

Title: Methods of artificial intelligence and their use in prediction

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Abstract: In the presented thesis we study field of artificial intelligence, in particular we study part dedicated to artificial neural networks. At the beginning, concept of artificial neural networks is introduced and compared to it's biological base. Afterwards, we also compare neural networks to some generalized linear models. One of the main problems of neural networks is their learning. Therefore biggest part of this work is dedicated to learning algorithms, especially to parameter estimation and specific computational aspects. In this part we attempt to bring in an overview of internal structure of neural network and to propose enhancement of learning algorithm. There are lots of techniques for enhancing and enriching basic model of neural networks. Some of these improvements are, together with genetic algorithms, introduced at the end of this work. At the very end of this work simulations are presented, where we attempt to verify some of the introduced theoretical assumptions and conclusions. Main simulation is an application of concept of neural networks on a problem of prediction of number of goals during an ice-hockey match.

Keywords: Neural network, Prediction, TwoStepNNL, Sport modeling