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**Lab 10-I**

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In [2]: import cv2
import numpy as np

net = cv2.dnn.readNet("yolov3.weights", "yolov3.cfg")
layer_names = net.getLayerNames()
output_layers = [layer_names[i[0] - 1] for i in [net.getUnconnectedOutLayers()]]

with open("coco.names", "r") as f:
    classes = [line.strip() for line in f.readlines()]

cap = cv2.VideoCapture(0)

while True:
    ret, frame = cap.read()
    height, width, channels = frame.shape

    blob = cv2.dnn.blobFromImage(frame, 0.00392, (416, 416), (0, 0, 0), True,
    net.setInput(blob)
    outs = net.forward(output_layers)

    class_ids = []
    confidences = []
    boxes = []

    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 = int(center_x - w / 2)
                y = int(center_y - h / 2)

                boxes.append([x, y, w, h])
                confidences.append(float(confidence))
                class_ids.append(class_id)

    indexes = cv2.dnn.NMSBoxes(boxes, confidences, 0.5, 0.4)

    for i in range(len(boxes)):
        if i in indexes:
            x, y, w, h = boxes[i]
            label = str(classes[class_ids[i]])
            confidence = confidences[i]
            color = (0, 255, 0)
            cv2.rectangle(frame, (x, y), (x + w, y + h), color, 2)
            cv2.putText(frame, f"{label} {confidence:.2f}", (x, y - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, color)

    cv2.imshow("YOLOv3 Object Detection", frame)

    if cv2.waitKey(1) & 0xFF == ord('q'):
        break

```

```
cap.release()  
cv2.destroyAllWindows()
```

**The code was able to detect me, my mom, and my book in one single frame.**