Hangfeng He

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Research Interests

My research interests include machine learning and natural language processing, with a focus on moving beyond scale-driven learning. Specifically, I work on incidental supervision for natural language understanding, interpretability of deep neural networks, reasoning in natural language, and structured data modeling.

Education

University of Pennsylvania, Philadelphia, PA, USA 2017-present
Ph.D., Computer and Information Science
Advisors: Dan Roth and Weijie Su
Peking University, Beijing, China 2013-2017
B.S., Computer Science, *Summa Cum Laude*

Publications

1. Cong Fang, **Hangfeng He**, Qi Long, and Weijie Su (**alphabetical order**). 2021. Exploring Deep Neural Networks via Layer-Peeled Model: Minority Collapse in Imbalanced Training. In *Proceedings of the National Academy of Sciences (PNAS).*
2. **Hangfeng He**, Mingyuan Zhang, Qiang Ning, and Dan Roth. 2021. Foreseeing the Benefits of Incidental Supervision. In *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP).*

3. Zhun Deng, **Hangfeng He**, and Weijie Su. 2021. Toward Better Generalization Bounds With Locally Elastic Stability. In *International Conference on Machine Learning (ICML)*.

4. Ayal Klein, Jonathan Mamou, Valentina Pyatkin, Daniela Brook Weiss, **Hangfeng He**, Dan Roth, Luke Zettlemoyer, and Ido Dagan. 2020. QANom: Question-Answer driven SRL for Nominalizations. In *Proceedings of the 28th International Conference on Computational Linguistics (COLING)*.

5. Shuxiao Chen, **Hangfeng He**, and Weijie Su (**alphabetical order**). 2020. Label-Aware Neural Tangent Kernel: Toward Better Generalization and Local Elasticity. In *Advances in Neural Information Processing Systems (NeurIPS)*.

6. Zhun Deng, **Hangfeng He**, Jiaoyang Huang, and Weijie Su. 2020. Towards Understanding the Dynamics of the First-Order Adversaries. In *International Conference on Machine Learning (ICML)*.

7. **Hangfeng He**, Qiang Ning, and Dan Roth. 2020. QuASE: Question-Answer Driven Sentence Encoding. In *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (ACL)*.

8. Soham Dan, **Hangfeng He**, and Dan Roth. 2020. Understanding Spatial Relations through Multiple Modalities. In *Proceedings of the 12th Language Resources and Evaluation Conference (LREC). Short papers.*

9. **Hangfeng He** and Weijie Su. 2020. The Local Elasticity of Neural Networks. In *International Conference on Learning Representations (ICLR)*.

10. Qiang Ning, **Hangfeng He**, Chuchu Fan, and Dan Roth. 2019. Partial or Complete, That's The Question. In *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT)*.

11. Jingjing Xu, **Hangfeng He**, Xu Sun, Xuancheng Ren, and Sujian Li. 2018. Cross-domain and semisupervised named entity recognition in chinese social media: A unified model. In *IEEE/ACM Transactions on Audio, Speech, and Language Processing (TASLP)*.

12. Federico Fancellu, Adam Lopez, Bonnie Webber, and **Hangfeng He**. 2017. Detecting negation scope is easy, except when it isn't. In *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics (EACL). Short papers.*

13. **Hangfeng He** and Xu Sun. 2017. F-Score Driven Max Margin Neural Network for Named Entity Recognition in Chinese Social Media. In *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics (EACL). Short papers*

14. **Hangfeng He** and Xu Sun. 2017. A Unified Model for Cross-Domain and Semi-Supervised Named Entity Recognition in Chinese Social Media. In *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*.

15. **Hangfeng He**, Federico Fancellu, and Bonnie Webber. 2017. Neural Networks for Negation Cue Detection in Chinese. In *Proceedings of the Workshop Computational Semantics Beyond Events and Roles (SemBEaR)*.

Preprints

1. Shuxiao Chen, Koby Crammer, **Hangfeng He**, Dan Roth, and Weijie Su (**alphabetical order**). 2021. Weighted Training for Cross-Task Learning. In *arXiv preprint*.

2. Matteo Sordello, **Hangfeng He**, and Weijie Su. 2019. Robust Learning Rate Selection for Stochastic Optimization via Splitting Diagnostic. In *arXiv preprint*.

Research Experience

Research Assistant. Peking University 2017
Mentor: Tingting Jiang
Project: Image caption
Research Assistant. University of Edinburgh 2016

Mentor: Bonnie Webber
Project: Negation detection in Chinese
Research Assistant. Peking University 2015
Mentor: Xu Sun
Project: Named entity recognition in Chinese social media

Teaching Experience

University of Pennsylvania

CIS 419/519 Applied Machine Learning Fall 2019
Head Teaching Assistant; Instructor: Dan Roth
CIS 419/519 Applied Machine Learning Spring 2018
Teaching Assistant; Instructor: Dan Roth

Mentoring Experience

Wanping Dong, PKU Undergraduate Student in Applied Math 2021
Worked on understanding the optimization of deep learning with local elasticity.
Gang Wen, PKU Undergraduate Student in Statistics 2021
Worked on understanding the optimization of deep learning with local elasticity.
Celine Lee, Penn Undergraduate Student (Now a PhD at Cornell) 2020
Worked on zero-shot/few-shot event extraction.
Tianyi Zhang, Penn MS Student in Data Science 2020
Worked on zero-shot/few-shot event extraction.
Shikhar Brajesh, Penn MS Student in Computer Science 2019
Worked on extended semantic role labeling.
Chenchen Hu, Penn MS Student in Computer Science (Now at Google) 2018
Worked on extended semantic role labeling.

Zhengyuan Xu, Penn MS Student in Computer Science (Now at Amazon) 2018
Worked on ethnic discrimination in criminal sentencing in China.
Ignacio Arranz, Penn MS Student in Data Science (Now at Reddit) 2018
Worked on self identification on Reddit.
Aditya Kashyap, Penn MS Student in Data Science (Now a PhD at Penn) 2018
Worked on self identification on Reddit.

Professional Service

Program Committee Member
ACL (2019-2021), EMNLP (2019), NAACL (2019)
Conference Reviewer
ICML (2021), NeurIPS (2020), ACL Rolling Review (2021)
Journal Reviewer
IEEE TNNLS (2018-2020)

Honors & Awards

Graduate Fellowship Award, University of Pennsylvania 2017
Outstanding Undergraduate, Peking University 2017
Weiling Scholarship, Peking University 2016
Jianeng Scholarship, Peking University 2015
May Fourth Scholarship, Peking University 2014

Invited Talks

Incidental Supervision for Natural Language Understanding
Invited Talk at USC/ISI AI Seminar, October, 2021

Local Elasticity: A Phenomenological Approach Toward Understanding Deep Learning

Invited Talk at uOttawa TML seminar, November, 2021

Skills

Programming: Python, Java, C, C++, C#
Tools & Frameworks: LaTeX, Vim, PyTorch, Theano

References

Dr. Dan Roth Eduardo D. Glandt Distinguished Professor
Computer and Information Science, University of Pennsylvania
Dr. Weijie Su Assistant Professor
Wharton Statistics and Data Science, University of Pennsylvania
Dr. Bonnie Webber Honorary Professor
Institute for Language, Cognition and Computation, University of Edinburgh
Dr. Tom Mitchell Founders University Professor
School of Computer Science, Carnegie Mellon University