IOT Based Smart Crop Protection System for Agriculture.

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MAIN CODE:

```
 import random
import ibmiotf.application
import ibmiotf.device
from time import sleep
import sys
#IBM Watson Device Credentials.
organization = "7znlxs"
deviceType = "cropprotection"
deviceId = "cropprotectionsystemid"
authMethod = "token"
authToken = "ejrRfZRywhhZCz!mUR"
def myCommandCallback(cmd):
 print("Command received: %s" % cmd.data['command'])
 status=cmd.data['command']
 if status=="sprinkler_on":
    print ("sprinkler is ON")
 else :
    print ("sprinkler is OFF")
 #print(cmd)


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()
#Connecting to IBM watson.
deviceCli.connect()
while True:
#Getting values from sensors.
 temp_sensor = round( random.uniform(0,80),2)
 PH_sensor = round(random.uniform(1,14),3)
 camera = ["Detected","Not Detected","Not Detected","Not Detected","Not
Detected","Not Detected",]
 camera_reading = random.choice(camera)
 flame = ["Detected","Not Detected","Not Detected","Not Detected","Not
Detected","Not Detected",]
 flame_reading = random.choice(flame)
 moist_level = round(random.uniform(0,100),2)
 water_level = round(random.uniform(0,30),2)

#storing the sensor data to send in json format to cloud.

 temp_data = { 'Temperature' : temp_sensor }
 PH_data = { 'PH Level' : PH_sensor }
 camera_data = { 'Animal attack' : camera_reading}
 flame_data = { 'Flame' : flame_reading }
 moist_data = { 'Moisture Level' : moist_level}
 water_data = { 'Water Level' : water_level}

# publishing Sensor data to IBM Watson for every 5-10 seconds.
 success = deviceCli.publishEvent("Temperature sensor", "json", temp_data,
qos=0)
 sleep(1)
 if success:
    print (" ............................publish ok............................. ")
 print ("Published Temperature = %s C" % temp_sensor, "to IBM Watson")

 success = deviceCli.publishEvent("PH sensor", "json", PH_data, qos=0)
 sleep(1)
 if success:
    print ("Published PH Level = %s" % PH_sensor, "to IBM Watson")

 success = deviceCli.publishEvent("camera", "json", camera_data, qos=0)
 sleep(1)
 if success:
    print ("Published Animal attack %s " % camera_reading, "to IBM Watson")
 success = deviceCli.publishEvent("Flame sensor", "json", flame_data, qos=0)
 sleep(1)
 if success:
    print ("Published Flame %s " % flame_reading, "to IBM Watson")

 success = deviceCli.publishEvent("Moisture sensor", "json", moist_data,
qos=0)
 sleep(1)
 if success:
    print ("Published Moisture Level = %s " % moist_level, "to IBM Watson")


 success = deviceCli.publishEvent("Water sensor", "json", water_data, qos=0)
 sleep(1)
 if success:
   print ("Published Water Level = %s cm" % water_level, "to IBM Watson")
 print ("")
 #Automation to control sprinklers by present temperature an to send alert
message to IBM Watson.


 if (temp_sensor > 35):
   print("sprinkler-1 is ON")
 success = deviceCli.publishEvent("Alert1", "json",{ 'alert1' : "Temperature(%s)
is high, sprinkerlers are turned ON" %temp_sensor }
, qos=0)
 sleep(1)
 if success:
   print( 'Published alert1 : ', "Temperature(%s) is high, sprinkerlers are turned
ON" %temp_sensor,"to IBM Watson")
 print("")
else:
 print("sprinkler-1 is OFF")
 print("")


 #To send alert message if farmer uses the unsafe fertilizer to crops.


 if (PH_sensor > 7.5 or PH_sensor < 5.5):
   success = deviceCli.publishEvent("Alert2", "json",{ 'alert2' : "Fertilizer PH
level(%s) is not safe,use other fertilizer" %PH_sensor } ,
qos=0)
 sleep(1)
 if success:
    print('Published alert2 : ' , "Fertilizer PH level(%s) is not safe,use other
fertilizer" %PH_sensor,"to IBM Watson")
 print("")


 #To send alert message to farmer that animal attack on crops.


 if (camera_reading == "Detected"):
    success = deviceCli.publishEvent("Alert3", "json", { 'alert3' : "Animal attack
on crops detected" }, qos=0)
 sleep(1)
 if success:
    print('Published alert3 : ' , "Animal attack on crops detected","to IBM
Watson","to IBM Watson")
 print("")
 #To send alert message if flame detected on crop land and turn ON the
splinkers to take immediate action.


 if (flame_reading == "Detected"):
    print("sprinkler-2 is ON")
 success = deviceCli.publishEvent("Alert4", "json", { 'alert4' : "Flame is
detected crops are in danger,sprinklers turned ON" }, qos=0)
 sleep(1)
 if success:
    print( 'Published alert4 : ' , "Flame is detected crops are in danger,sprinklers
turned ON","to IBM Watson")
```

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 #To send alert message if Moisture level is LOW and to Turn ON Motor-1 for
irrigation.
 if (moist_level < 20):
    print("Motor-1 is ON")
 success = deviceCli.publishEvent("Alert5", "json", { 'alert5' : "Moisture
level(%s) is low, Irrigation started" %moist_level }, qos=0)
 sleep(1)
 if success:
    print('Published alert5 : ' , "Moisture level(%s) is low, Irrigation started"
%moist_level,"to IBM Watson" )
 print("")
 #To send alert message if Water level is HIGH and to Turn ON Motor-2 to take
water out.
 if (water_level > 20):
    print("Motor-2 is ON")
 success = deviceCli.publishEvent("Alert6", "json", { 'alert6' : "Water level(%s)
is high, so motor is ON to take water out "
%water_level }, qos=0)
 sleep(1)
 if success:
    print('Published alert6 : ' , "water level(%s) is high, so motor is ON to take
water out " %water_level,"to IBM Watson" )
    print("")
 #command recived by farmer
deviceCli.commandCallback = myCommandCallback
# Disconnect the device and application from the cloud
deviceCli.disconnect()
```