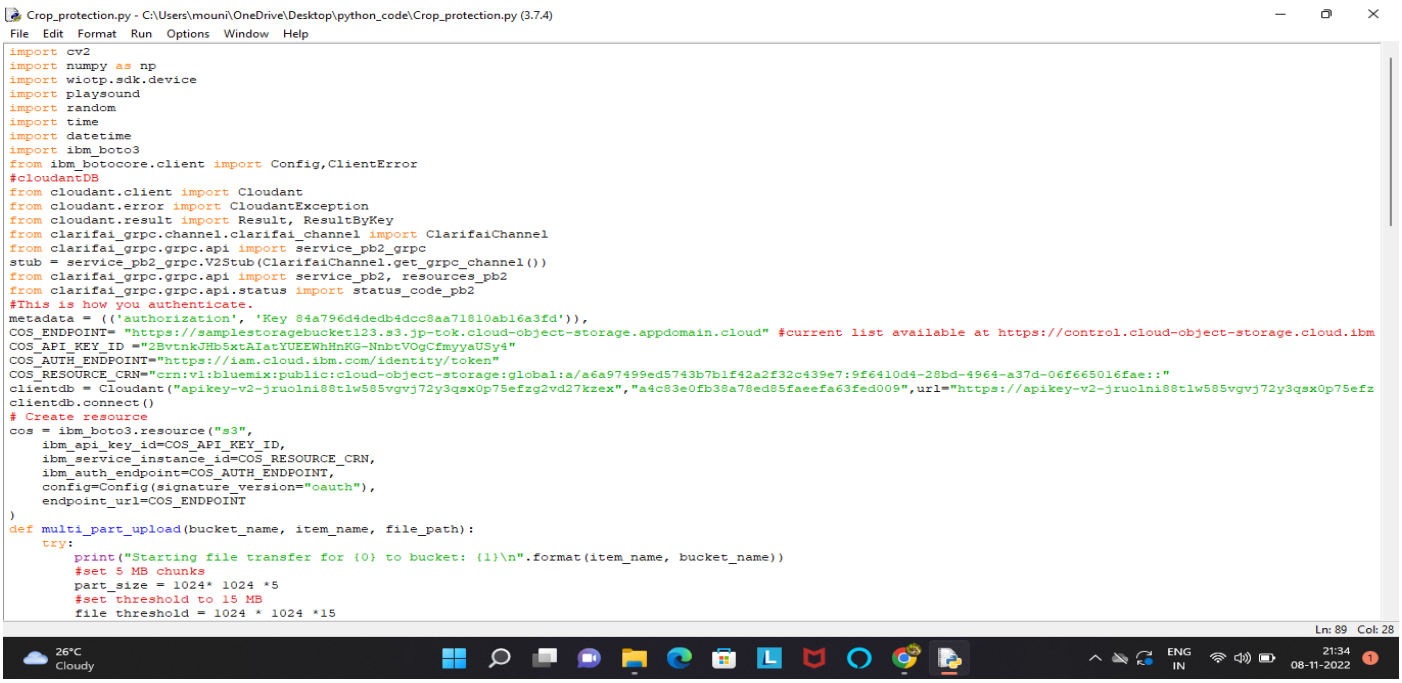
IoT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE

Team ID: PNT2022TMID41289 **Project Development Phase: Sprint 2**

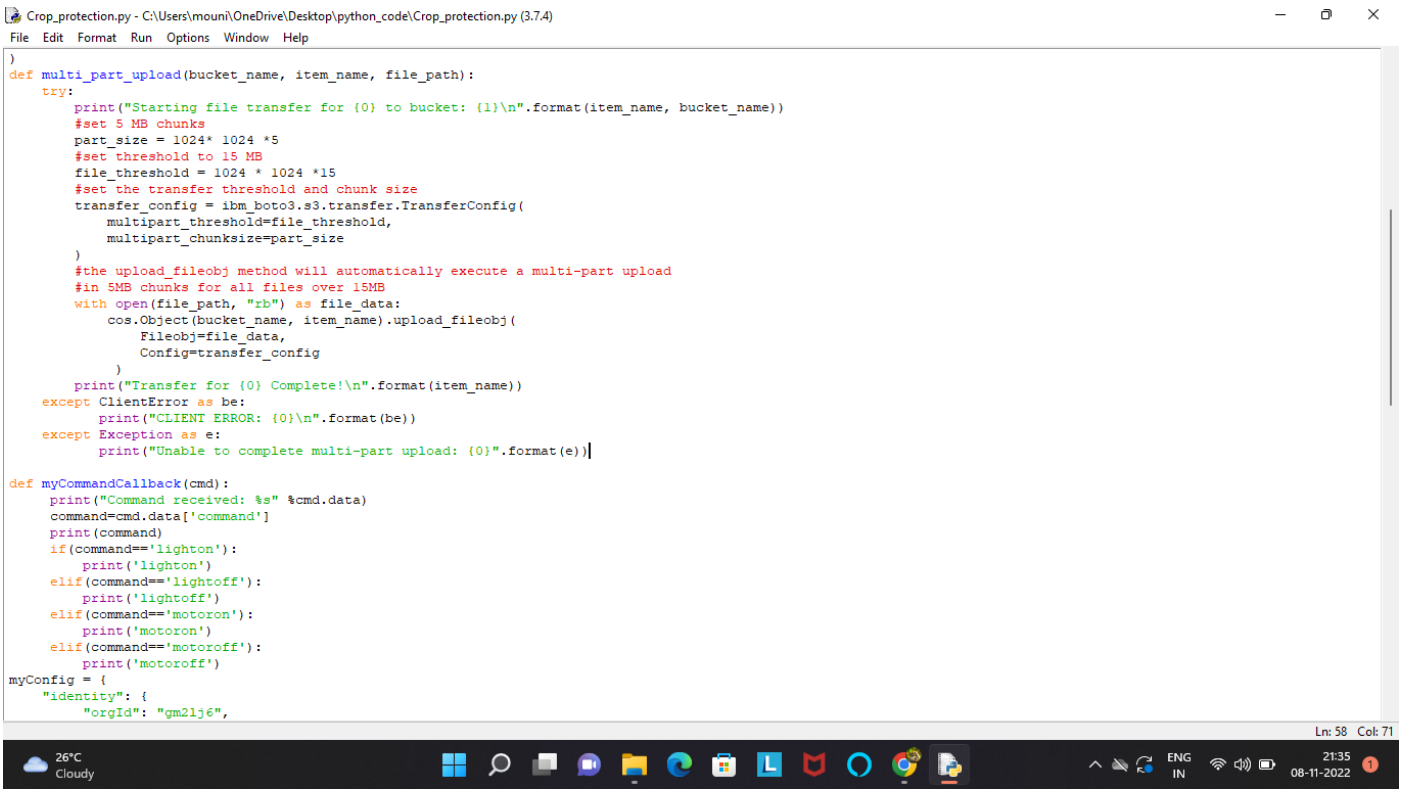
STEP 1:

Install IDLE Python Version3.7.4. and also install the required libraries from command prompt.



```
Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)
File  Edit  Format  Run  Options  Window  Help
import cv2
import numpy as np
import wiotp.sdk.device
import playsound
import random
import time
import datetime
import ibm_boto3
from ibm_botocore.client import Config,ClientError
#cloudantDB
from cloudant.client import Cloudant
from cloudant.error import CloudantException
from cloudant.result import Result, ResultByKey
from clarifai_grpc.channel.clarifai_channel import ClarifaiChannel
from clarifai_grpc.grpc.api import service_pb2_grpc
stub = service_pb2_grpc.V2Stub(ClarifaiChannel.get_grpc_channel())
from clarifai_grpc.grpc.api import service_pb2, resources_pb2
from clarifai_grpc.grpc.api.status import status_code_pb2
#This is how you authenticate.
metadata = (('authorization', 'Key 84a796d4dedb4dcc8aa71810ab16a3fd')),
COS_ENDPOINT= "https://samplestoragebucket123.s3.jp-tok.cloud-object-storage.appdomain.cloud" #current list available at https://control.cloud-object-storage.cloud.ibm
COS_API_KEY_ID ="2BvtnkJHb5xtAIatYUEEWhHnKG-NnbtVOgCfmyyaUSy4"
COS_AUTH_ENDPOINT="https://iam.cloud.ibm.com/identity/token"
COS_RESOURCE_CRN="crn:v1:bluemix:public:cloud-object-storage:global:a/a6a97499ed5743b7b1f42a2f32c439e7:9f6410d4-28bd-4964-a37d-06f665016fae::"
clientdb = Cloudant("apikey-v2-jruolni88tlw585vgvj72y3qsx0p75efzg2vd27kzex","a4c83e0fb38a78ed85faeefa63fed009",url="https://apikey-v2-jruolni88tlw585vgvj72y3qsx0p75efz
clientdb.connect()
# Create resource
cos = ibm_boto3.resource("s3",
    ibm_api_key_id=COS_API_KEY_ID,
    ibm_service_instance_id=COS_RESOURCE_CRN,
    ibm_auth_endpoint=COS_AUTH_ENDPOINT,
    config=Config(signature_version="oauth"),
    endpoint_url=COS_ENDPOINT
)
def multi_part_upload(bucket_name, item_name, file_path):
    try:
        print("Starting file transfer for {0} to bucket: {1}\n".format(item_name, bucket_name))
        #set 5 MB chunks
        part_size = 1024* 1024 *5
        #set threshold to 15 MB
        file_threshold = 1024 * 1024 *15
```

Ln: 89 Col: 28



```
Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)
File  Edit  Format  Run  Options  Window  Help
)
def multi_part_upload(bucket_name, item_name, file_path):
    try:
        print("Starting file transfer for {0} to bucket: {1}\n".format(item_name, bucket_name))
        #set 5 MB chunks
        part_size = 1024* 1024 *5
        #set threshold to 15 MB
        file_threshold = 1024 * 1024 *15
        #set the transfer threshold and chunk size
        transfer_config = ibm_boto3.s3.transfer.TransferConfig(
            multipart_threshold=file_threshold,
            multipart_chunksize=part_size
        )
        #the upload_fileobj method will automatically execute a multi-part upload
        #in 5MB chunks for all files over 15MB
        with open(file_path, "rb") as file_data:
            cos.Object(bucket_name, item_name).upload_fileobj(
                Fileobj=file_data,
                Config=transfer_config
            )
        print("Transfer for {0} Complete!\n".format(item_name))
    except ClientError as be:
        print("CLIENT ERROR: {0}\n".format(be))
    except Exception as e:
        print("Unable to complete multi-part upload: {0}".format(e))

def myCommandCallback(cmd):
    print("Command received: %s" %cmd.data)
    command=cmd.data['command']
    print(command)
    if(command=='lighton'):
        print('lighton')
    elif(command=='lightoff'):
        print('lightoff')
    elif(command=='motoron'):
        print('motoron')
    elif(command=='motoroff'):
        print('motoroff')
myConfig = {
    "identity": {
        "orgId": "gm2lj6",
```

Ln: 58 Col: 71

Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)

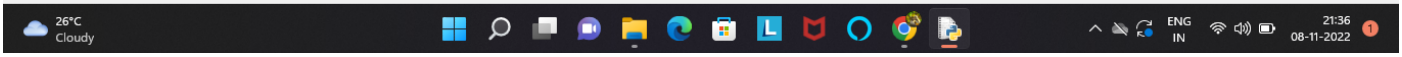
File Edit Format Run Options Window Help

```
myConfig = {
    "identity": {
         "orgId": "gm2lj6",
         "typeId": "Smartcrop",
         "deviceId": "12345"
      },
      "auth": {
          "token":"12345678"
      }
}
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

database_name= "noderedtoyyw20221019"
my_database = clientdb.create_database(database_name)
if my_database.exists():
    print(f"'{database_name}' succesfully created.")
cap=cv2.VideoCapture('garden.mp4')
if(cap.isOpened()==True):
    print('File opened')
else:
    print('File not found')

while(cap.isOpened()):
    ret, frame = cap.read()
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    ims = cv2.resize(frame, (960, 540))
    cv2.imwrite('ex.jpg',ims)
    with open("ex.jpg", "rb") as f:
        file_bytes = f.read()
    # this is the model ID of a publicly available General model. You may use any other public or custom model ID.
    request = service_pb2.PostModelOutputsRequest(
        model_id='aaa03c23b3724a16a56b629203edc62c',
        inputs=[resources_pb2.Input(data=resources_pb2.Data(image=resources_pb2.Image(base64=file_bytes))
        )])
    response = stub.PostModelOutputs(request, metadata=metadata)
    if response.status.code != status_code_pb2.SUCCESS:
        raise Exception("Request failed, status code: " + str(response.status.code))
    detect= False
    for concept in response.outputs[0].data.concepts:
        #print("%12s. %.2f' % (concept.name, concept.value))
```

Ln: 58 Col: 71

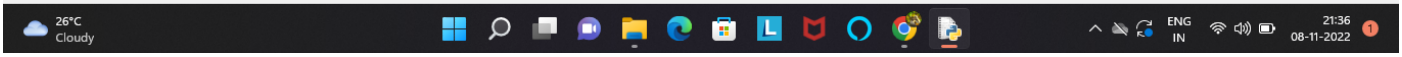


Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)

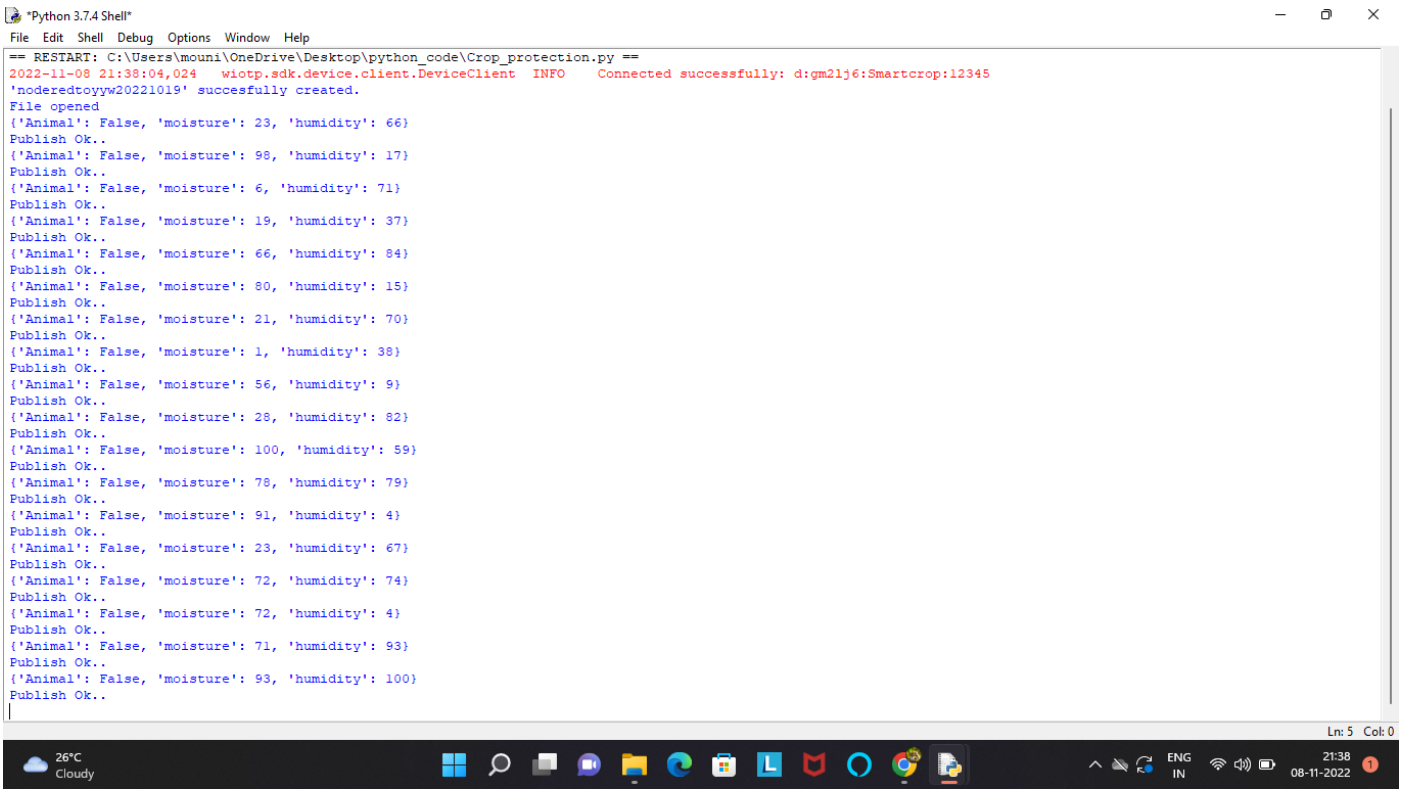
File Edit Format Run Options Window Help

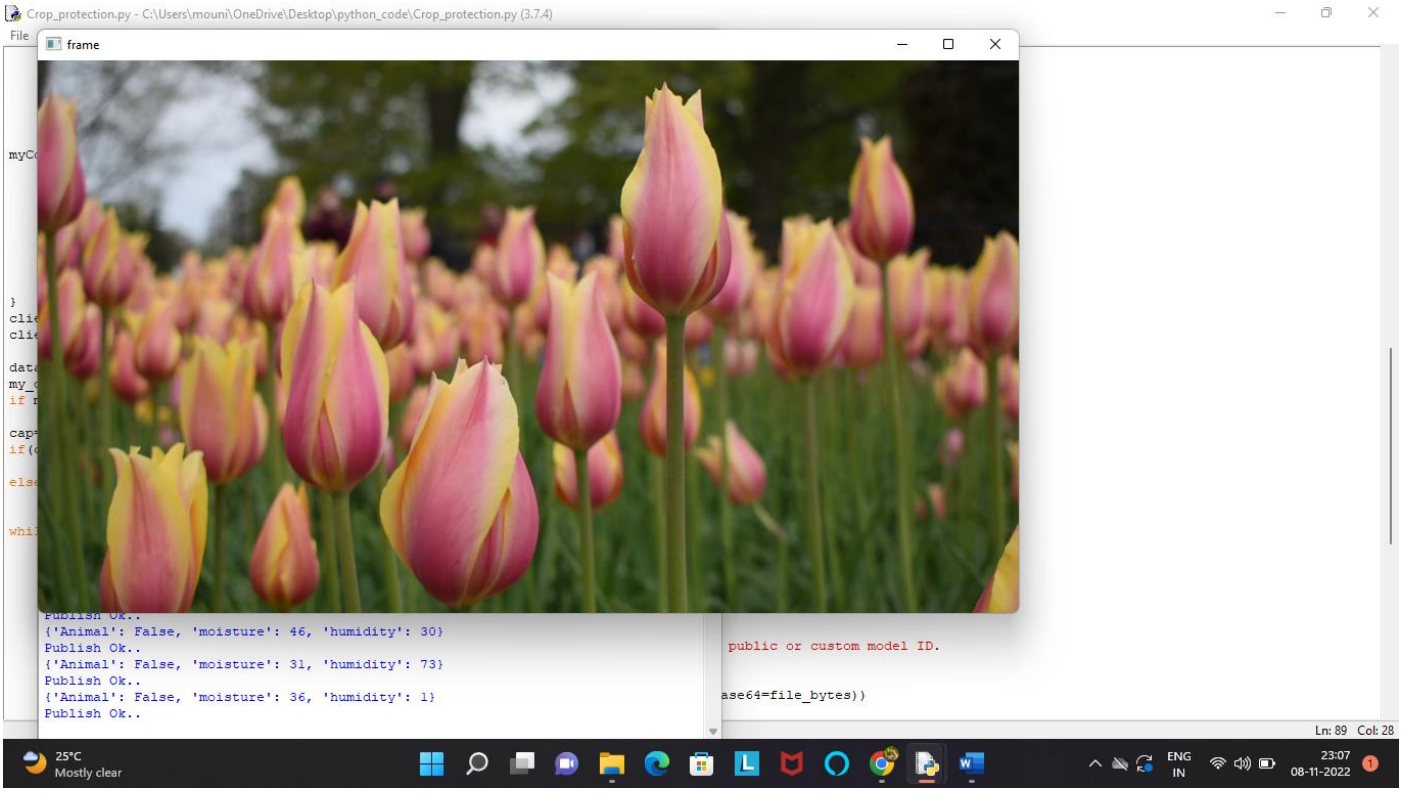
```
    # this is the model ID of a publicly available General model. You may use any other public or custom model ID.
    request = service_pb2.PostModelOutputsRequest(
        model_id='aaa03c23b3724a16a56b629203edc62c',
        inputs=[resources_pb2.Input(data=resources_pb2.Data(image=resources_pb2.Image(base64=file_bytes))
        )])
    response = stub.PostModelOutputs(request, metadata=metadata)
    if response.status.code != status_code_pb2.SUCCESS:
        raise Exception("Request failed, status code: " + str(response.status.code))
    detect= False
    for concept in response.outputs[0].data.concepts:
        #print("%12s. %.2f' % (concept.name, concept.value))
        if(concept.value>0.98):
            #print(concept.name)
            if(concept.name=="animal"):
               print("Alert!Alert!Animal detected")
               playsound.playsound('alert.mp3')
               picname=datetime.datetime.now().strftime("%y-%m-%d-%H-%M")
               cv2.imwrite(picname+'.jpg',frame)
               multi_part_upload('samplestoragebucket123', picname+'.jpg', picname+'.jpg')
               json_document={"link":COS_ENDPOINT+'/'+'samplestoragebucket123'+'/'+picname+'.jpg'}
               new_document = my_database.create_document(json_document)
               if new_document.exists():
                   print(f"Document successfully created.")
               time.sleep(5)
               detect=True
    moisture=random.randint(0,100)
    humidity=random.randint(0,100)
    myData={'Animal': detect,'moisture':moisture,'humidity':humidity}
    print(myData)
    if(humidity!=None):
        client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
        print("Publish Ok..")
    client.commandCallback = myCommandCallback
    cv2.imshow('frame',ims)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break
client.disconnect()
cap.release()
cv2.destroyAllWindows()
```

Ln: 58 Col: 71



OUTPUT:


Python 3.7.4 Shell
File Edit Shell Debug Options Window Help
== RESTART: C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py ==
2022-11-08 21:38:04,024 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:gm2lj6:Smartcrop:12345
'noderedtoyyw20221019' succesfully created.
File opened
{'Animal': False, 'moisture': 23, 'humidity': 66}
Publish Ok..
{'Animal': False, 'moisture': 98, 'humidity': 17}
Publish Ok..
{'Animal': False, 'moisture': 6, 'humidity': 71}
Publish Ok..
{'Animal': False, 'moisture': 19, 'humidity': 37}
Publish Ok..
{'Animal': False, 'moisture': 66, 'humidity': 84}
Publish Ok..
{'Animal': False, 'moisture': 80, 'humidity': 15}
Publish Ok..
{'Animal': False, 'moisture': 21, 'humidity': 70}
Publish Ok..
{'Animal': False, 'moisture': 1, 'humidity': 38}
Publish Ok..
{'Animal': False, 'moisture': 56, 'humidity': 9}
Publish Ok..
{'Animal': False, 'moisture': 28, 'humidity': 82}
Publish Ok..
{'Animal': False, 'moisture': 100, 'humidity': 59}
Publish Ok..
{'Animal': False, 'moisture': 78, 'humidity': 79}
Publish Ok..
{'Animal': False, 'moisture': 91, 'humidity': 4}
Publish Ok..
{'Animal': False, 'moisture': 23, 'humidity': 67}
Publish Ok..
{'Animal': False, 'moisture': 72, 'humidity': 74}
Publish Ok..
{'Animal': False, 'moisture': 72, 'humidity': 4}
Publish Ok..
{'Animal': False, 'moisture': 71, 'humidity': 93}
Publish Ok..
{'Animal': False, 'moisture': 93, 'humidity': 100}
Publish Ok..
Ln: 5 Col: 0
26°C Cloudy
ENG IN
21:38 08-11-2022


Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)
frame
{'Animal': False, 'moisture': 46, 'humidity': 30}
Publish Ok..
{'Animal': False, 'moisture': 31, 'humidity': 73}
Publish Ok..
{'Animal': False, 'moisture': 36, 'humidity': 1}
Publish Ok..
public or custom model ID.
ase64=file_bytes))
Ln: 89 Col: 28
25°C Mostly clear
ENG IN
23:07 08-11-2022

MODIFIED INPUT:

Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)

File Edit Format Run Options Window Help

```
my_database = clientdb.create_database(database_name)
if my_database.exists():
    print(f"'{database_name}' succesfully created.")
cap=cv2.VideoCapture('monkey.mp4')
if(cap.isOpened()==True):
    print('File opened')
else:
    print('File not found')

while(cap.isOpened()):
    ret, frame = cap.read()
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    ims = cv2.resize(frame, (960, 540))
    cv2.imwrite('ex.jpg',ims)
    with open("ex.jpg", "rb") as f:
        file_bytes = f.read()
    # this is the model ID of a publicly available General model. You may use any other public or custom model ID.
    request = service_pb2.PostModelOutputsRequest(
        model_id='aaa03c23b3724a16a56b629203edc62c',
        inputs=[resources_pb2.Input(data=resources_pb2.Data(image=resources_pb2.Image(base64=file_bytes))
        )])
    response = stub.PostModelOutputs(request, metadata=metadata)
    if response.status.code != status_code_pb2.SUCCESS:
        raise Exception("Request failed, status code: " + str(response.status.code))
    detect= False
    for concept in response.outputs[0].data.concepts:
        #print("%12s. %.2f' % (concept.name, concept.value))
        if(concept.value>0.98):
            #print(concept.name)
            if(concept.name=="animal"):
                print("Alert!Alert!Animal detected")
                playsound.playsound('alert.mp3')
                picname=datetime.datetime.now().strftime("%y-%m-%d-%H-%M")
                cv2.imwrite(picname+'.jpg',frame)
                multi_part_upload('samplestoragebucket123', picname+'.jpg', picname+'.jpg')
                json_document={"link":COS_ENDPOINT+'/'+'samplestoragebucket123'+'/'+picname+'.jpg'}
                new_document = my_database.create_document(json_document)
                if new_document.exists():
                    print(f"Document successfully created.")
                time.sleep(5)
                detect=True
```

Ln: 89 Col: 28

25°C Mostly clear ENG IN 23:10 08-11-2022

OUTPUT:

Python 3.7.4 Shell

File Edit Shell Debug Options Window Help

```
Type "help", "copyright", "credits" or "license()" for more information.
>>>
== RESTART: C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py ==
2022-11-08 21:38:54,510   wiotp.sdk.device.client.DeviceClient  INFO    Connected successfully: d:gm2lj6:Smartcrop:12345
'noderedtoyyw20221019' succesfully created.
File opened
Alert!Alert!Animal detected

    Error 263 for command:
        close alert.mp3
    The specified device is not open or is not recognized by MCI.
Failed to close the file: alert.mp3
Starting file transfer for 22-5m-08-21-39.jpg to bucket: samplestoragebucket123

CLIENT ERROR: An error occurred (AccessDenied) when calling the PutObject operation: Access Denied

Document successfully created.
{'Animal': True, 'moisture': 43, 'humidity': 87}
Publish Ok..
Alert!Alert!Animal detected

    Error 265 for command:
        open alert.mp3
    The device name is already being used as an alias by this application.  Use a unique alias.

    Error 263 for command:
        close alert.mp3
    The specified device is not open or is not recognized by MCI.
Failed to close the file: alert.mp3
Traceback (most recent call last):
  File "C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py", line 117, in <module>
    playsound.playsound('alert.mp3')
  File "C:\Users\mouni\AppData\Local\Programs\Python\Python37\lib\site-packages\playsound.py", line 72, in _playsoundWin
    winCommand(u'open {}'.format(sound))
  File "C:\Users\mouni\AppData\Local\Programs\Python\Python37\lib\site-packages\playsound.py", line 64, in winCommand
    raise PlaysoundException(exceptionMessage)
playsound.PlaysoundException:
    Error 265 for command:
        open alert.mp3
    The device name is already being used as an alias by this application.  Use a unique alias.
>>>
```

Ln: 42 Col: 4

Crop_protection.py - C:\Users\mouni\OneDrive\Desktop\python_code\Crop_protection.py (3.7.4)

File

frame

```
  File "C:\Users\mouni\AppData\Local\Programs\Python\Python37\lib\site-packages\
playsound.py", line 64, in winCommand
    raise PlaysoundException(exceptionMessage)
playsound.PlaysoundException:
    Error 265 for command:
        open alert.mp3
    The device name is already being used as an alias by this application.  Use
a unique alias.
```

```
blic or custom model ID.

64=file_bytes))
```

Ln: 89 Col: 28