

Python Script

Date	29 October 2022
Team ID	PNT2022TMID46736
Project Name	Iot based crop protection system for Agriculture

Description:

The random sensor data are generated and automation has been implemented through the pythoncode instead of using hardware to implement IOT based crop protection system. And the python code need to upload the data in IBM cloud are written in this python script.

Python Code:

```
import random

import ibmiotf.application

import ibmiotf.device

from time import sleep

import sys


#IBM Watson Device Credentials.

organization = "5kqdnP"

deviceType = "Jothika"

deviceId = "Jothika123"

authMethod = "token"

authToken = "123456789"


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, sprinklerlers are turned ON" %temp_sensor }
, qos=0)
    sleep(1)

    if success:

```

```
print('Published alert1 : ', "Temperature(%) is high, sprinklers 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(%) is not safe,use other fertilizer" %PH_sensor },  
qos=0)
```

```
sleep(1)
```

if success:

```
print('Published alert2 : ', "Fertilizer PH level(%) 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")  
print("")
```

else:

```
print("sprinkler-2 is OFF")
```

```
print("")
```

#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("")
```

else:

```
print("Motor-1 is OFF")
```

```
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("")
```

else:

```
print("Motor-2 of OFF")
```

```
print("")
```

#command recived by farmer

```
deviceCli.commandCallback = myCommandCallback
```

Disconnect the device and application from the cloud

```
deviceCli.disconnect()
```

Python Script Output:

```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help

Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\my pc\Documents\nalaiyathiran ibm\project development phase\sprint 1\Python script (IOT based smart crop protection s
ystem for agriculture).py
2022-10-30 15:23:08,539 ibmiotf.device.Client INFO Connected successfully: d:zf801i:bharathi:bharathi123
.....publish ok.....
Published Temperature = 41.7 C to IBM Watson
Published PH Level = 11.955 to IBM Watson
Published Animal attack Not Detected to IBM Watson
Published Flame Not Detected to IBM Watson
Published Moisture Level = 49.71 to IBM Watson
Published Water Level = 15.01 cm to IBM Watson

sprinkler-1 is ON
Published alert1 : Temperature(41.7) is high, sprinklers are turned ON to IBM Watson

Published alert2 : Fertilizer PH level(11.955) is not safe,use other fertilizer to IBM Watson

sprinkler-2 is OFF

Motor-1 is OFF

Motor-2 of OFF
```

```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help

Motor-1 is OFF

Motor-2 of OFF

.....publish ok.....
Published Temperature = 24.92 C to IBM Watson
Published PH Level = 3.948 to IBM Watson
Published Animal attack Detected to IBM Watson
Published Flame Not Detected to IBM Watson
Published Moisture Level = 65.01 to IBM Watson
Published Water Level = 11.14 cm to IBM Watson

sprinkler-1 is OFF

Published alert2 : Fertilizer PH level(3.948) is not safe,use other fertilizer to IBM Watson

Published alert3 : Animal attack on crops detected to IBM Watson to IBM Watson

sprinkler-2 is OFF

Motor-1 is OFF

Motor-2 of OFF

.....publish ok.....
```