

A project document on

REAL TIME WEATHER BASED SYSTEM **SMART SPRINKLER SYSTEM FOR GOLF** **COURSE**

About:

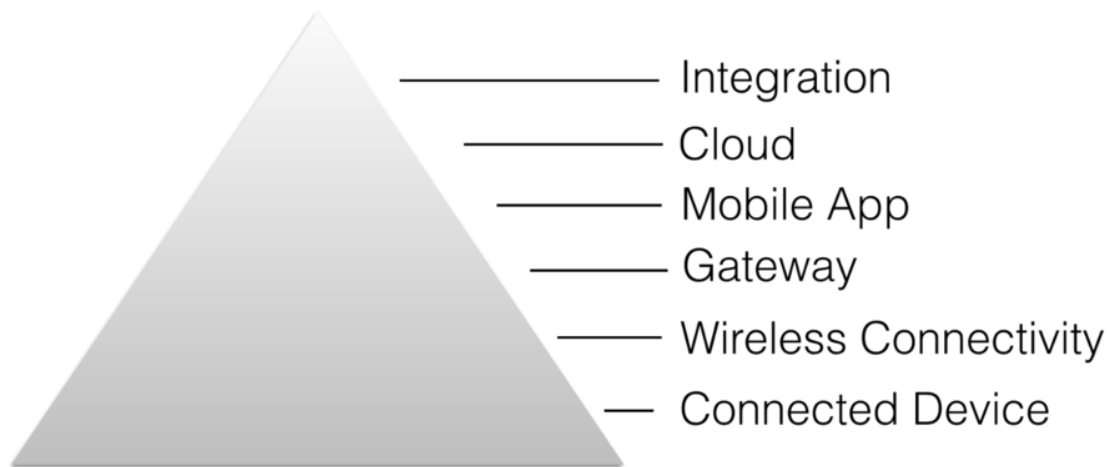
The project focuses on Continuous monitoring and storage of weather and soil moisture information of the golf course and generating an alert if the soil moisture is above the threshold value .The water sprinklers will be controlled remotely using mobile app .Less latency in communication from device to cloud with MQTT.

Introduction:

One of technologies in the rise, the Internet Of Things has started to provide a new way for analysis, luxury, efficiency and hassle free working in several sectors of the industry and other places. You can sense accurate temperature parameters inside a cold storage or at a furnace and send alert messages to the responsible authorities hence averting danger. You can control your house electricity when you are away and also figure out intruders if any ,inside .There are several examples and utilities of IOT. As a part of every technology race, it has also become a part in every core company's work flow wherein they always try their hand at this .

Abstract:

There has been a lot of speculation regarding over wastage of water in golf fields to maintain whereas there are so many people who die due to lack of proper water availability every year. The project is developed to control the over usage of sprinklers on a golf course and also maintain the optimum quality of the greens. The sensors record the parametric values like Temperature , Humidity and Soil Moisture. Then , if set under automatic condition the sprinklers would start otherwise , They can be held manually too. The IOT device is connected to a Mobile phone app and also a web monitor which helps to monitor and control the motors efficiently.



Working:

The idea begins by recording temperature, humidity and soil moisture content in every 10 seconds using our python code.

Technically we would use the

DHT11 sensor: It is used to measure the relative humidity of a place and in this case it would help us to know the moisture content of the environment

in the golf course. Ideally the soil's moisture on such a ground should be between 15-25%. It is used to measure the volumetric quantity of water in the soil. Its measured using tow prongs of variable resistance. Current is passed through the prongs. The more the resistance is felt, less is the soil moisture and the versa. We measure the analog voltage from the prongs and return the moisture content by the formula.

Analog_Output= ADCvalue/1023

*Moisture in percentage = 100- (Analog_Output*100)*

Python Code is written down to communicate as a sensor to our IBM IOT device here. So we create a code thats analogous to showcasing the functioning of a Soil Moisture Sensor. We connect it using the credentials of an IBM IOT device. The recent activities pane shows the values measured by our IOT device , sent through our python code.

NODE-RED APP:

Using the Node-RED service, we create a Web interface for our project. The various node connections are made to collect the data coming IBM IOT Platform and represent it in the form of a web dashboard. In this project, Gauge meters are used to represent the parameters. Special Message feature is also included to give suggestions for some activity. The UI interface also has two buttons to trigger the sprinkler motors or not. Then, we create HTTP requests node collection in order to able to interact with the App created for our smart phones.

SPRINKLER APP:

This app is created using MIT App Inventor Platform which is quite comfortable to create apps for small applications. The UI interface is created using textboxes and labels etc; Then for retrieving information from the IOT device, we take help from the HTTP requests that Node-Red creates

and connect in order to get through the necessary data to be displayed under temperature, humidity and soil moisture parameters. Using the Blocks we do all this logic synthesis and apart from that, some small effects when a user interacts are also generated using these blocks. Finally when the app is ready to be deployed, We build it and use its .apk file.

Block Diagram:

Python Code → IBM IOT → Node-Red → MIT-APP

Literature Review:

Water conservation is one of the key and tactical challenges that the humanity possess . Controlling the ways its wasted is quite important and with the help of IOT devices, one knows the right amount of water requirements for all types of irrigation systems, Dam checks etc; There are several other challenges that IOT can help us to overcome such as it can help us in social distancing by triggering an alarm using a PIR sensor. It can help in monitoring waste water treatment by several industries and alert the authorities the minute any of the levels go inappropriate. Overall , IOT is a booming market and a plethora of ideas put together from both hardware and software domains working in unison.

ADVANTAGES:

- **Efficient resource utilization:** If we know the functionality and the way that how each device work we definitely increase the efficient resource utilization as well as monitor natural resources.
- **Minimize human effort:** As the devices of IoT interact and

communicate with each other and do lot of task for us, then they minimize the human effort.

- **Save time:** As it reduces the human effort then it definitely saves out time. Time is the primary factor which can save through IoT platform.
- **Enhance Data Collection:**
- **Improve security:** Now, if we have a system that all these things are interconnected then we can make the system more secure and efficient.

DISADVANTAGES:

As the Internet of things facilitates a set of benefits, it also creates a significant set of challenges. Some of the IoT challenges are given below:

- **Security:** As the IoT systems are interconnected and communicate over networks. The system offers little control despite any security measures, and it can be lead the various kinds of network attacks.
- **Privacy:** Even without the active participation on the user, the IoT system provides substantial personal data in maximum detail.
- **Complexity:** The designing, developing, and maintaining and enabling the large technology to IoT system is quite complicated.