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*(week 4) face recognition *

→ what is face recognition

- face verification: input image, name, ID → output whether the input image is that of the claimed person (confirms if 2 imgs are same person)
- Recognition: has a database of K persons, get input image → output ID if the image is any of the K persons (identify who the person is)

→ One-shot learning

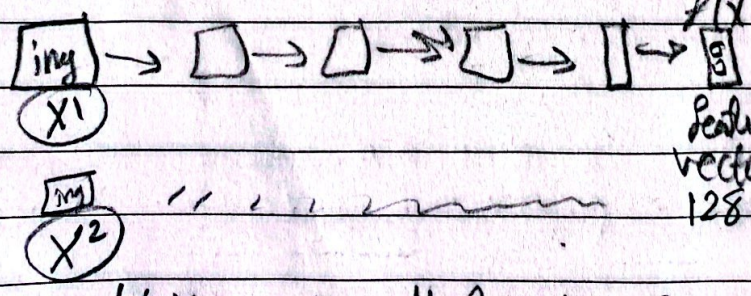
- its is one of the challenges facing face recognition that is need to be solve which is for most facial recognition app. require recognize a person from only one given photo
- learning Similarity function: d(img1, img2): degree of diff bet 1 & 2
  - if d(img1, img2) ≤ T same
  - > T diff.

→ This allows us to solve the one shot learning

→ Siamese Network

- The role of the function d() was to input 2 faces & tell me how similar or different they are from each other a good way to do this is to use a siamese network

ex:



- we feed x_1 & x^2 to the same NN with same param. & get diff vector of 128

$$d(x_1, x_2) = \| f(x^1) - f(x^2) \|_2^2$$

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→ triplet loss } we apply GD on it

• one way to train the variables of a NN to get good encdg of face image is to define & apply GD to triplet loss fun
• it is used with one shot learning & Siamese to train the model

→ face verification & binary classification

• triplet is good way to learn the variables of face recognition net.
• another way to train NN is to use these two (x_1) & (x_2) and then input these into a logistic regression unit to make prediction $\hat{y} = \sigma\left(\sum_{k=1}^{128} w_k \left| f(x^{(i)})_k - f(x^{(j)})_k \right| + b\right)$

→ What is neural style transfer?

• one of the most interesting app. of NN

→ what are deep ConvNets learning.

• we want to know what the shallow & the deeper layers of NN are computing.

→ Cost function

• to create NN style transformation sys. lets define Cost fun for the generated image

Content C | Style S | Generat G

• we measure $J(G)$ that measures how good the generated output
• $J(G) = \alpha J_{content}(C,G) + \beta J_{style}(S,G)$

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→ Content cost function

• Cost fun. of the NN style trans. algorithm has a Content Cost Component ① & a style cost component ②

• overall cost function: $J(G) = \alpha J_{cont}(C,G) + \beta J_{style}(S,G)$

→ style cost fun.

• measures the diff in style between the generated image & the style image