In [1]:

```python
# import the necessary packages
from tensorflow.keras.applications.mobilenet_v2 import preprocess_input
from tensorflow.keras.preprocessing.image import img_to_array
from tensorflow.keras.models import load_model
from imutils.video import VideoStream
import numpy as np
import imutils
import time
import cv2
import os
```

In [2]:

```python
def detect_and_predict_mask(frame, faceNet, maskNet):
        # grab the dimensions of the frame and then construct a blob
        # from it
        (h, w) = frame.shape[:2]
        blob = cv2.dnn.blobFromImage(frame, 1.0, (224, 224),
                (104.0, 177.0, 123.0))

        # pass the blob through the network and obtain the face detections
        faceNet.setInput(blob)
        detections = faceNet.forward()
        print(detections.shape)

        # initialize our list of faces, their corresponding locations,
        # and the list of predictions from our face mask network
        faces = []
        locs = []
        preds = []

        # loop over the detections
        for i in range(0, detections.shape[2]):
                # extract the confidence (i.e., probability) associated with
                # the detection
                confidence = detections[0, 0, i, 2]

                # filter out weak detections by ensuring the confidence is
                # greater than the minimum confidence
                if confidence > 0.5:
                        # compute the (x, y)-coordinates of the bounding box for
                        # the object
                        box = detections[0, 0, i, 3:7] * np.array([w, h, w, h])
                        (startX, startY, endX, endY) = box.astype("int")

                        # ensure the bounding boxes fall within the dimensions of
                        # the frame
                        (startX, startY) = (max(0, startX), max(0, startY))
                        (endX, endY) = (min(w - 1, endX), min(h - 1, endY))

                        # extract the face ROI, convert it from BGR to RGB channel
                        # ordering, resize it to 224x224, and preprocess it
                        face = frame[startY:endY, startX:endX]
                        face = cv2.cvtColor(face, cv2.COLOR_BGR2RGB)
                        face = cv2.resize(face, (224, 224))
                        face = img_to_array(face)
                        face = preprocess_input(face)

                        # add the face and bounding boxes to their respective
                        # lists
                        faces.append(face)
                        locs.append((startX, startY, endX, endY))

        # only make a predictions if at least one face was detected
        if len(faces) > 0:
                # for faster inference we'll make batch predictions on *all*
                # faces at the same time rather than one-by-one predictions
                # in the above `for` loop
                faces = np.array(faces, dtype="float32")
                preds = maskNet.predict(faces, batch_size=32)

        # return a 2-tuple of the face locations and their corresponding
        # locations
        return (locs, preds)
```

In [5]:

```python
# load our serialized face detector model from disk
prototxtPath = "C:/Users/Devanshi/Downloads/Face-Mask-Detection-master/face_detector/deploy.prototxt"
weightsPath = "C:/Users/Devanshi/Downloads/Face-Mask-Detection-master/face_detector/res10_300x300_ssd_iter_140000.caffemodel"
faceNet = cv2.dnn.readNet(prototxtPath, weightsPath)

# load the face mask detector model from disk
maskNet = load_model("mask_detector.model")

# initialize the video stream
print("[INFO] starting video stream...")
vs = VideoStream(src=0).start()

# loop over the frames from the video stream
while True:
        # grab the frame from the threaded video stream and resize it
        # to have a maximum width of 400 pixels
        frame = vs.read()
        frame = imutils.resize(frame, width=400)

        # detect faces in the frame and determine if they are wearing a
        # face mask or not
        (locs, preds) = detect_and_predict_mask(frame, faceNet, maskNet)

        # loop over the detected face locations and their corresponding
        # locations
        for (box, pred) in zip(locs, preds):
                # unpack the bounding box and predictions
                (startX, startY, endX, endY) = box
                (mask, withoutMask) = pred

                # determine the class label and color we'll use to draw
                # the bounding box and text
                label = "Mask" if mask > withoutMask else "No Mask"
                color = (0, 255, 0) if label == "Mask" else (0, 0, 255)

                # include the probability in the label
                label = "{}: {:.2f}%".format(label, max(mask, withoutMask) * 100)

                # display the label and bounding box rectangle on the output
                # frame
                cv2.putText(frame, label, (startX, startY - 10),
                        cv2.FONT_HERSHEY_SIMPLEX, 0.45, color, 2)
                cv2.rectangle(frame, (startX, startY), (endX, endY), color, 2)

        # show the output frame
        cv2.imshow("Frame", frame)
        key = cv2.waitKey(1) & 0xFF

        # if the `q` key was pressed, break from the loop
        if key == ord("q"):
                break

# do a bit of cleanup
cv2.destroyAllWindows()
vs.stop()
```

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