SMART AGRICULTURE SYSTEM

PROJECT REPORT

Smartinternz

Submitted By:

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SPS_PRO_101

1) Introduction

1.1) Overview:

- It is based on IOT that can monitor temperature, humidity and soil moisture to grow good crops.
- In agriculture irrigation on time is the most important factor as the monsoon rain falls.
- It is very essential to make effective intervention in agriculture.
- The farmer can get real time weather forecasting data through Open Weather API.

1.2) Purpose:

- To connect technology with agriculture for the better growth of yield and helping farmers.

2) Literature survey

2.1) Existing Problem:

- Farmers who are not aware of their land condition might be growing the wrong crop according to their land merits.
- Farmers don't have good idea about the exact weather and their land condition, their most of the work is based on assumptions, which sometimes results in poor yield.

2.2) Proposed Solution:

- With the help of app farmer can about his land's soil moisture, temperature and humidity.
- With the help of web app farmer will be able to know about exact weather conditions.
- The web app contains a feature for farmer, as they can control motor from anywhere which lead to saving of water and they can water crops on his requirement.

3) Theoritical Analysis

3.1) Project Requirement:

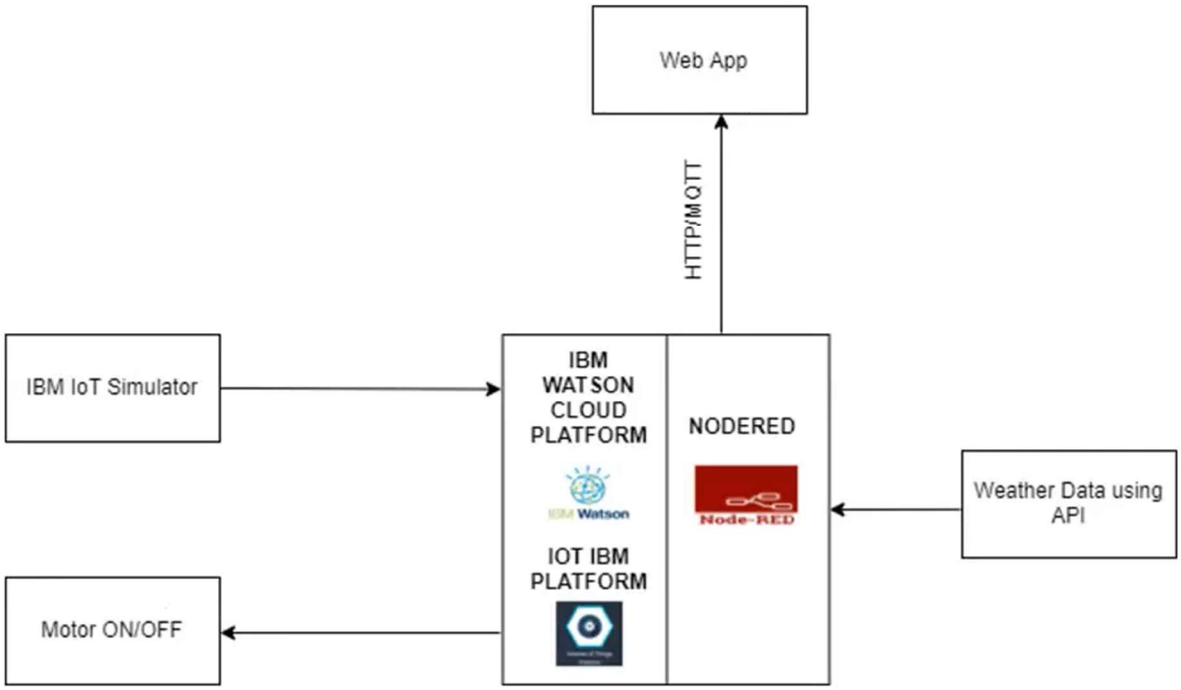
- IOT Application Development
- IOT Cloud Platform (IBM Watson)
- Open Weather API

3.2) Software Requirement:

- Node-red and GIT tools
- Python IDE and Script

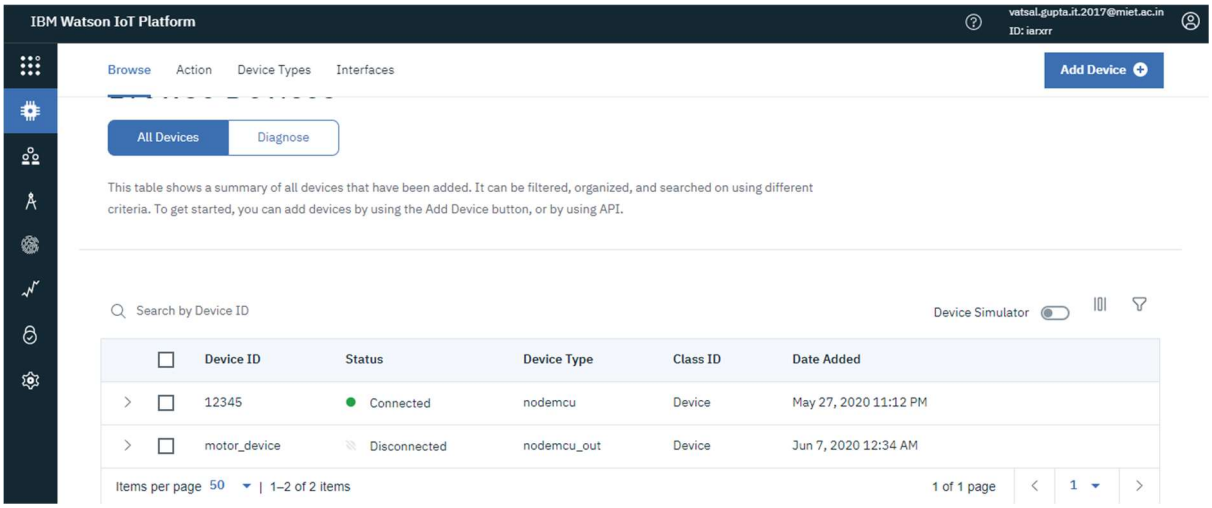
3.3) Block Diagram:

- In this block diagram , the working of IoT Simulator working shown with the help of IBM Watson and Node-red.
- We make a web app through Node-red which recieve commands from IBM instance.

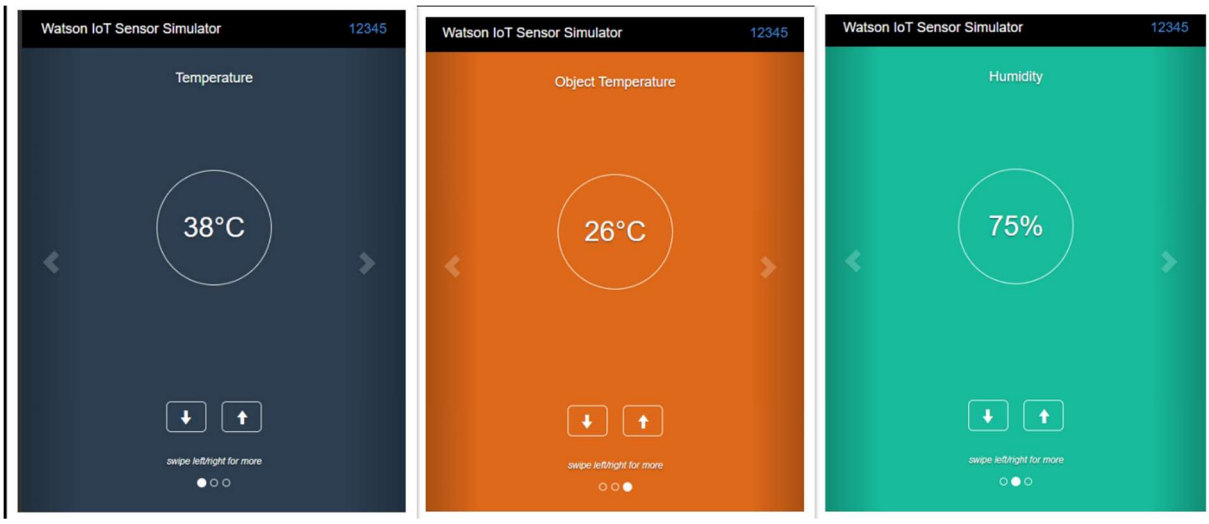


4) Hardware and Software Designing

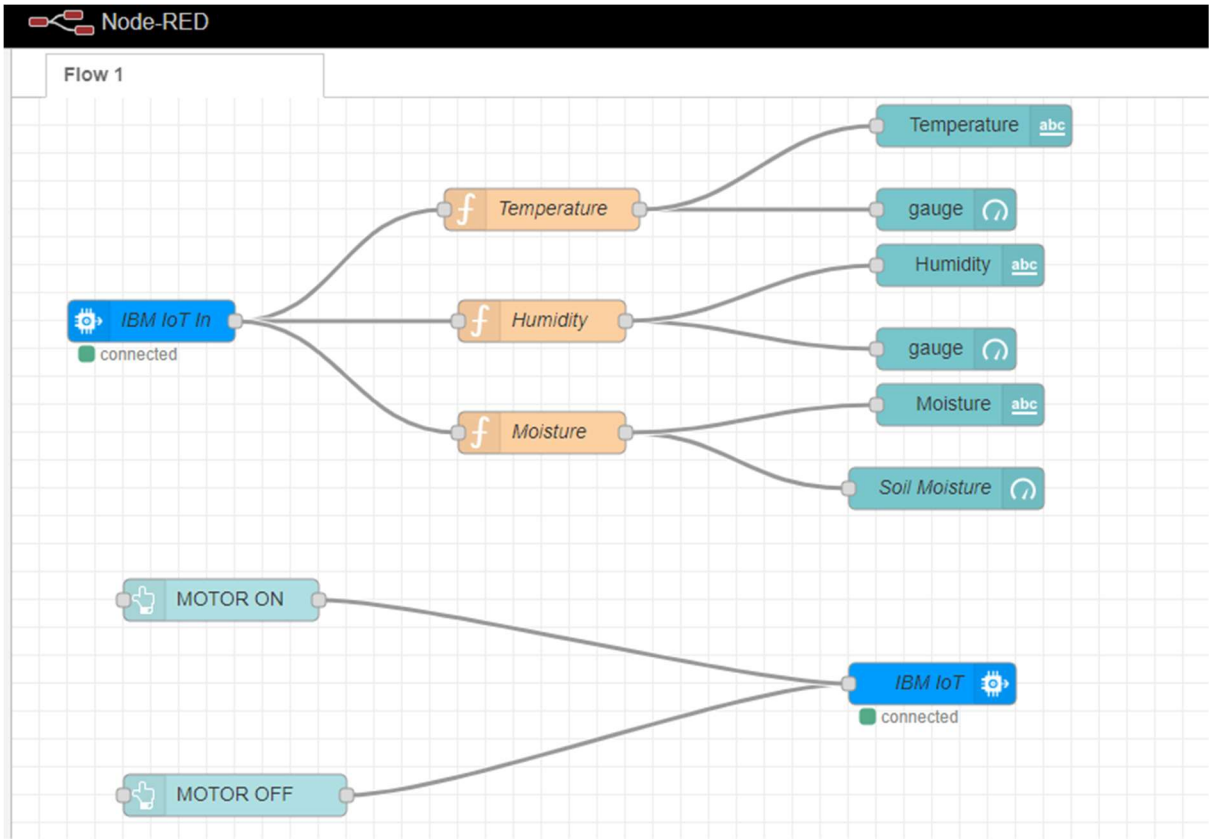
4.1) Creation of IOT devices on IBM Watson platform:



3.2) Connection of IoT device with IBM simulator:

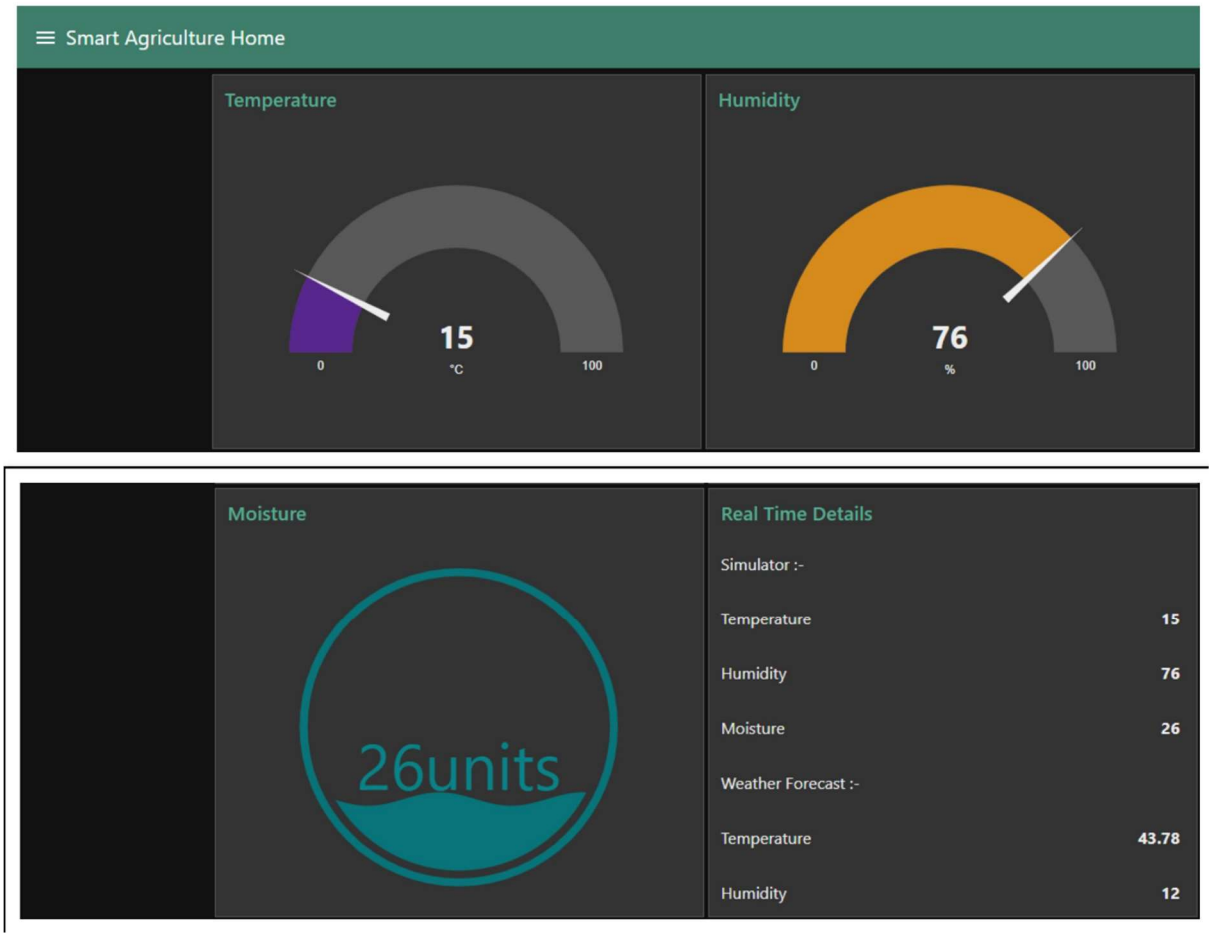


3.3) Node-red Flow:

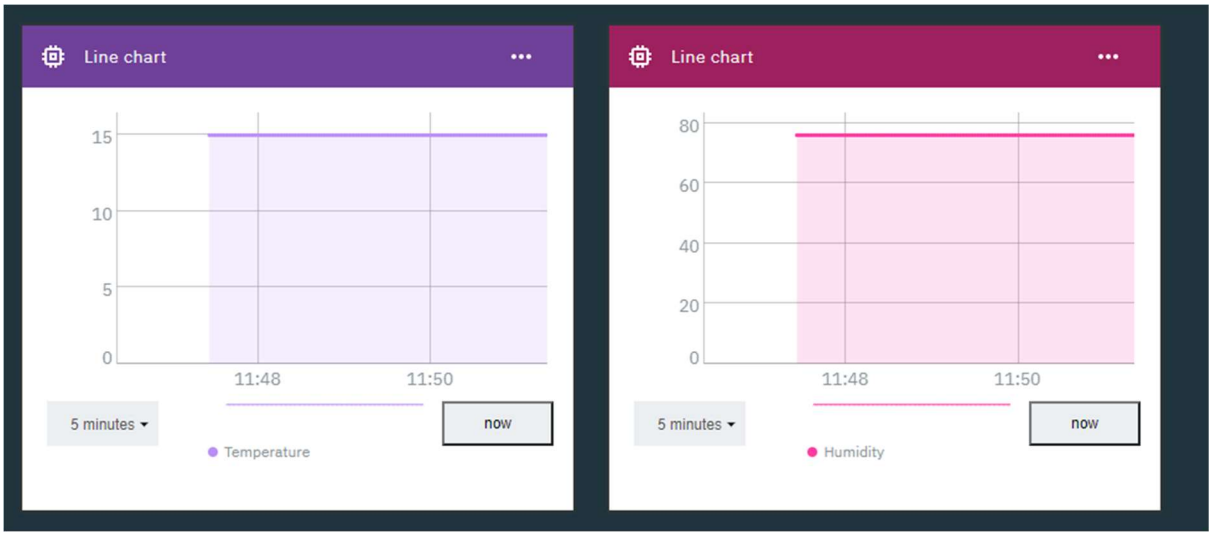


4) Experimental Investigation Outcomes

4.1) Node-red UI Dashboard:



4.2) Data from Simulator in Graphical Form:



4.3) Motor Receiving command from Web App:

```
king@DESKTOP-J59889B:/mnt/c/Users/gvats/Documents/Internship$ python3 ./subscribeibm.py
2020-06-12 11:57:30,529   ibmiotf.device.Client      INFO    Connected successfully: d:iarxrr:nodemcu_out:motor_device
Command received: {'command': 'motoron'}
MOTOR ON IS RECEIVED
Command received: {'command': 'motoroff'}
MOTOR OFF IS RECEIVED
Command received: {'command': 'motoron'}
MOTOR ON IS RECEIVED
Command received: {'command': 'motoroff'}
MOTOR OFF IS RECEIVED
Command received: {'command': 'motoron'}
MOTOR ON IS RECEIVED
Command received: {'command': 'motoroff'}
MOTOR OFF IS RECEIVED
Command received: {'command': 'motoron'}
MOTOR ON IS RECEIVED
Command received: {'command': 'motoroff'}
MOTOR OFF IS RECEIVED
Command received: {'command': 'motoron'}
MOTOR ON IS RECEIVED
Command received: {'command': 'motoroff'}
MOTOR OFF IS RECEIVED
Command received: {'command': 'motoron'}
MOTOR ON IS RECEIVED
Command received: {'command': 'motoroff'}
MOTOR OFF IS RECEIVED
```

5) Advantages and Disadvantages

5.1) Advantages:

- Controling motor from any where with the help of our app will reduce some hard work of farmer.
- Cost efficient.
- Having idea about real time weather can help farmers in effective decision-making about planting of crops.
- Small sized customer support team is enough as only a low volume of queries are redirected.

5.2) Disadvantages:

- App can only help a farmer who knows how to use mobile phone apps otherwise it is not for any use.
- Sometimes IBM Watson discovery service returns wrong results if not properly configured.

6) Application

6.2) Application:

- Using the IoT concept in the agriculture field will help farmers not only reduce waste but also increase in yield production varying from the quantity of fertilizer utilized to the quality of the production achieved.
- Crop Monitoring: Using IoT technique we can monitor the quality of crop.
- Precision Farming: Precision farming is a farming practice that is more accurate and controlled. It deals with production of crop along with raising livestock.

- Livestock Monitoring: With the help of sensor, health of the livestock can be monitored which will directly help in the yield production of good produced from them.

7) Conclusion

- It is a good web app which will help farmers in many ways.It helps farmers for good production. It also have drawbacks but fixed by time to time. It's a good start to connect agriculture with IoT technology through IBM cloud.

8) Source Code

8.1) Node-red flow (json):

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u","eventType":"+","commandType":"data","format":"json","name":"IBM IoT
In","service":"registered","allDevices":"","allApplications":"","allDeviceTypes":"","allLogicalInte
rfaces":true,"allEvents":true,"allCommands":false,"allFormats":"","qos":0,"x":100,"y":160,"wir
es":[["7336c501.fa2a3c","2ce2c650.72ddea","b89484bd.3590f8"]]},{"id":"7336c501.fa2a3c","t
ype":"function","z":"3eca1fe4.2ae29","name":"Temperature","func":"msg.payload=msg.paylo
ad.d.temperature\nreturn
msg;","outputs":1,"noerr":0,"x":380,"y":80,"wires":[["943d33b2.fa12","4fe8eb7d.f5e294"]]},{"id
":"2ce2c650.72ddea","type":"function","z":"3eca1fe4.2ae29","name":"Humidity","func":"msg.p
ayload=msg.payload.d.humidity\nreturn
msg;","outputs":1,"noerr":0,"x":380,"y":160,"wires":[["bb2736c5.20f898","ec42e4a0.288f38"]]}
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8a39e8","order":1,"width":0,"height":0,"gtype":"gage","title":"","label":"°C","format":"{{value}}",
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ssthru":false,"label":"MOTOR
OFF","tooltip":"","color":"","bgcolor":"","icon":"","payload":"{\"command\":\"motoroff\"}","payloa
dType":"json","topic":"","x":160,"y":500,"wires":[["defb93e8.e34"]]},{"id":"5bade57d.4a5f2c","ty
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url":"api.openweathermap.org/data/2.5/weather?q=Meerut,IN&units=metric&appid=768f44a3
6933b58004af0a957bd9a6f0","tls":"","persist":false,"proxy":"","authType":"","x":340,"y":800,"
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```
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2.a56a08","order":1,"width":0,"height":0,"gtype":"gage","title":"Temperature","label":"°C","for
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bjectTemp\nreturn
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```

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8.2) Python Code:

```
import time

import sys

import ibmiotf.application # to install pip install ibmiotf

import ibmiotf.device

#Provide your IBM Watson Device Credentials

organization = "iarxrr" #replace the ORG ID

deviceType = "nodemcu_out"#replace the Device type wi

deviceId = "motor_device"#replace Device ID\

authMethod = "token"

authToken = "123456789" #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()
```