

Applied Deep Learning

hw4 report

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1 RNN Model

RNN In this assignment, we have two tasks, both of them can be trained on a same RNN model. There is a encoder and decoder in the RNN model. For machine translation task, use the RNN encoder to encode the input sequences information and use the RNN decoder to decode the sequence. For natural language generation task, this task can be regarded as kind of machine translation task, we can simple unfold the information as input sequence with two output sequence. We need to unfold the information with the a token, and retrieve back the origin meaning of that token. By replacing the information with the token, we can avoid OOV condition and gain better performance.

input: "inform(name='trattoria contadina';pricerange=moderate)",
output: "trattoria contadina is a nice restaurant in the moderate price range"

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input: "inform _NAME_ _PRICERANGE_",
output: "_NAME_ is a nice restaurant in the _PRICERANGE_ price range"

2 Learned and Improvement

Improvement In this task, we can use attention-based RNN to get a better performance. By changing the input of the RNN decoder to the weighted linear combination(Eq 1) the the each time step's output, the decoder model will have more informative feature to decode the right prediction result.

$$c_i = \sum_{j=1}^T \alpha_{i,j} h_j \quad (1)$$

Learned I found that the sequential information can be well modeled by the Recurrent Neural Network. Moreover, we can use Bidirectional RNN to achieve a higher performance, since it can some how capture more informative info from the both direction of the sequence. Pending different length sequence input into same length will get better performance than separating them into different pending length.

References

- [1] Bing Liu, Ian Lane, *Attention-Based Recurrent Neural Network Models for Joint Intent Detection and Slot Filling*, Carnegie Mellon University, 2016.