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Assignment Sheet Nr. 5

Question 1

Architecture

Our neural network is composed of one input layer with $3 * 192 * 108$ input neurons, 7 hidden layers and one output layer with one only neuron. Each input neuron gets a color value of a pixel, while output neuron gives values in the range $[0, 1]$.

The number of neurons in each layer are represented by the following schema:

$$3 * 192 * 108 \rightarrow 30 \rightarrow 30 \rightarrow 30 \rightarrow 30 \rightarrow 20 \rightarrow 20 \rightarrow 20 \rightarrow 1$$

Each hidden layer applies the CeLU function to the outputs of neurons. To the output neuron the system applies the Sigmoid function.

The network uses the Stochastic Gradient Descent as optimizer.

Explanation

This architecture is the result of many tests with different kinds of activation functions, a high variance of neurons for each layer and a number of hidden layers included between 1 and 10.

We noticed that the upper bound of layers is 8, the accuracy drops after that threshold. If we added more neurons per layer than the ones in the current setup, the network can't significantly increase the accuracy at each time step. Furthermore, this is helpful to lower the complexity of the network.