard node from manage pallet to create a UI
- To display the weather forecasting data from Open Weather API and IOT simulator UI will be necessary
- For motor controlling commands,configure the nodes to create buttons.
- Display the command using UI





PYTHON

- Python is a general-purpose programming language that can be used on any modern computer operating system. It can be used for processing text, numbers, images, scientific data and just about anything else you might save on a computer.
- To get motor command in IBM IOT platform write a python code giving motor commands 'MOTOR ON'& 'MOTOR OFF'



SLACK

- Slack is a proprietary business communication platform
- Slack is a communication tool that is created to streamline and simplify conversations.It is similar to the other messaging applications.
- A channel for every organized conversations. Channels can be divided up by team, project, client, or whatever else is relevant to your organization.
- It is best platform that is used to communicate with the mentors and getting the instructions related to the project
- Work faster with your tools in one place.

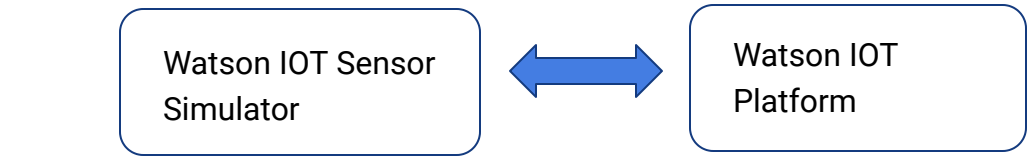
GITHUB

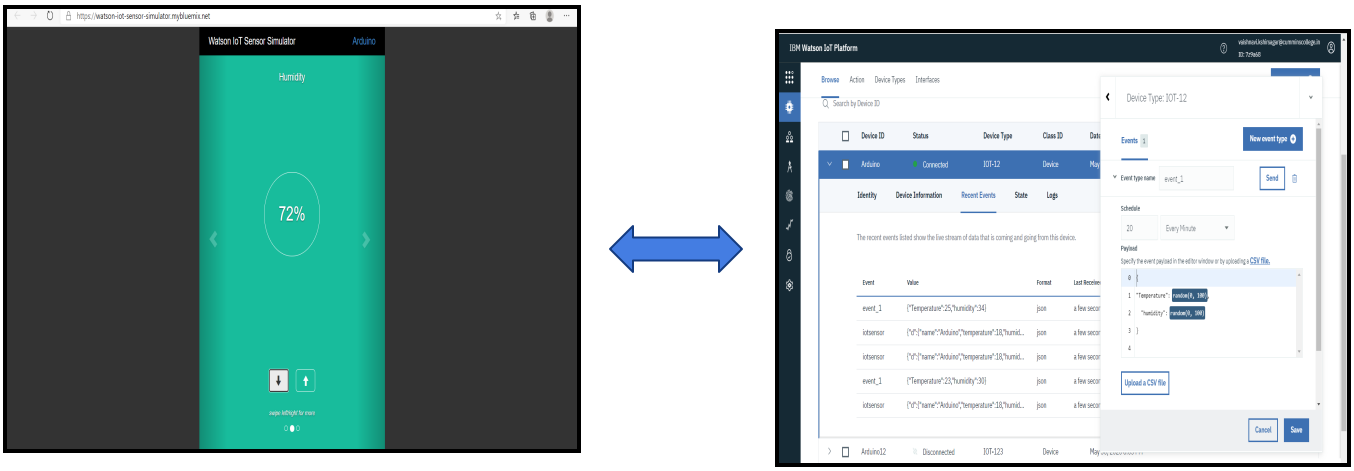
- Company that provides hosting for software development version control using Git.
- It makes a lot easier for individuals and teams to use Git for version control and collaboration.
- Github lets you work together on a project
- Github Repository used to store your project development
- Git is an open-source that is its main advantage.
- Github is used in our project to store and upload files and get reviews through it.

4. EXPERIMENTAL INVESTIGATION

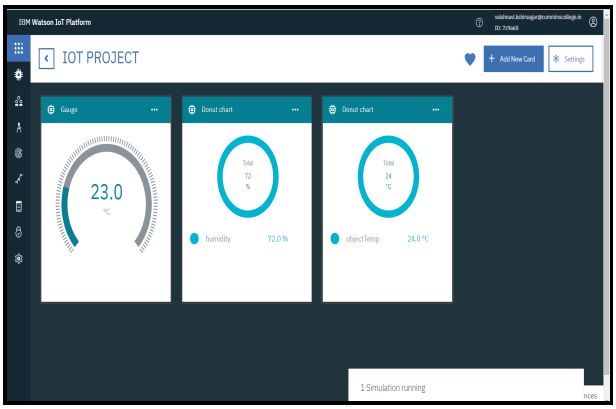
- Connect IOT simulator to Watson IOT Platform

By Connecting your device from Watson Iot platform to the IBM IOT Simulator by putting the device credentials ,it will show the temperature, humidity,object temperature values on the board and indicates the device has been connected.



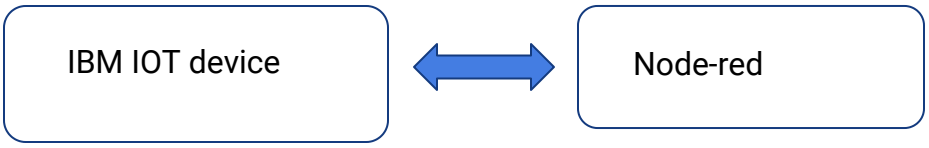


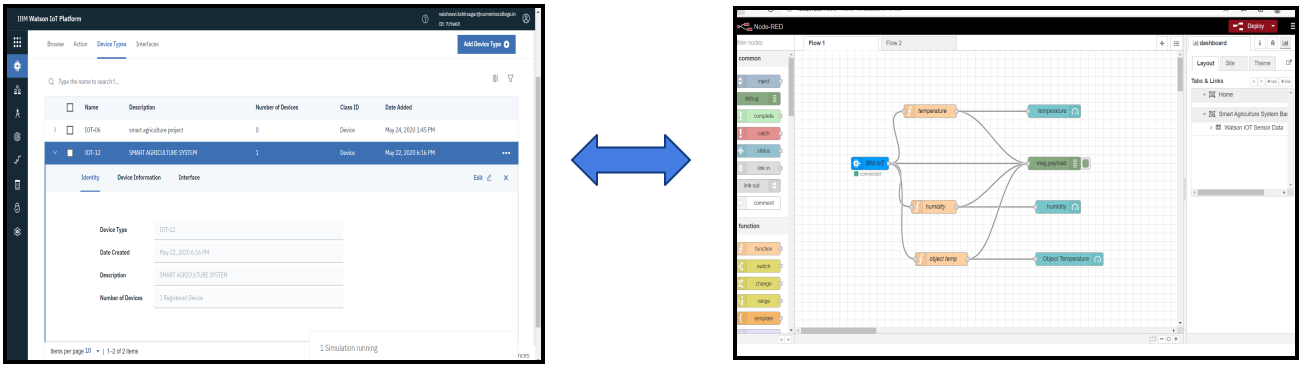
VISUALIZATION ON BOARD:



- **Connecting IBM IOT device to NOde-red**

After installing IBM IOT nodes in node-red,connect your device to the node-red by giving the device credentials .The simulator data will be shown in the debug.





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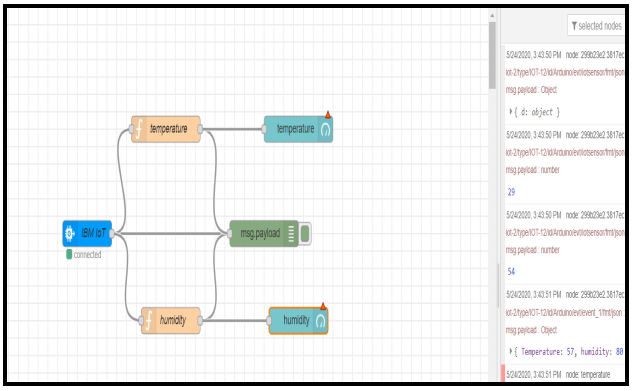
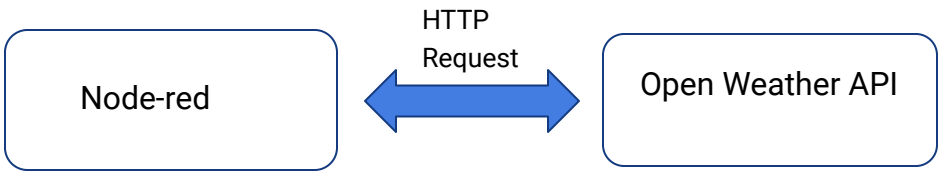
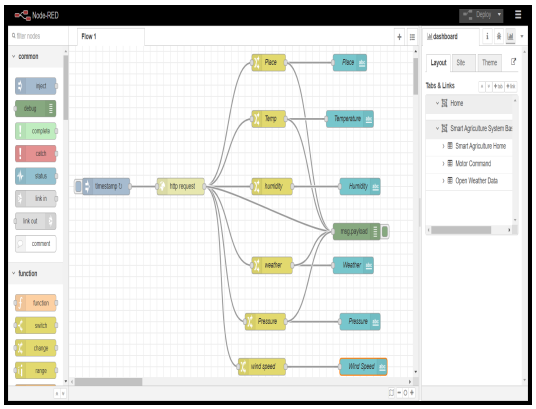
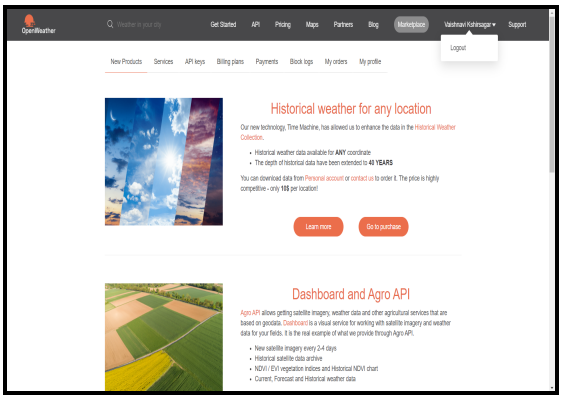


- **Get the weather forecasting data on node-red using Http request node**

To display the weather forecasting data from Open Weather API and IOT simulator in UI ,configure the required nodes in Node-red.By installing the http request node and putting the API key got from OPEN Weather Map ,current weather data will be shown in the Debug .







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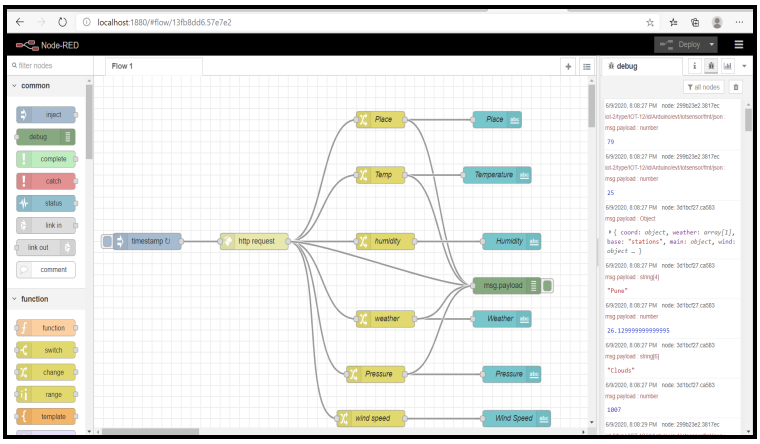
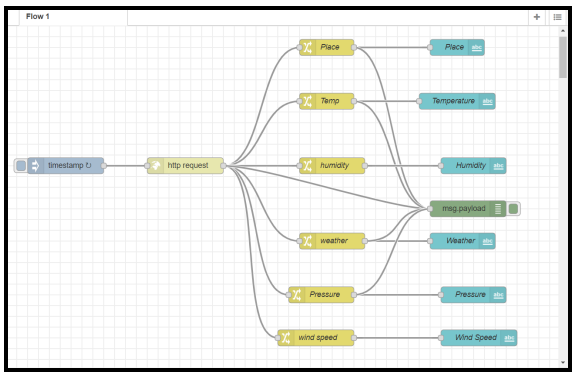
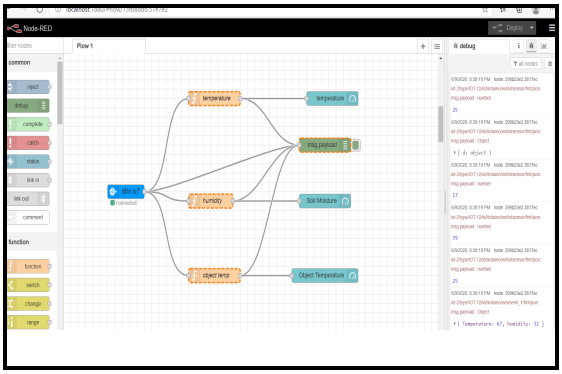


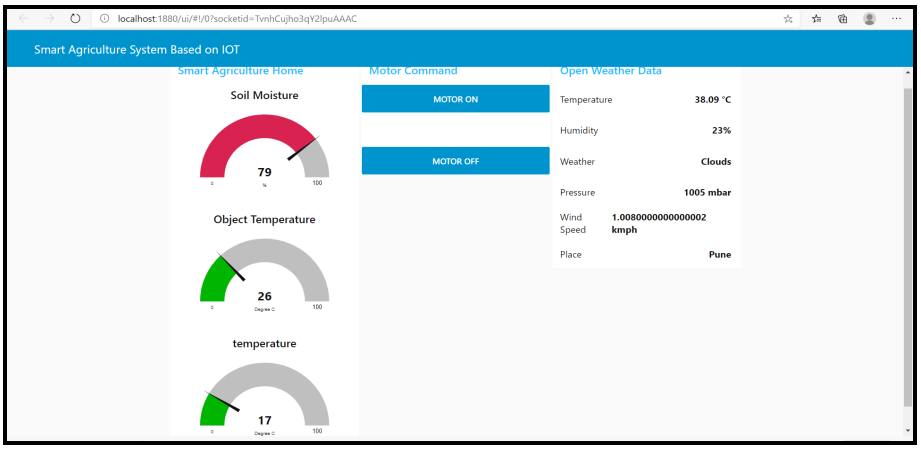
- **Display weather parameters in UI**

  To display the weather parameters from IOT simulator and Open Weather MAP,we have to configure the nodes by putting the credentials and the API key .Download the dashboard from manage pallet.



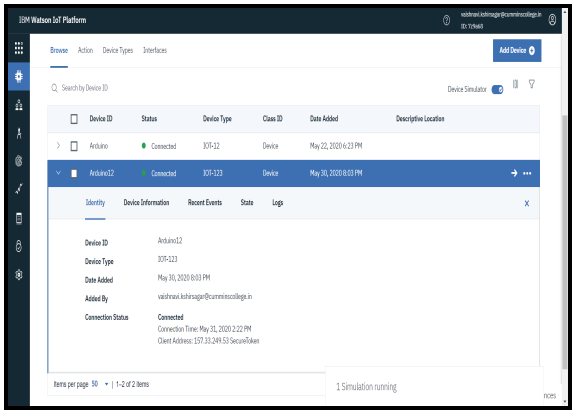


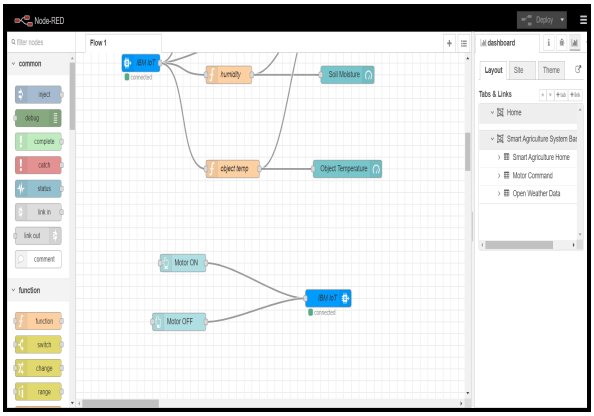
VISUALIZATION



- **DISPLAY MOTOR COMMANDS IN UI**

TO display the buttons for MOTOR ON & MOTOR OFF commands download buttons from dashboard and give it new device credentials .use output IOT node and configure it .After deploying the buttons will be shown in the UI or dashboard.





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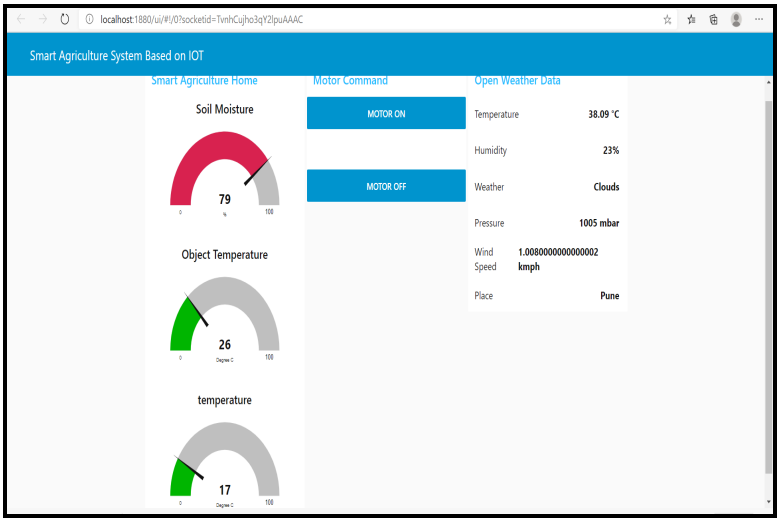
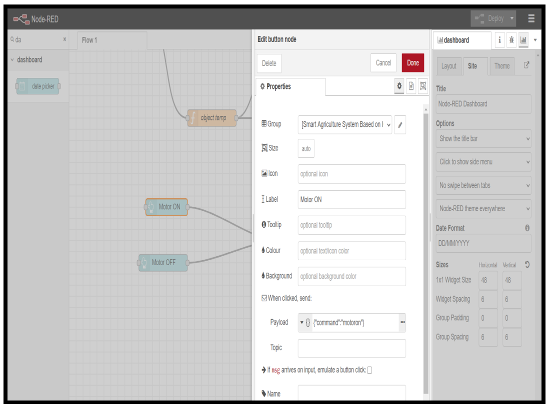
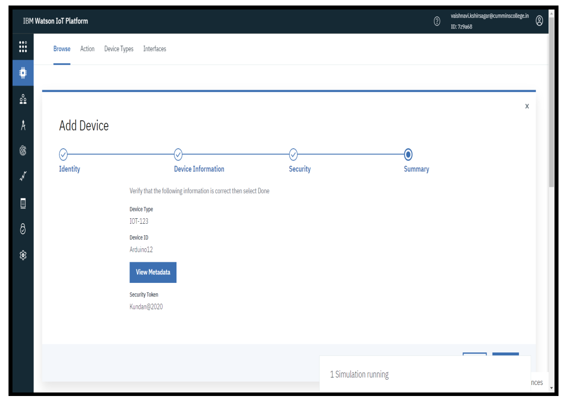


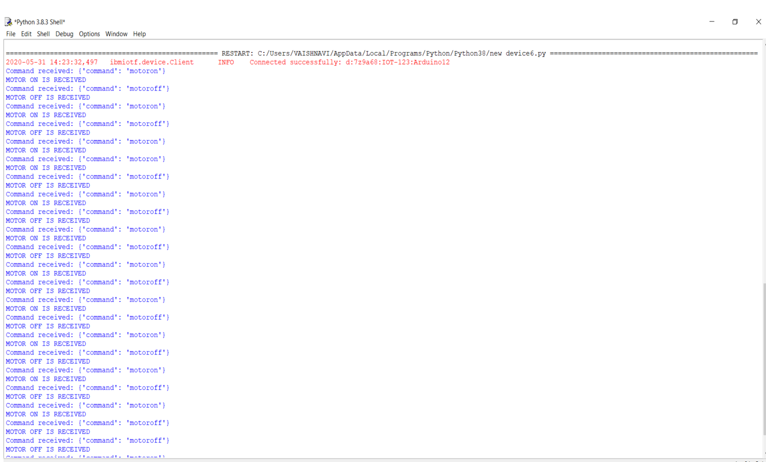
- ## RETRIEVE THE MOTOR COMMANDS FROM IBM IOT

  For controlling of motors and receive the data from web application, configure the new device created and write a python code to get the motor commands.





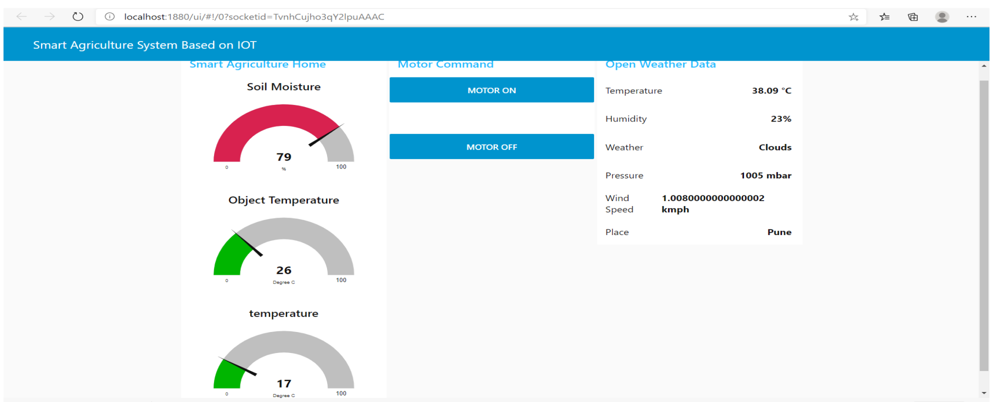
VISUALIZATION:



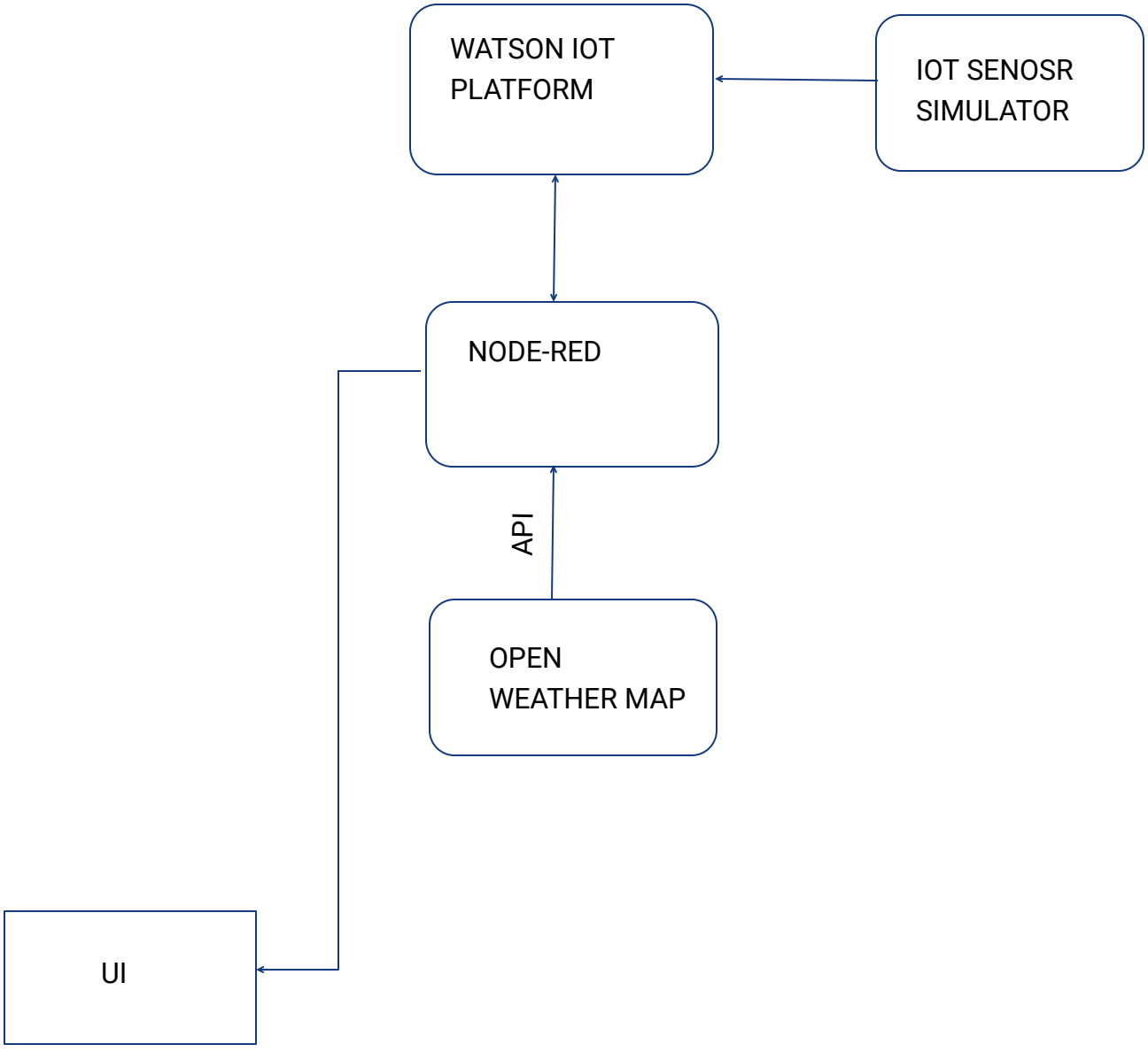
RESULT

- UI will be created in node-red which will display the sensor data, motor commands i.e MOTOR ON & MOTOR OFF and the current weather data of your location
- Python will send motor command to the IOT after you click the buttons in the UI.
- You can get current weather data along with name of your place on the dashboard.

DASHBOARD or UI:



5.FLOWCHART


WATSON IOT PLATFORM
IOT SENOSR SIMULATOR
NODE-RED
API
OPEN WEATHER MAP
UI

7.ADVANTAGES & DISADVANATGES

ADVANTAGES

- This application is easy to understand and operate .
- It gives current weather data from any location.
- It is easily accessible and cost effective.
- User can use it conveniently at any time.
- Minimized the labor force to control the motors at the place of farming.
- It displays the soil parameters like temperature & humidity in just few seconds.

DISADVANTAGES

- Network issue may occur problem to operate the application
- It will not give the information about the soil is moisturized in right amount or not after the controlling of motors .
- developing this application may take more time .
- Only hardware requirement is your operating system that is the mobile or laptop.

8.APPLICATIONS

1. Farmer gets real time weather forecasting data
2. monitors soil moisture and climatic conditions.
3. Displays the parameters temperature,humidity & object temperature
4. Manually control the motors with motor commands MOTOR ON & MOTOR OFF
5. Monitoring can be possible from any location.
6. Farmer can water his crops even if he is not present near the crop by controlling motors.

9.CONCLUSION

1. Software Designing is easy to develop and understand.
2. It uses PAAS service under IBM Cloud
3. This application can be used widely and helps the farmers .
4. All the software needed to build this application are accessible and cost effective.
5. Network issue may occur some problem.
6. Storage space provided by the IBM cloud is less.
7. Connecting of the all the software is easy.

10.FUTURE SCOPE

1. **It is a open source.**

   This application doesn't require license or we do not have to pay to use and develop .

2. **Easily Adpatable**

   It is really easy to use and operate all the software using your creative ideas.

3. **Social Media Impact**

   Social media is a great platform to promote this application for development of farming.Farmers will get lots of benefits through it.

4. **Easily Accessible**

   This software application can be available in your mobile itself and now-a-days everyone use mobiles, so its very easy to access it.

5. **Decrease in labor force**

   This application will help to reduce labor ,because farmers can keep track on their crops moisture from any location they want to.

11. BIBILOGRAPHY

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- https://www.w3schools.com/whatis/whatis_github.asp
- https://en.wikipedia.org/wiki/Python_(programming_language)
- https://en.wikipedia.org/wiki/Slack_(software)

APPENDIX

A source code

```
import time
import sys
import ibmiotf.application # to install pip install ibmiotf
import ibmiotf.device

organization = "7z9a68" #replace the ORG ID
deviceType = "IOT-123"#replace the Device type wi
deviceId = "Arduino12"#replace Device ID
authMethod = "token"
authToken = "Kundan@2020" #Replace the authtoken

def myCommandCallback(cmd): # function for Callback
        print("Command received: %s" % cmd.data)
        if cmd.data['command']=='motoron':
                print("MOTOR ON IS RECEIVED")

        elif cmd.data['command']=='motoroff':
                print("MOTOR OFF IS RECEIVED")

        if cmd.command == "setInterval":
                 if 'interval' not in cmd.data:
                        print("Error - command is missing required information: 'interval'")
                else:
                        interval = cmd.data['interval']

        elif cmd.command == "print":
                if 'message' not in cmd.data:
                        print("Error - command is missing required information: 'message'")

                else:
                        output=cmd.data['message']
                        print(output)

try:
          deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method":
```

```
authMethod, "auth-token": authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #.....................................

except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type
"greeting" 10 times
deviceCli.connect()

while True:
 deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud
deviceCli.disconnect()
```