On the growth of parameters of approximating neural networks

Erion Morina[1]

[1] University of Graz
morina.erion@hotmail.com

This talk focuses on the analysis of fully connected feed forward ReLU-neural networks as they approximate a given, smooth function. In contrast to conventionally studied universal approximation properties under increasing architectures, e.g. in terms of width or depth of the networks, we are concerned with the asymptotic growth of the parameters of approximating networks. Such results are of interest, e.g., for computing generalization errors or for proving consistency results for neural network training. The main result of our work is that, for a ReLU architecture which is known to achieve an optimal approximation error, the realizing parameters grow at most polynomially. The obtained rate with respect to normalized network size is compared to existing results and shown to be superior in most cases, in particular for high dimensional input.

Joint work with: Martin Holler (University of Graz).