

A Method of Graph Construction for Dialogue Relation Extraction

Jungwoo Lim¹, Jungbae Park

¹ Computer Science and Engineering,
Korea University, Seoul, Korea
dlawjddn803@gmail.com, insmile@korea.ac.kr

Abstract. Relational extraction is a task of automatically extracting relation between entities from documents or sentences, and is one of the significant fields in natural language processing. Especially, conversational relation extraction has characteristics such as a sparse information compared to a long length and frequently appearing referential pronouns, unlike the existing relation extraction in sentence units, so it is difficult to predict the relation between the subject and the object. In this study, to overcome these difficulties, we construct a dialogue graph considering the characteristics of dialogue.

Keywords: Dialogue Relation Extraction, Graph Construction

1 Introduction

In the field of natural language processing, automatically extracting information is becoming more important with the emergence of vast amounts of corpus and documents. Moreover, information extraction is receiving a lot of attention in natural language processing because it is the basis of the technology for converting unstructured data into structured data [1]. Since a lot of significant information is often contained within a large amount of documents, it is very useful to automatically extract information from these documents. In addition, information extraction has the advantage that information can be applied to techniques such as question and answer and information retrieval.

Relation extraction, which predicts the relationship between two entities in a sentence, is one of the main research areas of information extraction. In relational extraction at the sentence level, entities such as people or groups form the most basic unit of information and are connected by relations (eg, org:subsidiaries). The relation extraction task is a task that automatically selects such a relation, and the predicted result is mainly in the form of a triple of (subject, object, relation) [2]. Sentence-based relation extraction is also widely applied in knowledge base extension and question-and-answer systems, summary, dialogue systems, and information retrieval [3].

The task of extracting relationships in a dialogue is to predict the relationship between the speakers or characters appearing in the dialogue. Since the conversation is colloquial, the information necessary to understand the relationship between the

speakers may be far away, and the ratio of referential pronouns is relatively high [4]. Existing dialogue relationship extraction studies have mainly presented methodologies using graphs, because the structure of the graph can overcome these shortcomings relatively well because the necessary information is located sporadically compared to the length of the conversation [5]. To this end, we suggest a method of constructing graph for dialogue relation extraction.

2 Graph Construction

In this paper, we propose a graph construction method that fully reflects the characteristics of dialogue. We first build the subject and object node embedding using the language model. Then, we also embed each utterance into the embedding node. We then link each node with some rules. If the subject appears in the second utterance, the edge between subject node and the second utterance node is formed. Also, we build an additional advisor node, which enhances the information of the graph by passing “[CLS]+ Dialogue + [subj] + subject + [MASK] + [obj] + object + [SEP].” The embedding of [MASK] then retain the information about the dialogue considering the subject and object, and we call this node as an advisory node.

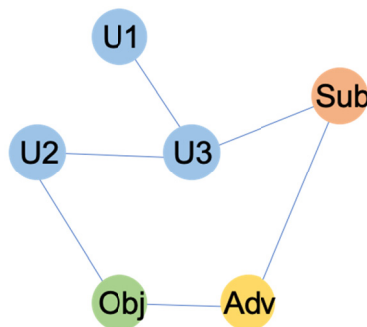


Fig. 1. Figure of our proposed method

3 Conclusions

In this study, we propose a graph construction method for relation extraction specialized for dialogue and use an advice node that considers the spread information and the context of dialogue, subject, and object. We further conduct research on the effectiveness of the graph with comparative experiments and analysis.

4 Acknowledgement

This work was supported by the Technology development Program(S3100955) funded by the Ministry of SMEs and Startups(MSS, Korea) and This research was supported by Basic Science Research Program through the National Research Foundation of Korea(NRF) funded by the Ministry of Education(NRF-2021R1A6A1A03045425)

References

- 1 Pawar, S., Palshikar, G. K., & Bhattacharyya, P. (2017). Relation extraction: A survey. *arXiv preprint arXiv:1712.05191*.
- 2 Smirnova, A., & Cudré-Mauroux, P. (2018). Relation extraction using distant supervision: A survey. *ACM Computing Surveys (CSUR)*, 51(5), 1-35.
- 3 Geng, Z., Chen, G., Han, Y., Lu, G., & Li, F. (2020). Semantic relation extraction using sequential and tree-structured LSTM with attention. *Information Sciences*, 509, 183-192.
- 4 Yu, D., Sun, K., Cardie, C., & Yu, D. (2020). Dialogue-based relation extraction. *arXiv preprint arXiv:2004.08056*.
- 5 Xue, F., Sun, A., Zhang, H., & Chng, E. S. (2021, May). Gdpnet: Refining latent multi-view graph for relation extraction. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 35, No. 16, pp. 14194-14202).