Seminar Topics: Information Extraction WS 2022-2023, English topics

Wen Lai

lavine@cis.lmu.de

9th November, 2022



- 1 Text-to-Table
- 2 Universal Information Extraction

Seminar Topics: Information Extraction WS 2022-2023, English topics

Multi-modal Information Extraction

• **Text-to-Table**: Given a text, one creates a table or several tables expressing the main content of the text, while the model is learned from text-table pair data.

The Celtics saw great team play in their Christmas Day win, and it translated to the box score. Boston had 25 assists to just 11 for New York, and the team committed just six turnovers on the night. All-Star Isaiah Thomas once again led Boston with 27 points, while star center Al Horford scored 15 points and stuffed the stat sheet with seven rebounds, five assists, three steals, and two blocks. Third-year point guard Marcus Smart impressed off the bench, dishing seven assists and scoring 15 points including the game - winning three - pointer. New York, meanwhile, saw solid play from its stars. Sophomore big man Kristaps Porzingis had 22 points and 12 rebounds as well as four blocks. All-Star Carmelo Anthony had 29 points, 22 of which came in the second half. Point guard Derrick Rose also had 25 points in one of his highest - scoring outings of the season.

| | - | Celtics | | 25 | | |
|-------------------|---------------|---------|------|--------|----------------|--------|
| \Longrightarrow | | Ass | ists | Points | Total rebounds | Steals |
| | Al Horford | 5 | , | 15 | 7 | 3 |
| | Isaiah Thomas | | | | | |
| | Marcus Smart | 7 | 1 | 15 | | |

Knicks

Carmelo Anthony

Kristaps Porzingis

Derrick Rose

Number of team assists

25

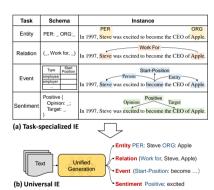
12

Challenges

- How to represent the table data?
 - Three types of table: both column headers and row headers/ column headers/ row headers;
 - The cell of row and column is a sequence of words;
- Which model we need to consider?
 - Consider as a sequence-to-sequence task;
 - Dual task of the Table-to-Text problem.
- Applications
 - Document summarization and text mining;
 - Medical, insurance etc.
- Resources
 - Wu et al., 2022. Text-to-Table: A New Way of Information Extraction. In Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics.

- 1 Text-to-Table
- 2 Universal Information Extraction
- Multi-modal Information Extraction

- Task-specialized IE, which leads to dedicated architectures, isolated models, and specialized knowledge sources for different IE tasks.
 - It is very complicated to develop dedicated architectures for a large amount of IE tasks/settings/scenarios.
 - Learning isolated models severely restricts the knowledge sharing between related tasks and settings.
 - It is costly and time-consuming to construct data sets and knowledge sources specialized for different IE tasks.
- Universal IE, which develop a universal IE architecture that can uniformly model different IE tasks, adaptively predict heterogeneous structures and effectively learn from various resources.



Challenges

- Due to the diversity of IE tasks, there are many different target structures to extract, e.g., entity, relation, event, etc.
- IE tasks are often demand-specific which are defined using different schemas, therefore we need to adaptively control the extraction process.

Resources

- Lu et al., 2022. Unified Structure Generation for Universal Information Extraction. In Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics.
- Kan et al., 2022. A Unified Generative Framework based on Prompt Learning for Various Information Extraction Tasks. arXiv preprint arXiv:2209.11570 (2022)

- 1 Text-to-Table
- Universal Information Extraction
- 3 Multi-modal Information Extraction

8 / 10



(a) [Kolo MISC] loves the sun and is so pretty



(b) [Nasa ORG] produces vintage travel posters for newly discovered planets



(c) Meghan Markle and Prince Harry announce their first official royal tour <Meghan Markle, Prince Harry, couple>



(d) Congrats to Angel and Jesenia Rodriguez on their marriage last night <Angel, Jesenia Rodriguez, couple>

 Multi-modal IE: IE leveraged different data modality: text, visual, speech, XML/HTML.

Challenges

- Which modalities are more useful?
 - Some are more suitable for the multi-modal model, while others are more suitable for the unimodal model.
 - Performance on different modalities are also different.
- How to represent the multi-modal information?
- Which models should we use?

Resources

- Xu et al., 2022. Different Data, Different Modalities! Reinforced Data Splitting for Effective Multimodal Information Extraction from Social Media Posts. In Proceedings of the 29th International Conference on Computational Linguistics.
- Dong et al., 2020. Multi-modal Information Extraction from Text, Semi-structured, and Tabular Data on the Web. In Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics: Tutorial Abstracts.

