

Posudek diplomové práce

Matematicko-fyzikální fakulta Univerzity Karlovy

Autor práce Abhishek Agrawal
Název práce Eye-tracking features in syntactic parsing
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Autor posudku RNDr. Jana Straková, Ph.D. **Role** Oponent
Pracoviště Ústav formální a aplikované lingvistiky

Text posudku:

The diploma thesis “Eye-tracking features in syntactic parsing” explores the contribution of eye-tracking information for dependency parsing. The thesis directly builds on previous publication in this field. Strzyz et al. (2019) assume eye-tracking data is available only during the training phase and they leverage these in a multitask setting. In addition to the mentioned work, the thesis experiments are based on a presumption that the eye-tracking information is available to the dependency parser not only during training phase, but both during training and inference, allowing a broader spectrum of experimental approaches. Namely, the eye-tracking information is added as regular classification features as the input to the dependency parser.

If we set aside that the author suggests replacing expensive manual annotators' labor by more expensive cognitive neuroscience experiments (medical experiments with humans as subjects are expensive and involve far greater amount of bureaucracy), the thesis topic is theoretically intriguing and refreshing one.

From theoretical perspective, the author grasped the topic quite well, showing solid knowledge in two domains: natural language processing and experimental cognitive neuroscience, specifically eye-tracking literature. Also, the experimental procedures are proper and the scientific writing is good.

I do however have a few objections:

Firstly, the thesis appears to have required very little implementation work. It looks like the code used for the experiments is a straightforwardly modified previous source code of Strzyz et al. (2019). The thesis also does not contribute with any new data, because the eye-tracking Dundee treebank is also already available (Barrett, 2015) in which the classification features are already measured, preprocessed and even linguistically annotated and linked to tokens by Barrett et al. (2016) and Hollenstein and Zhang (2019). Therefore, in my opinion, the thesis contribution is limited, as the work is a straightforward injection of the existing features into an existing source code.

Secondly, the numbers in absolute values stay behind the expectations, since all previous work achieved notably higher results, including Strzyz et al. (2019) which this work directly builds on. That is especially suprising given that the experimental setting was richer than that of Strzyz et al. (2019) – classification features vs. multitask setting. Even though in most cases the numbers are not directly comparable due to different data splits, there is room for improvement:

- a) Instead of using 4 year old BIST parser (Kiperwasser and Goldberg, 2016) a state-of-the-art or near SoTA parser might have been a more preferable choice for a secondary parser, e.g. Dozat and Manning (2018) which marcantly surpass Kiperwasser and Goldberg (2016),
- b) de facto standard pretrained word embeddings could have been used (word2vec, FastText) to mitigate the small size of the corpus,
- c) an attempt at hyperparameter tuning could have been made as opposed to blindly adopting all values from previous work.

To conclude, the thesis is written in good English without any spelling or grammatical errors, with rare appearance of informal style and occasional errors (p. 18 clearly misses continuing text, Chapter 4 does not specify which parser is used on the development set).

The work has a standard outline. The typesetting is adequate, all tables and figures are labeled correctly. The amount of research work and the number of experiments is adequate. Work with references is very good.

The author proves that he is capable to conduct research on his own.

I therefore recommend the thesis for defense.

Práci doporučuji k obhajobě.

Práci nenavrhuji na zvláštní ocenění.

Datum 3. 9. 2020

Podpis