WEAPON DETECTION SYSTEM

A project by:
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Powered by: OpenCV, Imutiles, Numpy

A project of Artificial Intelligence

Introduction:

Overview: by the help of OpenCV library installed and Imutiles library the prototype detects various images of the gun by subtracting the background of the image, and using the classifier of cv2 on HAAR cascade file (.xml) we are able to the gun from images regardless of the background.

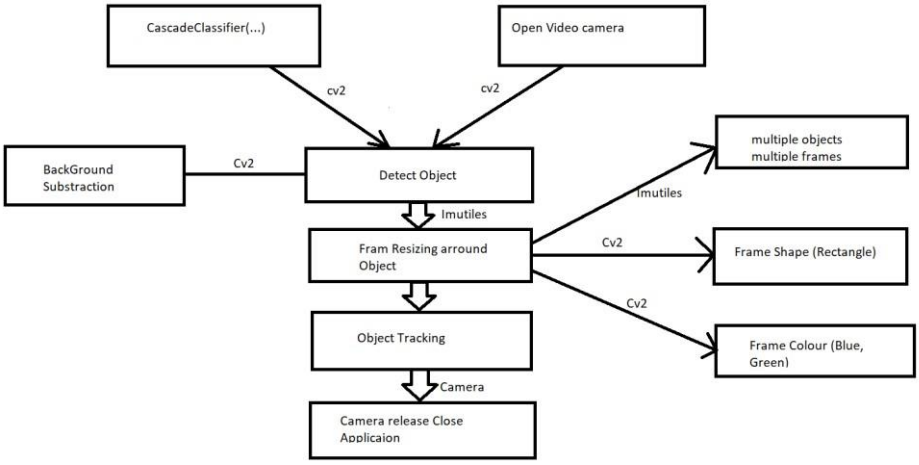
Objective: the objective of the project is to enhance the security systems. Being able to detect the gun using videocam in runtime from an image this project can further be improved for the development security purposes.

Scope and limitations: the scope of the project is the purpose of enhancing the security issues, by installing it in home-cams, offices-cam, and public places. As being the project for the security of public can develop the interest of authorities for the project. The limitation of this project righ now is that it detect the gun from an image. And only hand guns can be detected, as per respect to the shape for which it is trained.

Application-areas: there are various application areas of this project such as home-cams, public places cameras, banks cameras, offices cameras.

Methodology

Flow Diagram:



Data set: the Dataset being used is cascade file (.xml) that is classified by the help of (OpenCV) cv2 cascade classifier, that use machine learning, a cascade function is trained using a large number of both positive and negative images. The next step is to use it to find or detect objects in other pictures.

Libraries used: The libraries used in the project include:

NumPy: For the numerical computation used in this project to mention up the respective scale values in the format of (X,Y) coordinates weight and height.

OpenCV (Cv2): Cv2 library working on this OpenCV project (computer vision project). Through this library we were will be able to detect the gun in the respective image.

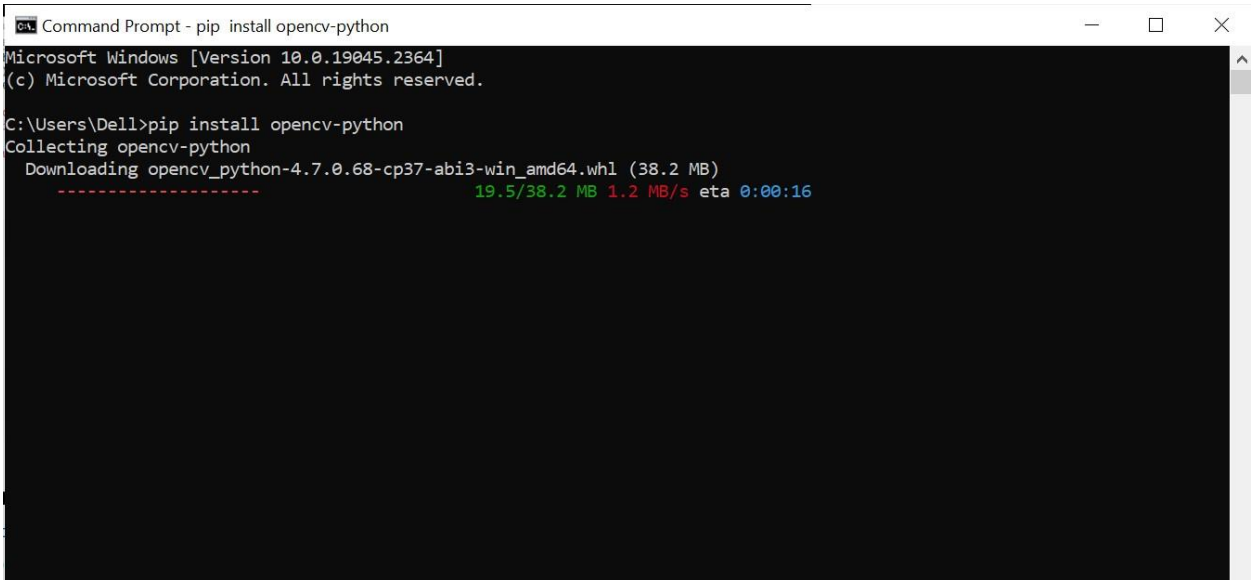
Imutils: this library is used to carry out series of image processing functions such as rotation, resizing. Imutiles is used in this project for resizing out the frame and specifying the width of frame tat is 50.

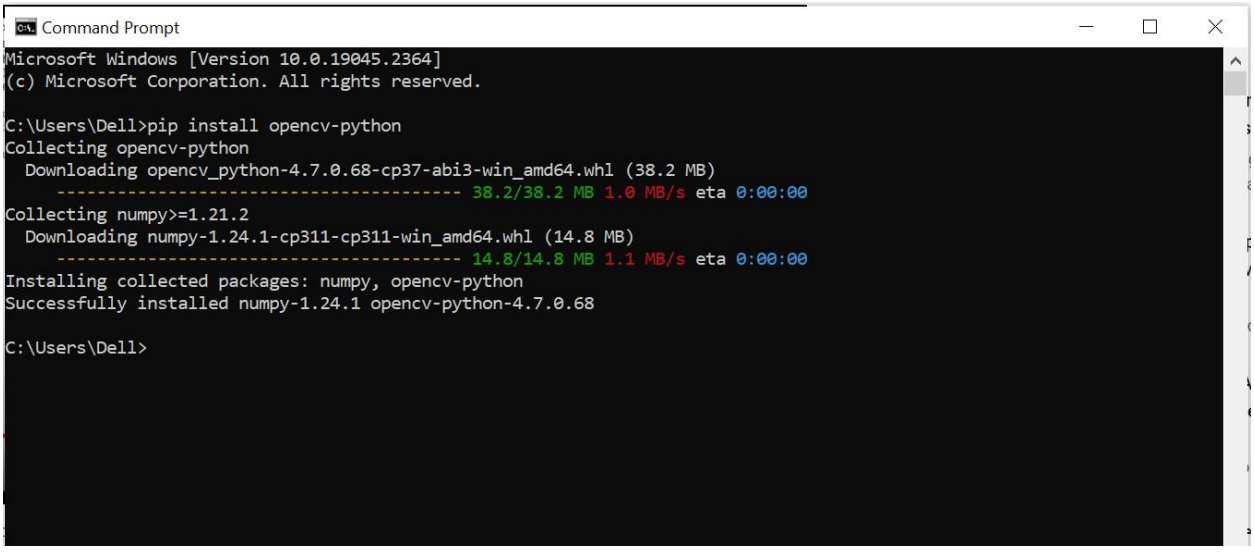
Datetime: this library is used for giving the current date and time .

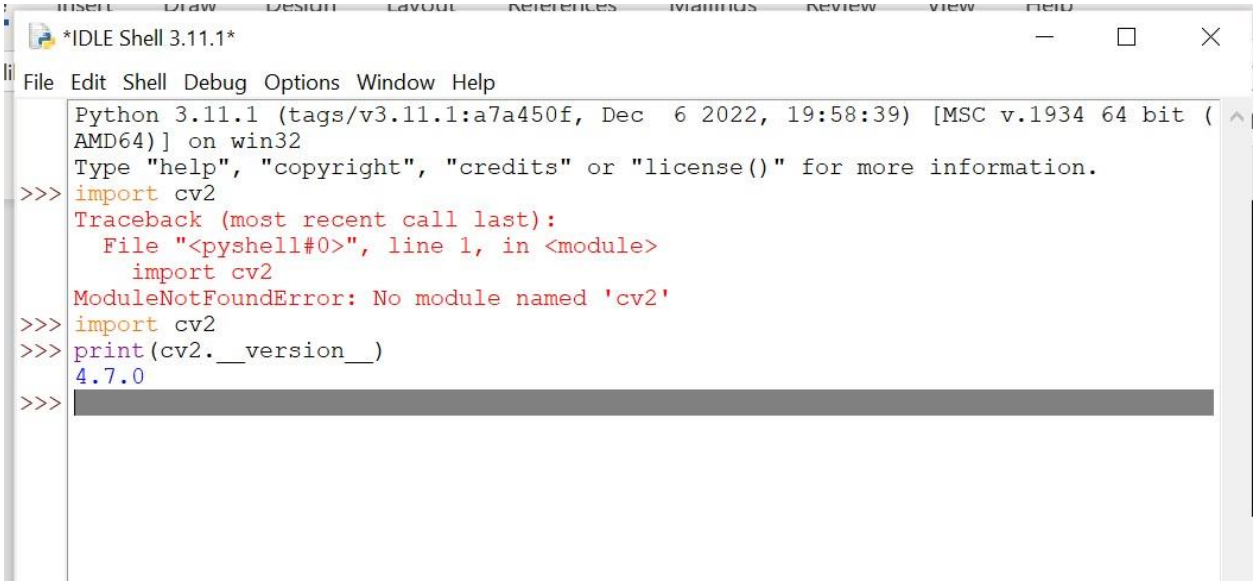
Languages: The Language used to built the project is python and the IDE used for it is PyCharm and IDLE Python 3.11 (64-bit).

Packages: the PyCharm 3.11 come with pre-installed packages but the OpenCv for importing cv2 and Imutiles packages need to be installed to run image processing techniques in the project. The scree shots of installation is given.

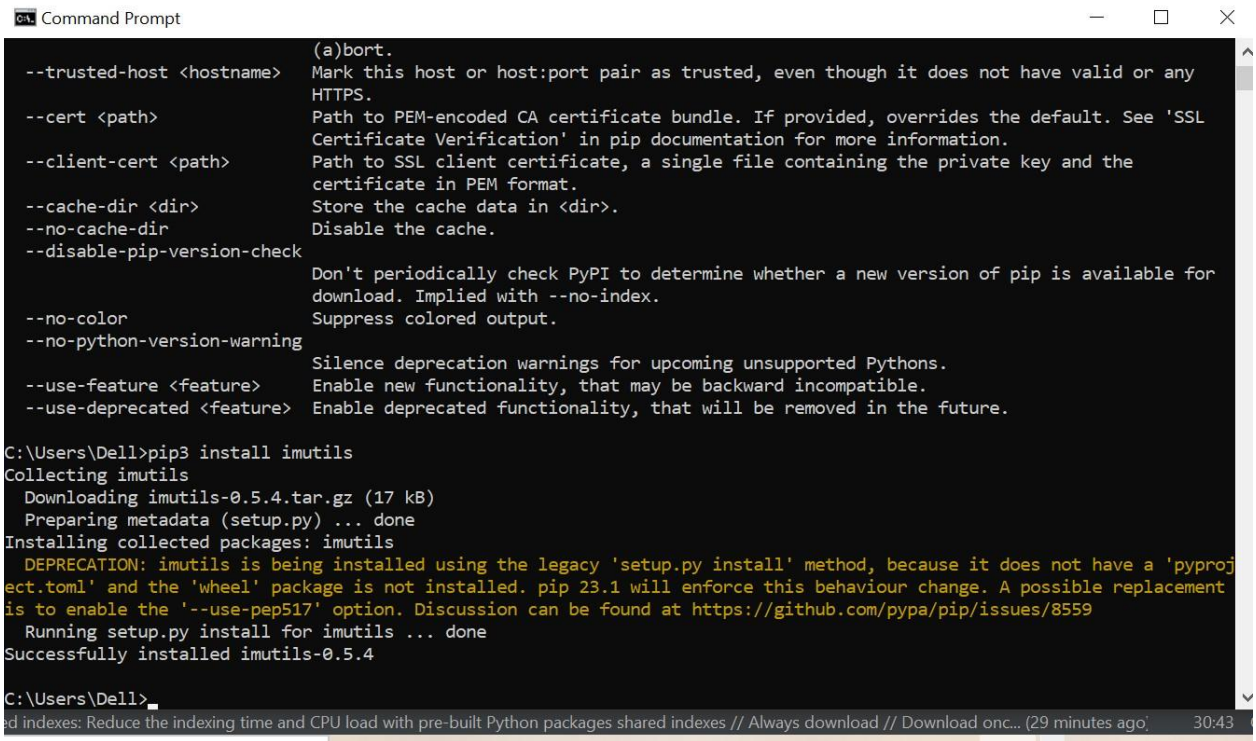
Installing OpenCV Library







Installing Imutiles Library

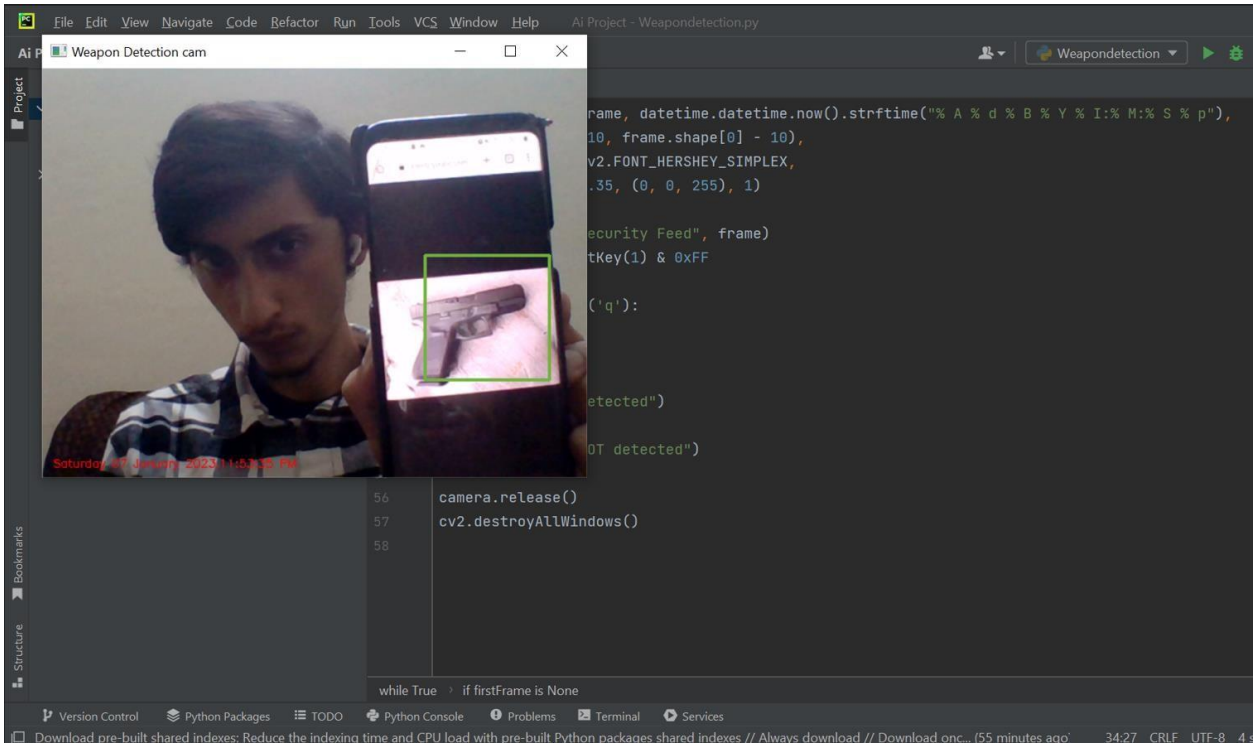


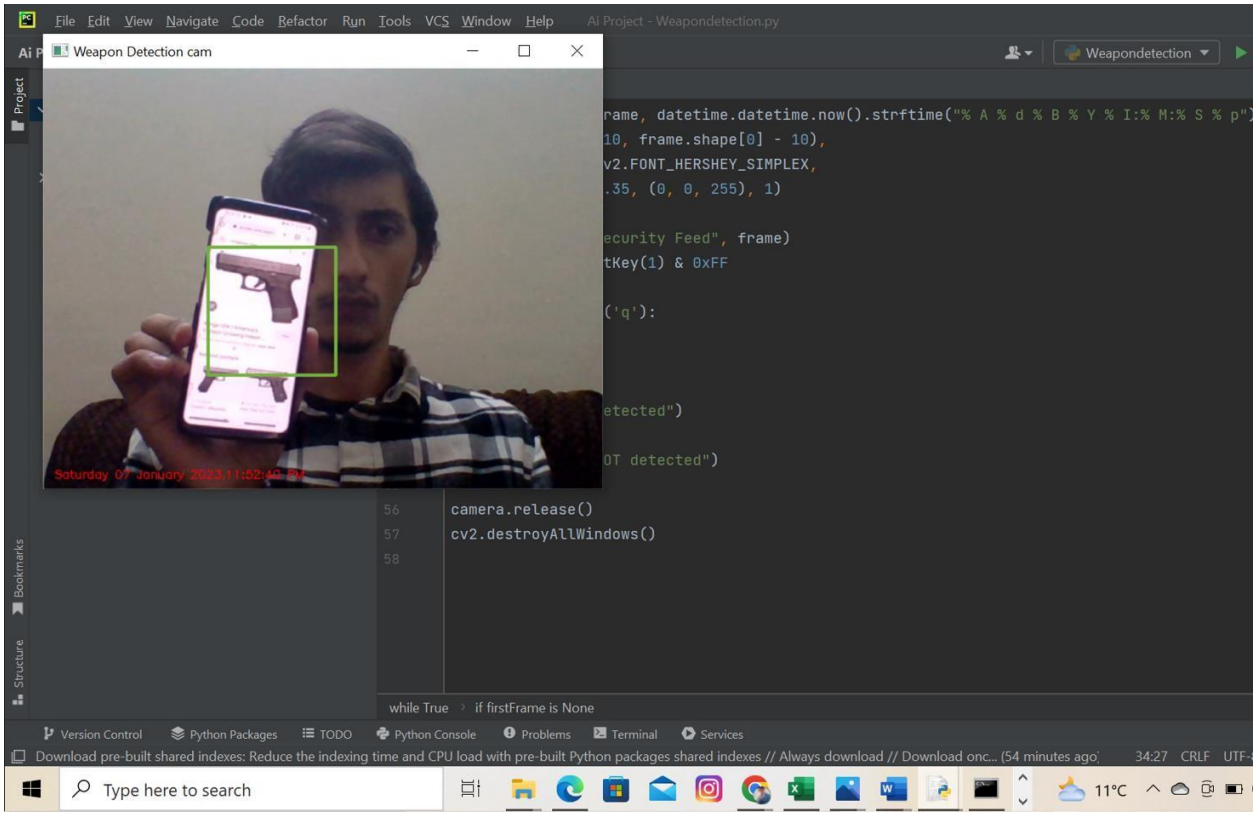
Conclusion: the project is able to detect the hand gun through the videocam of the laptop in real time with the help of object imported of libraries and conclude weather the gun is detected or not. The project can be improved as for now it detects the hand gun from the images in future it can be updated to detect all

types of guns regardless of the environment, a special type of application will be available that can be installed with in the security cams of the houses, offices, banks that will enhance the security level of that area / place.

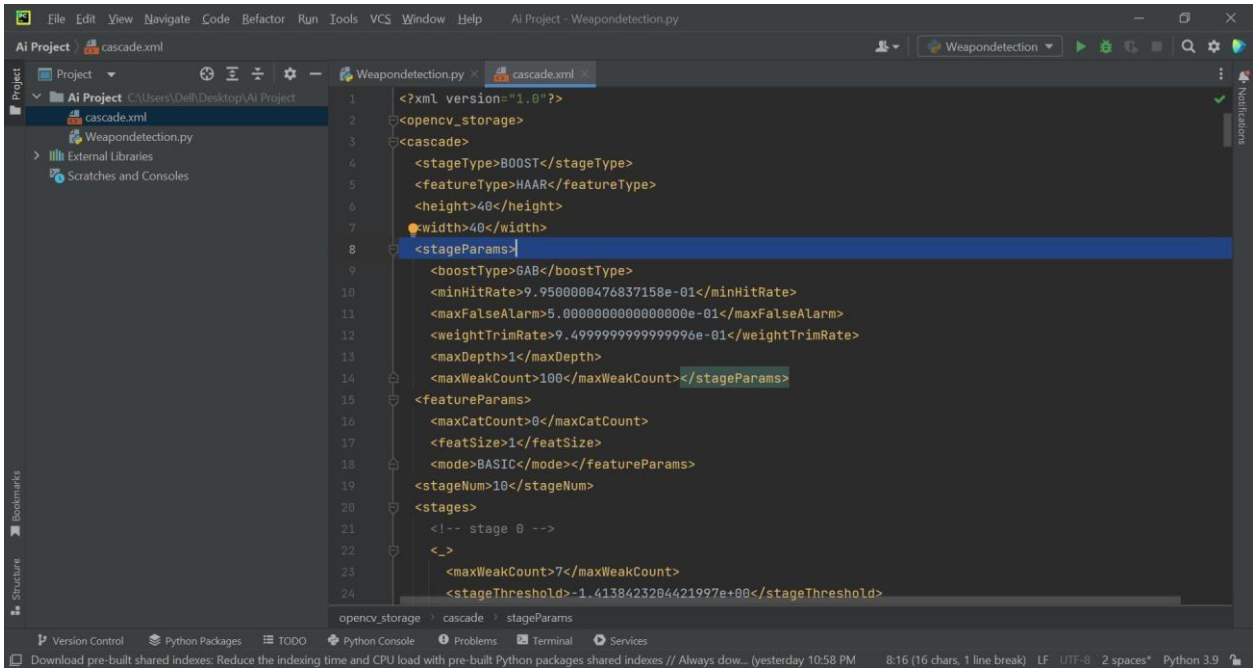
The Actual Output:

The Guns can be detected on different Displays of devices and regardless of a same picture.





Cascade File:



Actual Code:

```
import numpy as
np import cv2
import imutils
import datetime


gun_cascade = cv2.CascadeClassifier('cascade.xml')
camera = cv2.VideoCapture(0)
 firstFrame =
None gun_exist =
False
 while
True:


    ret, frame = camera.read()
     frame = imutils.resize(frame, width=500)
gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
     gun = gun_cascade.detectMultiScale(gray,
1.3, 5,
                                        minSize=(100, 100))
     if len(gun) >
0:
        gun_exist = True
     for (x, y, w, h) in
gun:
        frame = cv2.rectangle(frame,
(x, y),
                              (x + w, y + h),
(255, 0, 0), 2)          roi_gray = gray[y:y + h,
x:x + w]          roi_color = frame[y:y + h, x:x +
w]
     if firstFrame is
None:          firstFrame
= gray          continue


    # print(datetime.date(2019))
    # draw the text and timestamp on the frame
    cv2.putText(frame, datetime.datetime.now().strftime("% A % d % B % Y %
I:% M:% S % p"),
                (10, frame.shape[0] - 10),
cv2.FONT_HERSHEY_SIMPLEX,
                0.35, (0, 0, 255), 1)
cv2.imshow("Weapon Detection cam", frame)
key = cv2.waitKey(1) & 0xFF
     if key ==
ord('q'):
        break
 if
gun_exist:
    print("guns detected")
```

```
else:
    print("guns NOT detected")


camera.release()
cv2.destroyAllWindows()
```