

Mathematical Neuroscience SEMINAR

Artificial Neural Networks For Pattern Recognition: How Does The Network Learn The Patterns ?

Murat Özbayoğlu

Department of Computer Engineering, TOBB ETU

An Artificial Neural Networks (ANN) model is one of the most popular methods used in the Pattern Recognition (PR) problem, where an input feature vector is either classified into a certain number of output classes (pattern classification) or prediction of continuous output variable (s) (regression) is implemented. In either case, a similar problem arises, the ANN must learn the patterns that are introduced to it. This is an optimization process of choosing the optimum network parameters, such as number of layers, number of inputs, network weights, activation function, number of patterns, size of the data set, etc. Most of the time, an analytical solution to this optimization problem is not feasible, not only due to the number of parameters involved (can be in the order of thousands) but also optimizing the process based on the training data itself generally is not the best course of action (overfitting, memorizing the patterns). Hence, an iterative process approach is chosen where the network weights are adjusted so that the error at the output is minimized and instead of finding the optimum solution based on the training data, early stopping of the learning process is implemented by optimizing the Cross Validation (CV) data. As a result, generalization (not memorization) of the data is achieved. Results from different practical pattern recognition problems indicate that this approach has better recognition performance in general when unseen data is introduced to the trained network.

Undergraduate students are also welcome.

Date: Thursday, June 21, 2012

Time: 16:30

Place: M-203 Seminar Room, Department of Mathematics, METU

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