

Facial Recognition Using Deep Learning

Convolutional Neural Networks allow us to extract a wide range of features from images. Turns out, we can use this idea of feature extraction for face recognition too! That's what we are going to explore in this tutorial, using deep conv nets for face recognition. *Note: this is face **recognition** (i.e. actually telling whose face it is), **not** just detection (i.e. identifying faces in a picture).*

The approach we are going to use for face recognition is fairly straight forward. The key here is to get a deep neural network to produce a bunch of numbers that describe a face (known as face encodings). When you pass in two different images of the same person, the network should return similar outputs (i.e. closer numbers) for both images, whereas when you pass in images of two different people, the network should return very different outputs for the two images. This means that the neural network needs to be trained to automatically identify different features of faces and calculate numbers based on that. The output of the neural network can be thought of as an identifier for a particular person's face — if you pass in different images of the same person, the output of the neural network will be very similar/close, whereas if you pass in images of a different person, the output will be very different.

Here are the steps we will be taking:

1. **Detect**/identify faces in an image (using a face detection model) — for simplicity, this tutorial will only use images with one face/person in it, not more/less
2. Predict face poses/**landmarks** (for the faces identified in step 1)
3. Using data from step 2 and the actual image, calculate face **encodings** (numbers that describe the face)
4. **Compare** the face encodings of known faces with those from test images to tell who is in the picture