Vehicle Detection Algorithm

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# Project title:

**Vehicle detection algorithm using Classification**.

# Objective:

Vehicle automation being the present trend in the technology, we aim to build a basic block of the main objective of vehicle automation that is **object detection**. Object detection is a process of identifying and analyzing a object. Our objective is to build a model that could detect vehicle in an image.

# Scope:

We aim to build a model that could detect vehicle in an image. We took dataset that is readily available via online. There are too complex models in the market we aim to make it a simple. The project is completed with in duration of 2 weeks where we worked on dataset loading and pre-processing in the first week and worked on training model in the second week.

# Architecture diagram:

Import modules

Load data

Import modules

Preprocess data

# 

Predict output

# Implementation:

# Importing necessary modules

import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sns

import cv2

#loading the datasaet

path = r"D:\Surya\College\SEM\_6\Applied Machine Learning\Assignments\Mini Project\dataset\data\vehicles/1.png"

image = cv2.imread(path)

image = cv2.cvtColor(image, cv2.COLOR\_BGR2RGB)

plt.figure(figsize=(15,8))

plt.imshow(image)

plt.axis("off")

print("Shape:", image.shape)

print("Pixel(0,0):", image[0][0])

from sklearn.datasets import load\_files

data = load\_files("D:\Surya\College\SEM\_6\Applied Machine Learning\Assignments\Mini Project\dataset\data")

data.keys()

for i in range(len(data["data"])):

data["data"][i] = cv2.imdecode(np.asarray(bytearray(data["data"][i]), dtype=np.uint8), cv2.IMREAD\_COLOR)

plt.imshow(data["data"][5])

print(data["target"][5])

plt.imshow(data["data"][15000])

print(data["target"][15000])

plt.imshow(data["data"][0])

print(data["target"][0])

# building and Training a model

from sklearn.naive\_bayes import MultinomialNB

from sklearn.model\_selection import train\_test\_split

from sklearn.metrics import classification\_report

X = data["data"]

y = data["target"]

n\_channels = 3 #RGB

width = 64 #px

height = 64 #px

X = np.array(X).reshape(len(X),n\_channels\*width\*height)

X\_train, X\_test, y\_train, y\_test = train\_test\_split(

X, y, test\_size=0.1, random\_state=42, shuffle=True)

clf = MultinomialNB()

clf.fit(X\_train, y\_train) y\_pred = clf.predict(X\_test)

print(classification\_report(y\_test, y\_pred))

sns.histplot(y\_pred)

n\_predictions = 5

images\_test = X\_test[20:20+n\_predictions].reshape(n\_predictions, width, height, n\_channels)

for i, img in enumerate(images\_test):

plt.imshow(img)

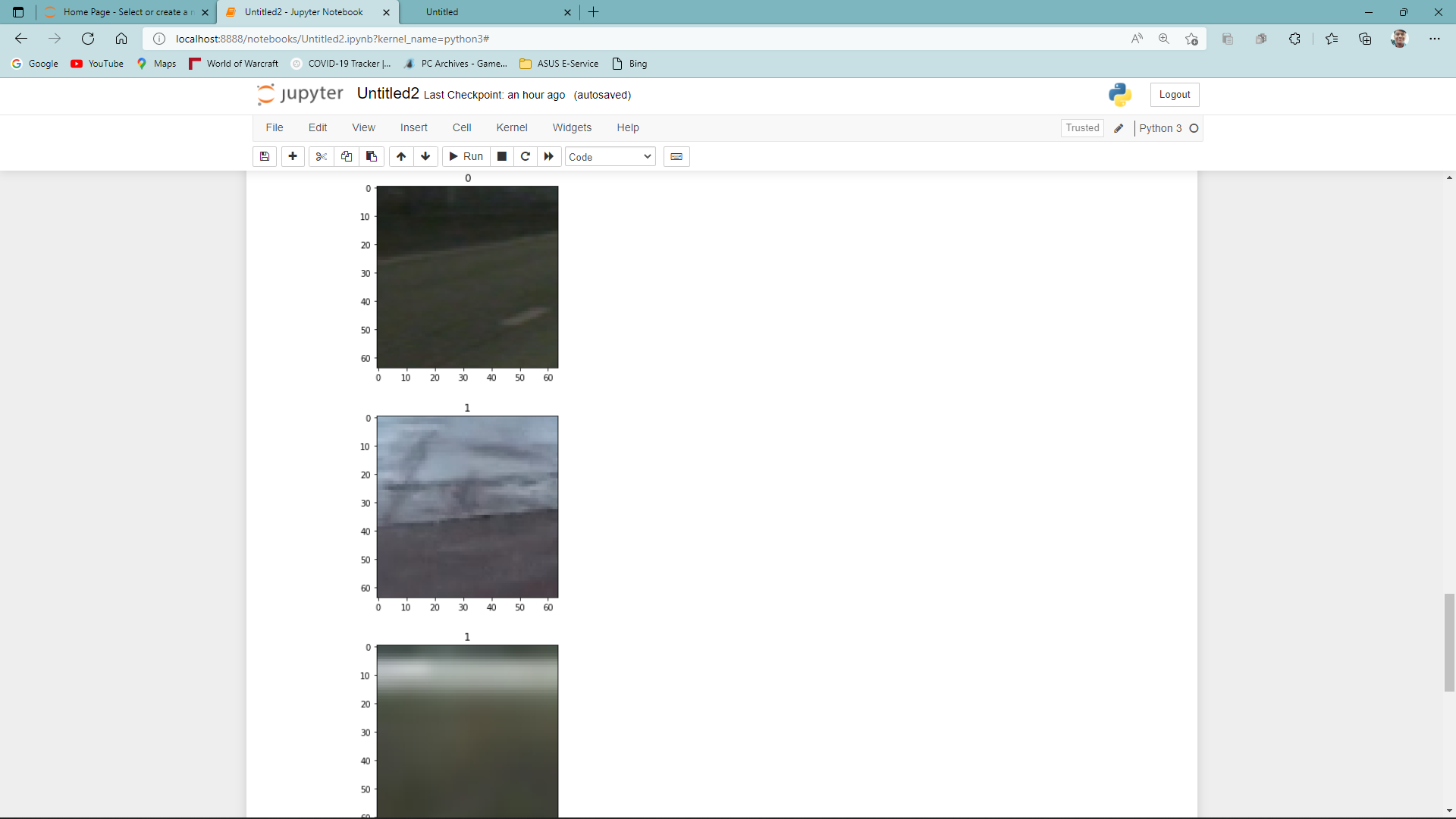
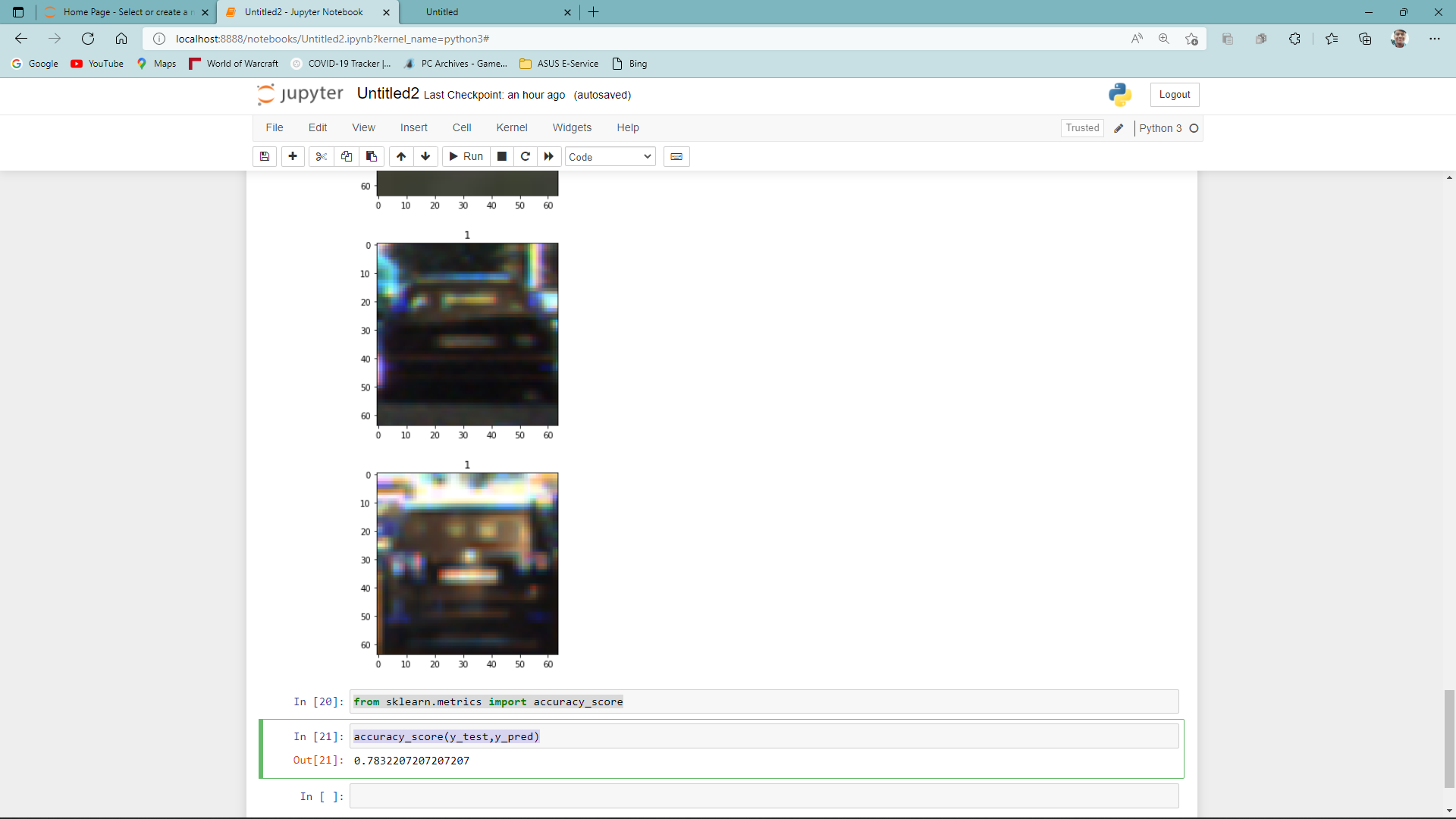
plt.title(y\_pred[20+i])

plt.show()

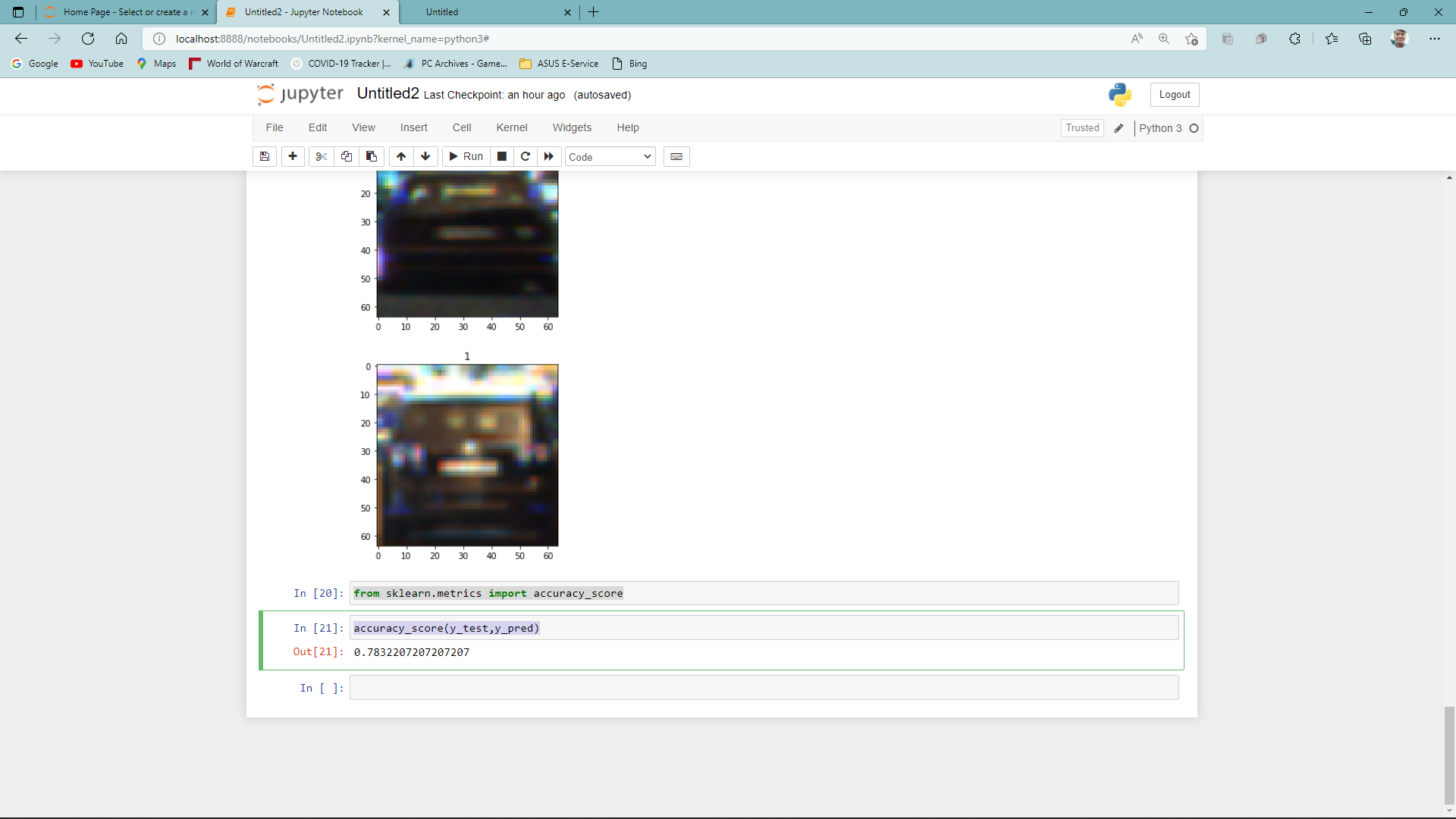
from sklearn.metrics import accuracy\_score

accuracy\_score(y\_test,y\_pred)

# Results:



**Note: prediction 1 – true and prediction 0 is false**



**Accuracy of our model is 78.32%**

# References:

<https://www.kaggle.com/datasets/brsdincer/vehicle-detection-image-set> (Dataset)

https://scikit-learn.org/stable/supervised\_learning.html#supervised-learning