```
from IPython.display import display, Javascript, Image
from google.colab.output import eval_js
from base64 import b64decode, b64encode
import cv2
import numpy as np
import PIL
import io
import html
import time

# function to convert the JavaScript object into an OpenCV imag
def js_to_image(js_reply):
  """
  Params:
          js_reply: JavaScript object containing image from wel
  Returns:
          img: OpenCV BGR image
  """
  # decode base64 image
  image_bytes = b64decode(js_reply.split(',')[1])
  # convert bytes to numpy array
  jpg_as_np = np.frombuffer(image_bytes, dtype=np.uint8)
  # decode numpy array into OpenCV BGR image
  img = cv2.imdecode(jpg_as_np, flags=1)

  return img

# function to convert OpenCV Rectangle bounding box image into
def bbox_to_bytes(bbox_array):
  """
  Params:
          bbox_array: Numpy array (pixels) containing rectangl
  Returns:
        bytes: Base64 image byte string
  """
  # convert array into PIL image
  bbox_PIL = PIL.Image.fromarray(bbox_array, 'RGBA')
  iobuf = io.BytesIO()
  # format bbox into png for return
  bbox_PIL.save(iobuf, format='png')
  # format return string
  bbox_bytes = '{}'.format((str(b64encod

  return bbox_bytes
face_cascade = cv2.CascadeClassifier(cv2.samples.findFile(cv2.

def take_photo(filename='photo.jpg', quality=0.8):
  js = Javascript('''
    async function takePhoto(quality) {
      const div = document.createElement('div');
      const capture = document.createElement('button');
      capture.textContent = 'Capture';
      div.appendChild(capture);
```

NameError NameError

Please explain the error:

```
NameError: name 'video_stream' is n
```

Hypothesis

The error message `NameError: name 'video_stream' is not defined` indicates that the function `video_stream()` is being called before it has been defined or imported. This is likely because the user either forgot to define it, import it from a module, or accidentally misspelled it.

Suggested Changes

The code is attempting to use a function called `video_stream` but it has not been defined or imported from any module. It looks like the user is trying to use the `js2py` library for JavaScript-to-Python interoperability in the context of a web application likely dealing with video streams.

```
!pip install js2py opencv-python

import cv2
import js2py
import numpy as np

# Assume these are the intended Ja
js_code = """
function video_stream() {
  // Implementation for starting
  // ... (using browser APIs or o
}

function video_frame(label_html,
  // Implementation for fetching
  // ... (potentially using browse
```

```
      const video = document.createElement('video');
      video.style.display = 'block';
      const stream = await navigator.mediaDevices.getUserMedia

      document.body.appendChild(div);
      div.appendChild(video);
      video.srcObject = stream;
      await video.play();

      // Resize the output to fit the video element.
      google.colab.output.setIframeHeight(document.documentEle

      // Wait for Capture to be clicked.
      await new Promise((resolve) => capture.onclick = resolve

      const canvas = document.createElement('canvas');
      canvas.width = video.videoWidth;
      canvas.height = video.videoHeight;
      canvas.getContext('2d').drawImage(video, 0, 0);
      stream.getVideoTracks()[0].stop();
      div.remove();
      return canvas.toDataURL('image/jpeg', quality);
    }
    ''')
  display(js)

  # get photo data
  data = eval_js('takePhoto({})'.format(quality))
  # get OpenCV format image
  img = js_to_image(data)
  # grayscale img
  gray = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)
  print(gray.shape)
  # get face bounding box coordinates using Haar Cascade
  faces = face_cascade.detectMultiScale(gray)
  # draw face bounding box on image
  for (x,y,w,h) in faces:
      img = cv2.rectangle(img,(x,y),(x+w,y+h),(255,0,0),2)
  # save image
  cv2.imwrite(filename, img)

  return filename

try:
  filename = take_photo('photo.jpg')
  print('Saved to {}'.format(filename))

  # Show the image which was just taken.
  display(Image(filename))
except Exception as err:
  # Errors will be thrown if the user does not have a webcam or
  # grant the page permission to access it.
  print(str(err))

def video_stream():
  js = Javascript('''
```

```
    return { "img": "..." }; // Plac
}

function js_to_image(img_data) {
  // Implementation for converting
  // ... (using appropriate conver
  return new Image(); // Placehold
}

function bbox_to_bytes(bbox_array)
  // Implementation for converting
  // ... (using appropriate encodi
  return ""; // Placeholder, adapt
}
"""

# Execute the JavaScript code to c
context = js2py.EvalJs()
context.execute(js_code)

# Access the JavaScript functions
video_stream = context.video_strea
video_frame = context.video_frame
js_to_image = context.js_to_image
bbox_to_bytes = context.bbox_to_by

# Load the face detection cascade
face_cascade = cv2.CascadeClassifi

# start streaming video from webca
video_stream()
# label for video
label_html = 'Capturing...'
# initialze bounding box to empty
bbox = ''
count = 0
while True:
    js_reply = video_frame(label_h
    if not js_reply:
        break

    # convert JS response to OpenC
    img = js_to_image(js_reply["im

    # create transparent overlay
    bbox_array = np.zeros([480,640
```

```
var video;
var div = null;
var stream;
var captureCanvas;
var imgElement;
var labelElement;

var pendingResolve = null;
var shutdown = false;

function removeDom() {
   stream.getVideoTracks()[0].stop();
   video.remove();
   div.remove();
   video = null;
   div = null;
   stream = null;
   imgElement = null;
   captureCanvas = null;
   labelElement = null;
}

function onAnimationFrame() {
  if (!shutdown) {
    window.requestAnimationFrame(onAnimationFrame);
  }
  if (pendingResolve) {
    var result = "";
    if (!shutdown) {
      captureCanvas.getContext('2d').drawImage(video, 0, 0
      result = captureCanvas.toDataURL('image/jpeg', 0.8)
    }
    var lp = pendingResolve;
    pendingResolve = null;
    lp(result);
  }
}

async function createDom() {
  if (div !== null) {
    return stream;
  }

  div = document.createElement('div');
  div.style.border = '2px solid black';
  div.style.padding = '3px';
  div.style.width = '100%';
  div.style.maxWidth = '600px';
  document.body.appendChild(div);

  const modelOut = document.createElement('div');
  modelOut.innerHTML = "Status:";
  labelElement = document.createElement('span');
  labelElement.innerText = 'No data';
  labelElement.style.fontWeight = 'bold';
  modelOut.appendChild(labelElement);
```

```
# grayscale image for face det
gray = cv2.cvtColor(img, cv2.C

# get face region coordinates
faces = face_cascade.detectMul
# get face bounding box for ov
for (x,y,w,h) in faces:
  bbox_array = cv2.rectangle(i

bbox_array[:,:,3] = (bbox_arra
# convert overlay of bbox into
bbox_bytes = bbox_to_bytes(bbo
# update bbox so next frame ge
bbox = bbox_bytes
```

Use code with caution

Explanation of Changes:

1. **Install necessary libraries:** `!pip install js2py opencv-python` to install required libraries if not already present.
2. **Import necessary libraries:** `import cv2`, `import js2py`, `import numpy as np` to import the required modules.
3. **Define or import missing functions:** The code snippet introduces placeholders for `video_stream`, `video_frame`, `js_to_image`, and `bbox_to_bytes`. You should replace these placeholders with actual implementations specific to your environment or library usage. We used `js2py` to demonstrate how the user could define these functions using JavaScript syntax and access those functions within Python.
4. **Load face cascade:** The line `face_cascade = cv2.CascadeClassifier(cv2.data. + 'haarcascade_frontalface_defaul` loads the Haar Cascade classifier

```
    div.appendChild(modelOut);

    video = document.createElement('video');
    video.style.display = 'block';
    video.width = div.clientWidth - 6;
    video.setAttribute('playsinline', '');
    video.onclick = () => { shutdown = true; };
    stream = await navigator.mediaDevices.getUserMedia(
        {video: { facingMode: "environment"}});
    div.appendChild(video);

    imgElement = document.createElement('img');
    imgElement.style.position = 'absolute';
    imgElement.style.zIndex = 1;
    imgElement.onclick = () => { shutdown = true; };
    div.appendChild(imgElement);

    const instruction = document.createElement('div');
    instruction.innerHTML =
        '' +
        'When finished, click here or on the video to stop tl
    div.appendChild(instruction);
    instruction.onclick = () => { shutdown = true; };

    video.srcObject = stream;
    await video.play();

    captureCanvas = document.createElement('canvas');
    captureCanvas.width = 640; //video.videoWidth;
    captureCanvas.height = 480; //video.videoHeight;
    window.requestAnimationFrame(onAnimationFrame);

    return stream;
  }
  async function stream_frame(label, imgData) {
    if (shutdown) {
      removeDom();
      shutdown = false;
      return '';
    }

    var preCreate = Date.now();
    stream = await createDom();

    var preShow = Date.now();
    if (label != "") {
      labelElement.innerHTML = label;
    }

    if (imgData != "") {
      var videoRect = video.getClientRects()[0];
      imgElement.style.top = videoRect.top + "px";
      imgElement.style.left = videoRect.left + "px";
      imgElement.style.width = videoRect.width + "px";
      imgElement.style.height = videoRect.height + "px";
      imgElement.src = imgData;
```

for face detection using OpenCV.

Make sure the path is correct.

▶ Sources

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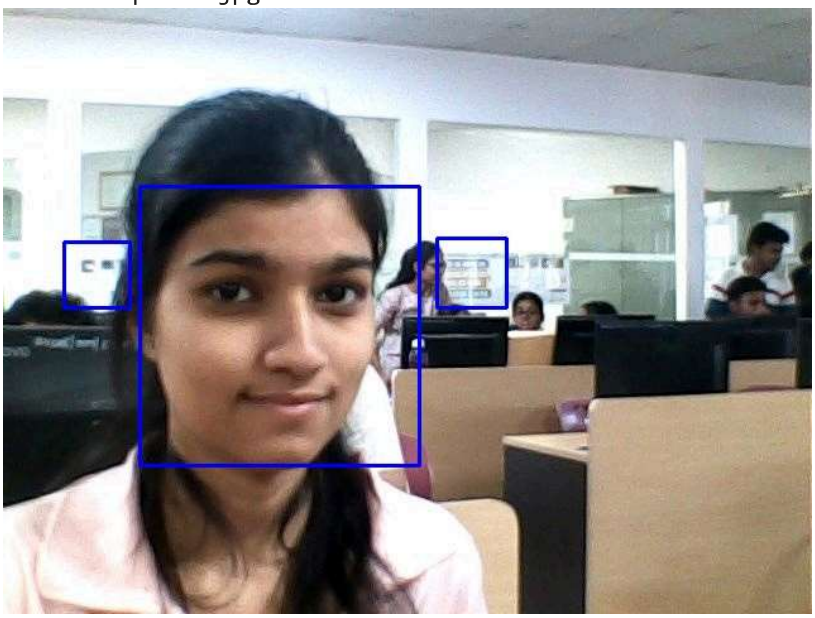
```
          imgElement.src = imgData;
        }

        var preCapture = Date.now();
        var result = await new Promise(function(resolve, reject)
          pendingResolve = resolve;
        });
        shutdown = false;

        return {'create': preShow - preCreate,
                'show': preCapture - preShow,
                'capture': Date.now() - preCapture,
                'img': result};
      }
      ''')

    display(js)

  def video_frame(label, bbox):
    data = eval_js('stream_frame("{}", "{}")'.format(label, bbox
    return data

  video_stream()
  # label for video
  label_html = 'Capturing...'
  # initialze bounding box to empty
  bbox = ''
  count = 0
  while True:
      js_reply = video_frame(label_html, bbox)
      if not js_reply:
          break

      # convert JS response to OpenCV Image
      img = js_to_image(js_reply["img"])

      # create transparent overlay for bounding box
      bbox_array = np.zeros([480,640,4], dtype=np.uint8)

      # grayscale image for face detection
      gray = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)

      # get face region coordinates
      faces = face_cascade.detectMultiScale(gray)
      # get face bounding box for overlay
      for (x,y,w,h) in faces:
        bbox_array = cv2.rectangle(bbox_array,(x,y),(x+w,y+h),(2

      bbox_array[:,:,3] = (bbox_array.max(axis = 2) > 0 ).astype
      # convert overlay of bbox into bytes
      bbox_bytes = bbox_to_bytes(bbox_array)
      # update bbox so next frame gets new overlay
      bbox = bbox_bytes
```

```
(480, 640)
Saved to photo.jpg
```



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