ZHIYUAN PENG

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Google Scholar
Homepage

EDUCATION

Incoming Postdoc at NC State University with Prof. DK Xu. My recent research interest mainly focuses on improving the efficiency and reliablity of augmented language models (ALMs) and applying intelligent agents (powered by ALMs) into networking

The Chinese University of Hong Kong *2017 - 2023*
Ph.D in Electronic Engineering, GPA: 3.84/4
Research interests: Speech recognition, speaker verification, 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:

CoMFLP: Correlation Measure based Fast Search on ASR Layer Pruning, *Wei LIU, Zhiyuan PENG, Tan LEE, Interspeech 2023*

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*

Exploiting Pre-Trained ASR Models for Alzheimer's Disease Recognition Through Spontaneous Speech, *Ying QIN, Wei LIU, Zhiyuan PENG, SI Ng, Jingyu LI, Haibin HU, Tan LEE, Arxiv 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.**