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「Event Centric Approaches in Natural Language Processing」
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Every day, tens of thousands of events happen around the world. People use natural language to record the events they observed and communicate to others about the information of the events. Thus, natural language texts provide us with a way to study the events happening in the real world. In the internet era, a large amount of text data is being published every day. They can come in different forms through different media, such as news articles, social media posts, web articles, just to name a few. With access to this abundant amount of text data, how to automatically extract and analyze the events in these natural language texts has become very critical. By analyzing the natural language data, we can learn about the events that happened in the past, the events happening currently, and predict the events that will happen in the future.

Due to their importance, events have been studied pervasively in natural language processing (NLP). Some works analyze individual events and aim to identify their composing factors from the unstructured natural language text. Other works, on the other hand, focus on the interactions between events and how multiple events are organized into a coherent story in natural language. In addition, many downstream NLP tasks can benefit from incorporating events into the task. In this thesis, we studied three event-centric NLP tasks (Figure 1) that analyze different aspects of events.

We first consider the task of event coreference resolution, in which we aim to find text mentions that refer to the same real-world event. We proposed an iterative transfer learning framework to learn the argument compatibility between event mentions, which is an important indicator of event coreference. The experiments on the benchmark KBP corpora confirm the effectiveness of our proposed method.

Second, we study the narrative event relation between events, which captured the stereotypical ordering of events that are causally or temporally related. We adopted a two-stage framework to acquire narrative event knowledge. We first collect narrative event pairs with statistical significance from an unannotated corpus. Then, we identify the shared arguments between narrative related events.

For the third task, we consider the task of extractive summarization by reframing it as an event saliency identification problem. We proposed a novel heterogeneous graph-based model to explore the relation between not only events but also different granularity of text spans, such as sentences or entities. Experiments on the benchmark CNN/DailyMail dataset illustrated the effectiveness of our proposed method.

We believe the various event-related tasks presented in this thesis provide a thorough study of the events in natural language processing from different aspects. We hope that this thesis will invoke new research ideas for future event-related research.
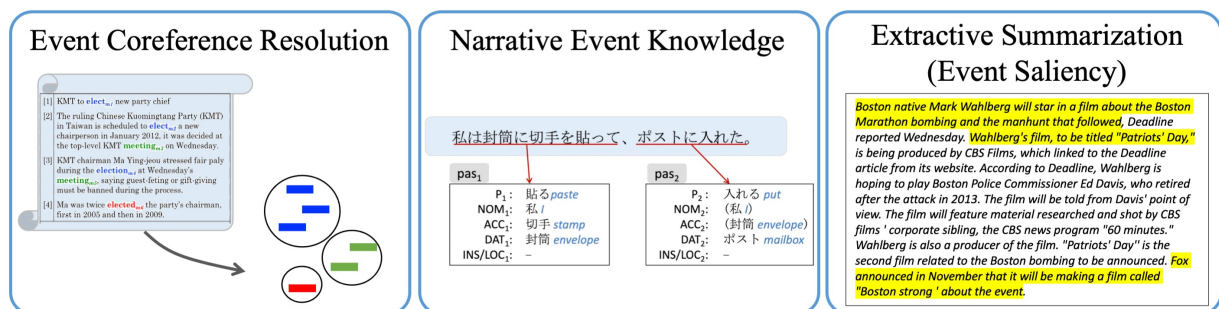

Figure 1: An overview of this thesis.