SMART IRRIGATION SYSTEM

**INTRODUCTION**

* 1. Overview

The term Internet of Things generally refers to scenarios where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers, allowing these devices to generate, exchange and consume data with minimal human intervention. There is, however, no single, universal definition.

Agriculture is the unquestionably the largest livelihood provider in India. With rising population, there is a need for increased agricultural production. In order to support greater production in farms, the requirement of the amount of fresh water used in irrigation also rises. Currently, agriculture accounts 83% of the total water consumption in India . Unplanned use of water inadvertently results in wastage of water. This suggests that there is an urgent need to developsystems that prevent water wastage without imposing pressure on farmers. Over the past 15 years, farmers started using computers and software systems to organize their financial data and keep track of their transactions with third parties and also monitor their crops more effectively. In the Internet era, where information plays a key role in people's lives, agriculture is rapidly becoming a very data intensive industry where farmers need to collect and evaluate a huge amount of information from a diverse number of devices (eg., sensors, faming machinery etc.) in order to become more efficient in production and communicating appropriate information.

* 1. Purpose

The Smart Irrigation System is an IoT based device which is capable of automating the irrigation process by analyzing the moisture of soil and the climatic condition.

It works on the basis of change in soil moisture and climatic conditions in which we can supply the water properly to the fields, so that the crop grows well.This is how the smart irrigation system using IOT helps the farmers in growing more crops seasonally

**LITERATURE SYRVEY**

2.1 Existing Problem

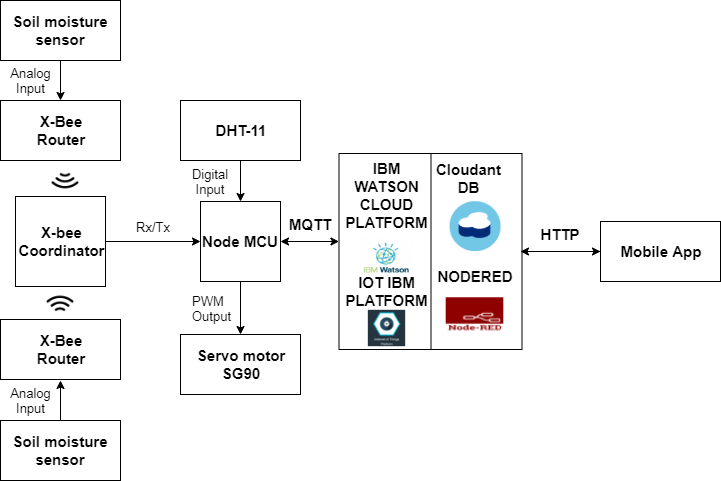
Now-a-days many of the people including youngsters are not showing any interest in the development of agriculture. Rainfall and Water availability in India has huge Regional Imbalance.Some of the farmers who have lack of prediction regarding the climatic conditions.They are unable to protect their crops.Due to any case in the failure of motor there will be excess amount of water flowing through the crops,so the crops gets damaged easily.

2.2 Proposed Solution

Due to excess amount of water flow through the crops,so that the crops get damaged.To overcome this problem we have built an application called “Smart Irrigation System based on IOT”.By building this application we can get to know about soli moisture and wearther conditions so that we can send the required amount of water to the crops when it is necessary.

**Theoritical Analysis**

3.1 Block Diagram



3.2 Software Design

import requests

import sys

import time

import ibmiotf.application

import ibmiotf.device

import random

#Provide your IBM Watson Device Credentials

organization = "y4s317"

deviceType = "Sanzo64"

deviceId = "1024"

authMethod = "token"

authToken = "9959235384"

def myCommandCallback(cmd):

print("Command received: %s" % cmd.data['command'])

if cmd.data['command']=='motoron':

print("Motor is ON")

elif cmd.data['command']=='motoroff':

print("Motor 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()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10 times

deviceCli.connect()

#print("response is")

#print(r.json())

#for i in r.json():

#print(i)

#print(r.json()["main"])

#print("temparature value:")

#print(r.json()["main"]["temp"])

while True:

r=requests.get('http://api.openweathermap.org/data/2.5/weather?q=GUNTUR,IN&appid=653fb09f6edb58246912c54a89290376')

print("humidity value:")

print(r.json()["main"]["humidity"])

hum=r.json()["main"]["humidity"]

temk=r.json()["main"]["temp"]

#print("temperature in kelvin is:",temk)

temperature=temk-272.15

print("temperature in celcius is:",temperature)

mois=random.randrange(20,60,2)

print("moisture level of soil is:",mois)

if(temperature>32 | mois<35):

req\_sms=requests.get('https://www.fast2sms.com/dev/bulk?authorization=7z0WXHCT9idMZvNQKEFUOqP25IRw8htSkcpofsVBlaJbyjmGg65SoMd1hgOy74LT0lNaZFH6tIsnQDKv&sender\_id=FSTSMS&message=Temperature,Moisture%20level%20of%20soil%20are%20improper&language=english&route=p&numbers=9949226229,9959235384')

data = { 'Temperature' : temperature, 'Moisture': mois, 'Humidity': hum }

#print (data)

def myOnPublishCallback():

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

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

if not success:

print("Not connected to IoTF")

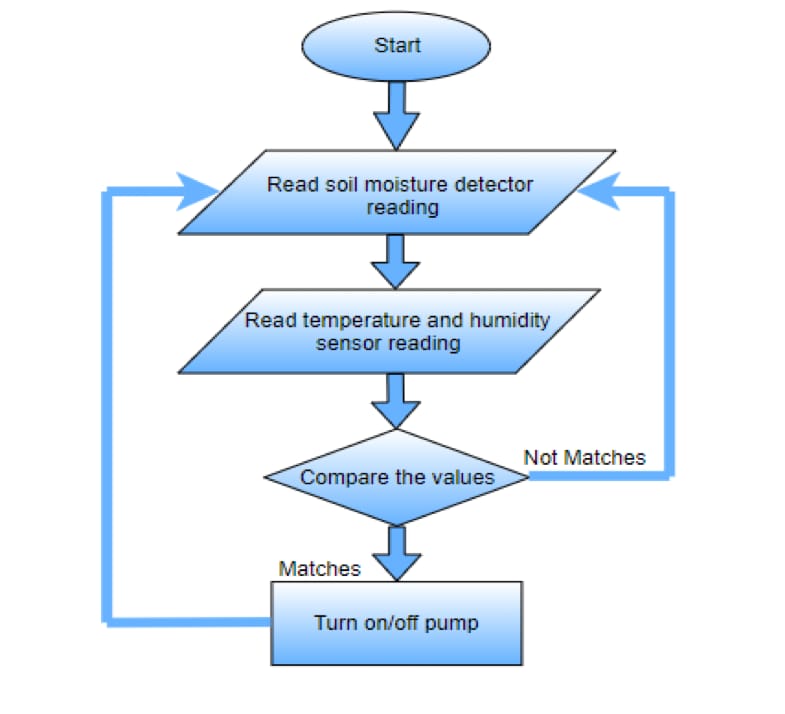
time.sleep(2)

deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud

deviceCli.disconnect()

**Flowchart**



**RESULT**

This application “Smart Bridge Irrigation” is designed such that the water supply to the fields is sent properely based on the temperature and weather conditions.In this application possibility of over irrigation is avoided by turning of the motor.

**Advantages**

The advantages of these smart irrigation systems are wide reaching. The smart irrigation system will help you have better control of your landscape and irrigation needs as well as peace of mind that the smart system can make decisions independently if you are away. You will save a significant amount of money on your water bills because through intelligent control and automation, your smart irrigation system will optimize resources so that everything gets what it needs without needless waste. Additionally, we have all seen many places in the country that have experienced droughts and we know that our water resources are precious. With smart irrigation systems we can be better stewards of our resources which is better for the environment. The opportunity to save dramatically, have better control and be more eco-friendly while maintaining a lush and beautiful landscape are just a few of the advantages a smart irrigation system provides and would make a wonderful addition to any home. Smart Irrigation System uses valves to turn irrigation ON and OFF. These valves may be easily automated by using controllers and solenoids. Automating farm or nursery irrigation allows farmers to apply the right amount of water at the right time, regardless of the availability of labour to turn valves on and off.

**Disadvantages**

The use of technology in farming and agriculture making it smart agriculture, is of course, a good initiative and a much-needed one with the present increasing demand in the food supply.But there is the chance where smart farming will require certain skill sets in particular in order to understand and operate the equipment. While the use of smart technology in agriculture is impressive, it does incur a lot of costs.As said earlier, if the devices are to be altered according to the level of the farmers, it will involve a lot of money to transform these types of equipment.This, on the other hand, means that the process will cost huge money.In the case of agriculture, most of the process is dependent on weather conditions.It is a natural phenomenon which in spite of the updated technology can become unpredictable.There is no force which can change or control the weather conditions such as rain, sunlight, drought etc.Even when the smart systems are in place, the importance of natural occurrences can not be changed.

**Applications**

In IoT-based smart farming, a system is built for monitoring the crop field with the help of sensors (light, humidity, temperature, soil moisture, etc.) and automating the irrigation system. The farmers can monitor the field conditions from anywhere. IoT-based smart farming is highly efficient when compared with the conventional approach.The applications of IoT-based smart farming not only target conventional, large farming operations, but could also be new levers to uplift other growing or common trends in agricultural like organic farming, family farming (complex or small spaces, particular cattle and/or cultures, preservation of particular or high quality varieties etc.), and enhance highly transparent farming.In terms of environmental issues, IoT-based smart farming can provide great benefits including more efficient water usage, or optimization of inputs and treatments. Now, let’s discuss the major applications of IoT-based smart farming that are revolutionizing agriculture. The soil moisture probe technology provides complete in-season local agronomy support, and recommendations to optimize water use efficiency. The virtual optimizer PRO combines various technologies for water management into one central, cloud based, and powerful location designed for consultants and growers to take advantage of the benefits in precision irrigation via a simplified interface.

**Conclusion**

A system to monitor moisture levels in the soil was designed and the project provided an opportunity to study the existing systems, along with their features and drawbacks. The proposed system can be used to switch on/off the water sprinkler according to soil moisture levels thereby automating the process of irrigation which is one of the most time consuming activities in farming. Agriculture is one of the most water-consuming activities. The system uses information from soil moisture sensors to irrigate soil which helps to prevent over irrigation or under irrigation of soil thereby avoiding crop damage. The farm owner can monitor the process online through a website. Through this project it can be concluded that there can be considerable development in farming with the use of IOT and automation. Thus, the system is a potential solution to the problems faced in the existing manual and cumbersome process of irrigation by enabling efficient utilization of water resources.

**Future Scope**

We can interface LCD screen in order to display the current status of the soil moisture content levels, percentage of water utilized to water the plant, duration of time for which the water pump is ON, etc. We can also show the graphical representation of the moisture content levels in the soil. To improve the efficiency and effectiveness of the system, the following recommendations can be put into consideration. Option of controlling the water pump can be given to the farmer. The farmer may choose to stop the growth of crops or the crops may get damaged due to adverse weather conditions. In such cases farmer may need to stop the system remotely.The idea of using IOT for irrigation can be extended further to other activities in farming such as cattle management, fire detection and climate control. This would minimize human intervention in farming activities.