Siru Ouyang

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Education

Shanghai Jiao Tong University **Shanghai, China**
Undergraduate in Computer Science (IEEE honor class) *Sep. 2018 - June 2022 (expected)*

overall GPA: 3.82/4.3 (89.0/100)

Papers

- **Siru Ouyang***, Zhuosheng Zhang*, and Hai Zhao, "Dialogue Graph Modeling in Machine Reading Comprehension" accepted by *Findings of ACL, 2021*. [arXiv] [code]
- **Siru Ouyang**, Zhuosheng Zhang, and Hai Zhao, "Fact-driven Logical Reasoning in Language Understanding". May 2021. In submission for *2022 ICLR* (rejcted by NeurIPS). [ArXiv]
- **Siru Ouyang**, Zhuosheng Zhang, and Hai Zhao, "Logic Pre-Training of Language Models". Sept. 2021. In submission for *2022 ICLR*. [OpenReview]
- Zhuosheng Zhang, **Siru Ouyang** and Hai Zhao, "Discourse-aware Network for Conversational Reading Comprehension". July 2021. In submission for *IEEE Transactions on Pattern Analysis and Machine Intelligence*.
- Zhuosheng Zhang*, **Siru Ouyang***, Hai Zhao, Masao Utiyama and Eiichiro Sumita, "Smoothing Dialogue States for Open Conversational Machine Reading" accepted by proceedings of *2021 EMNLP*. [arXiv] [code]
- Zhiyao Li, **Siru Ouyang**, Xiaofeng Gao and Guihai Chen, "Two-Hop Relay Deployment Based on User Trajectory in Wireless Networks", accepted by *The Computer Journal*, 2021.

Research Experiences

Dialogue Summarization via Data Augmentation | *Language Generation* **July 2021 - present**
Advisor: Diyi Yang *Georgia Institute of Technology*

- Explored several data augmentation methods in dialogue summarization, which is rarely explored and important in low-resource settings.

Logic Pre-Ttraining of Language Models | *Language Modeling* **June 2021 - Sept. 2021**
Advisor: Hai Zhao *Shanghai Jiao Tong University*

- We propose logic pre-training of language models, leading to the logic reasoning ability equipped PrLM, Prophet to make up for the lack in capturing logic relations in challenging NLU tasks for language models.
- To let logic pre-training perform on a clear, accurate, and generalized knowledge basis, we introduce *fact* instead of the plain language unit in previous PrLMs. The *fact* is extracted through syntactic parsing in avoidance of unnecessary complex knowledge injection.
- To explicitly guide the PrLM to capture logic relations, we introduce three pre-training objectives: 1) logical connectives masking to capture sentence-level logics, 2) logical structure completion to accurately capture facts from the original context, 3) logical path prediction on a logical graph to uncover global logic relationships among facts.
- Contributed a paper named "Logic Pre-Training for Language Models" as the first author in submission for 2022 ICLR.

Logical Reasoning in MRC | *Logical Reasoning* **Mar. 2021 - May 2021**
Advisor: Hai Zhao *Shanghai Jiao Tong University*

- Extracted a kind of broad "Fact Unit" according to backbone constituents of a sentence to effectively cover such indispensable logic reasoning basis, filling the gap of local, non-commonsense, non-entity, or even non-knowledge clues in existing methods.
- The proposed model Focal Reasoner builds super-graphs on top of fact units to capture both global connections between facts and the local concepts or actions inside the fact. Strengthened the model with question-option-aware interaction and question reformulation to compensate for the insentiveness of PrLMs.
- Achieved the new state-of-the-art results on ReClor and LogiQA on RoBERTa-large with single model. (ReClor acc: 58.90, LogiQA acc: 40.25, check the [Leaderboard].
- Contributed a paper named "Fact-driven Logical Reasoning" as the first author in submission for *2022 ICLR*.

End-to-End Open-domain CMR | ***Open-domain reading comprehension*** **Feb. 2021 - Apr. 2021**

Advisor: Hai Zhao *Shanghai Jiao Tong University*

- Investigate the open-retrieval setting for CMR. We bridge decision making and question generation for the challenging CMR task, which is the first practice to our best knowledge.
- Designed an end-to-end framework where the dialogue states for decision making are employed for question generation, in contrast to the independent models or pipeline systems in previous studies. Besides, a variety of strategies are empirically studied for smoothing the two dialogue states in only one decoder.
- Experiments on both ShARC and OrShARC dataset show the effectiveness of the proposed model, which achieves the new state-of-the-art results. A series of analyses shows the contributing factors.
- Contributed a paper named "Smoothing Dialogue States for Open Conversational Machine Reading" as the co-first author accepted by the proceedings of *2021 EMNLP*.

Dialogue Graph Modeling for Reading Comprehension | ***Discourse Structure*** **Nov. 2020 - Jan.2021**

Advisor: Hai Zhao *Shanghai Jiao Tong University*

- Proposed a dialogue graph modeling framework for conversational machine reading to model discourse structure and relations which is not considered by existing approaches.
- Employed GCNs to explicitly bridge the gap between user scenario with rule documents by injecting it as a special global node. Designed a decoupling graph to decouple the complex rule document so that it can capture the local representation and global interaction.
- Achieved the new state-of-the-art results on ShARC (macro acc: 81.2, micro acc: 77.4, BLEU1: 63.3, BLEU4: 48.4) which surpasses previous works by a large margin. Check the [leaderboard].
- Contributed a paper named "Dialogue Graph Modeling for Conversational Machine Reading" as the first author accepted by the *Findings of 2021 ACL*.

Relay Deployment in Wireless Networks | ***Approximation Algorithm*** **May 2020 - July 2020**

Advisor: Xiaofeng Gao *Shanghai Jiao Tong University*

- Proposed an algorithm for relay deployment in unstationary user trajectory scenario which is not considered before.
- Characterized user trajectories into Demand Nodes and used the designed approximation algorithm for deployment.
- Simulated the method on CRAWDAD dataset and reached a commendable result.
- Finished a paper named "Two-hop Relay deployment based on User Trajectory in Wireless Networks" in in submission as the second author for the journal *The Computer Journal*.

Course Projects / Extracurricular

Incremental Learning for Recommendation **April 2021 – May 2021**

Student *Shanghai Jiao Tong University*

- Proposed a novel approach based on incremental learning, which can effectively boost the performance upper bound for streaming CTR prediction.
- Conducted extensive experiments on a real-word datasets, Avazu. Experimental results on the task of CTR prediction show that our proposed approach can shorten the finetune time while boosting accuracy upper bound.

Piano Association **Sept. 2018 – Present**

Performer *Shanghai Jiao Tong University*

- Work as a volunteer to teach piano lessons for students and teachers in campus.
- Perform at the campus concert for more than 1000 audience several times.

Selected Courses

- Mathematics: Mathematical Analysis (3.7/4.3), Linear Algebra (3.7/4.3), Probability Theory and Stochastic Process (3.7/4.3), Convex Optimization (3.7/4.3), Signals and Systems (Complex Analysis) (3.7/4.3)
- CS: Information Theory (4.3/4.3), Data Structure (4.0/4.3), Algorithm Design and Analysis (4.0/4.3), Operating Systems (4.0/4.3), Machine Learning (3.7/4.3), Artificial Intelligence (3.7/4.3)

Skills

Languages: Python, C++, MATLAB, HTML/CSS, JavaScript, SQL
Frameworks and Libs: PyTorch, TensorFlow, transformers, allennlp, spacy, nltk
English: GRE-323 (Verbal: 153 Quntitative: 170 Analytical Writing: 4.0)
TOEFL-107 (speaking: 25)