**REALTIME WEATHER BASED SMART SPRINKLER SYSTEM FOR GOLF COURSE**

**Introduction:**

**Overview**:

In the recent years use of wireless technology is increasing for the need of upholding various sectors. In these years, IOT (Internet of Things) groped most of industrial area specially automation and control.In the various field’s we are using IOT. Now a days everything would be automatic. We are using IOT in everywhere. Real time weather based smart sprinkler system for GOLF COURSE is proposed.

The Golf Course requires the 8-12 acres of land with full of grass. The growth of grass is very important in the golf course. The grass will grow well when we give require amount of water. When the amount of water is gave to the land, the grass grow perfectly. In order to do that we use weather based smart sprinkler system for Golf Course.

**Purpose**:

This real time weather smart sprinkler system for Golf course have the temperature sensor and soil moisture sensors. This will track the information and give it to our mobile phone. We operate the water sprinkler by online.When was the temperature increase or soil moisture decreases then we get the notifications. Switching ON/OFF of the water sprinkler, we maintain good growth of grass. This all thigs are operated online using Internet of Things.

**Literature survey:**

**Existing problem**:

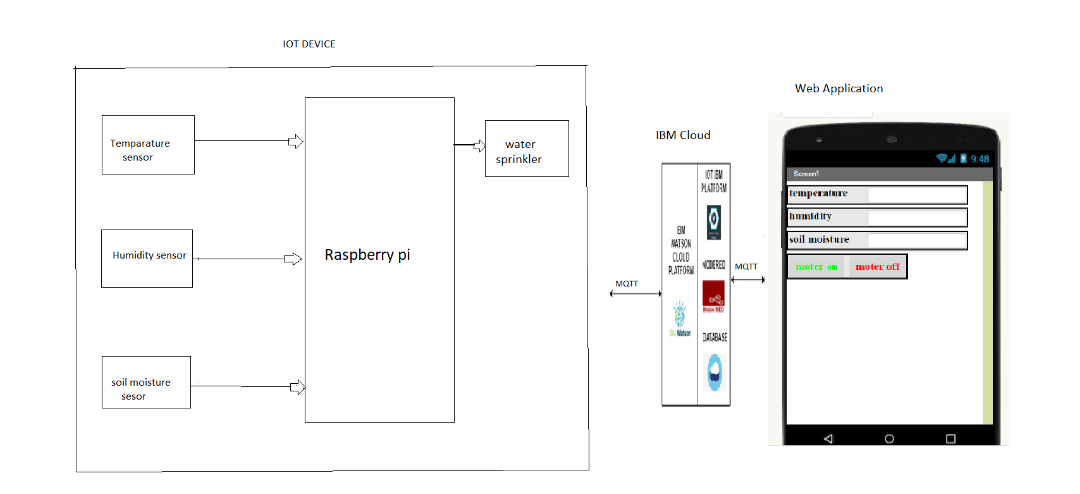
The Golf course have the 8-12 acres of land with full of grass. Giving required amount of water to the ground is very difficult. By using sprinkler, we spread water over all Golf course. But How much water will spread is question mark.

Proposed solution:

Here, Real time weather based smart sprinkler system is proposed. It regularly takes the temperature and soil moisture values from dht11 sensor and sent to app. By observing that notifications we operate water sprinkler by online using IOT. Then required amount of water is spread over the Golf course.

**Theoretical analysis:**

**Block Diagram**:



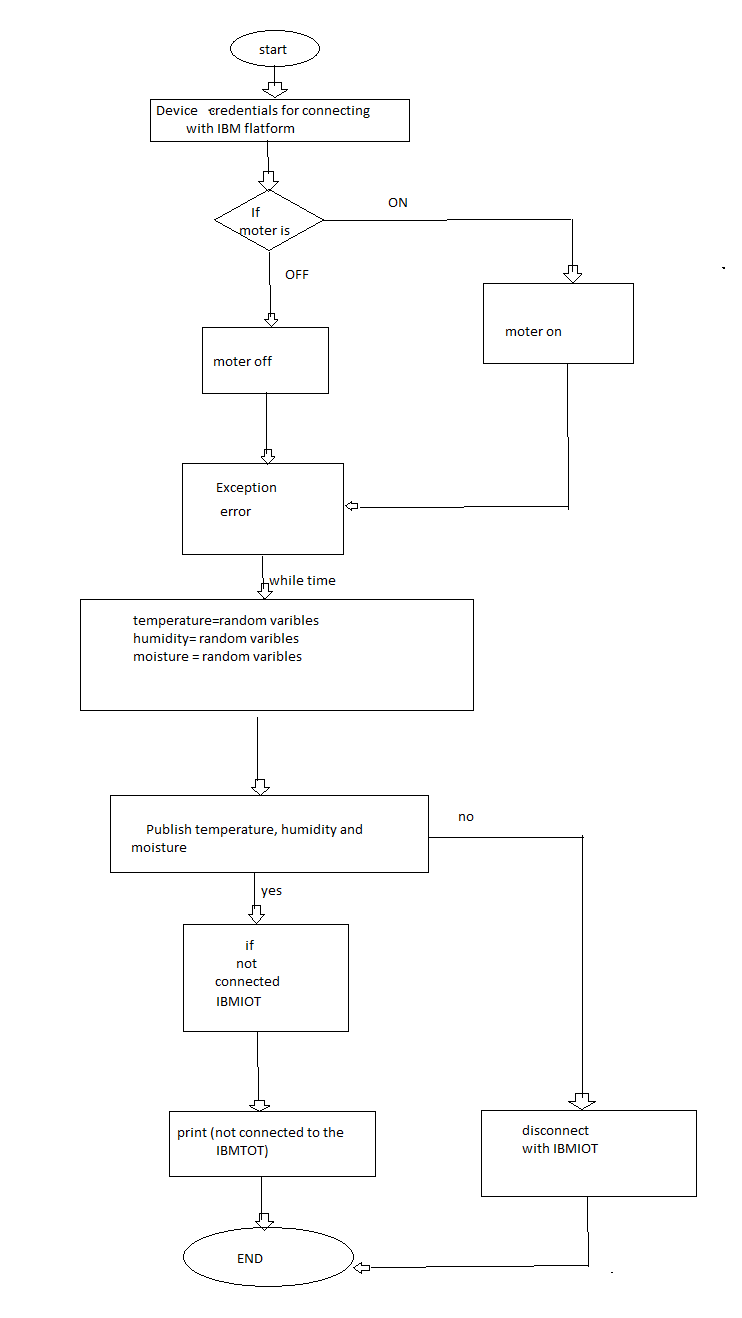
**Software designing**:

In the software designing part create a IBM cloud platform. In this design the raspberry pi model is used. the software should be design by taking avalues from the dht11 sensor and then sent to the IBM cloud services and then the data send to the mobile application which was developed using MIT app inventor. Here we use python language for coding, Node-Red ,etc.

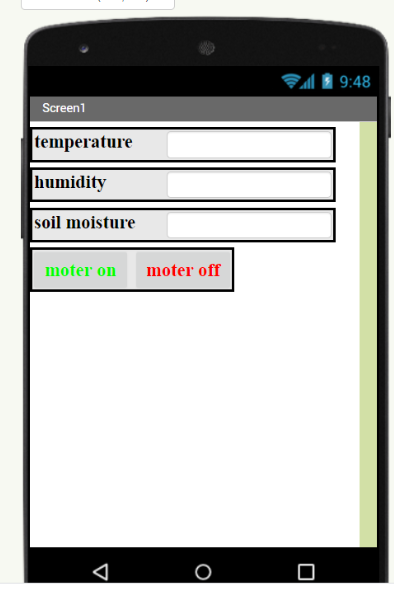
**Experimental Investigation:**

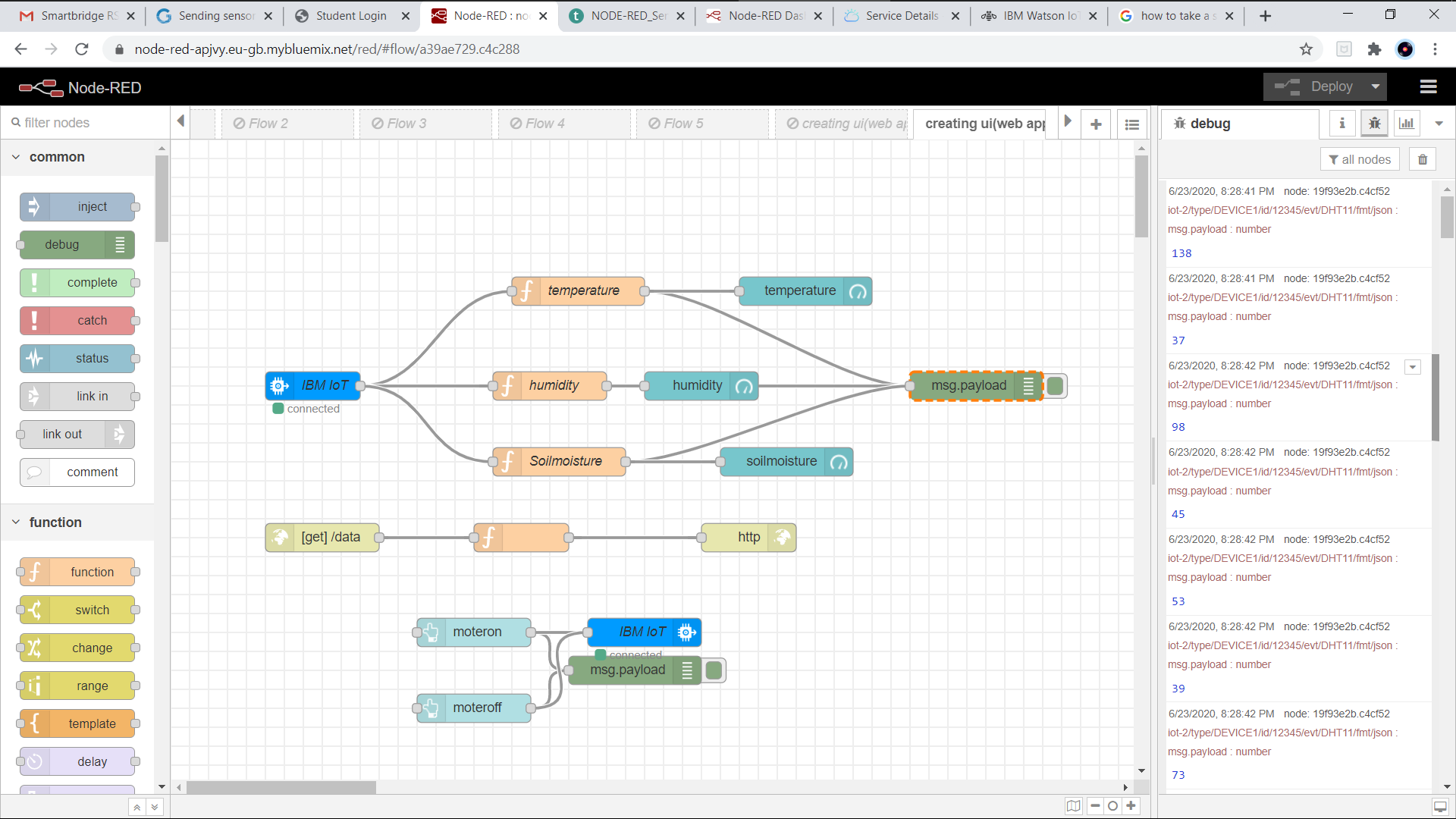
There are DHT11 sensors placed at the Golf course every water sprinkler and sensors are connected with the IOT device. The temperature sensor and soil moisture sensor take the values regularly and it was sent to IOT device. This IOT device will send the information to our mobile phone. By observing the weather conditions, we pass the instructions weather water sprinkler is ON/OFF.

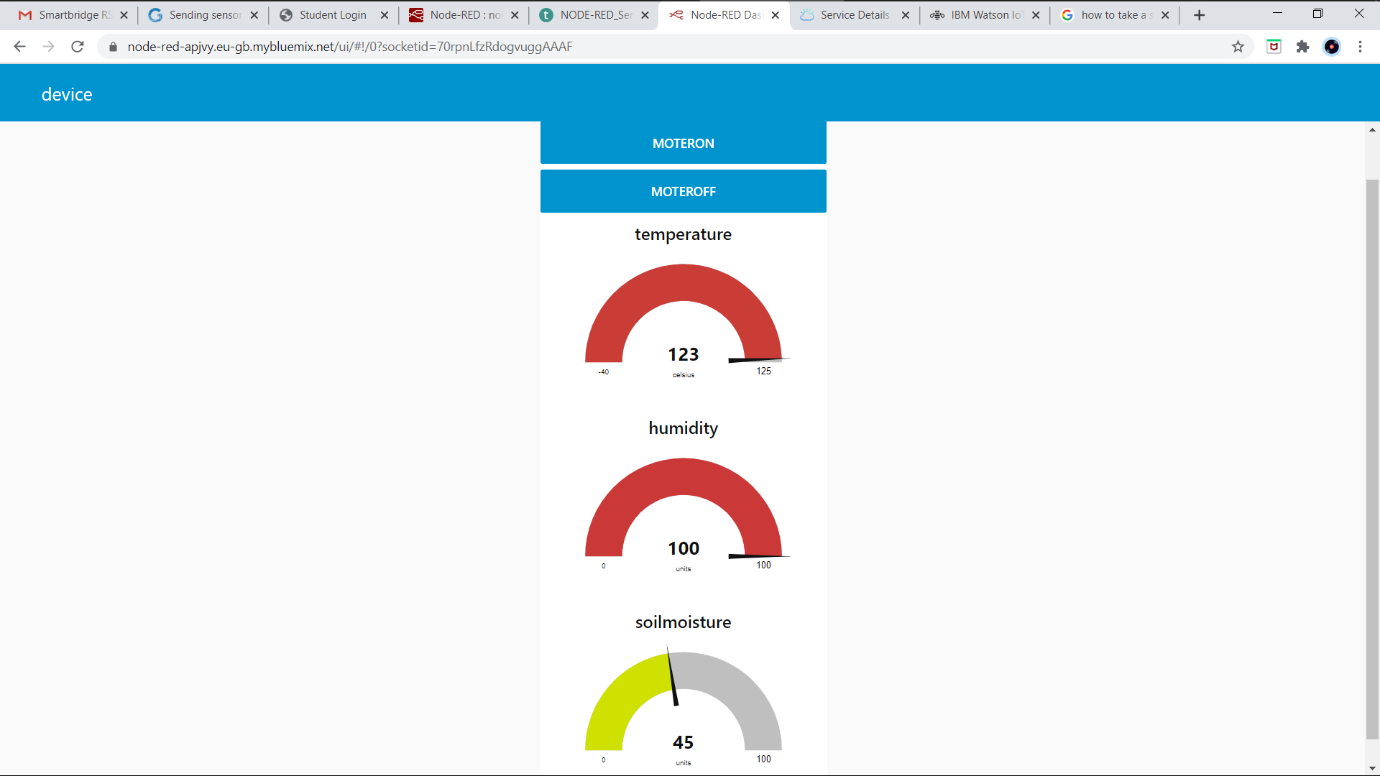
**Flow Chart:**

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**Result:**

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**Advantages and disadvantages of Real tie weather based smart sprinkler system for Golf course:**

Advantages:

* Without Human effort we maintain the good Golf course.
* Supervision by online:

We get regular weather report. Because the temperature and moisture sensor will give regular notifications.

* Save a ton of money by reducing water waste.
* Enhanced landscape health and beauty.
* Helps us to prepare for the future of water.

Disadvantages:

The weather based smart water sprinkler system is a bit expansive depending on the size of your ground, we will need more systems.

The Golf course has the very large area. To spread over all the ground, we require the more systems and observation become difficult.

**Applications:**

It is used in all the Golf courses, supervision by online using IOT device. We avoid the water wastage and get the good ground. We use this project in all type of play grounds.

**Conclusion:**

* The project Real time weather based smart sprinkler system for Golf course is very useful.
* By this we can decrease the WATER WASTAGE.
* We observe the weather conditions in the Golf course by online.
* We switch ON/OFF of water sprinkler by online using IOT device.
* This will decrease the human efforts.
* This project will also use in the many Play grounds.

**Future scope:**

Now a days, many of the Golf course and Play grounds using these types of systems. In Future everywhere in every field people use the Internet of Things projects. Because the projects will reduce the human efforts and wastage of nature.

**Code:**

import time

import sys

import ibmiotf.application

import ibmiotf.device

import random

#Provide your IBM Watson Device Credentials

organization = "6iwuiq"

deviceType = "DEVICE1"

deviceId = "12345"

authMethod = "token"

authToken = "12345678"

# Initialize GPIO

def myCommandCallback(cmd):

print("Command received: %s" % cmd.data)

print(type(cmd.data))

i=cmd.data['command']

if i=='moteron':

print("moter is on")

else:

print("moter is off")

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()

deviceCli.connect()

while True:

hum=random.randint(30,100)

temp = random.randint(30,150)

moisture= random.randint(0,100)

#Send Temperature & Humidity to IBM Watson

data = { 'Temperature' : temp, 'Humidity': hum, 'Soilmoisture' : moisture}

#print (data)

def myOnPublishCallback():

print ("Published Temperature = %s C" %temp, "Humidity = %s %%" %hum,"Soiloisture= %s" %moisture,"to IBM Watson")

success = deviceCli.publishEvent("DHT11", "json", data, qos=0, on\_publish=myOnPublishCallback)

if not success:

print("Not connected to IoTP")

time.sleep(2)

deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud

deviceCli.disconnect()