Jiahuan Pei

✉ ppsunrise99@gmail.com
in https://www.linkedin.com/in/pei-jiahuan-b4b507b4/
</> https://github.com/Jiahuan-Pei

I am working as an applied scientist at Amazon A9 team based in Berlin, Germany. I am working on core NLP/IR in Amazon product search. Formerly, I was a Ph.D. student from the IRLab at University of Amsterdam, supervised by Prof. dr. Maarten de Rijke and Prof. dr. Pengjie Ren. My interest includes natural language processing (dialogue systems, word embedding, parsing, summarization) and information retrieval (query understanding, recommender system, matcher embedding).

Education

Oct 2017. – Now	**Ph.D., University of Amsterdam,** Science of Informatics. Thesis title: *Collaborative agents for task-oriented dialogue systems.* Supervisor: Prof. dr. Maarten de Rijke
Sept. 2014 – Jul. 2017	**M.Sc., Dalian University of Technology,** Computer Applied Technology. Thesis title: *Research on Chinese word semantic similarity computation.* [link] Supervisor: Prof. dr. Degen Huang
Sept. 2010 – Jul. 2014	**B.Sc., Dalian Maritime University,** Software Engineering (Major), International Economics and Trade (Minor). Thesis title: *Chinese functional maximal-length noun phrase recognition.* [link] Supervisor: Assoc. Prof. Yiwu Xie

Experience

Dec. 2021 – Now	**Applied Scientist,** Amazon, Berlin, Germany. My role is to explore practical NLP/IR problems behind customer obsession with Amazon search and propose solutions in terms of science view.
Mar. 2021 – May 2021	**Applied Scientist Intern,** Amazon, Berlin, Germany. My role is to explore stochastic Transformers architecture and enhance it with uncertainty estimation with Monte Carlo method. Mentor: Dr. Cheng Wang
Mar. 2020 – Jun. 2020	**Applied Scientist Intern,** Amazon Alexa AI, Aachen, Germany. My role is to develop a lightweight adaptive Transformers model for natural language understanding in Alexa, which is able to remain more than 95% of the effectiveness while using less than 50% of the computational cost. Mentor: Dr. Daniil Sorokin

Teaching

Sep. 2018 – Oct. 2020	**Teaching Assistant,** Bachelor's IR course, University of Amsterdam. My role is to design the final search engine project, prepare pipeline code, grade, and answer students' questions.
Nov. 2018 – Jan. 2019	**Teaching Assistant,** Master's IR course, University of Amsterdam. My role is to supervise two groups of students to wrap up their research projects, which includes weekly meetings, model implementation and paper writing.

Teaching (continued)

Sep. 2018 – Now   **Thesis Supervisor,** University of Amsterdam.
I have supervised 3 master AI students and 1 bachelor AI student for their thesis. My role is to help with weekly discussions, model design, result analysis and paper writing.

Activities

2021 – 2022   **Campus intern ambassador,** Amazon Campus Intern Ambassador Program 2021/22.

2020 – 2021   **Reviewer,** ACM transactions on information systems, ACM transactions on internet technology, IJCAI 2020 (program committee), WWW 2020, ACL 2021, SIGIR 2020, COLING 2020, ECAL 2020.

2019 – 2020   **Soos talk chair,** IRLab, University of Amsterdam.

Sept. 2015 – Mar. 2016   **Research grant application:** Sentence similarity computation based on deep Learning. My role is the lead author in application for National Natural Science Foundation of China (No. 61672127).

May. 2014 – Sept. 2015   **Research grant participation:** English functional noun phrases identification. My role is research assistant, taking charge of model design and implementation in National Social Science Foundation of China (No.15BYY175).

Skills & Certificate

Knowledge   Deep Learning, Natural Language Processing, Machine Learning, Information Theory.

Coding   Python, Pytorch, Tensorflow, Theano, Java, C, C++, C#, Ruby, PHP, HTML, JavaScript, SQL, LaTeX, AWS (Sagemaker, S3, Stepfunctions).

Languages   Mandarin Chinese (First language), English (CET-6), Japanese (JLPT-N2).

Teaching   TLC-module Training (Teaching and Learning Centre, University of Amsterdam).

Awards

2016   **National scholarship for outstanding master students**, top 1%.

   Excellent graduate student in Dalian city, top 5%.

   Outstanding master's thesis award, top 5%.

2011–2014   **Outstanding student scholarship for bachelor students**, top 3%.

Talks

July. 2022   Frontiers of collaborative task-oriented dialogue systems, invited talk, University College London (UCL), London, United Kingdom. [slides].

Apr. 2022   Transformer uncertainty estimation with hierarchical stochastic attention, invited talk, Search Engine Amsterdam (SEA), Amsterdam, Netherlands. [link].

Apr. 2021   A cooperative memory network for personalized task-oriented dialogue systems with incomplete user profiles, conference talk, WWW' 21, Ljubljana, Slovenia. [slides]. [vedio].

Sept. 2020   Retrospective and prospective mixture-of-generators fortask-oriented dialogue response generation, conference talk, ECAI' 20, Santiago de Compostela, Spain. [slides]. [video].

Jun. 2020   Adaptive Transformers for efficient natural language understanding, invited talk, Amazon, Germany.

Talks (continued)

Aug. 2019   🔖   SEntNet: Source-aware recurrent entity network for dialogue response selection, conference talk, IJCAI' 19 SCAI Workshop, Macao, China. [slides].

Dec. 2016   🔖   Combining word embedding and semantic lexicon for Chinese word similarity computation, conference talk, NLPCC' 16, Kunming, China. [slides].

Jun. 2016   🔖   DUT-NLP-CH @ NTCIR-12 temporalia temporal intent disambiguation subtask, conference talk, NTCIR' 16, Tokyo, Japan. [slides].

Publications

Conference Papers

1. **Pei**, **Jiahuan**, Danushka Bollegala, and Omar Zaidan. "Learning Embeddings to Represent Information Retrieval Systems". In: *AMLC 2022 Deep Metric Learning and Semantic Similarity Search Workshop*. 2022.

2. **Pei**, **Jiahuan**, Cheng Wang, and György Szarvas. "Transformer Uncertainty Estimation with Hierarchical Stochastic Attentions". In: *Proceedings of AAAI Conference on Artificial Intelligence, AAAI 2022, CCF A)*. 2022. 🔗 URL: https://arxiv.org/pdf/2112.13776.pdf.

3. Yan, Guojun, **Jiahuan Pei**, Pengjie Ren, Zhaochun Ren, and Maarten de Rijke. "ReMeDi: Resources for Multi-domain, Multi-service, Medical Dialogues". In: International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR'22, **CCF A**). 2022.

4. **Pei**, **Jiahuan**, Pengjie Ren, and Maarten de Rijke. "A Cooperative Memory Network for Personalized Task-oriented Dialogue Systems with Incomplete User Profiles". In: *Proceedings of The Web Conference 2021 (WWW '21, CCF A)*. 2021. 🔗 URL: https://arxiv.org/pdf/2102.08322.pdf.

5. **Pei**, **Jiahuan**, Pengjie Ren, Christof Monz, and Maarten de Rijke. "Retrospective and Prospective Mixture-of-Generators for Task-oriented Dialogue Response Generation". In: *Proceedings of the 24th European Conference on Artificial Intelligence (ECAI' 20, CCF B)*. Nov. 2019. 🔗 URL: https://arxiv.org/pdf/1911.08151.pdf.

6. **Pei**, **Jiahuan**, Pengjie Ren, and Maarten de Rijke. "A Modular Task-oriented Dialogue System Using a Neural Mixture-of-Experts". In: *Proceedings of the 42nd International ACM SIGIR Workshop on Conversational Interaction Systems (SIGIR'19 WCIS Workshop)*. July 2019. 🔗 URL: http://arxiv.org/abs/1907.05346.

7. **Pei**, **Jiahuan**, Arent Stienstra, Julia Kiseleva, and Maarten de Rijke. "SEntNet: Source-aware Recurrent Entity Network for Dialogue Response Selection". In: *Proceedings of the 28th International Joint Conference on Artificial Intelligence Workshop on Search-Oriented Conversational AI (IJCAI' 19 SCAI Workshop)*. June 2019. 🔗 URL: http://arxiv.org/abs/1906.06788.

8. Ma, Jianjun, Mulangma Zhu, Degen Huang, and **Jiahuan Pei**. "Recognition of Syntactic Relationship between Clauses Using CRFs". In: *International Journal of Advanced Intelligence*. Vol. 10. Dec. 2018, pp. 1–14.

9. **Pei**, **Jiahuan**, Cong Zhang, Degen Huang, and Jianjun Ma. "Combining Word Embedding and Semantic Lexicon for Chinese Word Similarity Computation". In: *Natural Language Understanding and Intelligent Applications (NLPCC'16, CCF C)*. Dec. 2016, pp. 766–777. 🔗 URL: https://doi.org/10.1007/978-3-319-50496-4_69.

10. **Pei**, **Jiahuan**, Degen Huang, Jianjun Ma, Dingxin Song, and Leyuan Sang. "DUT-NLP-CH @ NTCIR-12 Temporalia Temporal Intent Disambiguation Subtask". In: *Proceedings of the 12th NTCIR Conference on Evaluation of Information Access Technologies (NTCIR' 16)*. June 2016. 🔗 URL: https://research.nii.ac.jp/ntcir/workshop/OnlineProceedings12/pdf/ntcir/TEMPORALIA/06-NTCIR12-TEMPORALIA-PeiJ.pdf.

Journal Articles

1 Wang, Benyou, Qianqian Xie, **Jiahuan Pei**, Prayag Tiwari, Zhao Li, and Jie Fu. "Pre-trained Language Models in Biomedical Domain: A Systematic Survey". In: *Association for Computing Machinery* (2021). URL: https://arxiv.org/pdf/2110.05006.pdf.

2 Ma, Jianjun, **Jiahuan Pei**, Degen Huang, and Dingxin Song. "Syntactic parsing of clause constituents for statistical machine translation". In: *International Journal of Computational Science and Engineering (IJCSE'18, JCR-Q3)* 17.1 (Sept. 2018), pp. 126–132. URL: https://doi.org/10.1504/IJCSE.2016.10004598.

3 Huang, Degen, **Jiahuan Pei**, Cong Zhang, Kaiyu Huang, and Jianjun Ma. "Incorporating Prior Knowledge into Word Embedding for Chinese Word Similarity Measurement". In: *ACM Transactions on Asian and Low-Resource Language Information Processing (TALLIP' 18, SCI, JCR-Q2, IF=1.413)* 17.3 (Apr. 2018). URL: https://doi.org/10.1145/3182622.

4 Zhang, Cong, **Jiahuan Pei**, Kaiyu Huang, Degen Huang, and Zhangzhi Yin. "Semantic graph optimization algorithm based chinesemicroblog opinion summarization". In: *Journal Of Shandong University (Natural Science)* 52.7 (2017), pp. 59–65. URL: http://lxbwk.njournal.sdu.edu.cn/CN/10.6040/j.issn.1671-9352.1.2016.PC2.

5 Ma, Jianjun, **Jiahuan Pei**, and Degen Huang. "Identification of English Functional Noun Phrases by CRFs and the Semantic Information". In: *Journal of Chinese Information Processing (CCF B, Chinese Journal)* 30 (Sept. 2016), pp. 59–66. URL: http://jcip.cipsc.org.cn/CN/Y2016/V30/I6/59.

Ongoing Work

1 Deng, Wentao, **Jiahuan Pei**, Pengjie Ren, and Maarten de Rijke. "Intent-Calibrated Self-Training for Answer Selection in Open-domain Dialogues". (To be submitted to ACL 2023). 2023.

2 Liu, Yuanxing, **Jiahuan Pei**, Ming Li, and Maarten de Rijke. "Learning Correlations from Neighboring Conversations for Conversational Recommendation". (To be submitted to SIGIR 2023). 2023.

3 **Pei**, **Jiahuan**, Guojun Yan, Pengjie Ren, and Maarten de Rijke. "Mixture-of-languages Routing for Multilingual Dialogues". (To be submitted to TOIS journal). 2022.