Hao Zhu

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Education

Tsinghua University **Beijing, China**
B.Eng in Computer Science and Technology Track *Aug. 2015 - present*

- Member of Natural Language Processing Group
- Advisor: Prof. **Zhiyuan Liu**
- Fellow of Initiative Scientific Research Program

Sevice

Reviewer: EMNLP 2018, NAACL 2019
Review Assistant: IJCAI 2018

Preprints

[1] Graph Neural Networks with Generated Parameters for Relation Extraction
Hao Zhu, *Yankai Lin, Zhiyuan Liu, Jie Fu, Tat-seng Chua and Maosong Sun.*

[2] Neural Finite-State Transducers: Beyond Rational Relations
Chu-Cheng Lin, **Hao Zhu***, Matthew R. Gormley, Jason Eisner*
(* indicates equal contribution and underlines means co-first authors. The followings are of the same function.)

Publications

[3] Iterative Entity Alignment via Joint Knowledge Embeddings
Hao Zhu, Ruobing Xie*, Zhiyuan Liu, Maosong Sun. IJCAI 2017.*

[4] Incorporating Chinese Characters of Words for Lexical Sememe Prediction
Huiming Jin, **Hao Zhu***, Ruobing Xie, Zhiyuan Liu, Maosong Sun, Fen Lin and Leyu Lin. ACL 2018.*

[5] Language Modeling with Sparse Product of Sememe Experts
Yihong Gu, Jun Yan*, **Hao Zhu***, Zhiyuan Liu, Ruobing Xie, Maosong Sun, Fen Lin and Leyu Lin. EMNLP 2018.*

[6] FewRel: A Large-Scale Supervised Few-shot Relation Classification Dataset with State-of-the-Art Evaluation
Xu Han, **Hao Zhu***, Pengfei Yu*, Ziyun Wang*, Yuan Yao, Zhiyuan Liu and Maosong Sun. EMNLP 2018.*

[7] Put It Back: Entity Typing with Language Model Enhancement
*Ji Xin, **Hao Zhu**, Xu Han, Zhiyuan Liu and Maosong Sun. EMNLP 2018.*

[8] Cross-lingual Lexical Sememe Prediction
Fanchao Qi, Yankai Lin*, Maosong Sun, **Hao Zhu**, Ruobing Xie and Zhiyuan Liu. EMNLP 2018.*

Experience

The Johns Hopkins University and Carnegie Mellon University **Baltimore and Pittsburgh, U. S.**
Visiting Student with Prof. Jason Eisner and Prof. Matthew R. Gormley *July 2018 - Dec. 2018*

Neural Finite-State Transducers [2]

- Proposed a new family of models unifying neural seq2seq models and weighted finite-state transducers.
- Proposed an importance sampling method for sampling from globally normalized models.
- Models compete favorably against seq2seq models while offering interpretable paths.

NExT Center, School of Computing, National University of Singapore **Singapore**

Visiting Research Assistant with Prof. Tat-seng Chua *July 2017 - Aug. 2017*

Graph Neural Networks with Generated Parameters for Relation Extraction [1]

- Proposed to utilize Graph Neural Networks (GNNs) to model multi-hop relations.
- Proposed to parameterize GNNs with natural language in order to encode relations into transition matrices flexibly.
- Improve over strong baselines by a large margin in both bag- and instance-level relation extraction.

Natural Language Processing Group, Tsinghua University **Beijing, China**

Undergraduate Research Assistant with Prof. Zhiyuan Liu *Jan. 2016 - present*

Project 1: Iterative Entity Alignment via Joint Knowledge Embeddings. [3]

- Proposed an algorithm to align synonymous entities from different Knowledge Bases automatically.
- Designed a framework to use entity pairs aligned in past iterations to enhance alignment accuracy.
- Experimented on randomly extracted subsets of Freebase 15K and outperformed other state-of-the-art models a lot on entity alignment and knowledge completion tasks.

Project 2: Incorporating Sememes into Natural Language Processing. [4][5]

- Led a group of students working on decomposing words into simpler concepts (sememes) and composing these concepts into words, sentences, etc.
- Studied the relationship between character-level information with words meaning.
- Proposed a language model which can model sememes as latent variable which both improves performance and interpretability. Conducted experiments with two peer students.

Project 3: Few-shot Relation Extraction. [6]

- Proposed the a natural language few-shot classification dataset with state-of-the-art evaluation.
- Built a platform to host three-party evaluation and leaderboard.
- Studied the reason of unsatisfied results of state-of-the-art models compared to human performance.

Honors, Fellowships and Awards

2018: **Scholarship (US$ 1, 500, Top 10 students in Tsinghua University)**, Cai Xiong Scholarship, Tsinghua University. Awarded to students with excellent scientific potential.

2018: **Fellowship (US$ 32, 000, Top 10 students in Tsinghua University)**, Fellowship of the Initiative Scientific Research Program, Tsinghua University. Supported students with excellent research potential and promising research.

2017: **Scholarship**, Outstanding Scholarship for Scientific Research and Innovation of Tsinghua University. Awarded to students with excellent scientific potential.

2017: **Fellowship (Top 50 students in Tsinghua University)**, Fellowship of the 11th "Spark" Innovative Talent Cultivation Program for Students of Tsinghua University. Awarded to students with strong research potential.

2015: **Scholarship**, Outstanding Freshman Scholarship of Tsinghua University. Awarded to students with excellent academic record.

2015: **Prize (Top 10 students in Tianjin)**, Outstanding Student in Tianjin. Awarded to students with excellent comprehensive abilities.

2014: **3rd Prize**, National Olympiad in Informatics. Nation-wide contest on algorithms design and implementation.

2014: **1st Prize**, National Olympiad in Informatics in Provinces. Nation-wide contest on algorithms design and implementation.

Skills

- Familiar with state-of-the-art natural language processing, machine learning and statistics.
- Proficient with PyTorch, Dynet, Tensorflow and Scikit-learn.
- Familiar with necessary Mathematics, such as Probability Theory, Calculus and Linear Algebra