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# DOBD Algorithm for Training Neural Network: Part I. Method

WU Jian-yu (吴建昱)，HE Xiao-rong (何小荣)

Department of Chemical Engineering, Tsinghua University, Beijing 100084，China

摘要　Overfitting is one of the important problems that restrain the application of neural network. The traditional OBD (Optimal Brain Damage) algorithm can avoid overfitting effectively. But it needs to train the network repeatedly with low calculational efficiency. In this paper, the Marquardt algorithm is incorporated into the OBD algorithm and a new method for pruning network－the Dynamic Optimal Brain Damage (DOBD) is introduced. This algorithm simplifies a network and obtains good generalization through dynamically deleting weight parameters with low sensitivity that is defined as the change of error function value with respect to the change of weights. Also a simplified method is presented through which sensitivities can be calculated during training with a little computation. A rule to determine the lower limit of sensitivity for deleting the unnecessary weights and other control methods during pruning and training are introduced. The training course is analyzed theoretically and the reason why DOBD algorithm can obtain a much faster training speed than the OBD algorithm and avoid overfitting effectively is given.

关键词　neural network　DOBD algorithm　Marquardt　overfitting　pruning　training　method

分类号　N945.12

**DOI:**

对应的英文版文章: 2022-016

通讯作者:

作者个人主页: WU Jian-yu (吴建昱);HE Xiao-rong (何小荣)

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