Project Report

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Title :*Smart Agriculture System*

Based on IoT

Category:*Internet Of Things*

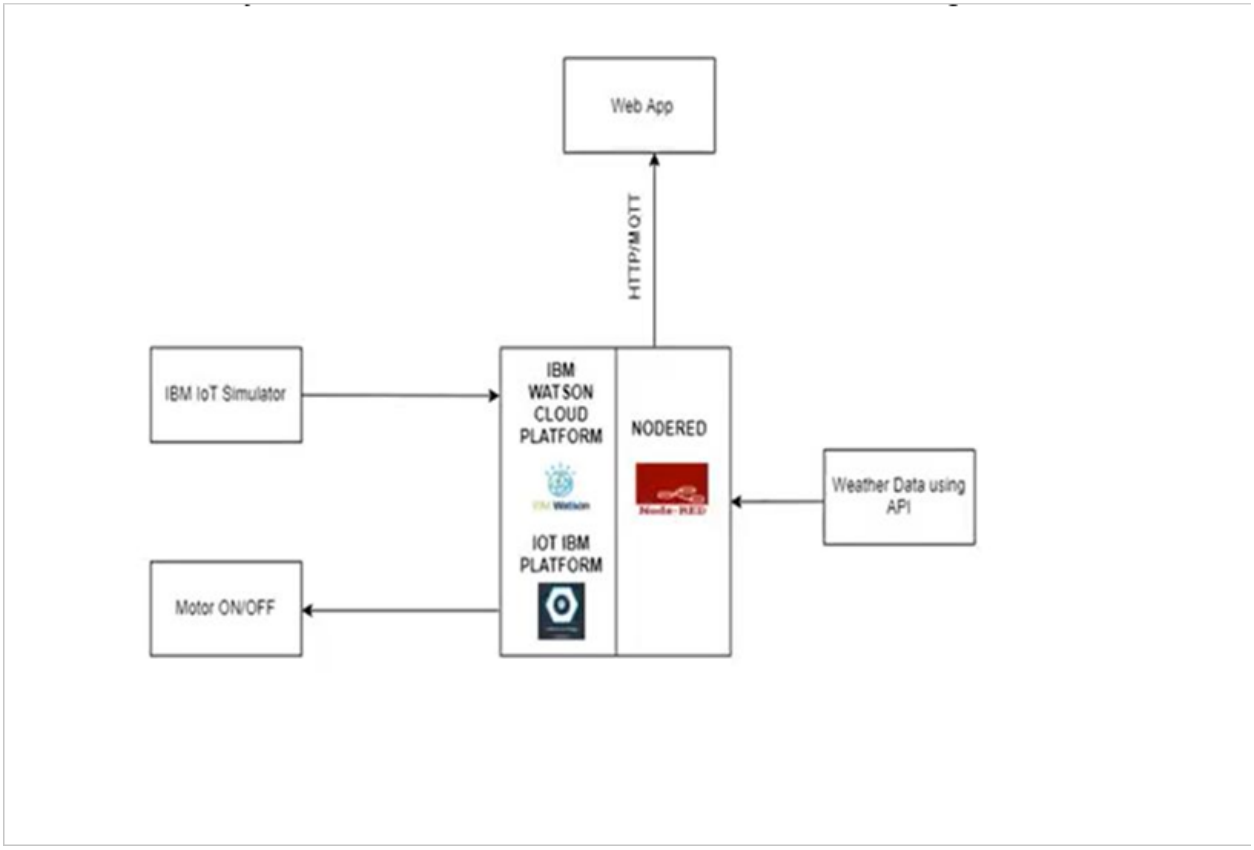
Internship at smartinternz.com@2020

SMART AGRICULTURE SYSTEM BASED ON IOT

Aim and Scope:

Smart Agriculture System based on Iot can monitor soil moisture and climatic conditions to grow and yield a good crop. The farmer can also get the real-time weather forecasting data by using external platforms like Open Weather API. Farmer will be provided a mobile app using which he can monitor the temperature, humidity and soil moisture parameters along with weather forecasting details. Based on all the parameter, farmer can water his crop by controlling the motor using the mobile application. Thus even if the farmer is not present near his crop he can water his crop by controlling the motors using the application from anywhere.

The Project Flow can be seen from the following diagram:



Project Deliverables:

1. Creating a platform to have the services used to create the app by checking out IBM's Cloud Platform.
2. The device used to set the temperature and humidity by Connecting the IoT Simulator for the Watson IoT platform.
3. Configure Node-Red to retrieve data from the IBM IoT platform and Open Weather API, Which is used to get the current weather using OpenWeather.
4. Creating a Web App to preview our red code.
5. Configure your device to retrieve information from the web app and control your motors.
6. Check the weather the motor keys work well and give effect.

These are the project deliverables that need to be delivered.

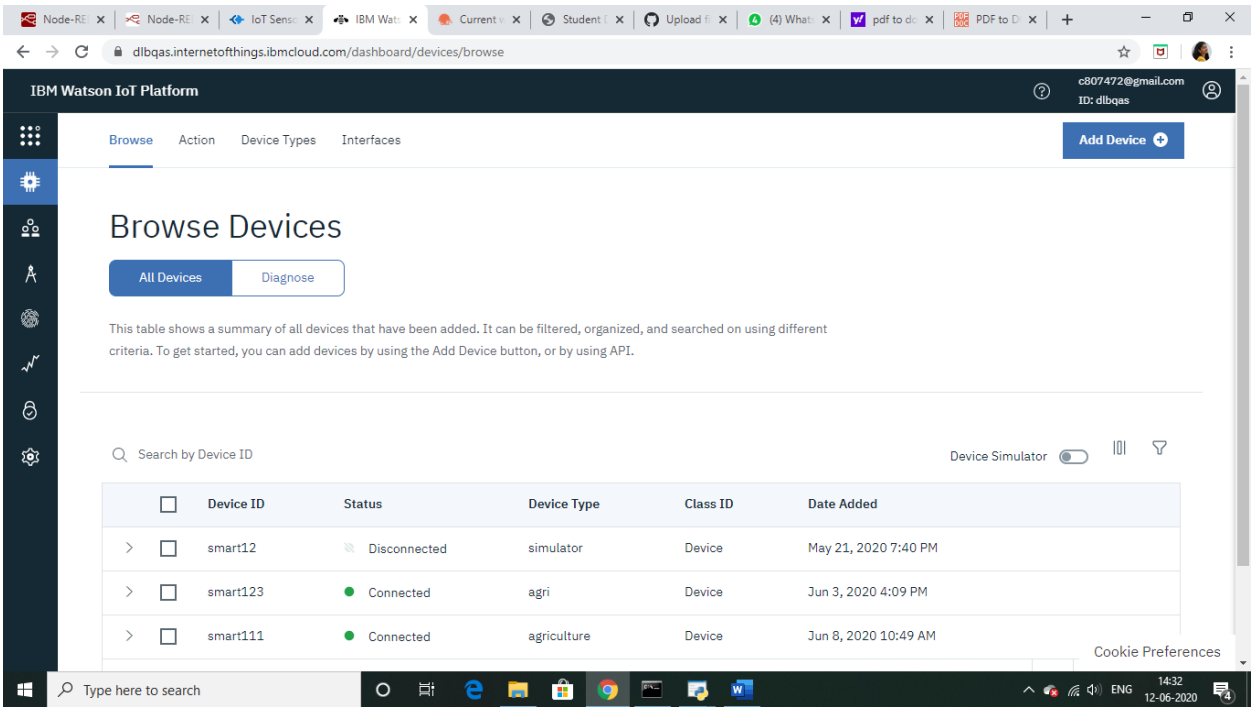
Project Team: *Chandrika sagar*

Getting Sensor Inputs into IBM Cloud :

First task to build the web app is to get the sensor data in the cloud. I am using IBM cloud for this. We need an IBM account for the same. Steps to take sensor data in the cloud:

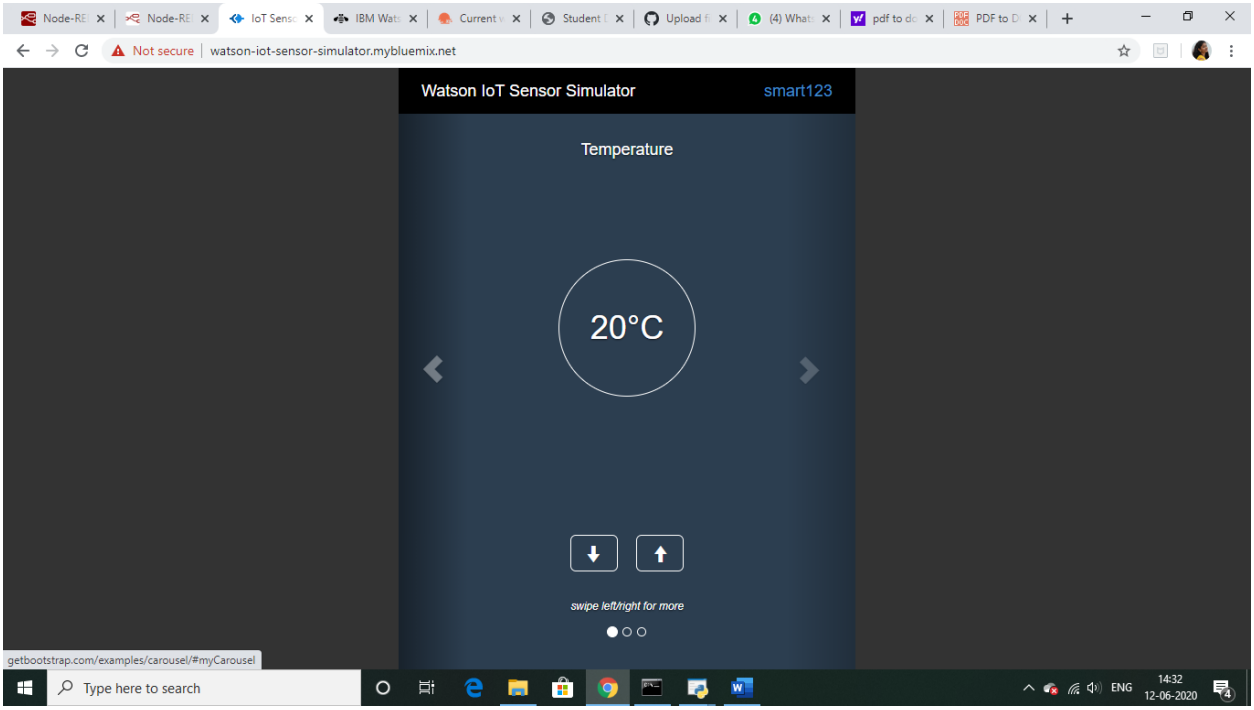
1. Sign up for IBM Academic Initiative Account using this link.
2. After this Sign up for IBM Cloud using link.
3. Go to IBM Watson IOT Platform by searching IOT platform in the catalogue in

   IBM
   Cloud

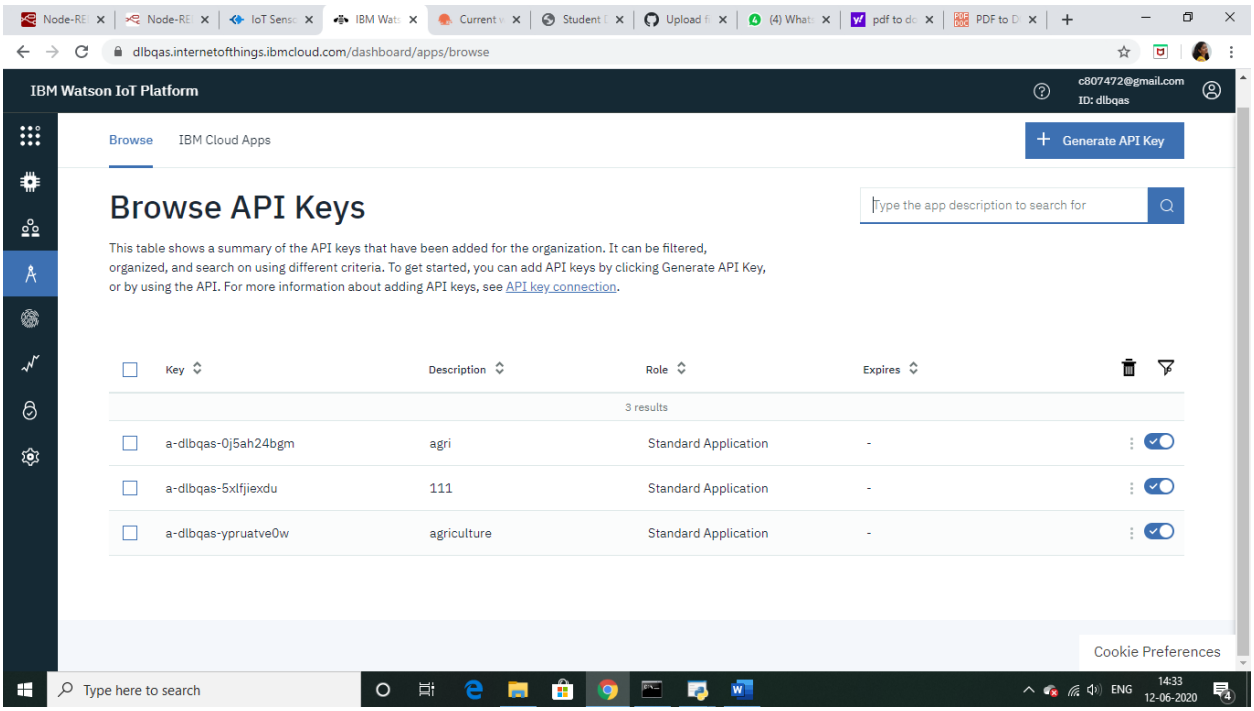


4.Go to the IOT Platform and now we will create a device here after which we will get the credentials for IOT simulator.

5.You will get Device credentials save them in a notepad so that we connect to IOT simulator. Go to link for IOT simulator. The following screen appears once your simulator get's connected.



6. Now in the cloud we can create cards to view the simulator data.



Node-Red

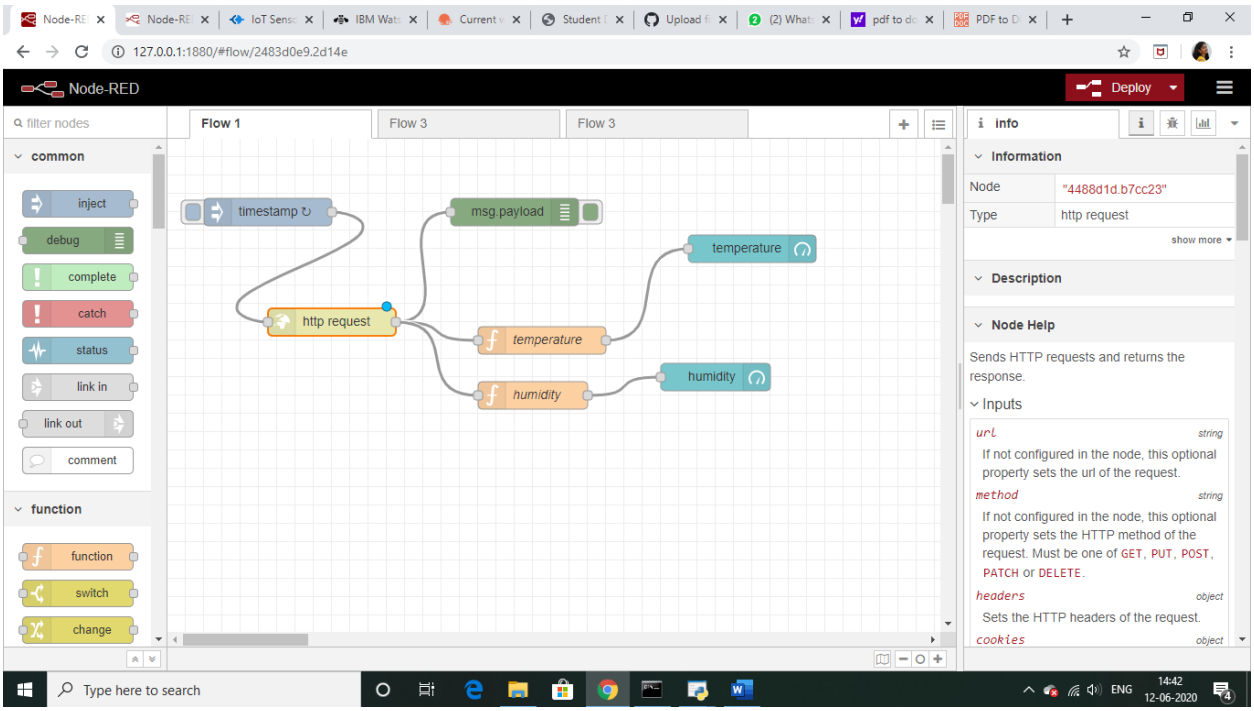
Now once we got the data in the cloud, we will use node red to get the data in a web app. To install node-red in windows follow this link. After this we would need to externally install IBM iot node in node red using the below code.

Node-red-contrib-scx-ibmiotapp

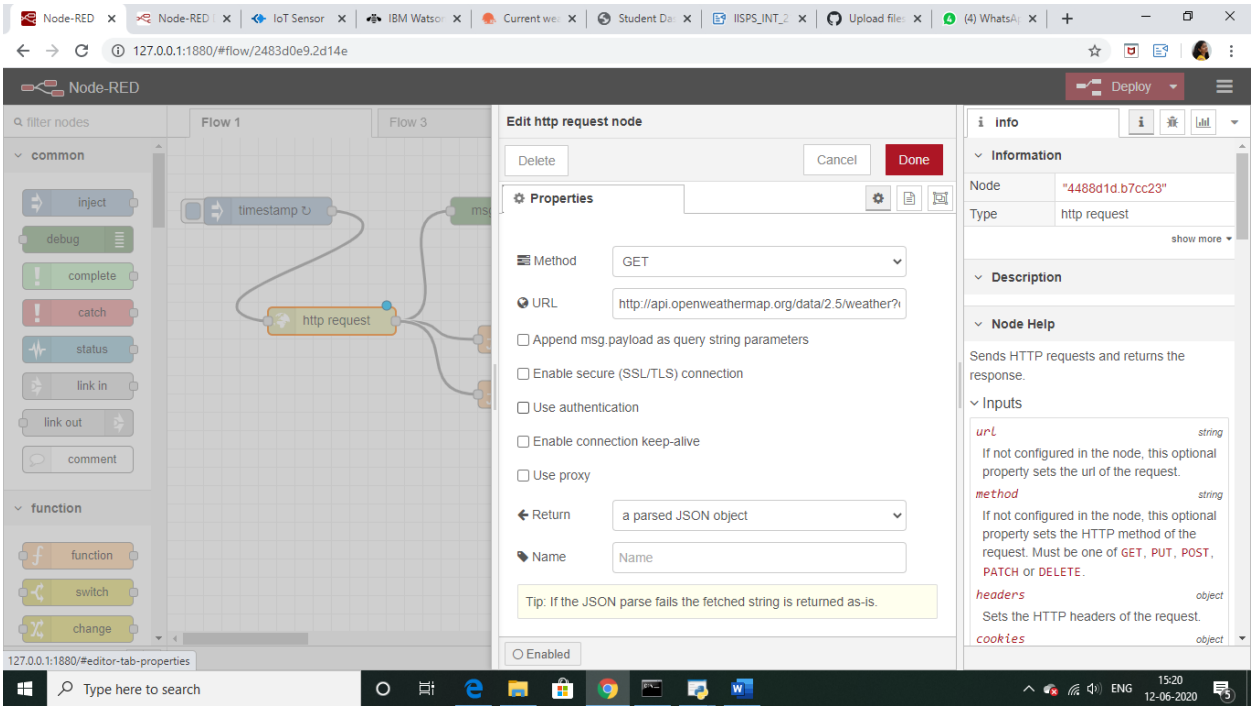
We would need 3 flows:

1. To take the weather data from OpenWeather API.
2. To take sensor data from the IBM cloud.
3. Finally, to transfer the motor control data to the cloud.

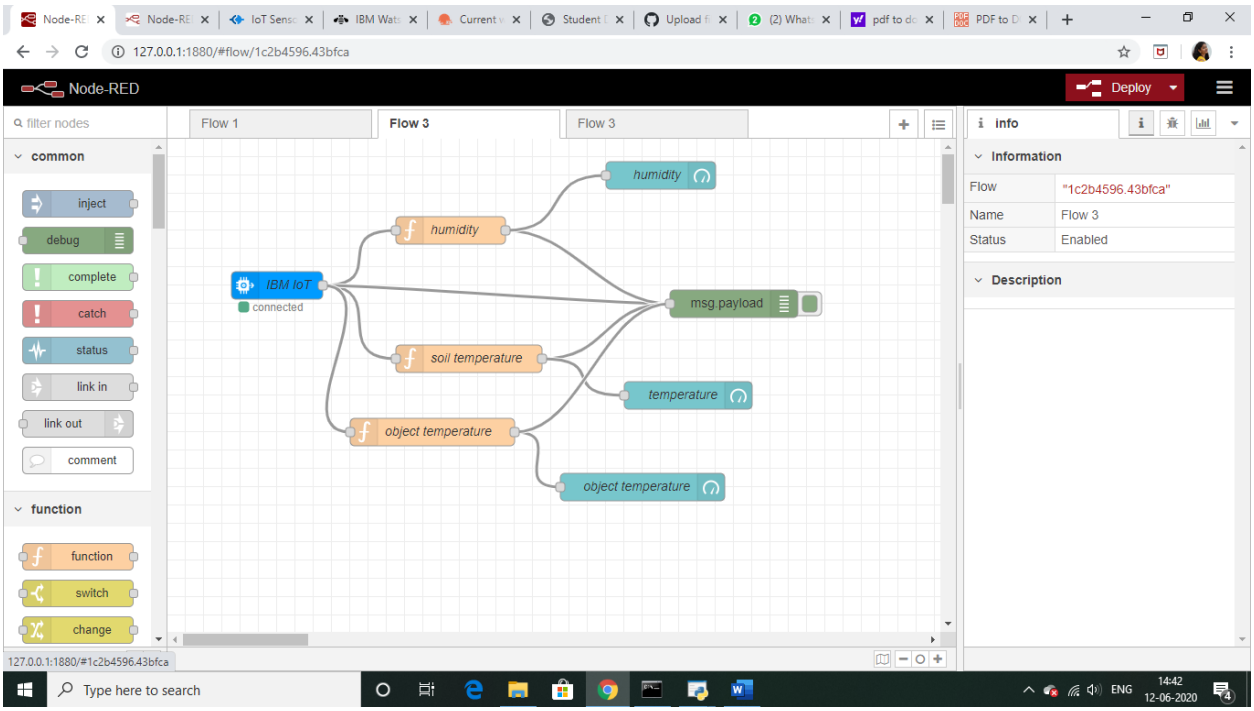
Flow1



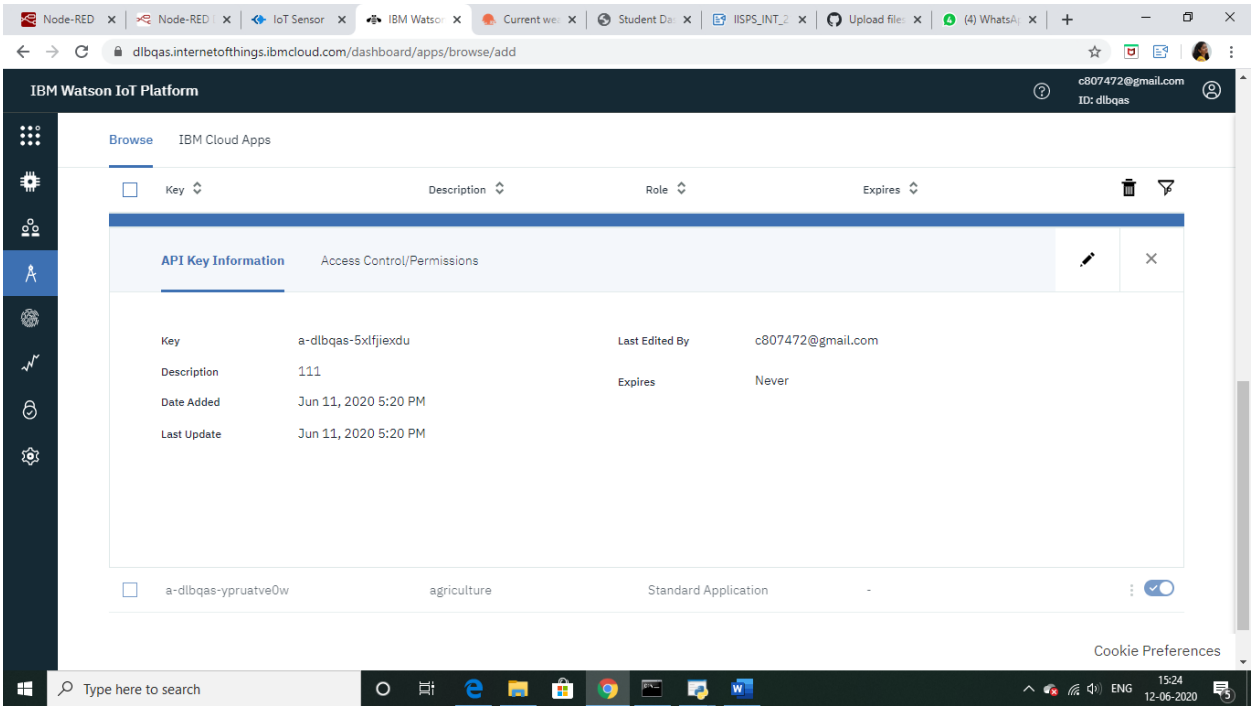
In this the settings for the function nodes and http nodes are as follows:



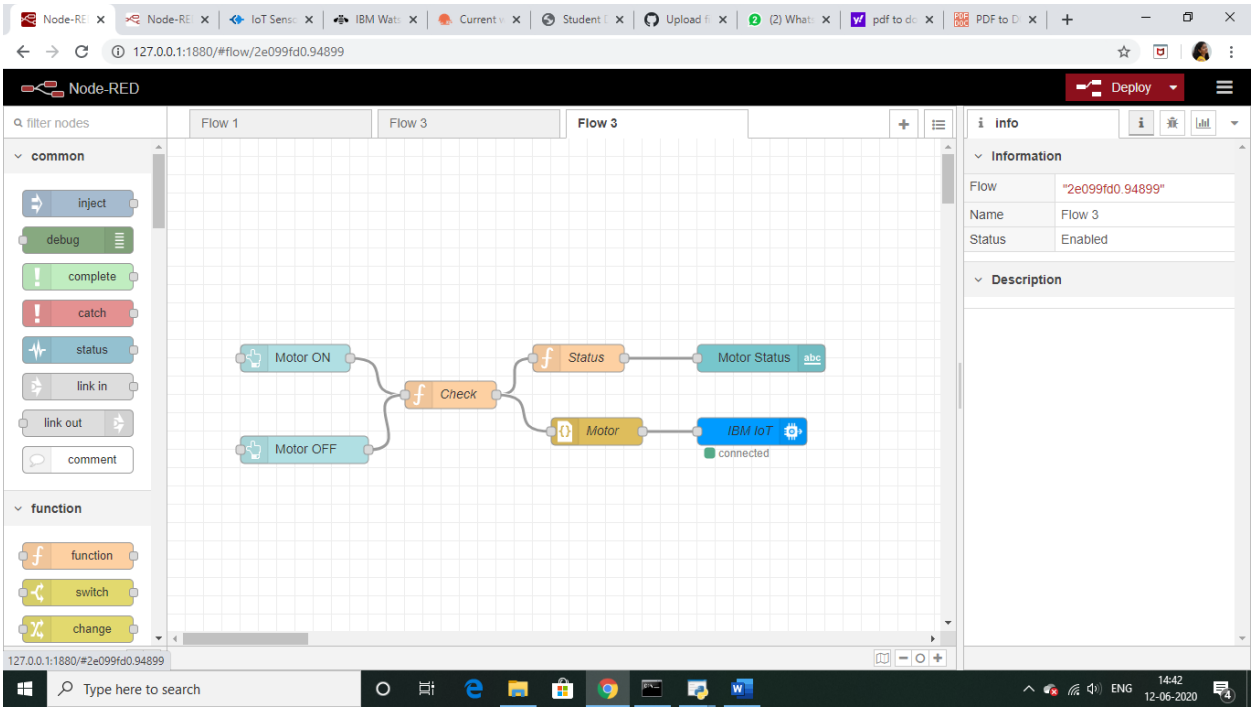
FLOW-2



Now we need to put API in IBM IOT node which we can get form IBM cloud from Apps tab.



FLOW-3



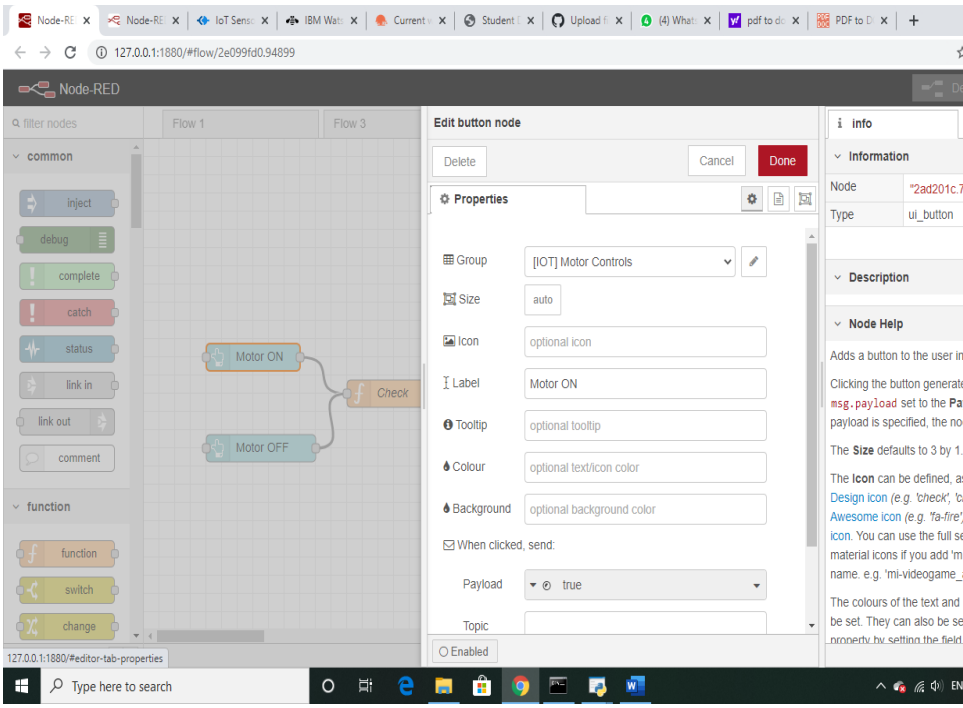
Code for “Motor Status Check”

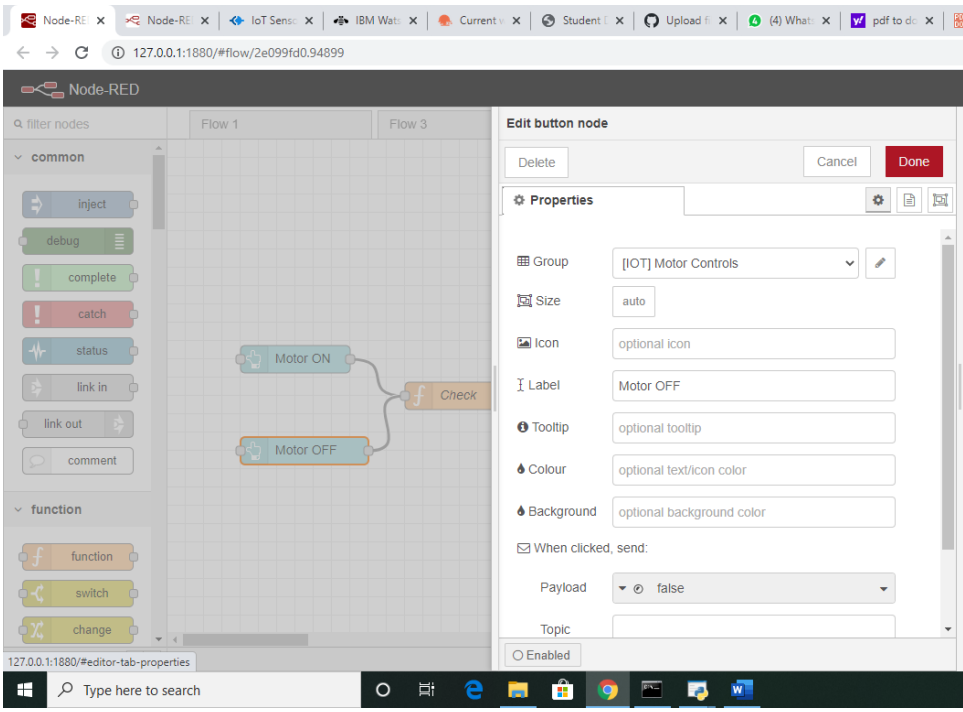
```
if(msg.payload === true)
msg.payload = '{"command":"ON"}'
else
msg.payload = '{"command":"OFF"}'
return msg;
```

Code for “status”

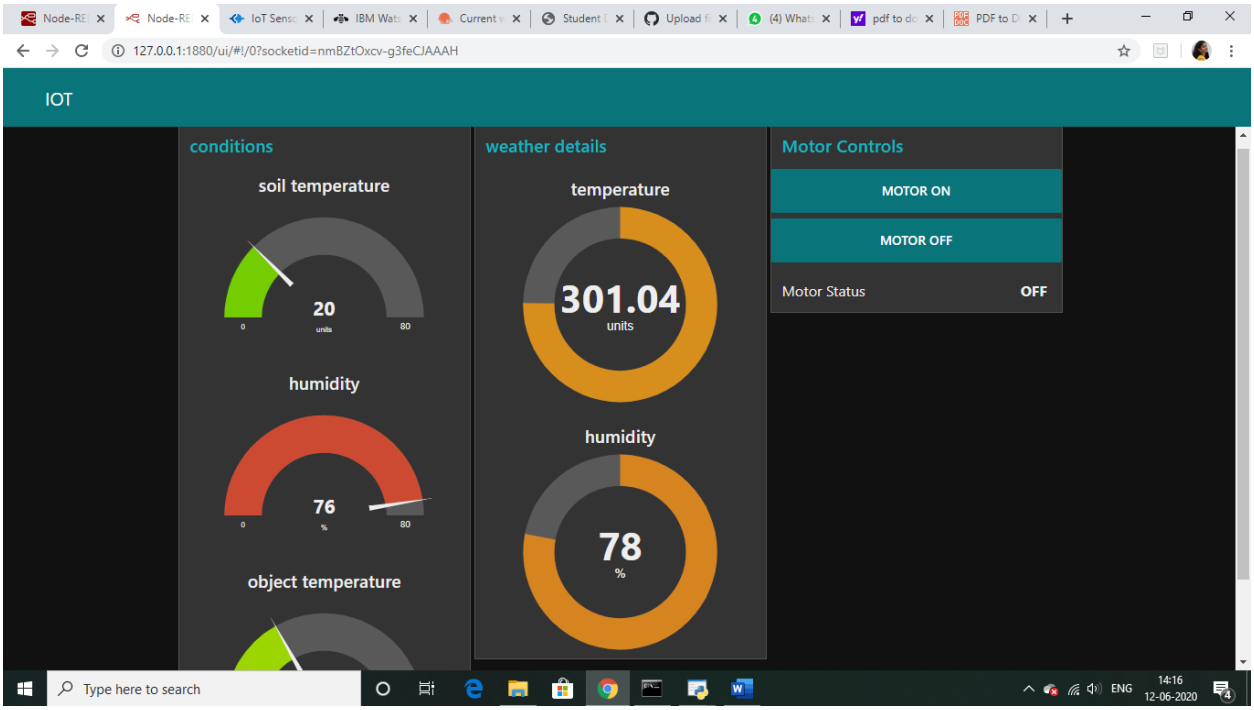
```
var data=JSON.parse(msg.payload);
msg.payload=data.command;
return msg;
```

Settings for “MOTOR” and Buttons


Node-RED
127.0.0.1:1880/#flow/2e099fd0.94899
filter nodes
Flow 1
Flow 3
common
inject
debug
complete
catch
status
link in
link out
comment
function
function
switch
change
Motor ON
Motor OFF
Check
Edit button node
Delete
Cancel
Done
Properties
Group
[IOT] Motor Controls
Size
auto
Icon
optional icon
Label
Motor ON
Tooltip
optional tooltip
Colour
optional text/icon color
Background
optional background color
When clicked, send:
Payload
true
Topic
Enabled
info
Information
Node
Type
ui_button
Description
Node Help
Type here to search


Node-RED
127.0.0.1:1880/#flow/2e099fd0.94899
filter nodes
Flow 1
Flow 3
common
inject
debug
complete
catch
status
link in
link out
comment
function
function
switch
change
Motor ON
Motor OFF
Check
Edit button node
Delete
Cancel
Done
Properties
Group
[IOT] Motor Controls
Size
auto
Icon
optional icon
Label
Motor OFF
Tooltip
optional tooltip
Colour
optional text/icon color
Background
optional background color
When clicked, send:
Payload
false
Topic
Enabled
Type here to search

Web APP



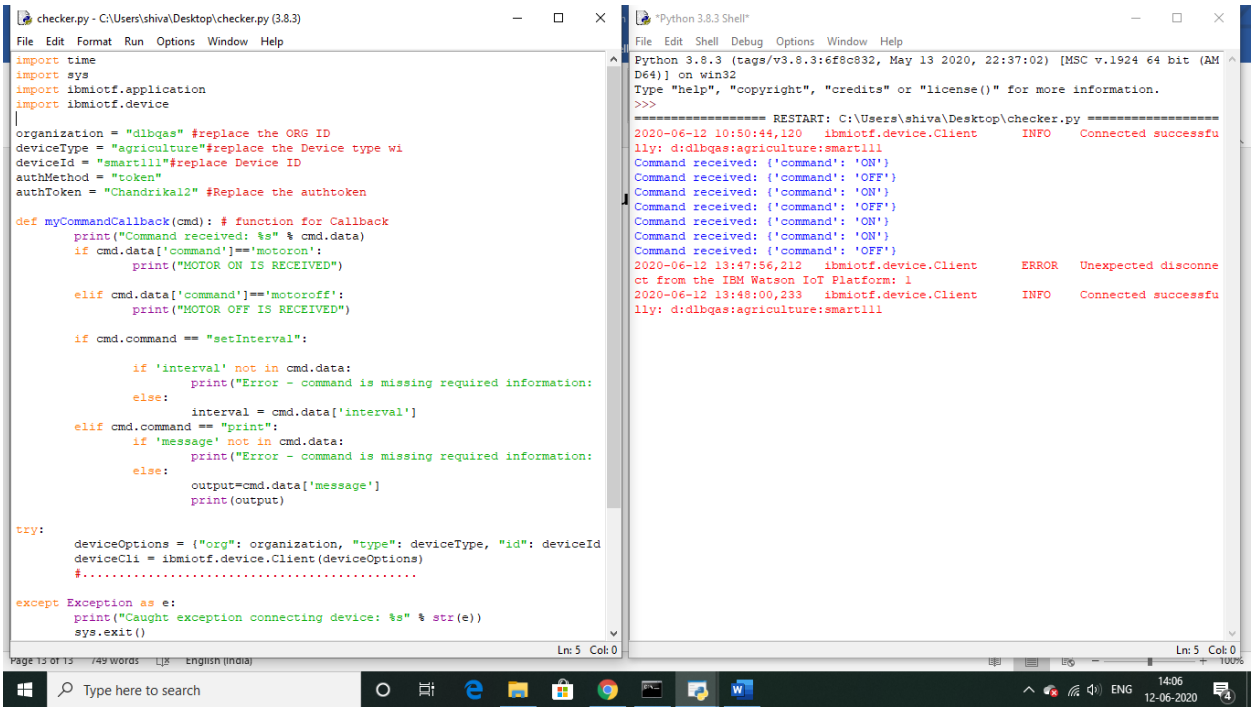
Python program to receive commands from Watson IOT platform

```
import time

import sys

import ibmiotf.application


import ibmiotf.device


organization = "dlbqas" #replace the ORG ID deviceType = "agriculture"#replace the

Device type wi deviceId = "smart111"#replace Device ID authMethod = "token"

authToken = "Chandrika12#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
```

FINAL OUTPUT


checker.py - C:\Users\shiva\Desktop\checker.py (3.8.3)
File Edit Format Run Options Window Help
import time
import sys
import ibmiotf.application
import ibmiotf.device
organization = "dlbqas" #replace the ORG ID
deviceType = "agriculture"#replace the Device type wi
deviceId = "smartlll"#replace Device ID
authMethod = "token"
authToken = "Chandrika12" #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:
else:
interval = cmd.data['interval']
elif cmd.command == "print":
if 'message' not in cmd.data:
print("Error - command is missing required information:
else:
output=cmd.data['message']
print(output)
try:
deviceOptions = {"org": organization, "type": deviceType, "id": deviceId
deviceCli = ibmiotf.device.Client(deviceOptions)
#.....
except Exception as e:
print("Caught exception connecting device: %s" % str(e))
sys.exit()
Ln: 5 Col: 0
Python 3.8.3 Shell
File Edit Shell Debug Options Window Help
Python 3.8.3 (tags/v3.8.3:6f8c832, May 13 2020, 22:37:02) [MSC v.1924 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\shiva\Desktop\checker.py ==========
2020-06-12 10:50:44,120 ibmiotf.device.Client INFO Connected successfu
lly: d:dlbqas:agriculture:smartlll
Command received: {'command': 'ON'}
Command received: {'command': 'OFF'}
Command received: {'command': 'ON'}
Command received: {'command': 'OFF'}
Command received: {'command': 'ON'}
Command received: {'command': 'ON'}
Command received: {'command': 'OFF'}
2020-06-12 13:47:56,212 ibmiotf.device.Client ERROR Unexpected disconne
ct from the IBM Watson IoT Platform: 1
2020-06-12 13:48:00,233 ibmiotf.device.Client INFO Connected successfu
lly: d:dlbqas:agriculture:smartlll
Ln: 5 Col: 0
Type here to search
ENG
14:06
12-06-2020