A COMPARATIVE STUDY OF WORD SENSE DISAMBIGUATION OF ENGLISH MODAL VERB BY BP NEURAL NETWORK AND SUPPORT VECTOR MACHINE

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Abstract. *This paper applies back propagation neural network (BP NN) and support vector machine (SVM) approaches in the word sense disambiguation (WSD) of English modal verb 'must' and compares the effects of WSD by the two models. First of all, a BP NN and a SVM for the WSD of English modal verb 'must' are established, respectively, and both reach an ideal correct disambiguation rate (98%). Then, based on the two models, a further investigation is carried out to see the influence of different features on the results of WSD of 'must'. After that, the two models are compared in two aspects: (1) the performance in disambiguating root 'must' from epistemic 'must'; (2) the performance in reflecting the influences of different linguistic (bag and relational) features on the effect of the WSD. The comparative results show that the SVM is more effective and has better generalization ability than the BP NN; however, BP NN is more suitable for investigating the influence of individual linguistic feature on the effect of WSD than SVM. These comparative results provide very useful reference for model selection for WSD and for semantic studies.*
Keywords: Word sense disambiguation, Neural network, Support vector machine, Comparison

Nomenclature
WSD = word sense disambiguation
NN = neural network
BP NN = back propagation neural network
SVM = support vector machine

1. **Introduction.** Word sense disambiguation (WSD) has been an important and significant issue in natural language processing and semantic study. WSD is an "intermediate task" [1], which means that it is not an end work, however, a necessary one in the natural language processing. It is essential for both language understanding applications such as message understanding and man-machine communication, etc. [2] and semantic study. The back propagation neural network (BP NN) and the support vector machine (SVM) are two typical and popular machine learning methods and have both been successfully applied to the model recognition and data classification. BP NN is based on the theory of connectionism [3]. It is a learning algorithm simulating the structure and function of human brains to separate different types of data. SVM is based on the statistic learning theory. It is a machine learning algorithm seeking for solutions of a hyperplane to separate two types of data. Many studies have been conducted on the development and application