ZHIYUAN PENG

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EDUCATION

The Chinese University of Hong Kong *2017 - 2023*
Ph.D in Electronic Engineering, GPA: 3.84/4
Research interests: Augmented language models, Prompt engineering, Speech processing, Attack and defense
Coursework: DeepLearning | BigData | ProbabilisticModel | SpeechProcessing

Harbin Institute of Technology, China *2013 - 2017*
Bachelor of Electronic and Information Engineering, GPA: 90.91/100, Rank 1st
Coursework: C/C++ | Networking | DigitalSignalProcessing | ImageProcessing | OS

SKILLS

Language: Python, C/C++, Perl, Bash, Matlab, Verilog HDL.
Tools: LangChain, PyTorch, Tensorflow, Kaldi/PyKaldi, Cython.
Others: MCU and Embedded System Development, digital signal processing by FPGA.

PUBLICATIONS

ReWOO: Decoupling Reasoning from Observations for Efficient Augmented Language Models, Binfeng Xu, *Zhiyuan PENG, Bowen Lei, Subhabrata Mukherjee, Yuchen Liu, Dongkuan Xu, submitted to NeurIPS 2023*

Below are works done during my Ph.D:

Covariance regularization for probabilistic linear discriminant analysis, *Zhiyuan PENG, Mingjie SHAO, Xuanji He, Ke Ding, Tan Lee, Guanglu Wan, ICASSP 2023*

Unifying Cosine and PLDA Back-ends for Speaker Verification, *Zhiyuan PENG, Xuanji He, Ke Ding, Tan Lee, Guanglu Wan, Proc. Interspeech 2022*

Label-free Knowledge Distillation with Contrastive Loss for Light-weight Speaker Recognition , *Zhiyuan PENG, Xuanji He, Ke Ding, Tan Lee, Guanglu Wan, ISCSLP 2022*

Pairing Weak with Strong: Twin Models for Defending against Adversarial Attack on Speaker Verification, *Zhiyuan PENG, Xu LI, Tan LEE, Proc. Interspeech 2021*

Mixture Factorized Auto-encoder for Unsupervised Hierarchical Deep Factorization of Speech Signal, *Zhiyuan PENG, Siyuan FENG, and Tan Lee, in Proc. ICASSP 2020*

Adversarial Multi-task Deep Features and Unsupervised Back-end Adaptation for Language Recognition, *Zhiyuan PENG, Siyuan FENG, and Tan Lee, in Proc. ICASSP 2019*

Combining Adversarial Training and Disentangled Speech Representation for Robust Zero-Resource Subword Modeling, *Siyuan FENG, Tan Lee, and Zhiyuan PENG, in Interspeech 2019*

Child Speech Disorder Detection with Siamese Recurrent Network using Speech Attribute Features, *Jiarui WANG, Ying Qin, Zhiyuan PENG and Tan LEE, in Interspeech 2019*

INTERN

Research intern (Sept. 2021 - May. 2022) at Meituan, Beijing

- **Backend adaptation for speaker verification(Bayes PLDA, Coral)**

- **Large-scale knowledge distillation for light-weight speaker verifier**
- **Experimented wav2vec2 -> fbank2vec for self-supervised pre-training of ASR system**

SEMINAR TALKS

Introduction to Dirichlet Process, December 2019
Large-scale Pairwise Classification and its Application in Speaker Verification, May 2019
Introduction to Probabilistic Graphical Model: Inference, May 2018

SELECTED PROJECT EXPERIENCE

Implementing a pairwise support vector machine *seminar work*

- **The back-end for speaker verification is to perform similarity scoring of embeddings. PSVM is a potential alternative to the standard PLDA scoring back-end.**
- **Developed both Cython and C++ implementations for PSVM.**

Using variational inference for the joint training of GMM-ivector extractor *seminar work*

- **The standard training method of GMM-ivector extractor has two individual EM training phases that may result in sub-optimal solutions. Variational inference can be adopt to jointly train both GMM and ivector extractor.**
- **Developed the C++ implementation for variational inference of GMM-ivector extractor.**