Date : 02/07/2020

Project Report

On

Smart Agriculture System Based on IoT

Submitted To
Smartbridge
(Smartinternz)

Guided By
Mr. Durga Prasad

Submitted By
Dnyanesh Kolhe
Intern Under Smartbridge
Internship ID: SB51192
Project ID : SPS_PRO_10
Email : dnyaneshkolhe1@gmail.com

CERTIFICATE

I hereby submit the project report entitled **SMART AGRICULTURE SYSTEM BASED ON INTERNET OF THINGS (IoT)** in Smartinternz (Smartbridge) under the supervision of Mr. Durgaprasad, Smartinternz.

Dnyanesh Kolhe

Mr. Durga Prasad
(Mentor)

Acknowledgement

I wish to extend my sincere gratitude to my mentor, Mr Durga Prasad Smartbridge (Smartinternz) for his valuable guidance, constant support and encouragement.
He always gave me his sugeestions that were crucial in making this report as flawless as possible.

A special thanks to SMARTBRIDGE (SMARTINTERNZ) for providing an incommensurable opportunity and facilites to explore more skills.

CONTENTS

Chapter 1

Introducation

1.1 Overview

A griculture is the art and science of cultivating the soil, growing crops and raising livestock. The main source of food for the population of the world is agriculture. Agriculture provides most of the world's food and fabrics.

For decades, agriculture has been associated with the production of essential food crops. At present, agriculture above and beyond farming includes forestry, dairy, fruit cultivation, poultry, beekeeping, mushroom, arbitrary, etc. Today, processing, marketing, and distribution of crops and livestock products, etc. are all acknowledged as part of current agriculture. Thus, agriculture could be referred to as the production, processing, promotion, and distribution of agricultural products.

Agriculture plays a critical role in the entire life of a given economy. Agriculture is the w material, agriculture also provides employment opportunities to a very large percentage of the population. But the farmers of our country who are responsible forbackbone of the economic system of a country. In addition to providing food and ra cultivating crops for the people are struggling and facing many problems.

India holds second postion in the farm output. Over 70% of the rural households depend on agriculture as their principal means of livelihood.

1.2 Purpose

The purpose of this project is to provide application to the farmer.
The global population is predicted to touch 9.6 billion by 2050 – this poses a big problem for the agriculture industry. Despite combating challenges like extreme weather conditions, rising climate change, and farming’s environmental impact, the demand for more food has to be met.

We are going to use various modules like soil moisture sensor, humidity sensor, temperature sensor under a single agriculture system to make it smarte
The objective of this report is to propose a Smart Agriculture System based on IOT which will enable farmers to access live data of Temperature of their crop, Humidity and Soil moisture of their farms and weather condition of the area and control the motor or say the irrigation system of their land from a smartphone application. The purpose of this project is to enable farmers to monitor their farms and operate the motor while sitting at their homes or maybe while they are out somewhere and cannot come to the field.

Chapter 2

Literature Survey

2.1 Existing Problem

The Indian farmer is a living idol of India, they are the most hardworking farmers around the world & always busy, working hard for their crops, during day and night. A farmer who grows crops has responsibility for making the land for harvesting the crops, sowing the seeds, irrigation and taking care of it. For this purpose, the farmers have to walk long distances every day to their farms and they need to stay in sun at their farms for the whole day and keep a check on the crops that the crops don't dry and water them when required.

In the difficult times, like in the presence of pandemic also, they have to work hard in their fields risking their lives to provide us with food.To have a control on their work virtually by monitoring weather. For this they need minute to minute updates on weather conditions. This will save the time to go farm daily to check weather conditions.

2.2 Proposed Solution

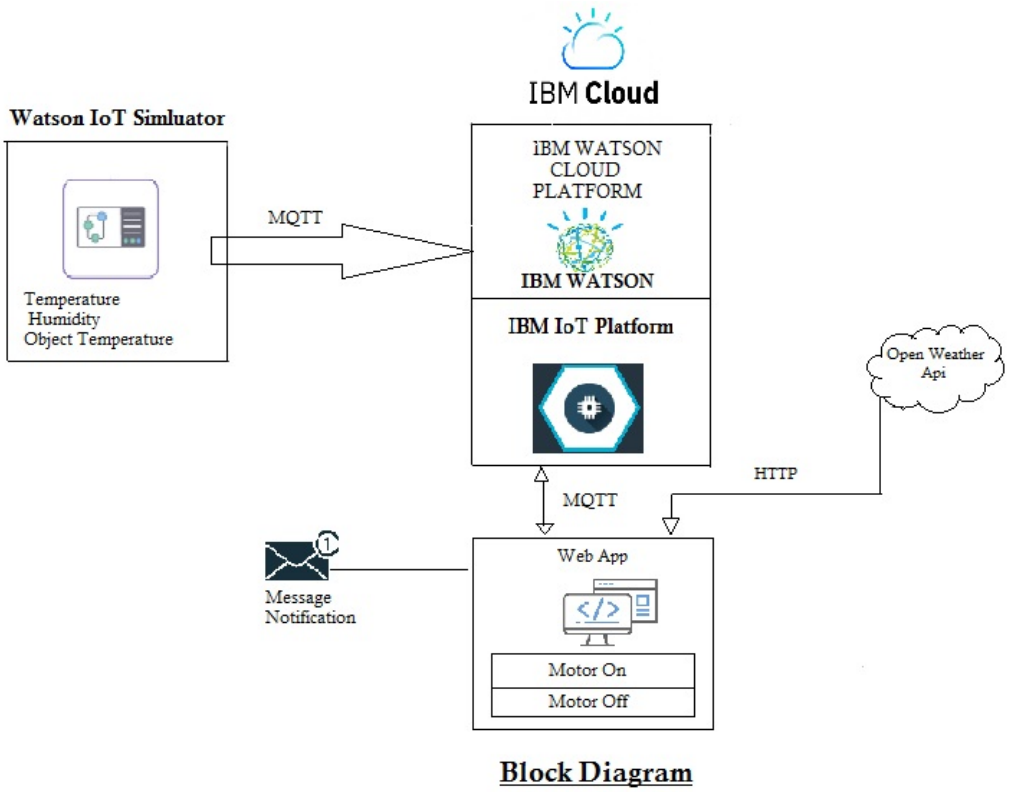
The smart agriculture system using Internet of Things (IOT) is a project that has a collection of sensors installed in the farm and an application which can be used on any android smartphone.This application gives the live updates of the temperature, humidity and soil moisture of the farms as sensed by the installed sensors.

In order to improve the farmers working conditions and make them easier, we introduce IoT services to farmer in which we use cloud services and internet to enable farmer to continue his work remotely via internet. He can monitor the field parameters and control the devices in farm.

Chapter 3

Theoritical Analysis

3.1 Block Diagram



Block Diagram

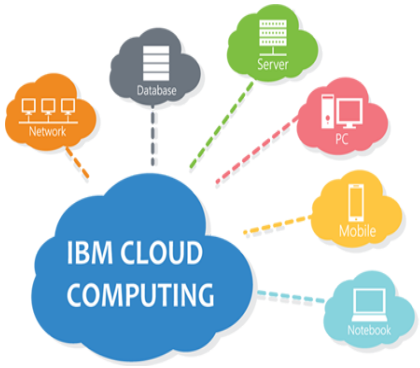
3.2 Software Designing

3.2.1 IBM Cloud platform

The IBM cloud platform combines platform as a service (PaaS) with infrastructure as a service (IaaS) to provide an integrated experience. The platform scales and supports both small development teams and organizations, and large enterprise businesses.

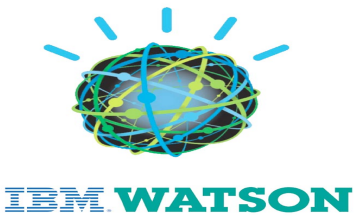
Globally deployed across data centres around the world, the solution you build on IBM Cloud™ spins up fast and performs reliably in a tested and supported

environment you can trust. The platform is built to support your needs whether it is working only in the public cloud or taking advantage of a multi cloud deployment model.



3.2.2 IBM Watson IoT Platform

Watson is the open, multi cloud platform that lets you automate the AI lifecycle. Build powerful models from scratch, or speed time-to-value with pre-built enterprise apps. It allows secure, analyse and manage IoT data.



3.2.3 Node-RED

Node-RED is a flow-based development tool for visual programming developed originally by IBM for wiring together hardware devices, APIs and online services as part of the Internet of Things. Node-RED provides a web browser-based flow editor, which can be used to create JavaScript functions. Elements of applications can be saved or shared for re-use.

3.2.4 Python IDE

IDLE (short for Integrated DeveLopment Environment or Integrated Development and Learning Environment) is an integrated development environment for Python, which has been bundled with the default implementation of the language.

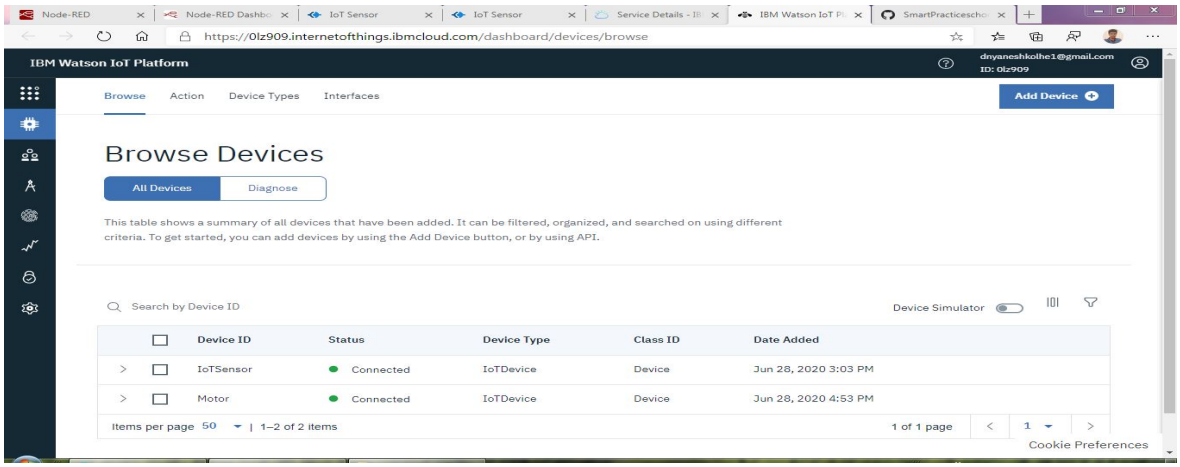
It is packaged as an optional part of the Python packaging with many Linux distributions.

Chapter 4

Experimental Investigations

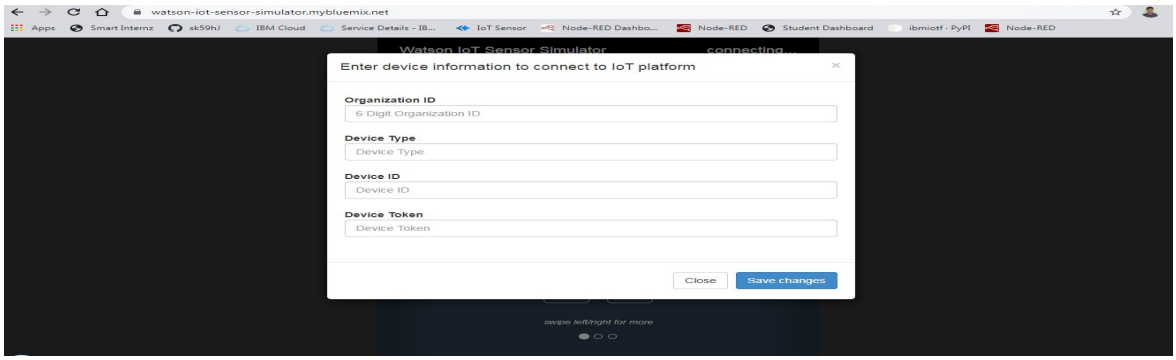
4.1 Creating IBM cloud account and setting up the device in IBM Watson IoT Platform

- IBM Watson IoT Platform is a managed, cloud-hosted service designed to make it simple to derive value from your IoT devices.
- Below are the devices created as per the requirement of the project, one for input and other for output:



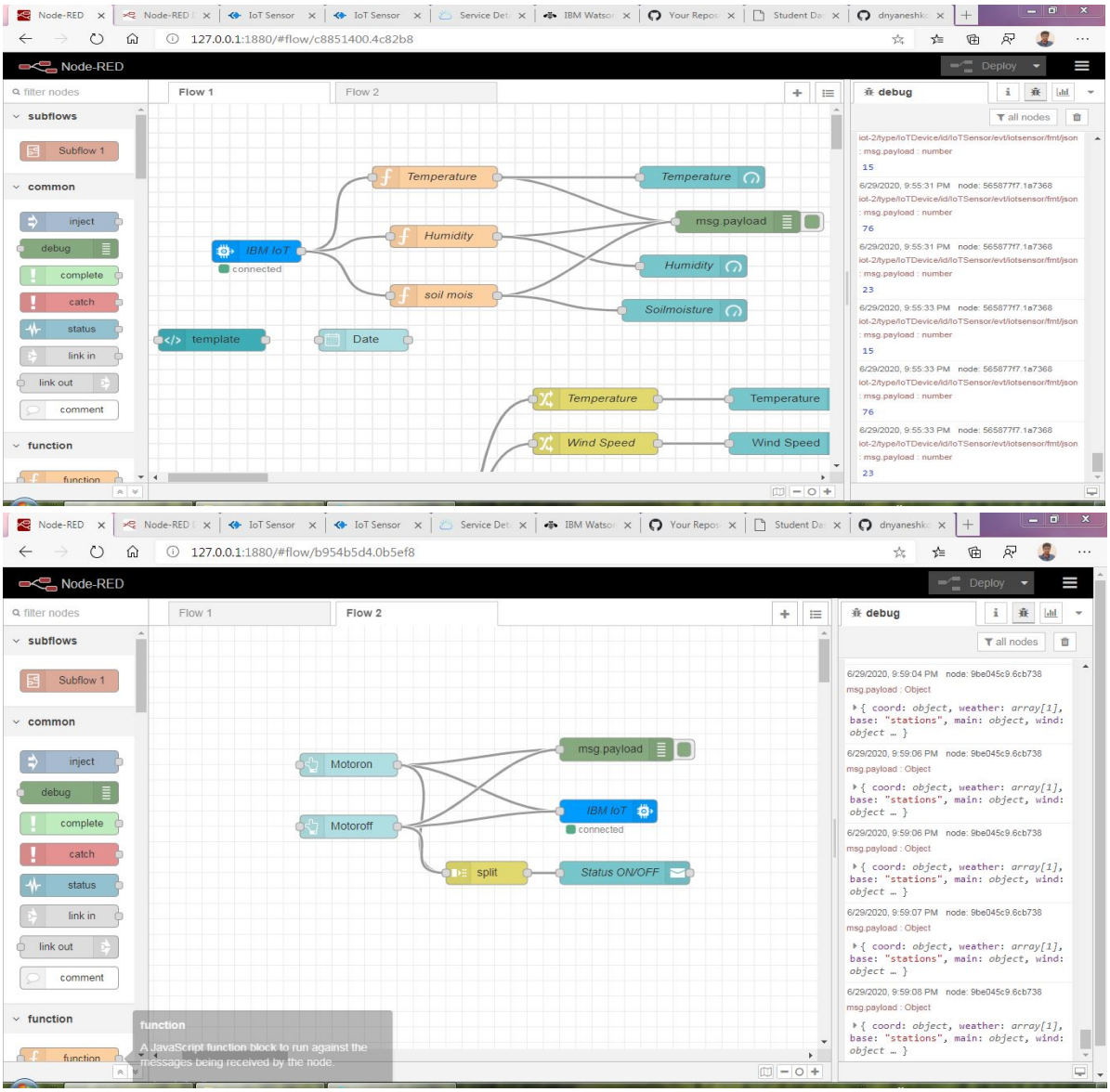
4.2 Setting IoT Sensor Simulator

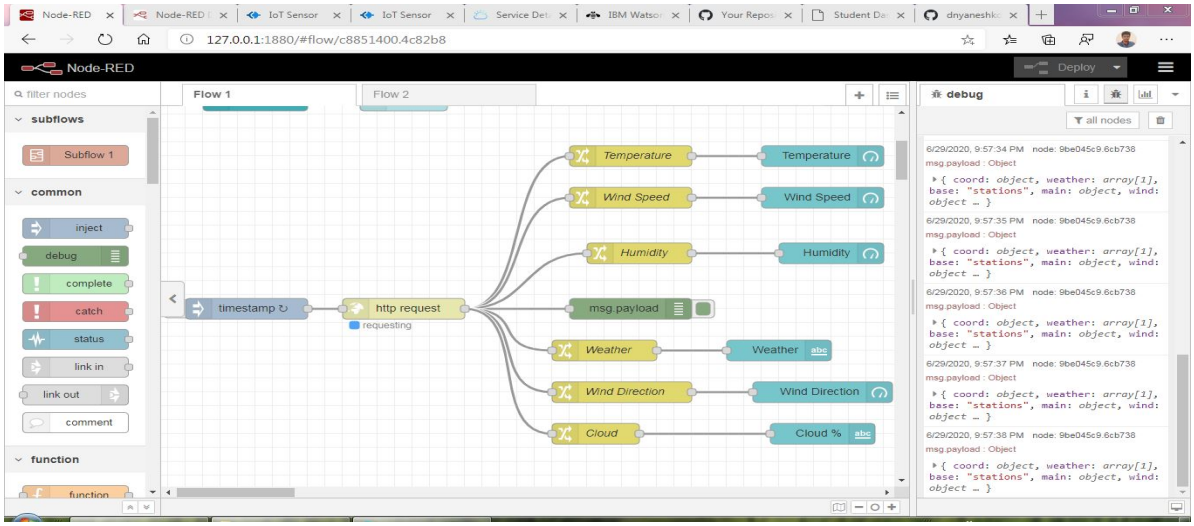
- Enter the details like Organization ID, Device Type, Device ID and Device token.



4.3 Creating the Node-Red flow for reading and to display the simulated Sensor value and the Weather API data

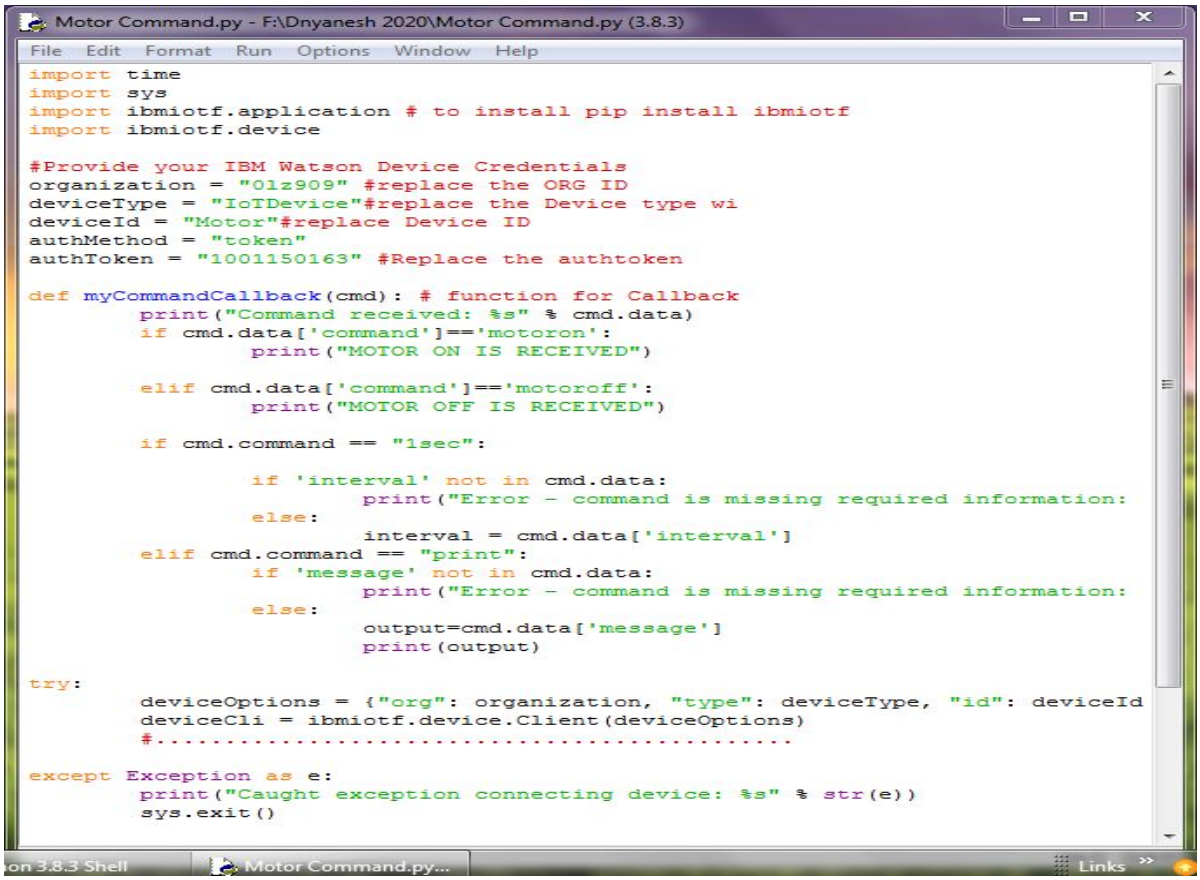
- The Weather API is obtained from openweather.com.
- The flow below includes the data from IBM sensor and simulator into the UI and the weather data from openweather.org and controls.





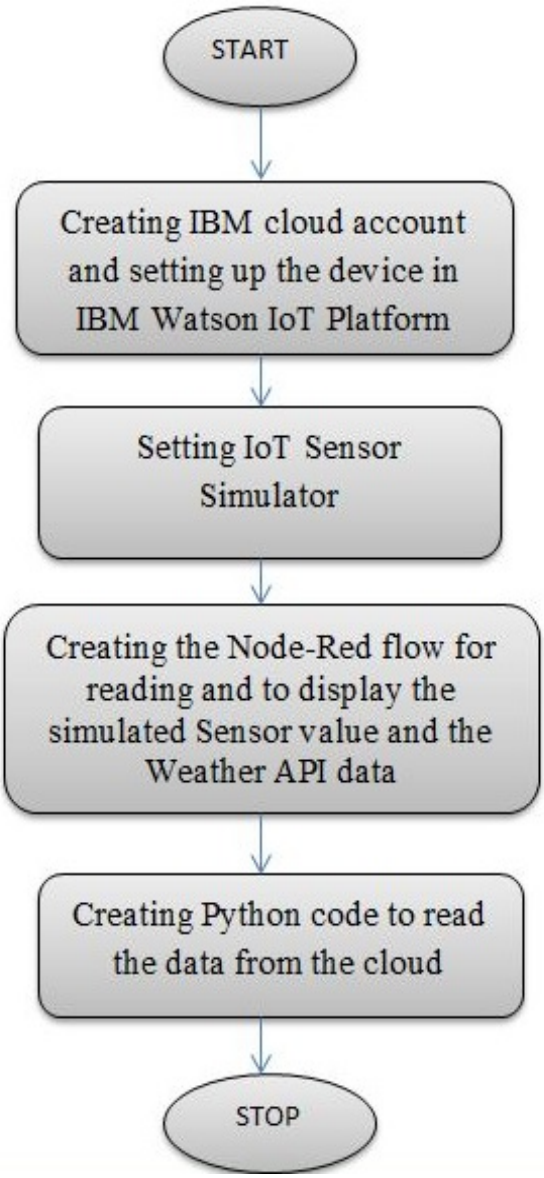
4.4 Creating Python code to read the data from the cloud.

- The Python code to show whether the motor is on/off is shown below:



Chapter 5

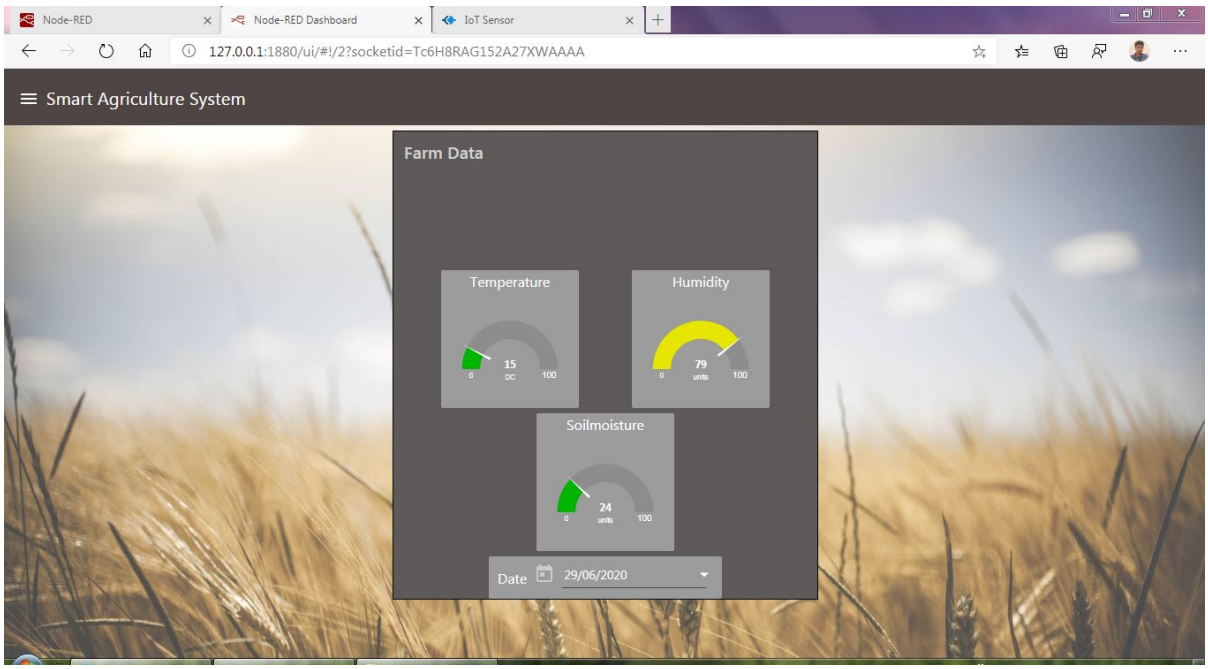
FlowChart



chapter 6

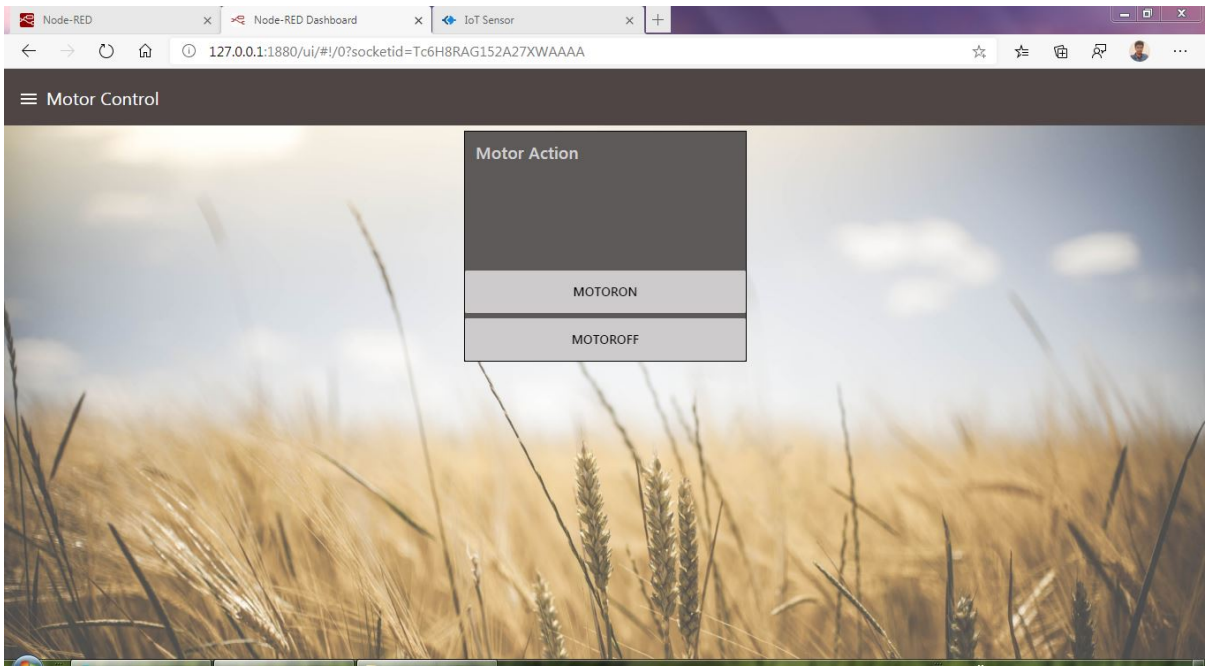
Result

6.1 Smart Agriculture Home Data From IoT Simulator

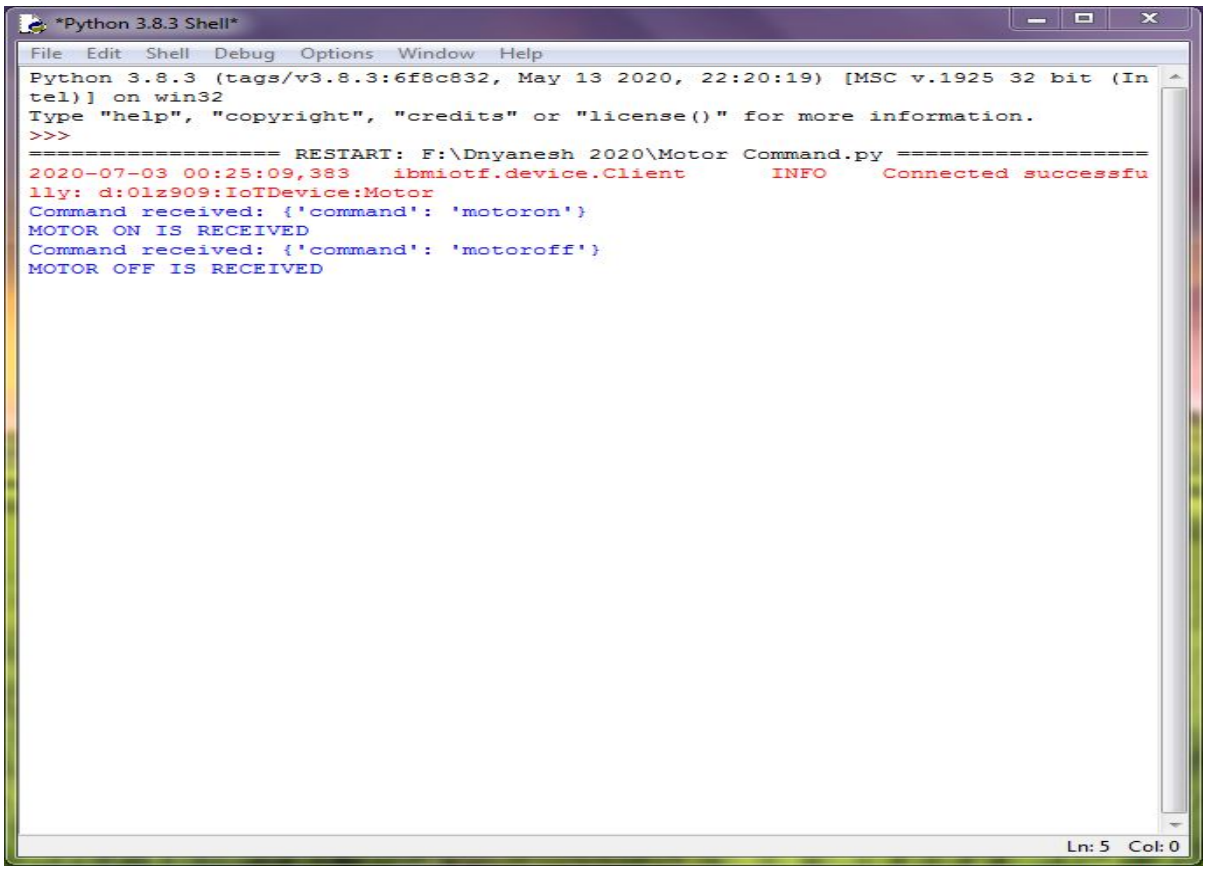


6.2 Weather Information From Open Weather API

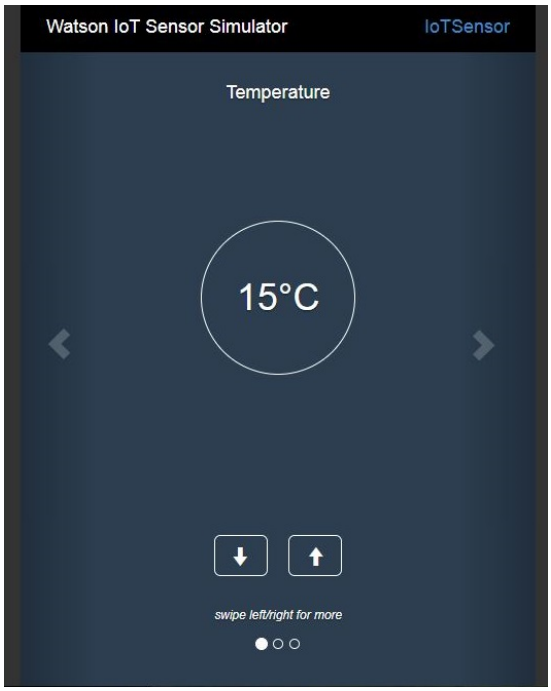
6.3.1 Motor Control

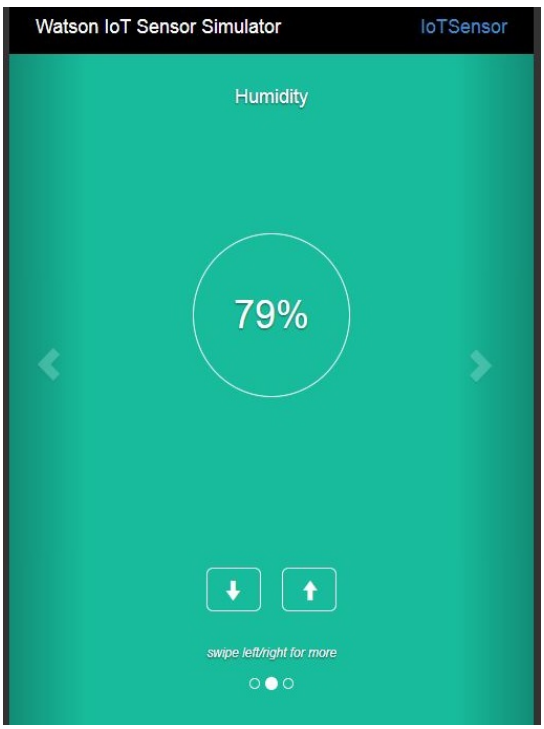


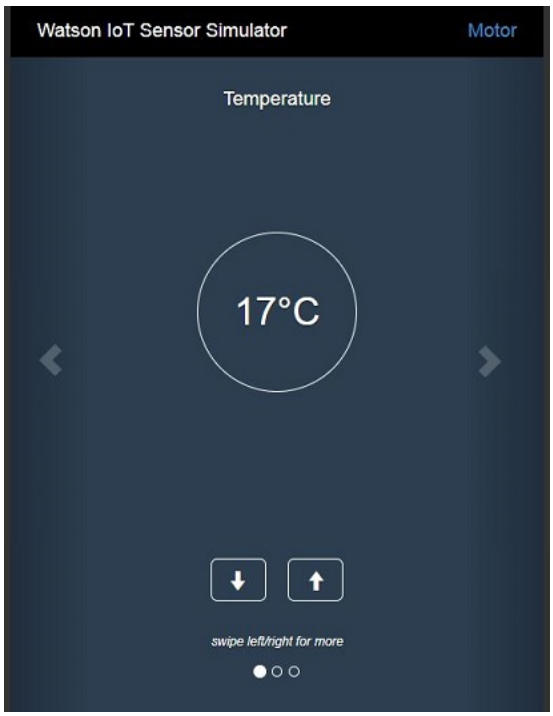
6.3.2 Motor Command Received in Python



6.4 IoT Input Sensors For Farm Parameters and Motor Control







chapter 7

Advantages an Disadvantages

7.1 Advantages

- First is that some efforts can be reduced while farming
- It allows farmers to maximize yields using minimum resources such as water, fertilizers, seeds etc.
- Smartphone operated pumps save cost of electricity.
- These improves data collection process and helps in wireless monitoring and control.
- It is cost effective method.

7.2 Diadvantages

- Lack of internet connectivity issues. Smat agriculture needs availability of internet continuously. Some part of rural area face slower internet connectivity.
- The smart agriculture based equipment requires farmers to understand and learn the use of technology. This is major challenge in adopting smart agriculture at large scale across the countries
- Small farmers may not be able to afford this technology.
- Loss of privacy and security.
- Less compatibility and more complexity.

Chapter 8

Applications

- In Smart agriculture system based on IOT, the system is built for monitoring the crop field with the help of sensors (humidity, temperature, soil moisture) and controlling the irrigation system. The farmers can monitor the field conditions from anywhere.
- Smart agriculture system based on IOT is highly efficient when compared with the conventional approach.
- In terms of environmental issues, IoT based smart farming can provide great benefits including more efficient water usage or optimization of inputs and treatments.

Chapter 9

Conclusion

Thus, the IoT agricultural applications are making it possible for farmers to collect meaningful data. Large landowners and small farmers must understand the potential of IoT market for agriculture by installing smart technologies to increase competitiveness and sustainability in their productions. With the population growing rapidly, the demand can be successfully met if the farmers implement agricultural IoT solutions in a prosperous manner.

Chapter 10

Future Scope

- IoT device can be helpful in many ways and future implementation can be interesting and insightful.

Chaper 11

Bibilography

https://www.allbusinesstemplates.com/download/?filecode=2KBA4&lang=en&iuid=9f9faa69-9fab-40ee-8457-ea0e5df8c8de
https://github.com/
https://www.youtube.com/watch?v=7YUTc4Cigc8&feature=youtu.be
https://www.zoho.com/writer/help/working-with-text.html
https://content-eu-7.content-cms.com/b73a5759-c6a6-4033-ab6b-d9d4f9a6d65b/dxsites/151914d1-03d2-48fe-97d9-d21166848e65/
https://cloud.ibm.com
https://nodered.org/
https://www.iotone.com/software/ibm-watson-iot-platform/s62
https://www.python.org/
https://watson-iot-sensor-simulator.mybluemix.net/
https://openweathermap.org/
https://github.com/rachuriharish23/ibmsubscribe

Appendix

Source Code

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

#Provide your IBM Watson Device Credentials
organization = "0lz909" #replace the ORG ID
deviceType = "IoTDevice"#replace the Device type wi
deviceId = "Motor"#replace Device ID
authMethod = "token"
authToken = "1001150163" #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 == "1sec":

                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()
```