This is week's 5 Data Glacier internship deliverable.

I will be using week'4 model and data.

This work was submitted on 18/07/2021 to Data Glacier by me Nada Belaidi.

I will be using fastapi from uvicon so I started with installing them to the virtual environment I used for last week's flask app (https://github.com/NadaBelaidi/Strawberry-segmentation-simple-flask-app)

```
(venv) C:\Users\Ahmed\Desktop\Strawberry-segmentation - Copie>py -m pip install uvicorn
Collecting uvicorn
  Using cached uvicorn-0.14.0-py3-none-any.whl (50 kB)
Requirement already satisfied: click>=7.* in c:\users\ahmed\appdata\local\programs\python\python39\lib\site-packages (fr
om uvicorn) (8.0.1)
Collecting asgiref>=3.3.4
  Using cached asgiref-3.4.1-py3-none-any.whl (25 kB)
Collecting h11>=0.8
  Using cached h11-0.12.0-py3-none-any.whl (54 kB)
Requirement already satisfied: colorama in c:\users\ahmed\appdata\local\programs\python\python39\lib\site-packages (from
 click>=7.*->uvicorn) (0.4.4)
Installing collected packages: h11, asgiref, uvicorn
  WARNING: The script uvicorn.exe is installed in 'C:\Users\Ahmed\AppData\Local\Programs\Python\Python39\Scripts' which
is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed asgiref-3.4.1 h11-0.12.0 uvicorn-0.14.0

(venv) C:\Users\Ahmed\Desktop\Strawberry-segmentation - Copie>py -m pip install fastapi
Requirement already satisfied: fastapi in c:\users\ahmed\appdata\local\programs\python\python39\lib\site-packages (0.66.
0)
Requirement already satisfied: starlette==0.14.2 in c:\users\ahmed\appdata\local\programs\python\python39\lib\site-packa
ges (from fastapi) (0.14.2)
Requirement already satisfied: pydantic!=1.7,!=1.7.1,!=1.7.2,!=1.7.3,!=1.8,!=1.8.1,<2.0.0,>=1.6.2 in c:\users\ahmed\appd
ata\local\programs\python\python39\lib\site-packages (from fastapi) (1.8.2)
Requirement already satisfied: typing-extensions>=3.7.4.3 in c:\users\ahmed\appdata\local\programs\python\python39\lib\s
ite-packages (from pydantic!=1.7,!=1.7.1,!=1.7.2,!=1.7.3,!=1.8,!=1.8.1,<2.0.0,>=1.6.2->fastapi) (3.7.4.3)
```

Since my deep learning model requires images to run on, I needed python-mltipart in order to upload image files.

```
(venv) PS C:\Users\Ahmed\Desktop\Strawberry-segmentation> py -m pip install python-multipart
WARNING: Ignoring invalid distribution -ensorflow (c:\users\ahmed\desktop\strawberry-segmentation\venv\lib\site-packages)
WARNING: Ignoring invalid distribution -ensorflow (c:\users\ahmed\desktop\strawberry-segmentation\venv\lib\site-packages)
Collecting python-multipart
  Downloading python-multipart-0.0.5.tar.gz (32 kB)
Requirement already satisfied: six>=1.4.0 in c:\users\ahmed\desktop\strawberry-segmentation\venv\lib\site-packages (from python-multip
art) (1.15.0)
Building wheels for collected packages: python-multipart
  Building wheel for python-multipart (setup.py) ... done
  Created wheel for python-multipart: filename=python_multipart-0.0.5-py3-none-any.whl size=31670 sha256=c60a57a2b6c917cdb00192501c10d
8c6dd3f7f8b2023e5ffff3d7f61fbf20589
  Stored in directory: c:\users\ahmed\appdata\local\pip\cache\wheels\fe\04\d1\a10661cc45f03c3cecda50deb2d2c22f57b4e84a75b2a5987e
```

I will be then importing modules and libraries needed.

```
from __future__ import division, print_function
# coding=utf-8
import sys
import os
import glob
import re
import numpy as np
import uvicorn
from fastapi import FastAPI, Form , File, UploadFile
from tensorflow import keras
import h5py
# Keras
from keras.applications.imagenet_utils import preprocess_input, decode_predictions
from keras.models import load_model
from keras.preprocessing import image
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from werkzeug.utils import secure_filename
from gevent.pywsgi import WSGIServer
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
from tensorflow.keras.preprocessing import image as image_utils
from tensorflow.keras.applications.imagenet_utils import preprocess_input
```

Creating the app and loading the model.

```
app = FastAPI()
# Model saved with Keras model.save()
MODEL_PATH = (r'C:\Users\Ahmed\Desktop\Strawberry-segmentation - Copie\models')

# Load your trained model
model = load_model(MODEL_PATH)
model.make_predict_function()
print('Model loaded. Check http://127.0.0.1:5000/')
```

Creating the model_predict function.

```
def model_predict(image_path):
    image = image_utils.load_img(image_path, target_size=(224, 224))
    image =  keras.preprocessing.image.img_to_array(image)
    image = image.reshape(1,224,224,3)
    image = preprocess_input(image)
    preds = model.predict(image)
    return preds
```

Creating the basic view function and the unpload and predict function.

```python
@app.get('/')
def basic_view():
    return {"WELCOME": "GO TO /docs route, or /post or send post request to /predict "}



@app.post('/predict')
def upload(file:UploadFile=File(...)):
    basepath = os.path.dirname(__file__)
    file_path = os.path.join(
        basepath, 'uploads', secure_filename(file.filename))

    preds = model_predict(file_path)
    if (preds<0):
        result="It's a strawberry!"
    else:
        result="That's not a strawberry!"
    return{ 'result': result }
```

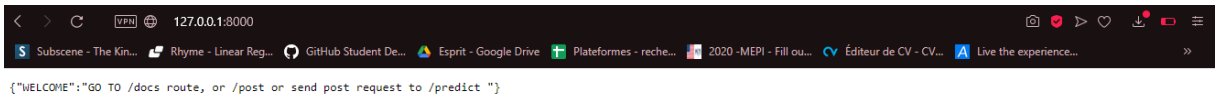
This line is necessary for running the app.

```python
if __name__ == '__main__':
    uvicorn.run(app, hosts='127.0.0.1', port=8000)
```

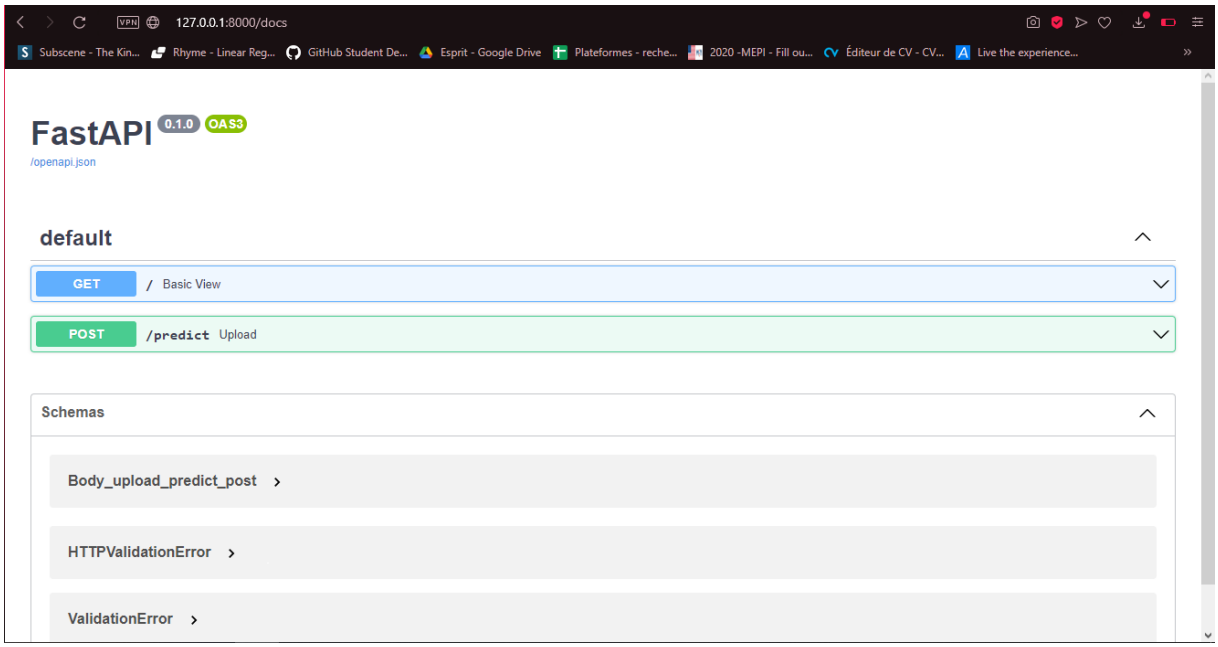
After debugging, i will be testing my app.

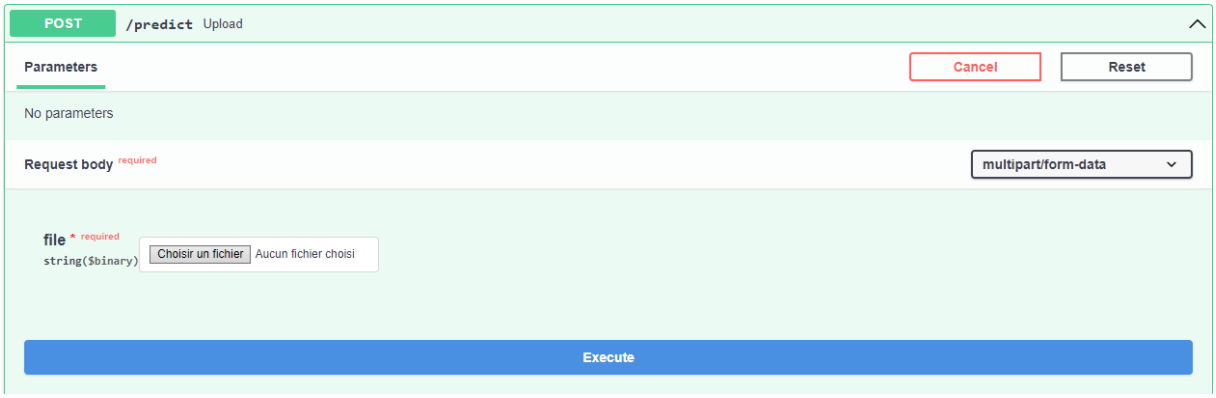
```
(venv) PS C:\Users\Ahmed\Desktop\Strawberry-segmentation - Copie> uvicorn app:app --reload
INFO:     Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO:     Started reloader process [33144] using statreload
2021-07-18 02:36:21.838992: W tensorflow/stream_executor/platform/default/dso_loader.cc:60] Could not load dynamic library 'cudart64_110.dll'; dlerror:
 cudart64_110.dll not found
2021-07-18 02:36:21.848363: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your ma
chine.
WARNING:tensorflow:SavedModel saved prior to TF 2.5 detected when loading Keras model. Please ensure that you are saving the model with model.save() or
 tf.keras.models.save_model(), *NOT* tf.saved_model.save(). To confirm, there should be a file named "keras_metadata.pb" in the SavedModel directory.
2021-07-18 02:36:27.361074: W tensorflow/stream_executor/platform/default/dso_loader.cc:60] Could not load dynamic library 'nvcuda.dll'; dlerror: nvcud
a.dll not found
2021-07-18 02:36:27.368034: W tensorflow/stream_executor/cuda/cuda_driver.cc:326] failed call to cuInit: UNKNOWN ERROR (303)
2021-07-18 02:36:27.377967: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:169] retrieving CUDA diagnostic information for host: NADA
2021-07-18 02:36:27.385713: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:176] hostname: NADA
2021-07-18 02:36:27.391597: I tensorflow/core/platform/cpu_feature_guard.cc:142] This TensorFlow binary is optimized with oneAPI Deep Neural Network Li
brary (oneDNN) to use the following CPU instructions in performance-critical operations:  AVX
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
Model loaded. Check http://127.0.0.1:5000/
INFO:     Started server process [8780]
INFO:     Waiting for application startup.
INFO:     Application startup complete.
```

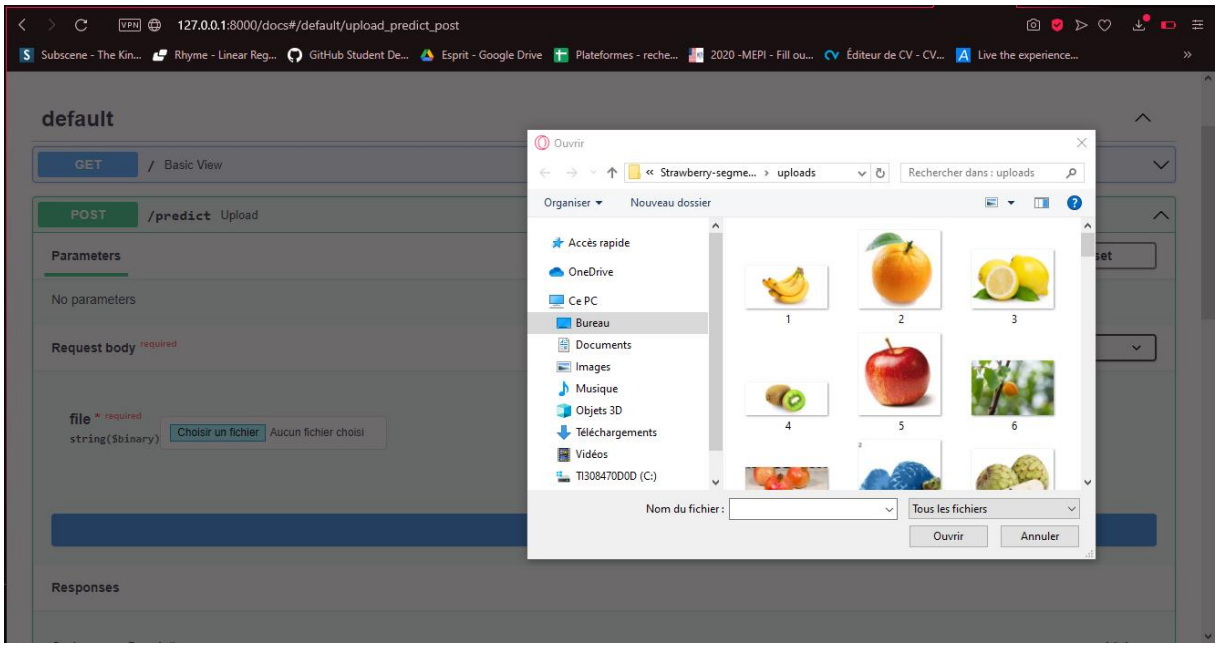
127.0.0.1/8000 on my browser to see what the API looks like.



127.0.0.1/8000/docs to test my functions.







Responses

Curl

```
curl -X 'POST' \
  'http://127.0.0.1:8000/predict' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'file=@5.jpg;type=image/jpeg'
```

Request URL

```
http://127.0.0.1:8000/predict
```

Server response

Code	Details
200	Response body

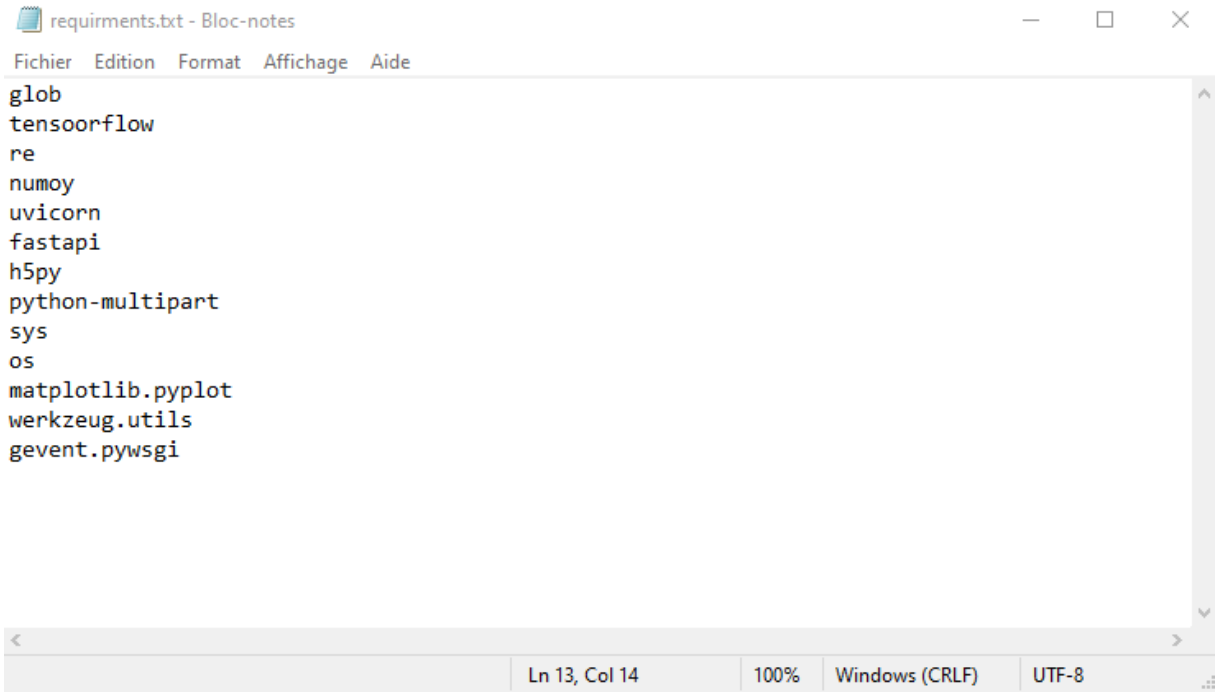
```
{
  "result": "That's not a strawberry!"
}
```

Download

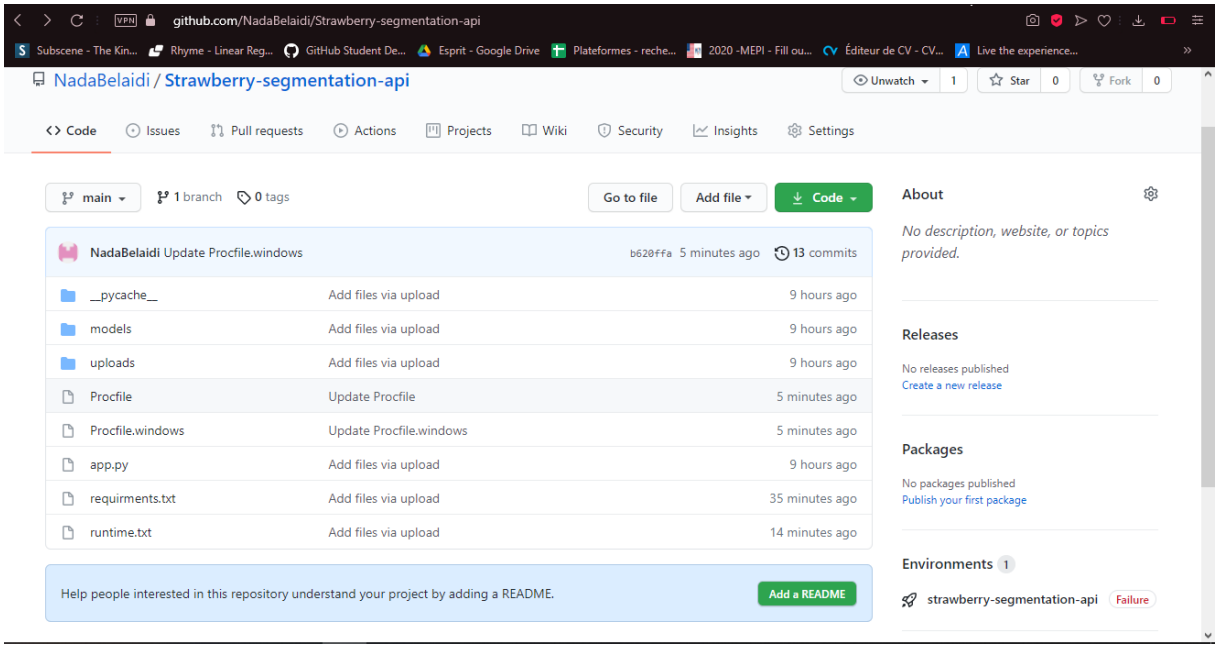
requirements.txt is important for deployment on Heroku.

runtime.txt has python-3.9.6 in it.

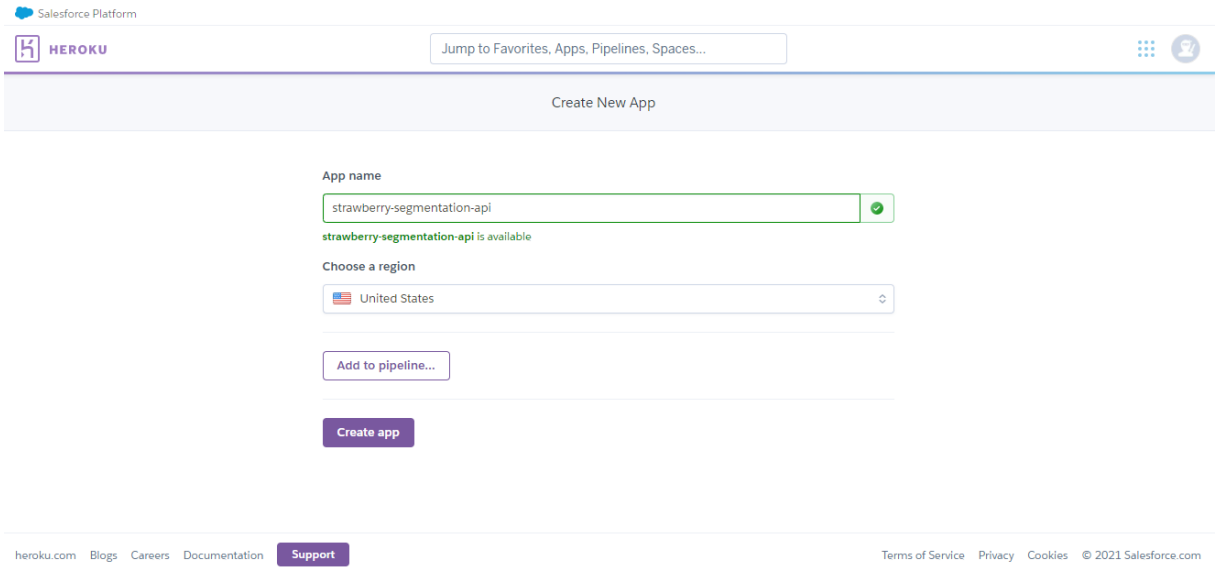
And I also created the Procfile and the Procfile.windows



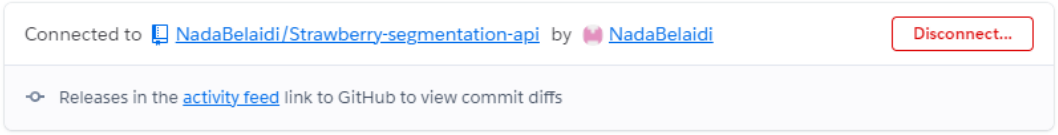
I pushed the folder containing the API to my Github repository.



I created an app on Heroku.



I connected it to my Github repository.



I will be now building it.

Building failed because I am using a free account, and my app was too large.

I did delete all unnecessary modules and libraries.

I believe that there is no solution for this, except for changing the whole app or going premium.

Same happened for the web app since it had the same deep learning model.

I will be trying to make another app for the assignment, meanwhile I will be submitting this in case it gets graded before I do.