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A study on integrating distinct classifiers with bidirectional LSTM for Slot Filling task

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In spite of being investigated for decades, slot filling task in Spoken Language Understanding has been still challenging and attractive to many researchers. This task is simply perceived as sequential labeling in a specific domain. Previously, features fed into a classifier such as Support Vector Machines (SVMs) or Conditional Random Fields (CRFs), are generated manually, which is relatively expensive and time-consuming. Fortunately, that costly work can be solved with a help of deep learning technique which is able to generate and extract potential features automatically during the training period. For sequential data, Recurrent Neural Network (RNNs) are popular models in order to learn latent representations of data, which are then utilized as input to a classifier *Softmax*.

Our proposed model, in contrast, employed a variant of RNNs, called Long Short-Term Memory Networks (LSTMs) which, more or less, tackle the downside of RNNs: vanishing gradients. Additionally, apart from using Softmax for classification, we also experimented integrations of LSTMs and other distinct classifiers, e.g. CRFs and SVMs, which are all trained simultaneously in our model. The experimental results show that these combinations are beneficial and worthing on both dataset Airline Travel Information System (ATIS) and DARPA Communicator, compared with the state-of-the-art model.