XUE Boyang

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Phone No.: (86) 189 9270 5010 (WeChat); (852) 6024 3345.
Expected Start Date: August 2024.
Research Interests: Reliable LLMs, Uncertainty Modeling, Dialogue Systems, Speech Recognition, etc.
Preferred Positions: Reliable LLMs, Multi-modal Learning, Tool Learning, etc. (Research Intern)

Education

The Chinese University of Hong Kong, Hong Kong SAR, China. **Aug. 2021 - Present**
Ph.D. Student in Department of System Engineering and Engineering Management.
Huazhong University of Science and Technology, Wuhan, China. **Sep. 2016 - Jun. 2020**
B.Eng. in School of Artificial Intelligence and Automation, Excellent Class.

Main Publications

- Hongru Wang*, **Boyang Xue***, Baohang Zhou, Tianhua Zhang, Cunxiang Wang, Guanhua Chen, Huimin Wang, Kam-Fai Wong. "Self-DC: When to retrieve and When to generate? Self Divide-and-Conquer for Compositional Unknown Questions", ACL 2024 (under review).
- **Boyang Xue***, Hongru Wang*, Weichao Wang, Rui Wang, Sheng Wang, Zeming Liu, Kam-Fai Wong. "MlingConf: A Comprehensive Study of Multilingual Confidence Estimation on Large Language Models", ACL 2024 (under review).
- Sheng Wang, **Boyang Xue**, Jiacheng Ye, Jiyue Jiang, Liheng Chen, Lingpeng Kong, Chuan Wu. "PRoLoRA: Partial Rotation Empowers More Parameter-Efficient LoRA", ACL 2024 (under review).
- Hongru Wang, **Boyang Xue**, Baohang Zhou, Rui Wang, Fei Mi, Weichao Wang, Yasheng Wang, Kam-Fai Wong. "UniRetriever: Multi-task Candidates Selection for Various Context-Adaptive Conversational Retrieval", COLING 2024.
- **Boyang Xue**, Weichao Wang, Hongru Wang, Fei Mi, Rui Wang, Yasheng Wang, Lifeng Shang, Xin Jiang, Qun Liu, Kam-Fai Wong. "Improving Factual Consistency for Knowledge-Grounded Dialogue Systems via Knowledge Enhancement and Alignment", Findings of EMNLP 2023.
- **Boyang Xue**, Shoukang Hu, Junhao Xu, Mengzhe Geng, Xunying Liu, Helen Meng. "Bayesian Neural Network Language Models for Speech Recognition", TASLP (SCI & JCR Q1), 2022.
- **Boyang Xue**, Jianwei Yu, Junhao Xu, Shansong Liu, Shoukang Hu, Zi Ye, Mengzhe Geng, Xunying Liu, Helen Meng, "Bayesian Transformer Language Models for Speech Recognition", ICASSP 2021.
- **Boyang Xue**, Cheng Cheng, Ye Yuan. "Deep Learning based Patient-Specific FHR Detection System on FECG", Chinese Patent. [CN112826513B]

Research Experiences & Responsibilities

◆ **Ph.D. Student in MoE Lab of High Confidence Software Technologies, CUHK.** **Sep. 2023 - Present**
Research Topic: Reliable AI, Uncertainty Alignment. **Advisor:** *Prof. WONG Kam-Fai*.

Project 1: We propose a comprehensive investigation of Multi-lingual confidence estimation framework on LLMs including 1) an elaborated and expert-checked multilingual QA dataset; 2) confidence estimation performance on diverse languages on multilingual QA dataset; and 3) a cross-lingual confidence estimation method to achieve more precise confidence estimation. One paper is under review of ACL 2024.

Project 2: To address the over-confidence problem that LLMs cannot express human-like uncertainty and are prone to generate hallucinated texts. We propose an uncertainty-alignment method for LLMs to improve the reliability. The related work will be submitted to NeurIPS 2024.

◆ **Research Intern in HUAWEI Noah's Ark Lab, Shenzhen.**　　　　**Nov. 2022 - Aug. 2023**
Research Topic: Knowledge-grounded Dialogue, Factual Consistency.　　**Advisor:** *Dr. Weichao WANG*.
Project: To address factual inconsistency issue in knowledge-grounded dialogue systems that the generated responses are not factually inconsistent with the provided knowledge source, we investigate two methods to efficiently improve the factual expression capability of FFNs by 1) knowledge enhancement for dialogue (K-Dial) and knowledge alignment method - Reinforcement Learning for Factual Consistency (RLFC). One paper has been accepted in Findings of EMNLP 2023.

◆ **Research Assistant and Ph.D. Student in HCCL Lab, CUHK.**　　　　**Sep. 2020 - Aug. 2022**
Research Topic: Language Model, Bayesian Learning, Speech Recognition. **Advisor:** *Prof. Xunying LIU*.
Project: To address the overfitting and poor generalization issues given limited training set in speech recognition, we apply a Bayesian framework including Bayesian Neural Networks, Gaussian Process Neural Networks, Variational Neural Networks in conventional LSTM-RNN and Transformer language models. Efficient inference approaches are used to automatically select 1) the optimal network internal components to be Bayesian learned using neural architecture search (NAS), and 2) a minimal number of Monte Carlo parameter sampling. Two papers have been accepted in speech top conference ICASSP and top journal TASLP (SCI Q1).

◆ **Research Intern in IMDS Lab, HUST.**　　　　**Sep. 2019 - Jun. 2020**
Research Topic: Medical Deep Learning, Patient-specific Diagnosis.　　**Advisor:** *Prof. Ye YUAN*.
Project: To efficiently non-invasively detect fetal heartbeat rate on FECGs as well as address the intra-patient variances and high cost of inter-patient diagnosis, we apply a deep-learning based framework and achieve patient-specific diagnosis on FECGs to detect fetal heartbeat rate. I served as principal investigator of the project (co-operated with Tongji Hospital). One Chinese patent has been accepted.

◆ **Team Leader in Intelligent Robotics Team, HUST.**　　　　**Dec. 2017 - Aug. 2019**
Research Topic: Embedded Development and Robotics.　　**Advisor:** *Prof. Dingxin HE*.
Project: Designed balanced cars, beacon-tracking cars, energy-efficient cars and joined the NXP Cup National University Intelligent Car Race twice. I was responsible for the programming and algorithm design for signal processing, motion control, wireless charging, and microcontroller development.

Awards & Honors

◆ Excellent Bachelor Thesis, Excellent Student Cadre, Excellent Graduate Student.
◆ Academic Scholarship of *Huazhong University of Science and Technology* in 2018-19 academic year.
◆ National Grand Prize (Top 3) in the *14th NXP Cup National University Intelligent Car Race*.
◆ First Prize in the *13th NXP Cup National University Intelligent Car Race*.
◆ Second Prize in the *19th Asia and Pacific Mathematical Contest in Modeling*.

Extracurricular Activities

◆ Serving as a reviewer of *ICASSP, ACL, EMNLP*.
◆ Serving as a co-founder and organizer of a NLP Academic Exchange Platform (NICE).
◆ Serving as a part-time author to write academic blogs on WeChat officials and Zhihu.
◆ Serving as a contributor in several open-source projects of Datawhale.
◆ Served as the secretary of the Communist Youth League in HUST (2016 - 2020).
◆ Served as the volunteer and participated several voluntary activities in the university.

Professional Skills

◆ Adept in C, Python (PyTorch and TensorFlow), MATLAB, Linux Shell, etc.
◆ Adept in HTML, CSS, JavaScript, and Photoshop to design group and personal websites.
◆ Well trained in English skills (IELTS 6.5 - L: 6.0, R: 7.5, W: 7.0, S: 6.0).
◆ Excellent communication, leadership, co-operation and writing skills.