**Week 4 – Notes**

**What is face recognition?**

The large majority of face recognition systems have auxiliary “liveness detection” systems that detects if the “face” is of a real person or if it’s an image of a face

There is a difference between face verification and face recognition.

Verification: input image and name / ID; output whether the input image is that of the claimed person

Recognition: has a database of K people; input image; output ID if the image is any of the K people or “not recognized”; the recognition problem is much harder than the verification one; if you have a verification system with 99% accuracy and want to use it for a recognition task where you have K =100, it will do very bad

**One-shot learning**

Learning from one example to recognize the person again

You have a system trained on a data set that has images with many people, each people having multiple associated images and then you want to recognize new people only by having one new “training” example

You cannot use a CNN that has as output a neuron with a softmax function that as many classes as different people, because when you add a new person, you have to retrain everything

Instead, a similarity function is learned d(img1, img2) = degree of difference between images and if d(img1, img2) <= theta => “same”, else “different”

A group of people with arrows drawn on them

Description automatically generated

**Siamese Network**

To compute that distance metric, we want to encode the images in a more compact and meaningful representation

That representation can be obtained if we pass the images through a CNN and the computed distance of these 2 representations is basically a squared norm

A diagram of blue cubes

Description automatically generated

Parameters of the CNN define the encoding f(x) and the network learns the parameters so that:

A close up of words

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