WK7 Report

Pre-trained Face Detector

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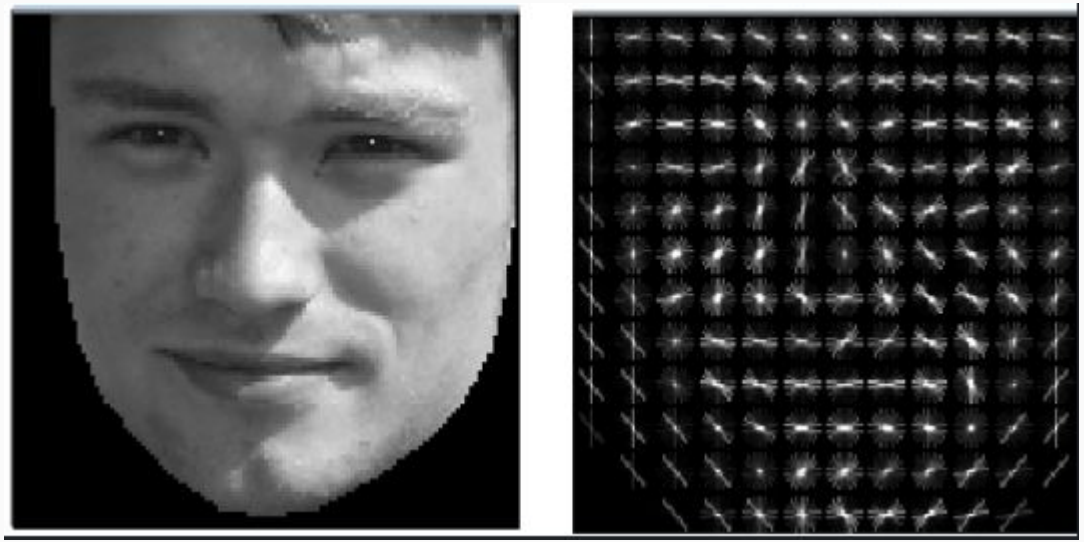
OpenFace

OpenFace 2.2.0: a facial behavior analysis toolkit

Facial Landmark Detection

Facial Feature Extraction



Source:

WHY MTCNN

- Faces can be captured with > 99% accuracy using MTCNN model.

- Then, unify the image size (e.g. 224, 224, 3)

```
[8]
from PIL import Image
import numpy as np

def extract_face(filename, required_size=(224, 224)):
  # load image from file
  pixels = pyplot.imread(filename)
  # create the detector, using default weights
  detector = MTCNN()
  # detect faces in the image
  results = detector.detect_faces(pixels)
  # extract the bounding box from the first face
  x1, y1, width, height = results[0]['box']
  x2, y2 = x1 + width, y1 + height
  # extract the face
  face = pixels[y1:y2, x1:x2]
  # resize pixels to the model size
  image = Image.fromarray(face)
  image = image.resize(required_size)
  face_array = np.asarray(image)
  return face_array
a = extract_face("/content/drive/MyDrive/American_Universit
print(a.shape)
```

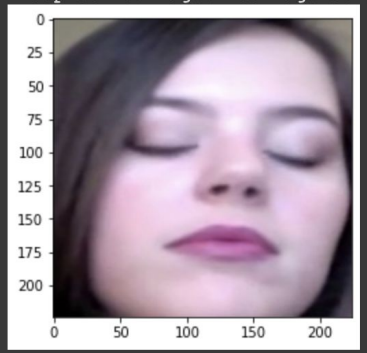
Extract the faces by using MTCNN

Real

```
(224, 224, 3)
```

```
1 plt.imshow(a)
```

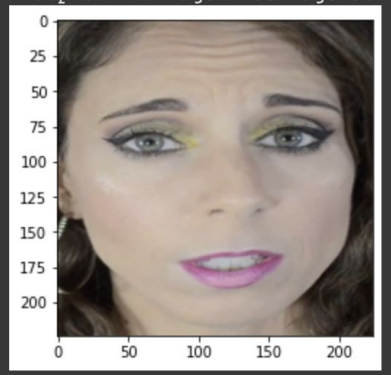
```
<matplotlib.image.AxesImage at 0x7f375eeaa710>
```




```
(224, 224, 3)
```

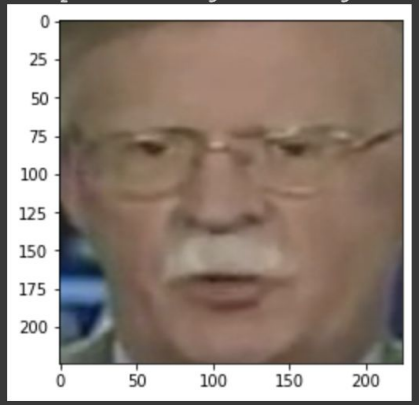
```
1 plt.imshow(a)
```

```
<matplotlib.image.AxesImage at 0x7f375e4706
```




```
1 plt.imshow(a)
```

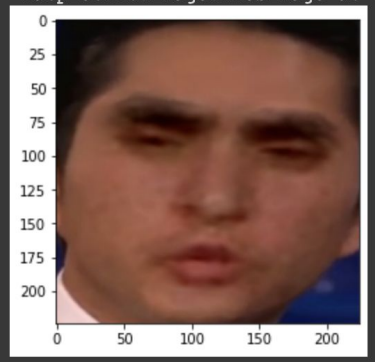
```
<matplotlib.image.AxesImage at 0x7f375e4
```



Extract the faces by using MTCNN

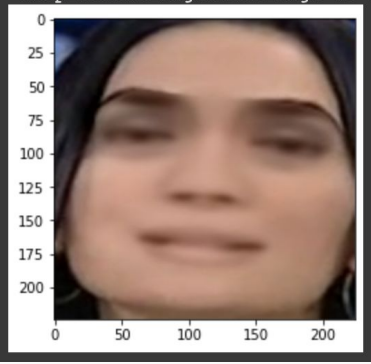
Deepfake


```
(224, 224, 3)

[ ]  1 plt.imshow(a)

<matplotlib.image.AxesImage at 0x7f44bfe6bc50>
```




```
(224, 224, 3)

1 plt.imshow(a)

<matplotlib.image.AxesImage at 0x7f37669cc690>
```


```
(224, 224, 3)

1 plt.imshow(a)

<matplotlib.image.AxesImage at 0x7f376693ef10>
```



Before building ML models

- numpy.ndarray.flatten()
- Decomposition? (e.g. SVD)
- Normalization? (eg. 0-255 to 0-1)
- Mean subtraction for each pixel?

ML Workflow


X train
y train
fake
fake
fake
244x244x3x720
N x 1
real
real
real
244x244x3x720
N x 1
Modelname.fit(X, y).predict(Xtest)