About Face Mask Segmentation & Recognition

What is Face recognition?

“Say hello to the future” the tagline of iPhoneX marked the advent of face recognition into mainstream apps using it as a feature to unlock the phone. This marks a milestone in itself as far as facial recognition technology is concerned.

- Deepa Naik

Facial recognition is a category of biometric software that maps an individual's facial features mathematically and stores the data as a face print. The software uses deep learning algorithms to compare a live capture or digital image to the stored face print in order to verify an individual's identity.

Facial Recognition is being used in many businesses

You’re used to unlocking your door with a key, but maybe not with your face. As strange as it sounds, our physical appearances can now verify payments, grant access and improve existing security systems. Protecting physical and digital possessions is a universal concern which benefits everyone unless you’re a cybercriminal or a kleptomaniac of course. Facial biometrics are gradually being applied to more industries, disrupting design, manufacturing, construction, law enforcement, and healthcare.

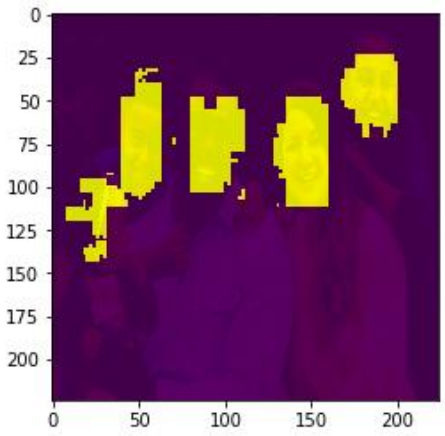
Understanding Face Recognition Software

Face recognition deals with Computer Vision a discipline of Artificial Intelligence and uses techniques of image processing and deep learning. Face recognition algorithms can be further classified based on whether they are used on 2D or 3D images or on finding faces in motion, like in a video.

Face Mask Segmentation vs. Face Recognition

Though they sound similar, the complexity involved in both is vastly different. In Face Mask Segmentation, the computer recognizes the face within an image and segments it by masking the pixels of interest. Face recognition deals with identification to establish whose face it is by matching it to an existing face database. You can refer to the images below for the distinction.

Face Mask Segmentation



Face recognition

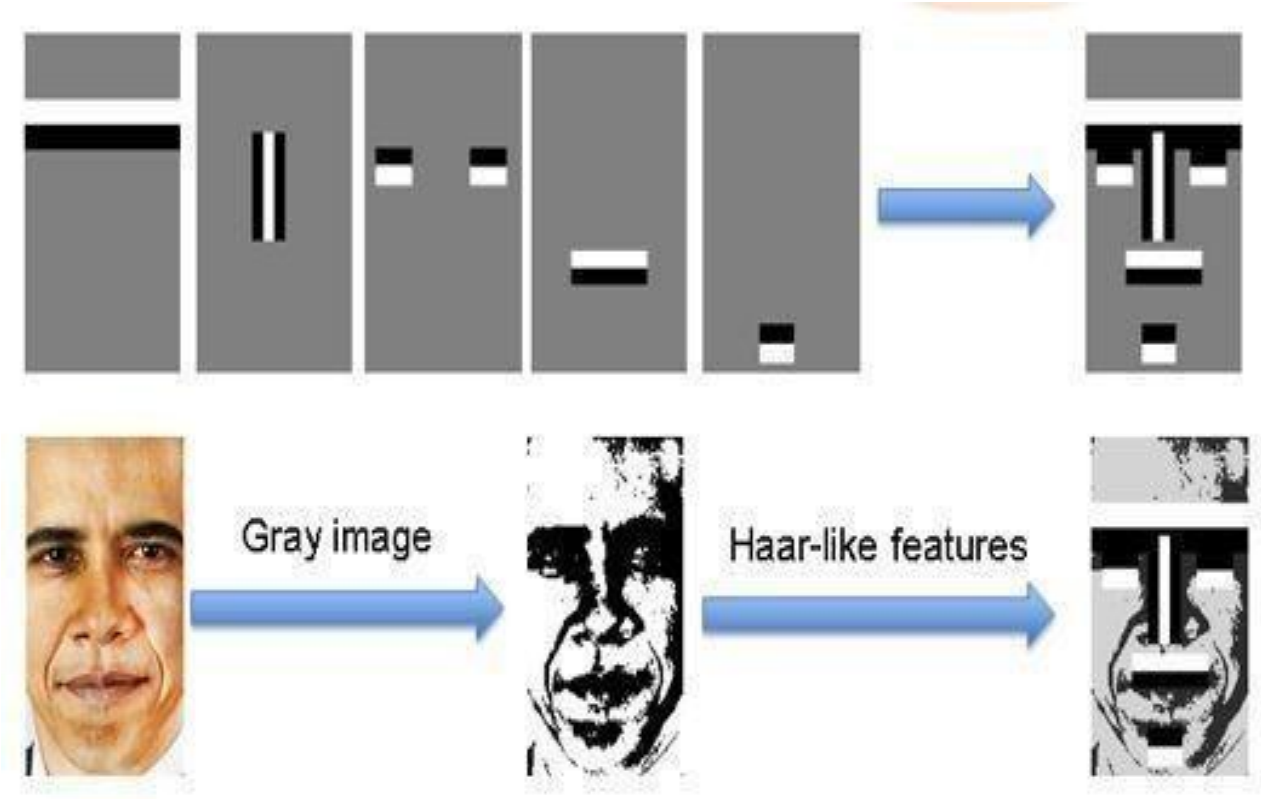
Apart from identification, other typical features are

- **Emotion Detection**
- **Age Detection**
- **Gender Detection**
- **Attention Measurement**
- **Sentiment Detection**
- **Ethnicity Detection**

How Does Face Recognition Work?

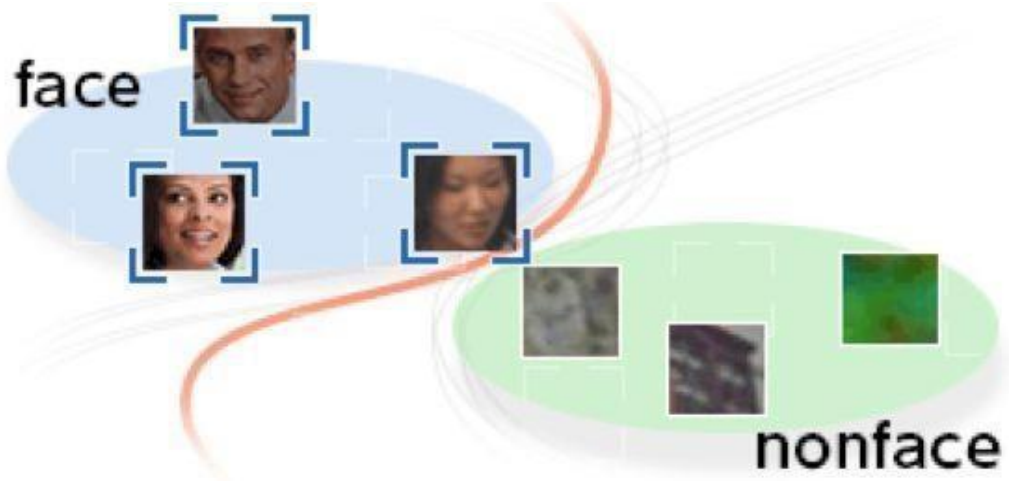
Until the year 2000, there were many different techniques to detect the face, but all were either slow or unreliable, or both. A major change happened in 2001, when Viola and Jones invented the Haar-based cascade classifier, a technique used to identify objects and it was improved by Lienhart and Maydt in 2002. The result of identifying objects was fast enough (identifying in real-time on normal PC) and was reliable (more than 95% accuracy).

There are two approaches to facial recognition: Feature-Based Face Recognition and Appearance-Based Face Recognition. Haar-like features are the rectangle which is divided into different rectangles. First, the image is grayscale, then the haar-like features (rectangle) are shifted through the image, comparing similar image rectangles with Haar-like features, similar ones are marked.



The following are three main steps in the face recognition using haar-like method:
Step

1. Detects the “position of the face”



Step 2. Finds the “feature of the face”

Step 3. Search and identify of the “detected face” in the database.