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「Entity-Centric Discourse Analysis and Its Applications」
（エンティティに注目した談話解析とその応用）
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Discourse analysis is proposed to address various problems relating to building meaning from a piece of text. It aims to extract the information carried by a piece of text and present the information in a computer-understandable way. We propose a bottom-up analysis scheme of discourse understanding based on structuralism. The basic idea is to draw meaning from discourse by identifying the components of discourse and the relationships between these components.

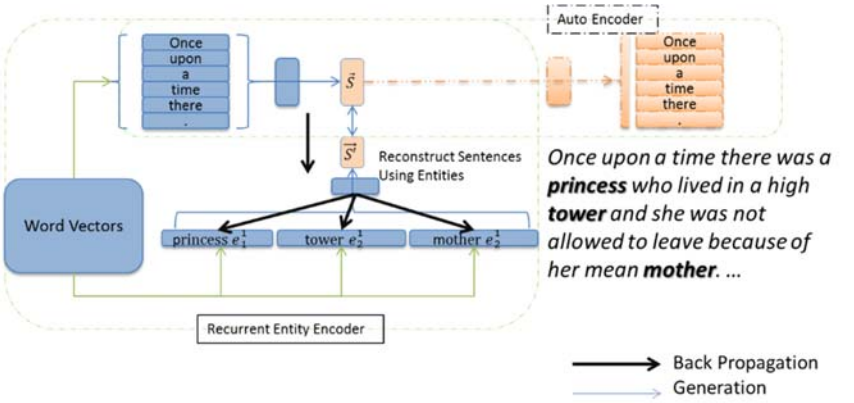

Figure 1 Recurrent Entity Encoder

Discourse corresponds to scenarios in real world. Every discourse unfolds around one or several entities and describes the state of each entity and the relations between them. Thus discourse analysis equals understanding the states of entities and their relationships.

This thesis discusses the problems emerging in conducting bottom-up discourse analysis, including identifying components of discourse, analyzing relations between entities and building meaning representations using entities. To identify the elements in discourse, we firstly need to collect all the entities, both explicit and implicit ones. Recovering implicit elements from discourse is referred to as “empty category” detection. We use a neural network to encode tree-based features into a dense vector and predict and recover empty categories based on the vector. After collecting all the entities, we develop an entity-based meaning representation model. The proposed model encodes information into entity-centric representations. In contrast to most neural network models which rely on an encoder to represent text as vectors, and conduct reasoning or calculation (question answering/translation) using the vector representations, here we focus on using entities to represent meanings of text. With all the entities collected in text, we use a recurrent entity encoder to regenerate the text. The loss is used to update the states of entities so as to encode information contained in text into entities.

These entities and their states are then passed to downstream tasks. For example, In machine translation, the mapping of entities across languages are less volatile, say, mappings like “I-私”, “apple-林檎” always hold no matter how the context changes. External resources like dictionaries can be used to assist the mapping of entities across languages. Other information like the relationships between entities are subject to change. We use an additional relation vector to represent the volatile information. Translation is conducted from two different aspects, entity translation and relation translation. The proposed meaning representation method can also be used in other tasks like question answering as discussed in the thesis.

Our proposed entity-centric representations aim to map discourse to real world scenarios. It helps build strong and robust representations for “general-purpose”. Besides, since most knowledge bases are constructed as entity-centric, these external knowledge can be easily encoded into the proposed scheme. In the future, we will focus on improving entity-centric representations using external knowledge and the interpretability of neural models toward better discourse analysis.