Project Development Phase

Sprint-1

Python Script

Date	19 November 2022
Team ID	PNT2022TMID32468
Project Name	IOT BASED CROP PROTECTION SYSTEM FOR AGRICULTURE

Description:

Instead of generating sensor values from the hardware circuits, we are using random module to generate sensor data and to automate IOT based crop protection system through the python code. The data generated from the python code are being stored in the IBM cloud.

PythonCode:

```
import random
import
ibmiotf.application
import ibmiotf.device
from time import sleep
import sys

#IBM Watson Device Credentials...
organization = "tw9ckq"
deviceType = "jade" deviceId =
"7010" authMethod = "token"
authToken = "9944893843"


def myCommandCallback(cmd): print("Command
  received: %s" % cmd.data['command'])
  status=cmd.data['command'] if status=="sprinkler_on":
    print ("sprinkler is turning ON")
  else : print ("sprinkler is turning
    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("Exception detected in connecting device: %s" % str(e))
  sys.exit()

#Connecting to IBM watson...
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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 = { 'Temp' : temp_sensor }
  PH_data = { 'PH value' : 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 datas to IBM Watson for every 5-10 seconds…
  success = deviceCli.publishEvent("Temperaturesensor", "json", temp_data, qos=0) sleep(1)

  if success:
    print ("... ...publish ok... ... ...")
    print ("Published Temp = %s C" % temp_sensor, "to IBM Watson")
    success = deviceCli.publishEvent("PH sensor", "json", PH_data, qos=0)
    sleep(1)

  if success:
    print ("Published PH value = %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:
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    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
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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 turning 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 is turning
    OFF") print("")

#command recived by farmer
deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud
deviceCli.disconnect()
```
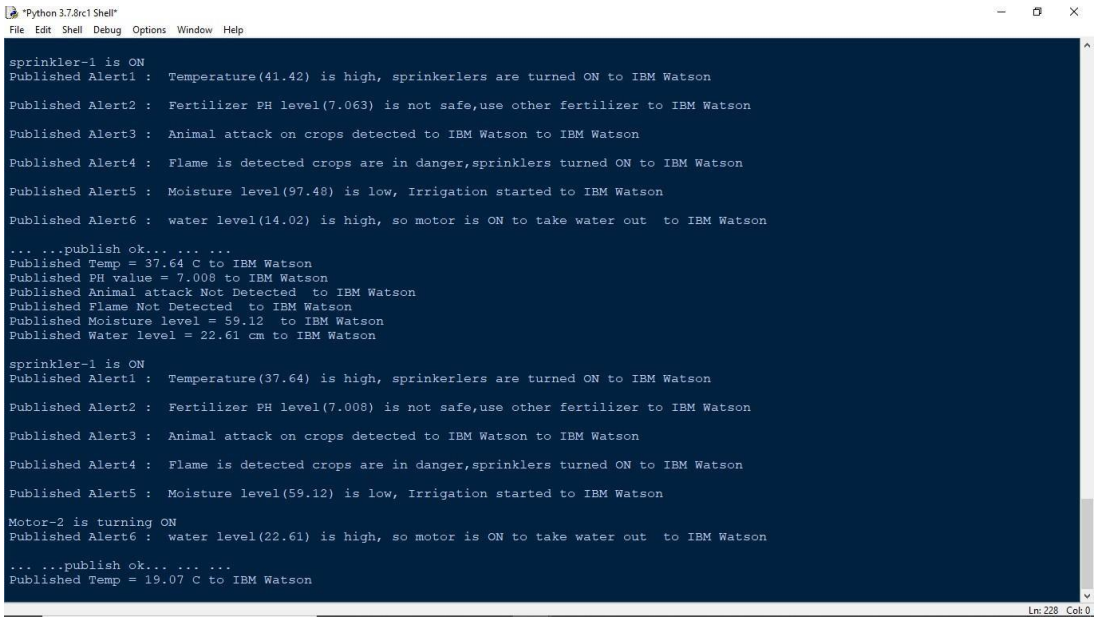

Python Script Output:


Python 3.7.8rc1 Shell
File Edit Shell Debug Options Window Help
sprinkler-1 is ON
Published Alert1 : Temperature(41.42) is high, sprinkerlers are turned ON to IBM Watson
Published Alert2 : Fertilizer PH level(7.063) is not safe,use other fertilizer to IBM Watson
Published Alert3 : Animal attack on crops detected to IBM Watson to IBM Watson
Published Alert4 : Flame is detected crops are in danger,sprinklers turned ON to IBM Watson
Published Alert5 : Moisture level(97.48) is low, Irrigation started to IBM Watson
Published Alert6 : water level(14.02) is high, so motor is ON to take water out to IBM Watson
... ...publish ok... ... ...
Published Temp = 37.64 C to IBM Watson
Published PH value = 7.008 to IBM Watson
Published Animal attack Not Detected to IBM Watson
Published Flame Not Detected to IBM Watson
Published Moisture level = 59.12 to IBM Watson
Published Water level = 22.61 cm to IBM Watson
sprinkler-1 is ON
Published Alert1 : Temperature(37.64) is high, sprinkerlers are turned ON to IBM Watson
Published Alert2 : Fertilizer PH level(7.008) is not safe,use other fertilizer to IBM Watson
Published Alert3 : Animal attack on crops detected to IBM Watson to IBM Watson
Published Alert4 : Flame is detected crops are in danger,sprinklers turned ON to IBM Watson
Published Alert5 : Moisture level(59.12) is low, Irrigation started to IBM Watson
Motor-2 is turning ON
Published Alert6 : water level(22.61) is high, so motor is ON to take water out to IBM Watson
... ...publish ok... ... ...
Published Temp = 19.07 C to IBM Watson
Ln: 228 Col: 0