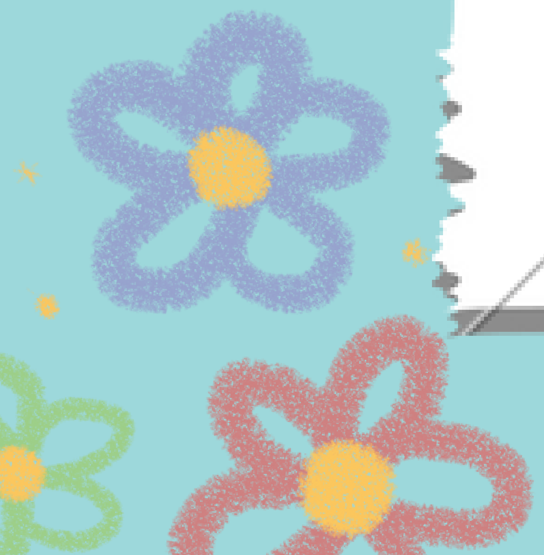
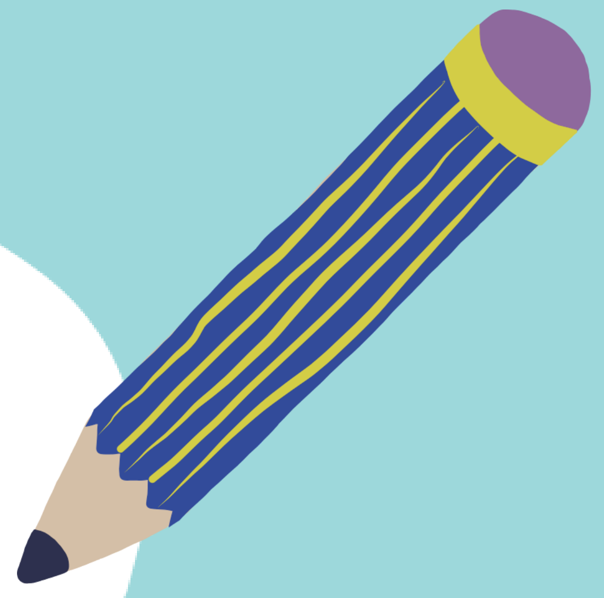
FINAL PROJECT

KELOMPOK 5





Kelompok 5

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Pendeteksian Objek Menggunakan YOLO

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Pengertian YOLO

- *YOLO (You Only Look Once) adalah metode/cara untuk melakukan deteksi objek. Ini adalah algoritma / strategi di balik bagaimana kode akan mendeteksi objek dalam gambar.*
- *YOLO mengambil pendekatan melihat seluruh gambar hanya sekali dan melewati jaringan sekali dan mendeteksi objek. Karena itulah namanya. Ini sangat cepat. Itulah alasan mengapa ia menjadi sangat populer.*
- *Algoritma Yolo mampu mendeteksi semua 80 jenis objek ini dalam sebuah gambar. Itu juga dapat dilatih dengan cara khusus untuk mendeteksi berbagai objek baru dengan sangat mudah. Kumpulan data yang telah dilatihkan untuk 80 kelas cukup terkenal dengan nama kumpulan data “Coco”.*

Modul dnn OpenCV

- *Modul DNN (Deep Neural Network) awalnya merupakan bagian dari repo. Ini telah dipindahkan ke cabang master repo tahun lalu, memberi pengguna kemampuan untuk menjalankan inferensi pada model pembelajaran mendalam yang telah dilatih sebelumnya dalam OpenCV itu sendiri.opencv_contribopencv (Satu hal yang perlu diperhatikan di sini adalah, modul tidak dimaksudkan untuk digunakan untuk pelatihan. Ini hanya untuk menjalankan inferensi pada gambar/video.) dnn*

Requirements:

Hal-hal berikut diperlukan untuk mengeksekusi kode yang akan kita tulis:

- *Python 3*
- *Numpy*
- *OpenCV Python bindings*

Requirements:

- Download Numpy : https://numpy.org/install/
- Install PIP : https://www.geeksforgeeks.org/download-and-install-pip-latest-version/
- OpenCV for Python: https://www.geeksforgeeks.org/how-to-install-opencv-for-python-in-windows/

Argument

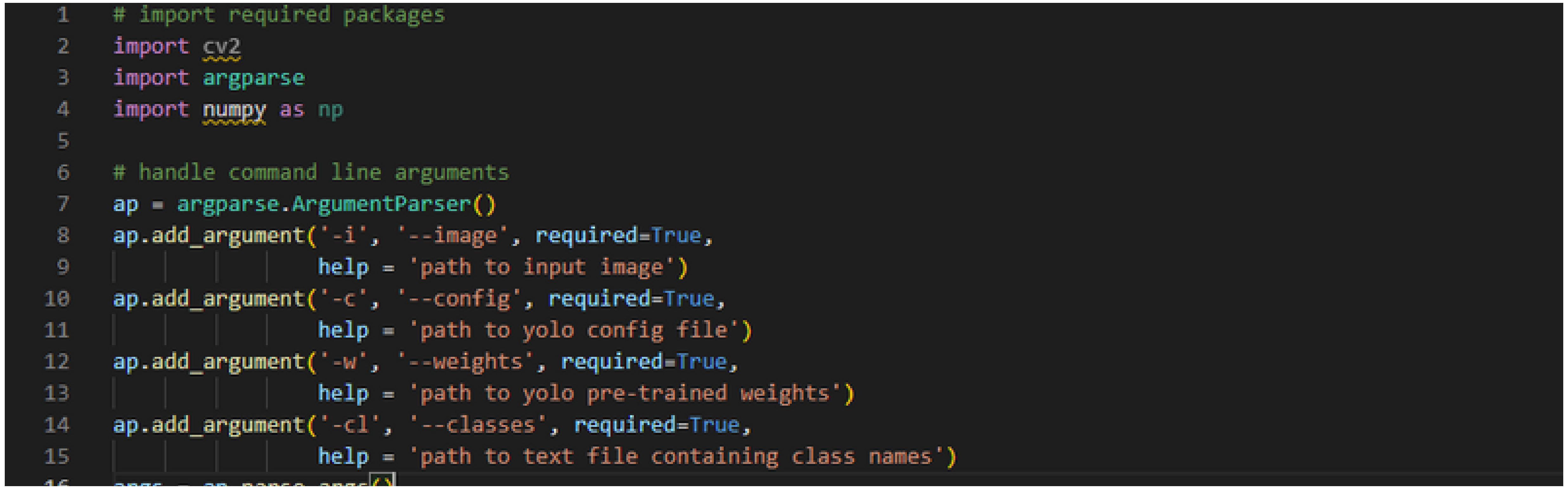
Skrip membutuhkan empat argumen input, yaitu:

- Input image
- YOLO config file
- Pre-trained YOLO weights
- Text file containing class names

SOURCE CODE

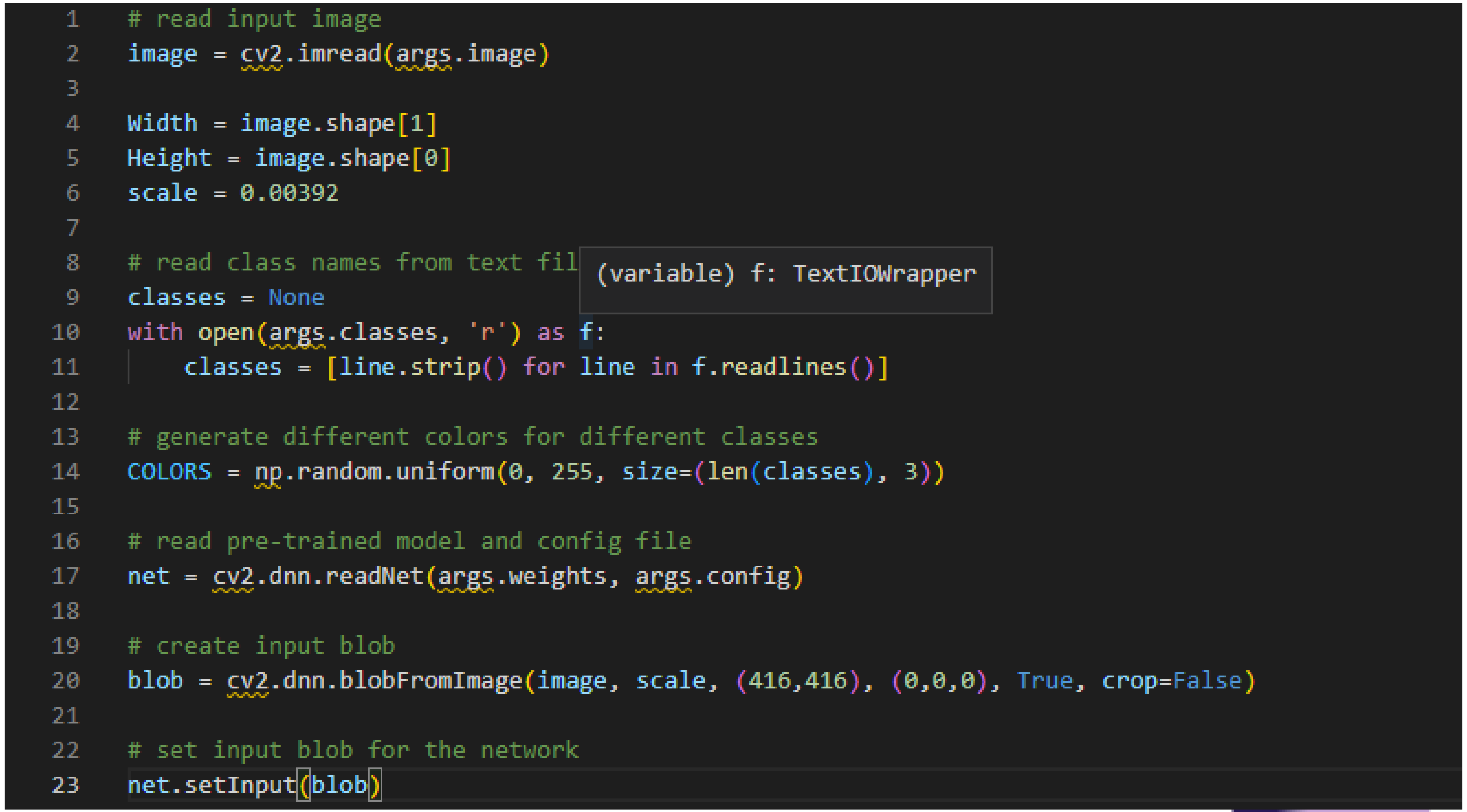
KELOMPOK 5

import packages



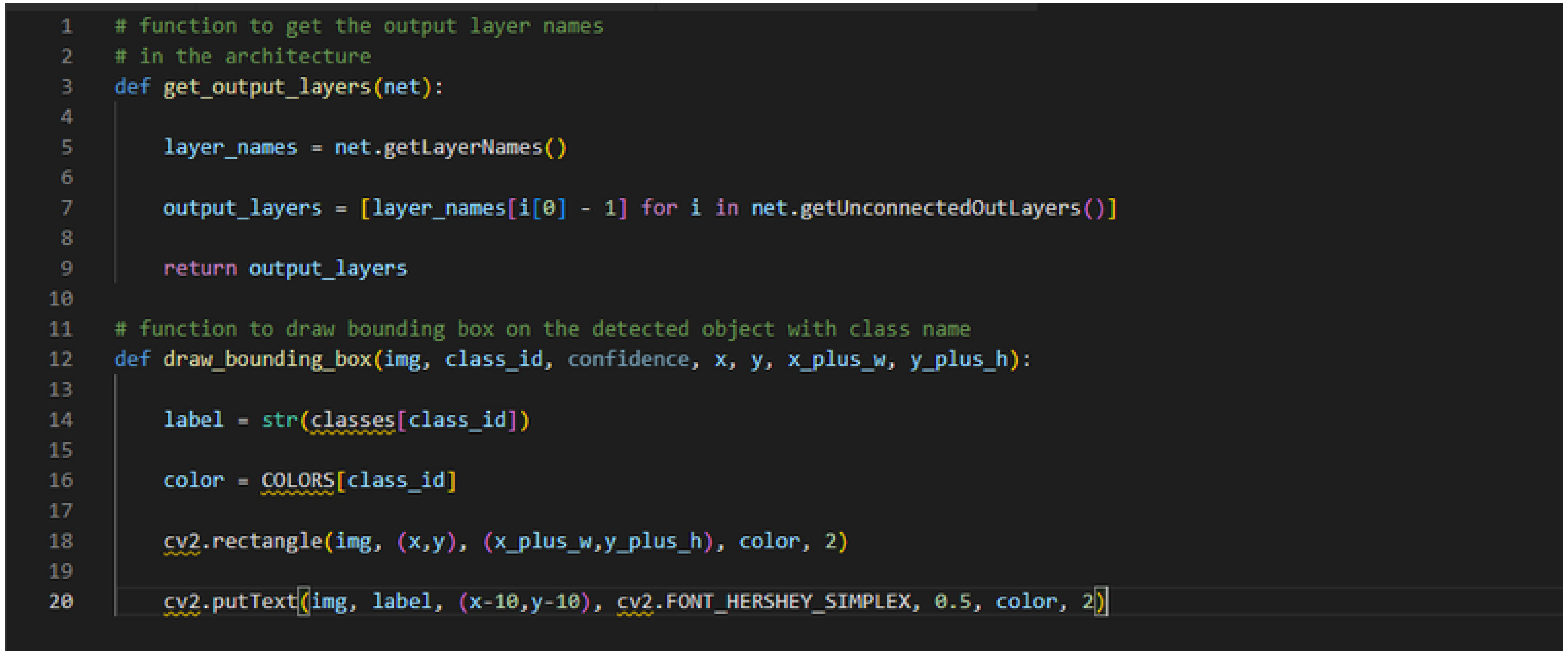
```python
# import required packages
import cv2
import argparse
import numpy as np

# handle command line arguments
ap = argparse.ArgumentParser()
ap.add_argument('-i', '--image', required=True,
                help = 'path to input image')
ap.add_argument('-c', '--config', required=True,
                help = 'path to yolo config file')
ap.add_argument('-w', '--weights', required=True,
                help = 'path to yolo pre-trained weights')
ap.add_argument('-cl', '--classes', required=True,
                help = 'path to text file containing class names')
args = ap.parse_args()
```

Preparing input



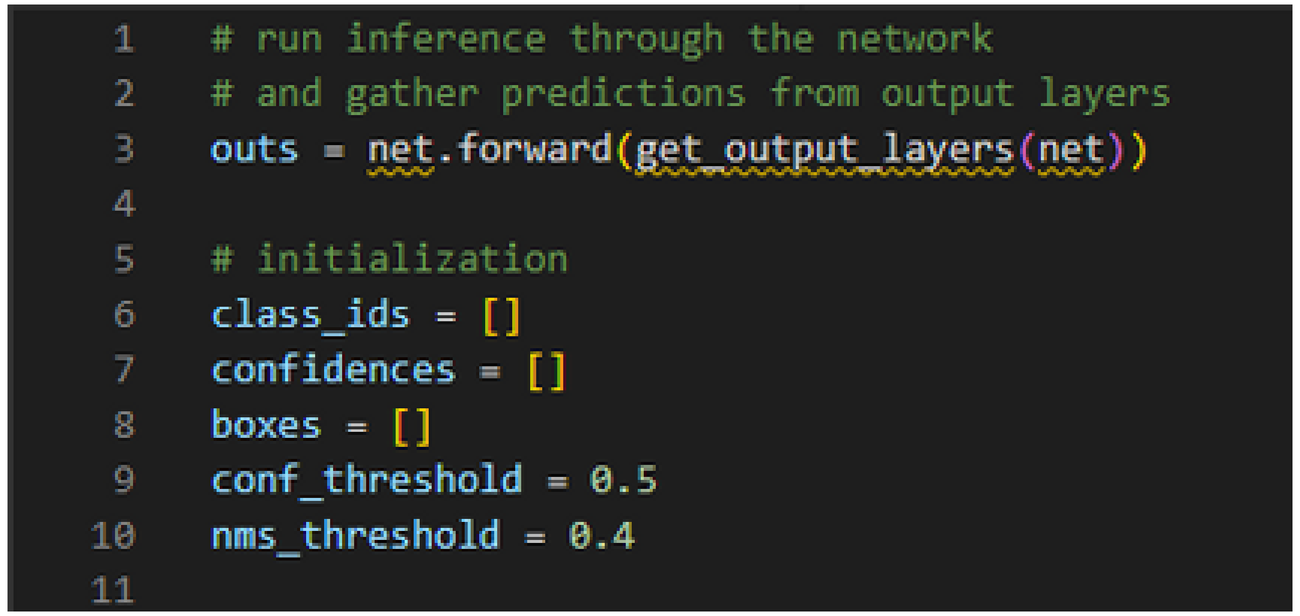
```python
# read input image
image = cv2.imread(args.image)

Width = image.shape[1]
Height = image.shape[0]
scale = 0.00392

# read class names from text fil
classes = None
with open(args.classes, 'r') as f:
    classes = [line.strip() for line in f.readlines()]

# generate different colors for different classes
COLORS = np.random.uniform(0, 255, size=(len(classes), 3))

# read pre-trained model and config file
net = cv2.dnn.readNet(args.weights, args.config)

# create input blob
blob = cv2.dnn.blobFromImage(image, scale, (416,416), (0,0,0), True, crop=False)

# set input blob for the network
net.setInput(blob)
```

Output layer and bounding box

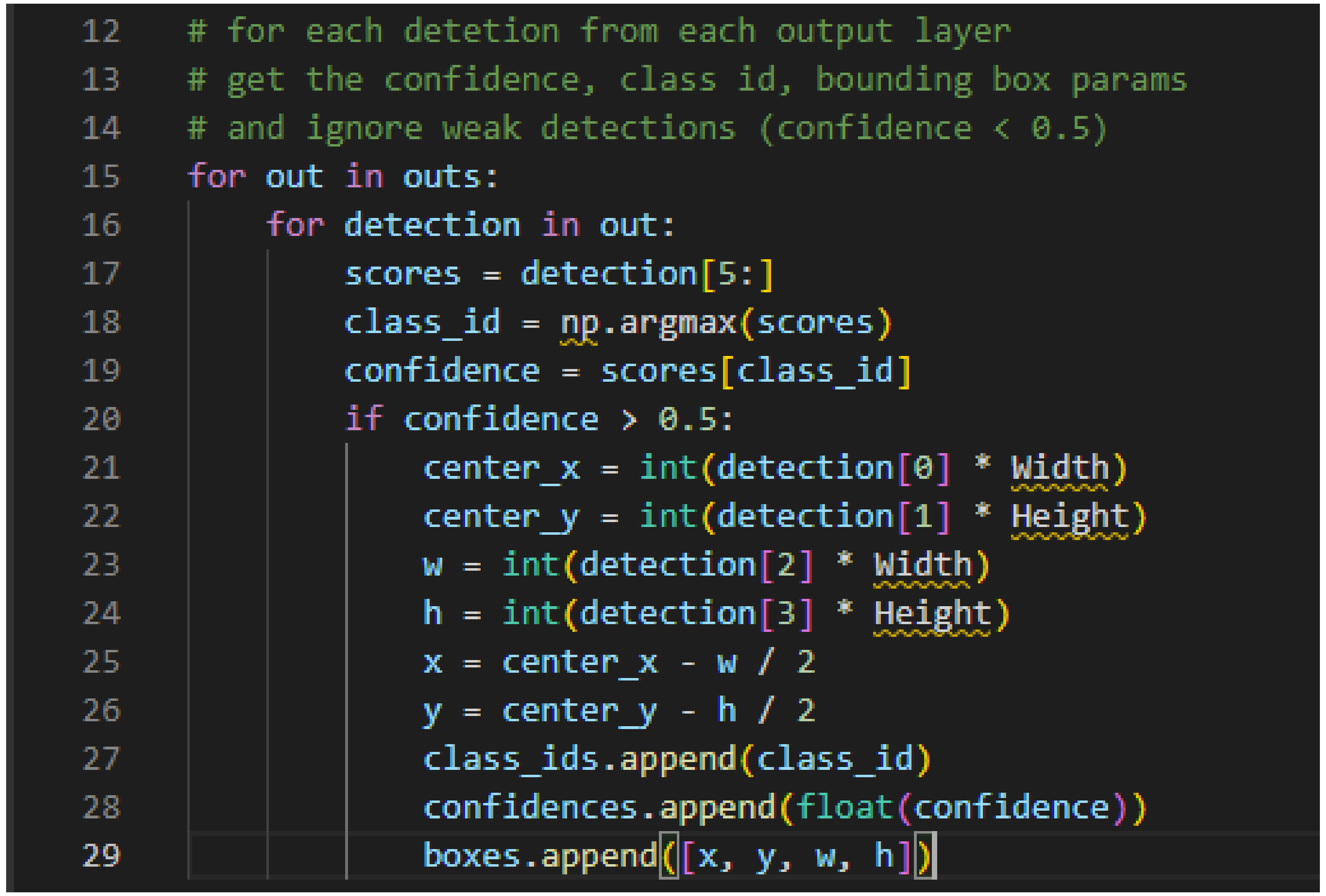


```python
# function to get the output layer names
# in the architecture
def get_output_layers(net):

    layer_names = net.getLayerNames()

    output_layers = [layer_names[i[0] - 1] for i in net.getUnconnectedOutLayers()]

    return output_layers

# function to draw bounding box on the detected object with class name
def draw_bounding_box(img, class_id, confidence, x, y, x_plus_w, y_plus_h):

    label = str(classes[class_id])

    color = COLORS[class_id]

    cv2.rectangle(img, (x,y), (x_plus_w,y_plus_h), color, 2)

    cv2.putText(img, label, (x-10,y-10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, color, 2)
```

Running inference

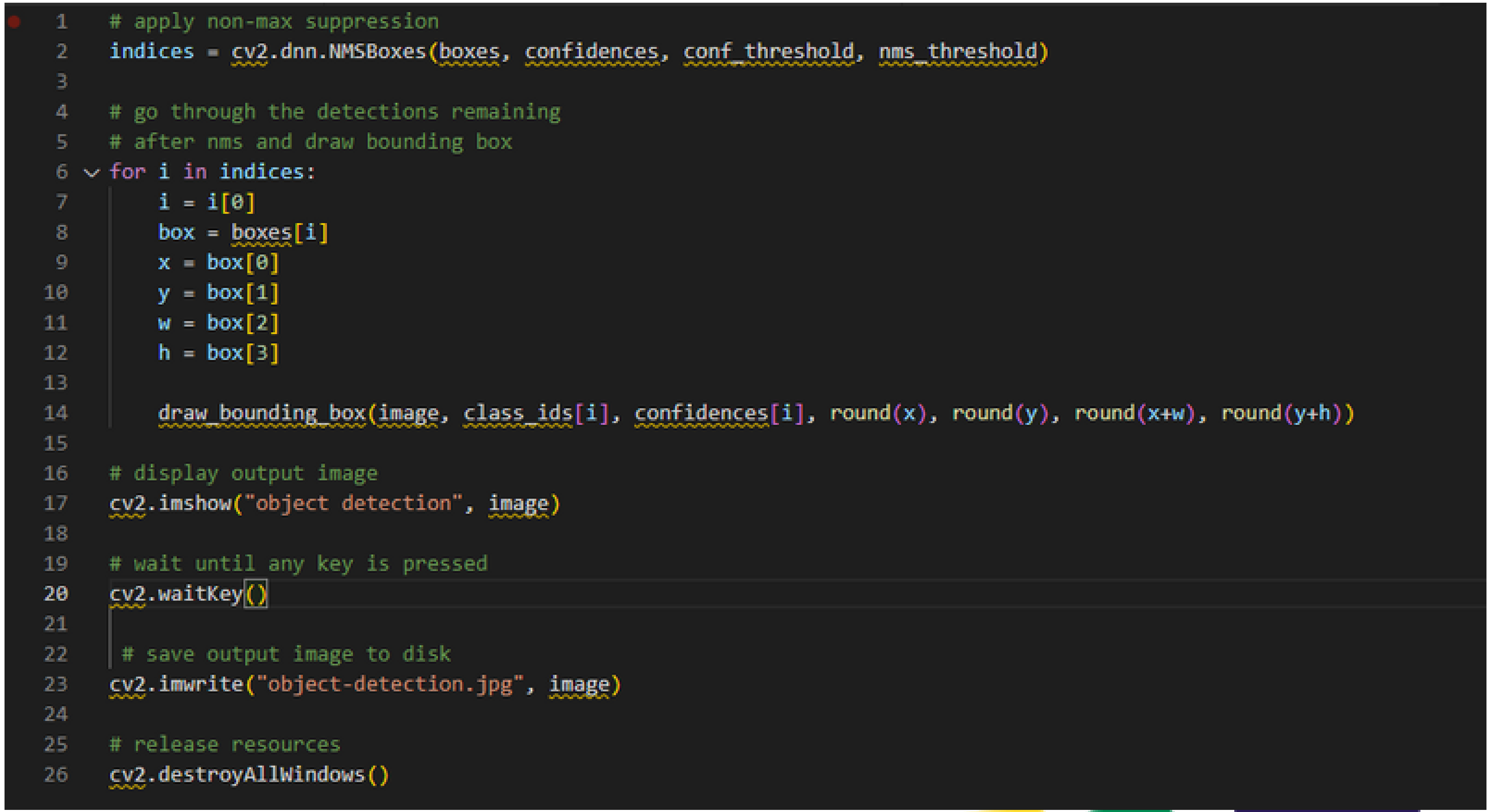


```python
# run inference through the network
# and gather predictions from output layers
outs = net.forward(get_output_layers(net))

# initialization
class_ids = []
confidences = []
boxes = []
conf_threshold = 0.5
nms_threshold = 0.4

```



```python
# for each detetion from each output layer
# get the confidence, class id, bounding box params
# and ignore weak detections (confidence < 0.5)
for out in outs:
    for detection in out:
        scores = detection[5:]
        class_id = np.argmax(scores)
        confidence = scores[class_id]
        if confidence > 0.5:
            center_x = int(detection[0] * Width)
            center_y = int(detection[1] * Height)
            w = int(detection[2] * Width)
            h = int(detection[3] * Height)
            x = center_x - w / 2
            y = center_y - h / 2
            class_ids.append(class_id)
            confidences.append(float(confidence))
            boxes.append([x, y, w, h])
```

Non-max suppression



```python
# apply non-max suppression
indices = cv2.dnn.NMSBoxes(boxes, confidences, conf_threshold, nms_threshold)

# go through the detections remaining
# after nms and draw bounding box
for i in indices:
    i = i[0]
    box = boxes[i]
    x = box[0]
    y = box[1]
    w = box[2]
    h = box[3]

    draw_bounding_box(image, class_ids[i], confidences[i], round(x), round(y), round(x+w), round(y+h))

# display output image
cv2.imshow("object detection", image)

# wait until any key is pressed
cv2.waitKey()

# save output image to disk
cv2.imwrite("object-detection.jpg", image)

# release resources
cv2.destroyAllWindows()
```

Daftar Pustaka

- *https://towardsdatascience.com/yolo-object-detection-with-opencv-and-python-21e50ac599e9*
- *https://www.geeksforgeeks.org/download-and-install-pip-latest-version/*
- *https://www.geeksforgeeks.org/how-to-install-opencv-for-python-in-windows/*
- *https://ichi.pro/id/algoritma-yolo-pendekatan-orang-awam-96166096596081*
- *https://numpy.org/install/*

Terima Kasih

Semoga Bermanfaat