Smart Agriculture System Based On IoT

Internship Project Report

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TITLE: Smart Agriculture System Based On IoT

1. INTRODUCTION

1.1. Overview

In olden Days Farmers used to figure the ripeness of soil and influenced suspicions to develop which to kind of yield. They didn't think about the humidity, level of water and especially climate condition which terrible a farmer increasingly. The use of Internet of things (IOT) to remodel the agribusiness empowering the agriculturists through the extensive range of strategies, for example, accuracy as well as practical farming to deal with challenges in the field. IOT modernization helps in assembly information on circumstances like climate, dampness, temperature and fruitfulness of soil.

1.2. Purpose

Crop web based examination empowers discovery of level of water, growth of crops in to the field, trim development, horticulture. IOT utilize farmers to get related information at their home or wherever they are. Remote sensor structures are utilized for watching the homestead conditions and tinier scale controllers are utilized to control motors. IOT development can diminish the cost and update the productivity of standard developing.

2. LITERATURE SURVEY

2.1. Existing problem

The scenario of decreasing water tables, drying up of rivers and tanks, unpredictable environment present an urgent need of proper utilization of water in harvesting. To cope up with this use of temperature and moisture sensors at suitable locations for monitoring of crops. Farmers are not able to assess the unpredictable behaviour of environment. Now a day's in some parts of the world corona virus cases are rising day by day, which is resulting in restrictions to farmers to go to their fields.

2.2. Proposed solution

An algorithm developed will be so that, data from sensor placed in field such as temperature sensor, humidity sensor, soil moisture measurement sensor will be collected in cloud and from cloud data will be transferred to mobile based application installed in farmer's mobile handset. User friendly GUI will be made so that it will be easy for farmer to read the data and decide whether to turn the motor ON or OFF. The system can have duplex communication link based on cellular – Internet interface that allow data inspection. The technological development in open source software make it easy to develop the device which can make better monitoring.

3. OBJECTIVES

- Smart Agriculture System based on IoT that can monitor soil moisture and climatic conditions to grow and yield a good crop.
- The farmer should also get the real-time weather forecasting data.
- Farmer is to be provided with a mobile app using which he can monitor the temperature, humidity and soil moisture parameters along with weather forecasting details.
- Farmer should be able to control the motors using the mobile application.
- Function should be created such that it will help farmer to operate all the motors remotely.
- User interface should be clean and neat.
- User friendly GUI should be made.

4. TECHNICAL REQUIREMENTS:

4.1. Hardware requirement:

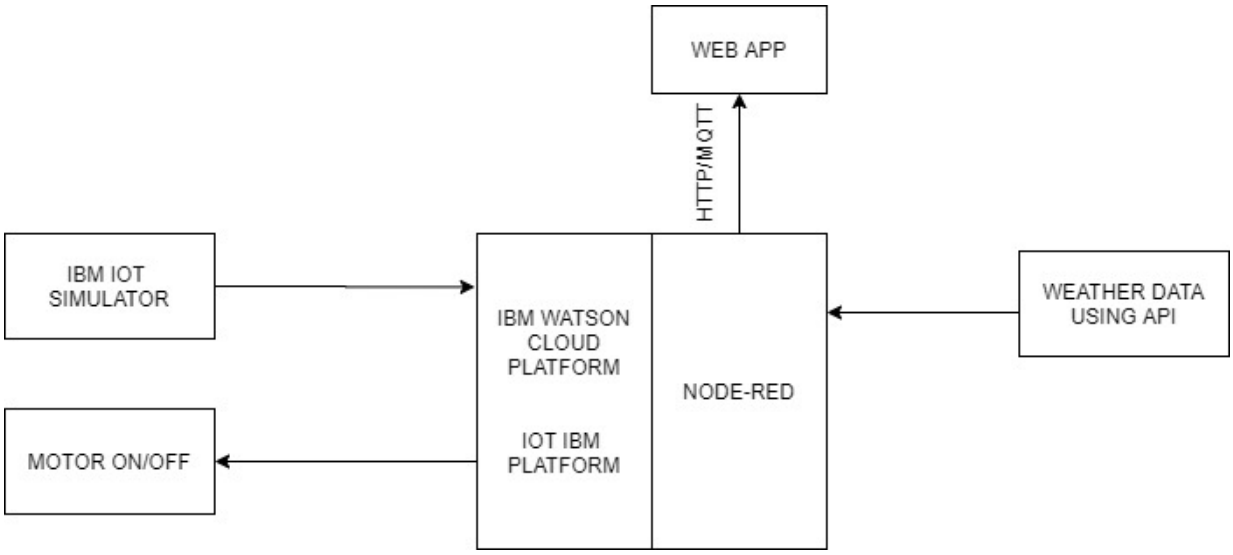
- Microcontroller for controlling action.
- Temperature sensor for temperature measurement.
- Humidity sensor for measurement of humidity level of atmosphere.
- Soil moisture sensor for measuring moisture level in soil.
- Wi-Fi module to transfer collected data from sensors on cloud.
- Mobile device at the receiver side (farmer side).

4.2. Software requirement:

- IBM cloud access.
- Open weather API.
- Application to be developed at the farmer side on mobile.
- Online IoT simulator for getting the Temperature, Humidity and Soil Moisture values.

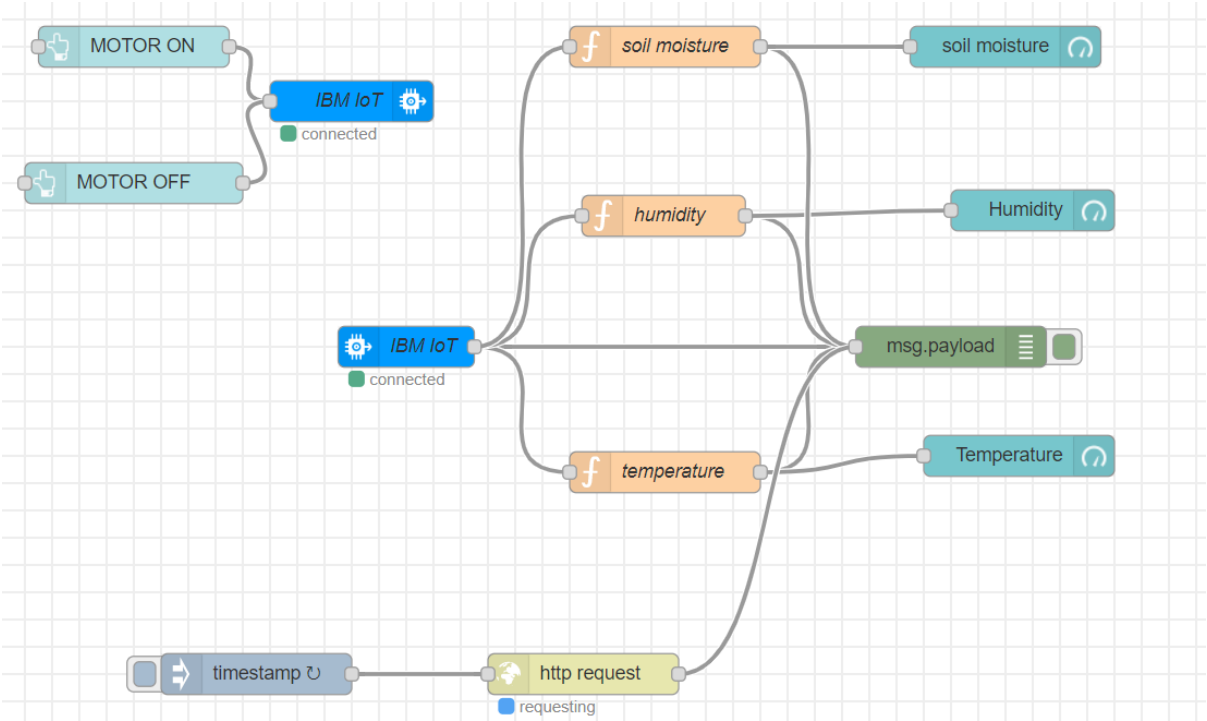
5. THEORITICAL ANALYSIS

5.1. Block Diagram

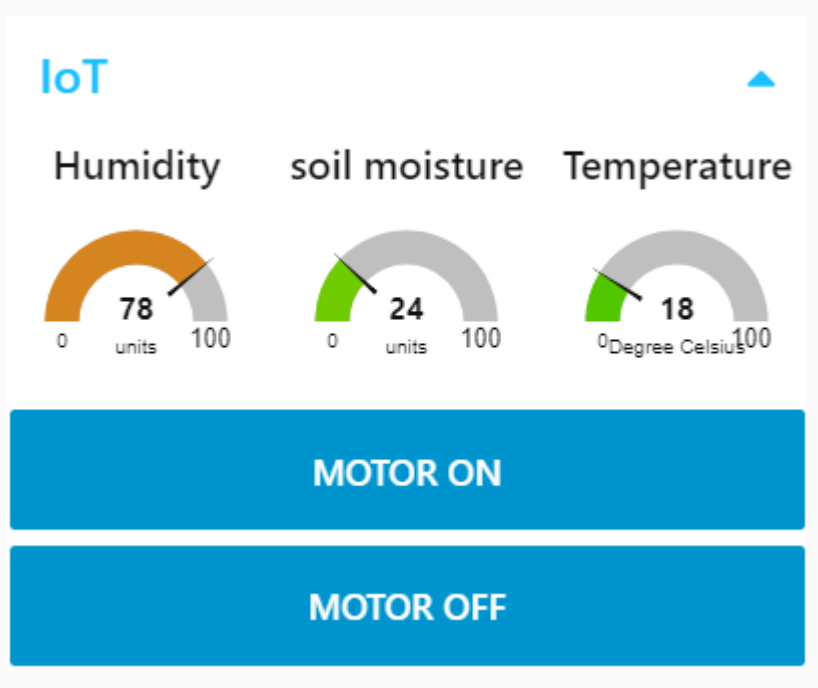


5.2. Software Design

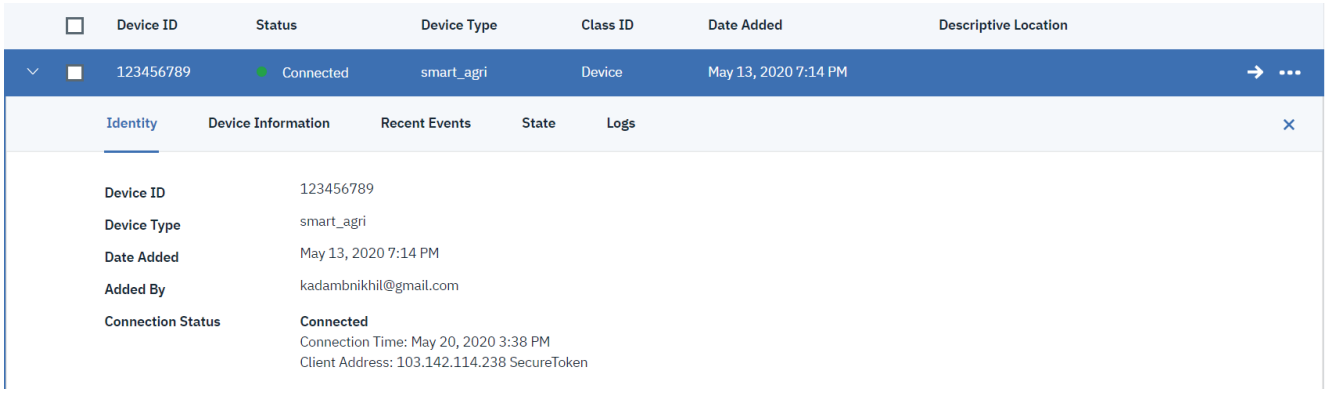
5.2.1 Node-red



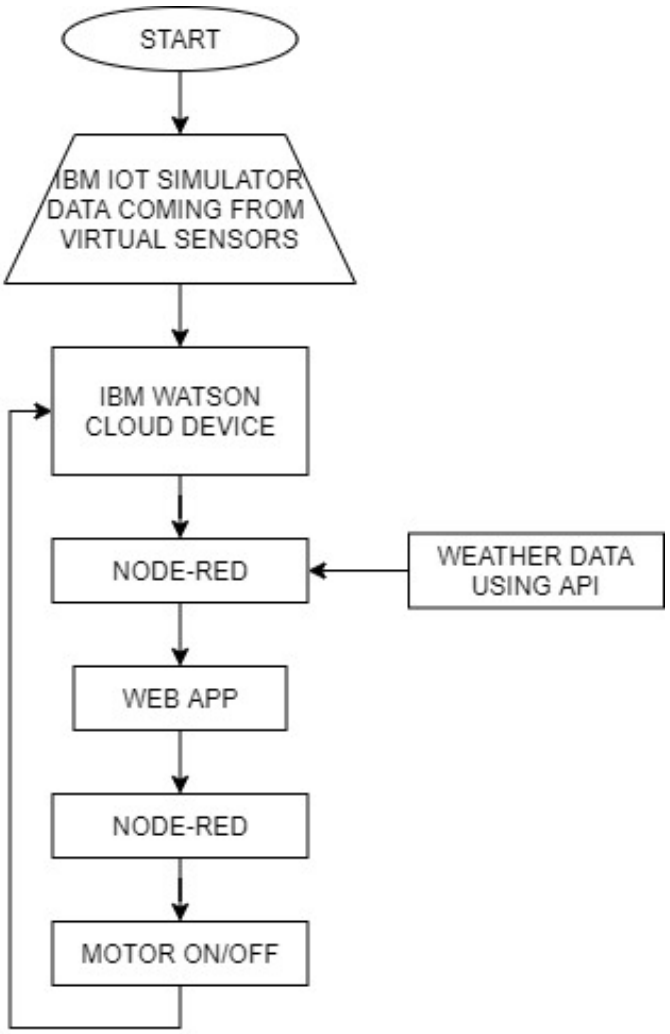
5.2.2 Node-red GUI



5.2.3 Watson IOT device

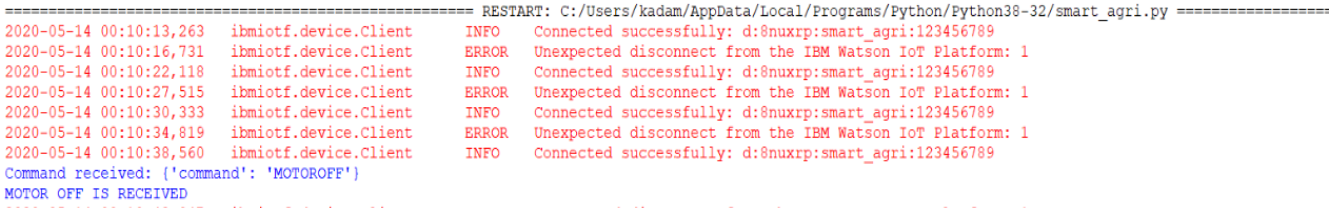


6. FLOWCHART

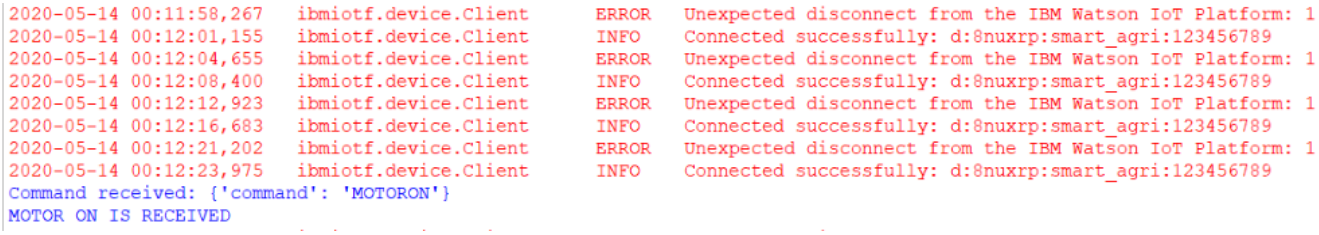

START
IBM IOT SIMULATOR DATA COMING FROM VIRTUAL SENSORS
IBM WATSON CLOUD DEVICE
NODE-RED
WEATHER DATA USING API
WEB APP
NODE-RED
MOTOR ON/OFF

7. RESULTS

Real time simulation results were observed in following screenshots.
Result when MOTOR OFF button pressed:



Result when MOTOR ON button pressed:



8. ADVANTAGES AND DISADVANTAGES

8.1. Advantages

- Increased Production.
- Water Conservation.
- Reduced human error due to false prediction of weather conditions.
- Remote access to motor controls to farmer.
- Real time data.

8.2. Disadvantages

- Excess setup cost.
- No failure prevention.
- Prone to failure due to loss of internet.
- The cost of maintenance becomes high whether there is a repair or not.
- Malfunction can happen with data.

9. APPLICATIONS AND FUTURE SCOPE

- Climate condition based farming.
- Precision farming.
- Smart greenhouse.
- Remote monitoring of agriculture based small businesses like animal husbandry.

10. CONCLUSION

'Internet of Things' is far and wide castoff in relating devices and gathering statistics. This agriculture monitoring system serves as a reliable and efficient system and corrective action can be taken. Wireless monitoring of field reduces the human power and it also allows user to see accurate changes in crop yield. It is cheaper in cost and consumes less power. The smart agriculture system has been designed and synthesized. The developed system is more efficient and beneficial for farmers. It gives the information about the temperature, humidity of the air in agricultural field, soil moisture level. The system can be used in green house and temperature dependant plants. The application of such system in the field can definitely help to advance the harvest of the crops and global production. In future this system can be improved by adding several modern techniques like irrigation method, solar power source usage.

11. BIBILIOGRAPHY

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2. https://smartinternz.com/assets/docs/Smart%20Home%20Automation%20using%20IBM%20cloud%20Services%20(1).pdf
3. https://www.youtube.com/watch?v=cicTw4SEdxk
4. https://smartinternz.com/assets/docs/Sending%20Http%20request%20to%20Open%20weather%20map%20website%20to%20get%20the%20weather%20forecast.pdf
5. Patil, Gokul & Gawande, Prashant & Bag, Rohit. (2017). Smart Agriculture System based on IoT and its Social Impact.

APPENDIX (SOURCE CODE)

```
python -m pip install --upgrade pip

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

#Provide your IBM Watson Device Credentials
organization = "8nuxrp" #replace the ORG ID
deviceType = "smart_agri"#replace the Device type wi
deviceId = "123456789"#replace Device ID
authMethod = "token"
authToken = "Nikhil@1997" #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()
```