XUE Boyang

Address: Jintai District, Baoji City, Shaanxi Province, 721000, P.R.China.
Email: byxue@se.cuhk.edu.hk; beyondhsueh1024@gmail.com.   WeChat: NightWalzer.
Personal Website: https://amourwaltz.github.io.   GitHub: https://github.com/AmourWaltz.
Research Interest: Dialogue System, Language Modeling, Natural Language Processing.

Education

The Chinese University of Hong Kong, Hong Kong SAR 999077, China.   **Aug. 2021 - Present**
Degree: Ph.D. Student.   Major: Natural Language Processing.
Huazhong University of Science and Technology, Wuhan 430074, China.   **Sep. 2016 - Jun. 2020**
Degree: Bachelor of Engineering.   Major: Artificial Intelligence and Automation.

Main Publications

First Author:

Bayesian Neural Network Language Models for Speech Recognition. in *IEEE/ACM TASLP, 2022*.

Bayesian Transformer Language Models for Speech Recognition. in *IEEE ICASSP, 2021*.

一种基于深度学习和特异性矫正在 FECG 上胎儿心率检测系统. *Chinese Patent, 2020.*

Experiences

Sep.2020 - Present: Research student in HCCL Lab, CUHK supervised by *Prof. Xunying LIU*.

- Applying variational Bayesian neural networks on Transformer language models (LMs) to improve the model generalization for domain adaptation tasks. Improvements of the CUHK Elderly Speech Recognition system were obtained on a cross domain LM adaptation task on the conversational corpus to a low-resource Alzheimer's speech corpus. Papers have been accepted in the speech top conference *ICASSP 2021*.

- Systematically investigating the variational inference based Bayesian frameworks including Bayesian Neural Networks, Gaussian Process and Variational Neural Networks for uncertainty modeling in both conventional LSTM-RNN and Transformer LMs to address the overfitting issue given limited training set across a range of speech recognition scenarios. NAS techniques that efficiently select the optimal network internal components to be Bayesian learned and a minimal number of Monte Carlo parameter samples were used to reduce computation cost. A signal-to-noise ratio computed over the parametric variational Gaussian distributions was also measured for uncertainty analysis in terms of both training data quantity and language model complexity. One article has been accepted in the speech top journal *IEEE/ACM TASLP*.

Sep.2019 - June.2020: Research intern in IMDS Lab, HUST supervised by *Prof. Ye YUAN*.

- Principal manager of a Fetal Heartbeat Detection Project (co-operated with Tongji Hospital). Proposed a deep-learning based framework including a CNN-LSTM model to detect fetal QRS wave and a patient-specific model to alleviate intra-differences on FECGs from different patients, with important clinical values for prenatal diagnosis to reduce fetal mortality. A *Chinese Patent* has been granted.

Dec.2017 - Aug.2019: Team leader in Intelligent Robotics Team, HUST supervised by *Prof. Dingxin HE*.

- Designed Balanced cars, Tracking cars for Beacons, Energy-efficient cars et al. and joined the *NXP Cup National University Intelligent Car Race* twice [Video]. Responsible for the programming on the NXP Cortex-M Chips for algorithms of image and signal processing, PID-based motion control, wireless charging, etc.

Selected Awards & Honors

- National Grand Prize in *14th NXP Cup National University Intelligent Car Race* (Top 3/500+, 2019).
- Second Prize in *19th Asia and Pacific Mathematical Contest in Modeling* (APMCM, 2019).
- Excellent Bachelor Thesis (HUST, 2020), University Scholarship (HUST, 2019), etc.

Skills

- Programming and Developments: C, Python, MATLAB, Linux Shell, Latex, PyTorch, etc.
- Excellent communication, leadership, team spirit and English writing skills (IELTS - W:7.0). Served as a part-time author in Zhihu and PaperWeely. Served as the manager for a PRML open-source project in Datawhale.
- Always joined the voluntary activities, skilled in piano, tennis, hiking, etc.