Autoencoders for image quality improvement with Omhu

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As a company, Omhu's goal is to help people with severe skin conditions basing its diagnosis, supported by professional expertise of dermatologists on the photos sent by its clients. This project is entrenched within its machine learning department and aims to enhance the quality of the smartphone photographs that are the starting point of every diagnosis. Many issues from which those photos are suffering makes it extremely tricky to come up with solid conclusions of the patient's problem. Those are, among others, blurr, poor lightning and visible grain.

Our goal is to develop a type of neural network known as autoencoder that would solve this problem by removing each photograph issue and enhancing its quality so that it would be feasible to determine patients' condition. By manually applying transformations which imitate common issues with received patient's photographs to the data set of good quality images, we will train our network to reconstruct its former properties. That would enable specialists and other networks used during diagnosis to work efficiently despite significant variation in received data quality.

In order to achieve our final goal and not deviate from our path we have set up certain milestones that when obtained and combined would create a final shape of the network. These are:

- Data visualization and noise implementation to Cifar10 dataset
- Developing autoencoder and autodecoder for applied noise in Cifar10 dataset
- Introducing a functionality for enhancing Cifar10 elements resolution
- Improving results of implemented model
- Applying our algorithm on real-life photo dataset - optional

We start with visualizing our data set - in this case we decided to use CIFAR 10, and introducing noise to its images. Having done that we could move towards developing the network itself. At this stage we would like it to removed applied in the previous step noise. Afterwards we will work on the functionality that would improve CIFAR 10 images quality after they would be cleansed from any issues. In the next step we will try to achieve better results with our model. We assume that each step will take us approximately one week to implement and test. As an option we would like to try to deploy our model with real life data - a set of photographs sent by the clients, but that will be determined on a later date depending on our progress.

References:

CIFAR10 dataset: https://www.cs.toronto.edu/~kriz/cifar.html

Cats vs dogs dataset: https://www.kaggle.com/c/dogs-vs-cats/overview