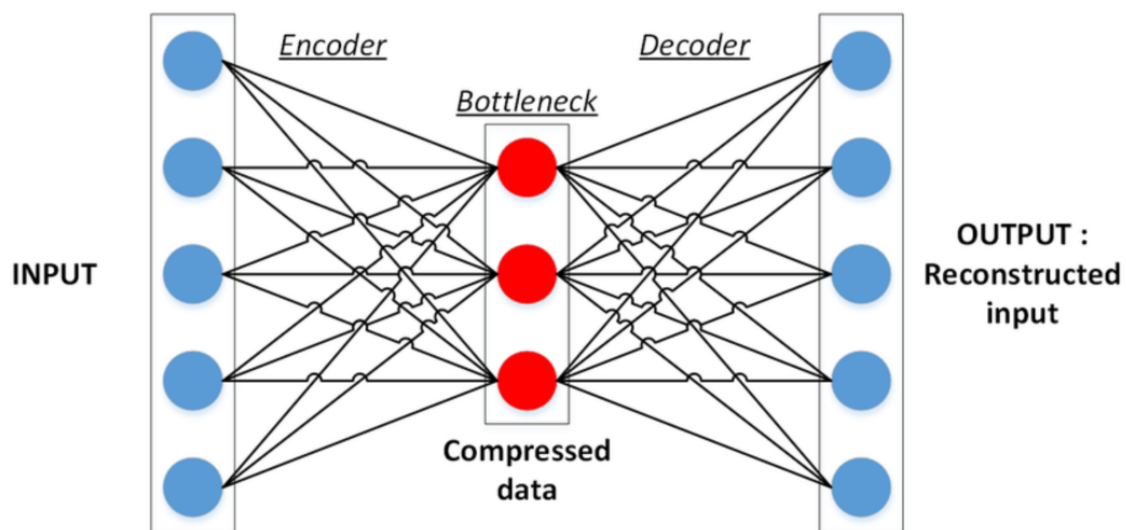Name: Rahul Vijayvargiya
Student ID: 245784

Assignment 5: Neural Networks and Deep Learning

Autoencoders and Siamese Neural Networks:

Autoencoder is a technique in Deep learning which we gonna use for our assignment to decompress the image into latent view and decode the image from latent view based on encoding and decoding layers,

- Encoder: Learns how to compress the original input into a small encoding
- Decoder: Learns how to restore the original data from that encoding generated by the Encoder
- Bottleneck is the latent view, where compressed data is store in latent form

Siamese Neural Networks: is a technique in a deep learning to identify the similarities between images, face recognition,
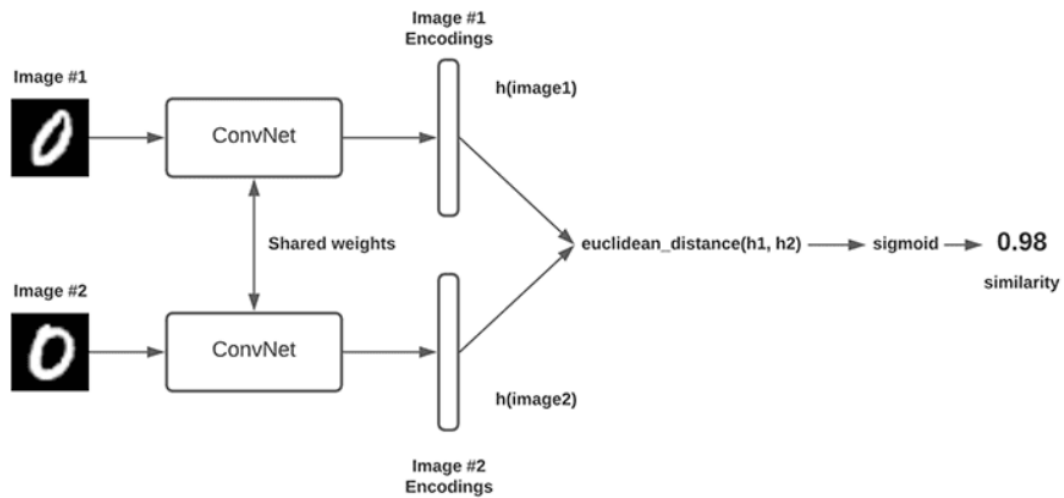
Description about Data:

Source: [Totally Looks Like Dataset](#)

Data we have in image format, two folders left and right, more than 6000 images in jpg format available in the dataset, open source and free to use dataset, need to process the image in order to use with Autoencoder and Siamese Neural Network Algorithms

Data Preprocessing:

So our dataset is a bunch of images, i use glob and path functions to read all the images from the directory and combine both images from the folders left and right, read images through openCV imread method and decode into array and tensorflow decode to jpg and use tensorflow slices to use a slices of array

Experiments:

Using of different activations functions relu and sigmoid in autoencoders, training data with resnet, changing epochs and batch size of the model

model loss

model loss

model loss

Code

Original

Reconstructed
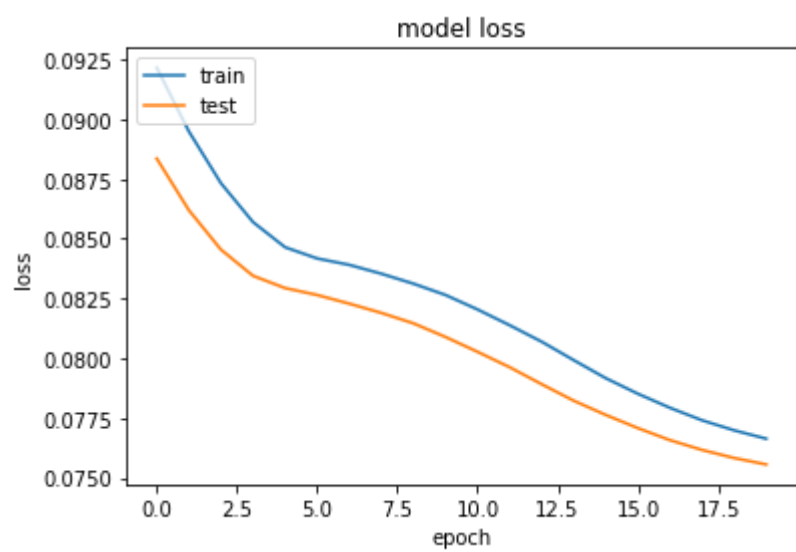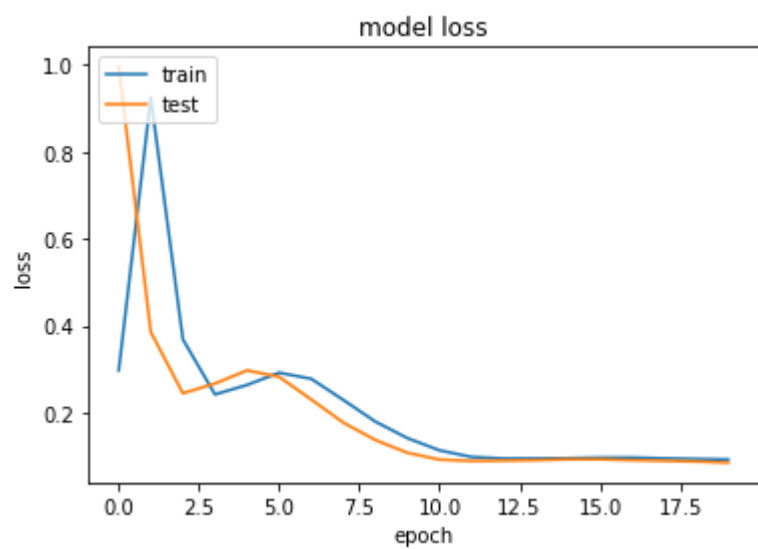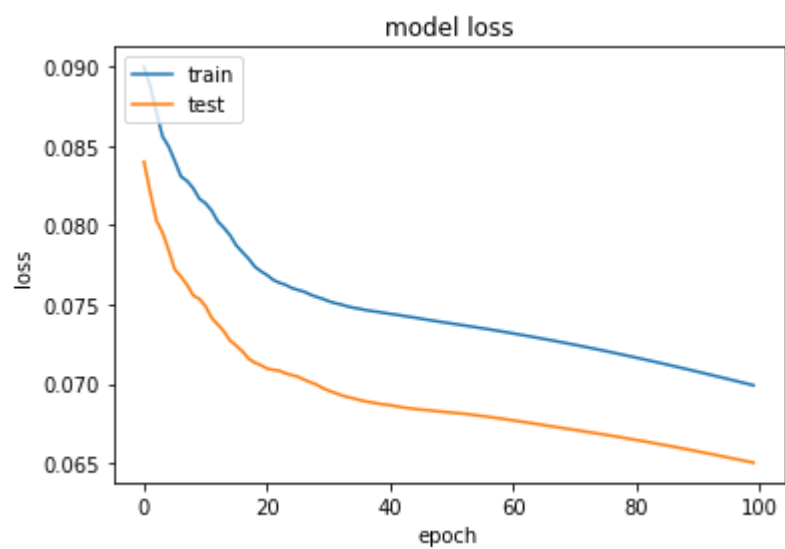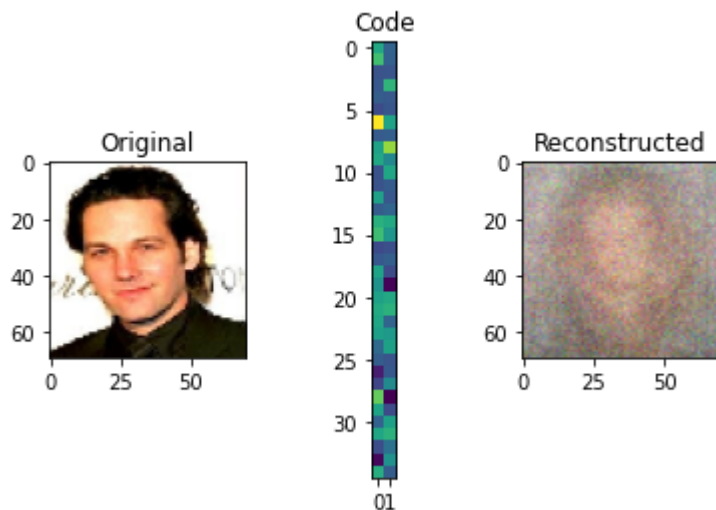
Different parameter gave us different result so far we didn't obtain any concrete result for which we were using autoencoder

With the siamese neural network we did achieve the result, we compares images and found similarities in the images

Encoded and decoded images :
Positive similarity: 0.99747443
Negative similarity 0.996416

Overview:

So far i learned more about neural networks, how they worked, how to train autoencoders and siamese neural network using tensorflow and keras api,
How to preprocess images dataset, convert images into numpy arrays and decode images, playing with RGB scales and convert data type of images

Sources:

https://stackabuse.com/autoencoders-for-image-reconstruction-in-python-and-keras/

https://keras.io/examples/vision/siamese_network/

https://towardsdatascience.com/how-to-generate-images-using-autoencoders-acfbc6c3555e

https://towardsdatascience.com/a-friendly-introduction-to-siamese-networks-85ab17522942