CogCompTime: A Tool for Understanding Time in Natural Language

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Highlights
- Time is an important dimension. In NLP, there are two fundamental components related to time:
  - Time expressions (Timex; e.g., “yesterday”)
  - Temporal relations (Temprel; e.g., before/after)

CogCompTime extracts these two components from raw text, with the most recent research progress incorporated.

- Transitivity constraints:
  - A → B → C = A → C
  - Highly interrelated and the decision of a relation often depends on other events.

Common Sense on Temporal Ordering (NAACL’18)
- When the verbs are missing, it’s very difficult even for humans to figure out the order. However, if we know that E1 died, and E2 exploded, it’s obvious that E2 > E1 due to our prior knowledge about these events.

The TEMPoral relation PRObabilistic knowledge Base (TEMPROB) is a probabilistic KB that provides the typical temporal ordering between verbs (i.e., temporal ordering common sense). CogCompTime adopts the statistics found in TEMPROB as an additional feature for the temporal relation classifier.

Method Overview
- We adopt a multi-axial modeling approach to temporal relations with
  - Intention/Action
  - Temporal ordering
  - Common sense

- Our approach is a balance between these two, called Multi-axis modeling:
  - We also allow dense modeling, but only within a same axis.

System Overview
- I worked out after finishing my homework yesterday, [DCT-2018-06-01]
  - TemporalChunker (T1: yesterday)
- E1: worked E2: finishing
  - E1 is after E2
- E1 & E2 both on T1
- Temporal Graph
- Time Expression
- Event Extraction
- Temporal Relation
- Visualization

Conclusion
- This paper presents CogCompTime, a state-of-the-art package that extracts from natural language text:
  - time expressions (Timex) and their normalized values
  - events on the main-axis of a story
  - temporal relations (TempRel) between events and Timex.

This demo may be useful for:
- Identifying the shortcomings of existing methods
- Applications that need temporal understanding

Reference

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