Pu Wang

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Research Interest

Speech recognition, spoken language understanding, dysarthric speech processing, parameter-efficient optimizations, explainable neural networks.

Education

PhD **KU Leuven**, Engineering Science, ESAT-PSI — Sep. 2019 to Present

Promoter: Prof. Dr. Hugo Van hamme

Thesis title: *Parameter efficiency in neural networks for speech recognition and spoken language understanding*

MS **Southeast University**, Engineering Science — Sep. 2016 to Jun. 2019

Promoter: Prof. Dr. Ruqiang Yan

Thesis title: *Degradation tracking and fault prediction of mechanical rotating parts based on cross recursive analysis*

BS **Southeast University**, Engineering Science — Sep. 2012 to Jun. 2016

Promoter: Prof. Dr. Ruqiang Yan

Thesis title: *Bearing fault diagnosis using cross recurrent quantitative analysis*

Experience

Visiting Scholar Carnegie Mellon University, Langauge Technologies Institute — Jan. 2025 to Present

Promoter: Prof. Dr. Shinji Watanabe

Scientific Researcher KU Leuven, ESAT, Processing speech and images (PSI) — Dec. 2019 to Present

Participant project: *"Next level Flemish speech recognition"* (NELF, FWO-SBO grant S004923N)

Project summary: Develop automatic speech recognition technology that does not require costly corpora with large amounts of manually transcribed speech. Leverage low-cost, unlabeled, or weakly labeled speech data in self-training and unsupervised training settings. Create compact algorithms that generalize well to diverse Flemish dialects, non-native speakers, and small populations.

Publications

P. Wang, and H. Van hamme, "Disentangled-Transformer: An Explainable End-to-End Automatic Speech Recognition Model with Speech Content-Context Separation", IEEE IPAS 2025.

P. Wang, and H. Van hamme, "Primal-OWSM: Speech Foundation Model with Parameter-efficient Primal Attention for Low-resource Dutch Speech Recognition", BNAIC/BeNeLearn 2024.

wangpuup/primal-attention

P. Wang, and H. Van hamme, "Disentangle-Transformer: An Explainable End-to-End Automatic Speech Recognition Model with Speech Content-Context Separation Learning Based on Varying Temporal Resolutions", BNAIC/BeNeLearn 2024.

P. Wang, and H. Van hamme, “Exploring width-adaptive transformers for automatic speech recognition”, IEEE/ACM Transactions on Audio, Speech and Language Processing, 2024, under review.

wangpuup/width-adaptive-attention

P. Wang, and H. Van hamme, “Benefits of pre-trained mono- and cross-lingual speech representations for spoken language understanding of Dutch dysarthric speech”, EURASIP journal on Audio, Speech, and Music Processing, 2023.

wangpuup/assist-dy

P. Wang, and H. Van hamme, “Bottleneck low-rank transformers for low-resource spoken language understanding”, Interspeech 2022.

P. Wang, B. BabaAli, and H. Van hamme, “A study into pre-training strategies for spoken language understanding on dysarthric speech”, Interspeech 2021.

wangpuup/pre-training-with-dysarthric-speech

P. Wang, and H. Van hamme, “A light transformer for speech-to-intent applications”, IEEE SLT 2021.

wangpuup/light-transformer

P. Wang, and H. Van hamme, “Pre-training for low resource speech-to-intent applications”, arXiv preprint, 2021.

P. Wang, B. R. Hou, and R. Q. Yan, “ECG arrhythmias detection using auxiliary classifier generative adversarial network and residual network”, IEEE Access, 2019.

P. Wang, H. Wang, and R. Q. Yan, “Bearing degradation evaluation using improved cross recurrence quantification analysis and nonlinear auto-regressive neural network”, IEEE Access, 2019.

S. Y. Shao, **P. Wang**, and R. Q. Yan, “Generative adversarial networks for data augmentation in machine fault diagnosis”, Computer in Industry, 2019.

B. R. Hou, J. Y. Yang, **P. Wang**, and R. Q. Yan, “LSTM-based auto-encoder model for ECG arrhythmias classification”, IEEE Transactions on Instrumentation and Measurement, 2019.

P. Wang, and R. Q. Yan, “Gear damage severity evaluation based on cross recurrence quantification analysis”, IEEE Conference on Sensing, Diagnostics, Prognostics, and Control, 2017.

Teaching

Master’s Thesis Assessor
Fatjon Barçi, “Sound Event Localization and Detection using Machine Learning” Sep. 2024

Master’s Thesis Supervisor
Michael Rudolf Thiel, “Exploring the technology behind ChatGPT” Nov. 2023 to Sep. 2024

Master’s Thesis Supervisor
Diogo Simões, “Quantitative spoken language understanding” Nov. 2022 to Jun. 2024

Miscellaneous

Reviewer for journals: IEEE Transactions on Neural Networks and Learning Systems; IEEE Transactions on Neural Systems and Rehabilitation Engineering; Neural Processing Letters; Artificial Intelligence; Scientific Reports; and others.

Intern at MAXIEYE Automotive Technology Co., Shanghai, China — Aug. 2018 to Sep. 2018

Intern at iFLYTEK Co., Heifei, China — Jul. 2018 to Aug. 2018

Academic Qualifications and Awards

Grant FWO (Belgium) long stay abroad — 2024

Best Poster Award in Chinese Equipment Monitoring, Diagnosis and Maintenance Academic Conference: work from MS thesis — 2020

Outstanding Thesis Award MS — 2019

National Scholarship holder — 2018

2nd Prize of the International Mathematical Modeling Challenge — 2016

Outstanding Thesis Award BS — 2016

Languages

Mandarin (native), English (proficient), Dutch (Elementary, A1), French (Elementary, A1)