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A Hybrid Model Based on Neural Networks for Biomedical Relation

Extraction

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Abstract: Biomedical relation extraction can automatically extract high-quality biomedical relations from biomedical texts, which is a vital step for the mining of biomedical knowledge hidden in the literature. Recurrent neural networks (RNNs) and convolutional neural networks (CNNs) are two major neural network models for biomedical relation extraction. Neural network-based methods for biomedical relation extraction typically focus on the sentence sequence and employ RNNs or CNNs to learn the latent features from sentence sequences separately. However, RNNs and CNNs have their own advantages for biomedical relation extraction. Combining RNNs and CNNs may improve biomedical relation extraction. In this paper, we present a hybrid model for the extraction of biomedical relations that combines RNNs and CNNs. First, the shortest dependency path (SDP) is generated based on the dependency graph of the candidate sentence. To make full use of the SDP, we divide the SDP into a dependency word sequence and a relation sequence. Then, RNNs and CNNs are employed to automatically learn the features from the sentence sequence and the dependency sequences, respectively. Finally, the output features of the RNNs and CNNs are combined to detect and extract biomedical relations. We evaluate our hybrid model using five public (protein-protein interaction) PPI corpora and a (drug-drug interaction) DDI corpus. The experimental results suggest that the advantages of RNNs and CNNs in biomedical relation extraction are complementary. Combining RNNs and CNNs can effectively boost biomedical relation extraction performance.

Key words: relation extraction, recurrent neural networks, convolutional neural networks, biomedical literature

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