Dang Le Dang Khoa (Phillip)

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Technical Skills

- **Programming Languages**: Python (Pandas, Matplotlib, Numpy, Scikit-learn, Pytorch), C/C++ (STL, Libtorch, OpenMP), Shell scripting, React Native, PHP.
- **Toolkits**: kaldi-asr, wenet-e2e, huggingface-transformer, git.
- **Skills**: Automatic Speech Recognition (ASR), Natural Language Processing (NLP), Data Analytics, Machine Learning and Software Engineering.

Experience

Senior Research Engineer — **Institute for Infocomm Research (I2R) - A*STAR** — **February 2020 - Present**

Automatic Speech Recognition (ASR)

- Trained and maintained Multilingual South East Asia ASR engines and language models, reduced the WERs by 10% compared to the baseline models.
- Finetuned and adapted entity localization ASR engines into domain-specific services, including Legal, Aviation Control, and Education. Featured project: Intelligent Court Transcription System - External-URL.
- Analyzed and benchmarked the quality of audio and text data, handled the data preprocessing, augmentation, and engineering pipeline.

Natural Language Processing (NLP) - Speech and Audio Analytics

- Trained and deployed the ECAPA-TDNN deep learning model for a speaker diarization inference service, achieved a 5% decrease in EER compared to the baseline X-Vectors model.
- Trained and deployed U-net speech enhancement model for Satellite-based VHF communication, improved the AUC by 3% compared to the baseline RNN model.
- Contributed to internal tools and APIs, including Transformer-based Sentiment Analysis, Embedded Sound Classification, Vietnamese-voiced FAQ LLM-based chatbot, etc.

Researcher — **Satellite Research Centre** — **August 2016 - August 2018**

- Implemented a novel Star Tracking Algorithm onto a Programmable System-on-a-chip for mini satellites.
- Optimized the pattern recognition algorithm runtime, improved the accuracy by 5% on average.
- Designed a tree-based pattern searching algorithm that enhanced runtime processing by 25%.

Projects

VLSP 2023 Challenge - ASR

VLSP 2023 Vietnamese ASR is a challenge subtrack that requires participating teams to tackle an ASR problem in the Vietnamese language, with the constraint of noisy and limited-size datasets. My contributions to the team include:

- Leading the team to address the ASR combined with Emotion Classification problem.
- Designing and implementing an end-to-end solution for training and distilling ASR models with small datasets.
- *Challenge Description*: https://vlsp.org.vn/vlsp2023/eval/asr

Vessenger AI

Vessenger AI is a web-based application that assists clients in managing meeting minutes. Its functions include recording, transcribing, translating, and diarizing speakers in a multilingual, team-based meeting scenario. My responsibilities include:

- Deployed the Speaker Diarization Inference API.
- Maintained the interfacing and preprocessing backend services.
- *Demo Application URL*: https://devaliasr.kkode.com/home/beta7

WER-in-CPP

WER-in-CPP is my personal open-source program that computes and represents ASR Word-Error-Rate metrics in the text-based format.

- Developed and implemented algorithms based on the Minimum-Edit-Distance Dynamic Programming problem.
- Designed the text-based visualization and added features for statistical analysis.
- *Source code*: github.com/dangkhoadl/WER-in-cpp

Achievements & Publications

ICASSP 2024 Publication - In Review

- Published as the first author of "Acoustic Scattering AI for Noninvasive Object Classifications: A Case Study on Hair Assessment".
- Conducted a study on hair-on-head style classification. The paper explores various deep learning approaches, including self-supervised learning, vector embedding, large model adaptation and finetuning.
- *Publication*: External-URL.

AI Singapore - Trusted Media Challenge 2021

- Participated in the audio-visual fake media detection challenge, a competition hosted by AI Singapore and sponsored by Singapore Press Holdings Ltd., with prize money of up to SGD 700,000.
- Led the **aasrali** team and contributed the main engineering work, competing against 474 other teams.
- Ranked 6th on the final stage leaderboard - Top 1% teams - Final Round Leaderboard: External-URL.

Google Code Jam 2018

- Competed individually in the problem-solving contest organized annually by Google, with over 27,000 competitors.
- Advanced to round 2 - Top 10% candidates.

Education

Master of Engineering — **Nanyang Technological University, Singapore** — **August 2015 - August 2018**

- School of Electrical and Electronics Engineering - Research.
- Thesis title: Implementation of An Autonomous Star Recognition Algorithm using Hardware-Software Co-Processing Approach.
- *Source code*: github.com/dangkhoadl/Master-Thesis-Star-Tracking-System
- *Publication*: doi.org/10.32657/10220/48371

Bachelor of Engineering — **Vietnam National University - HCMUT** — **August 2010 - April 2015**

- Major: Electrical and Electronics Engineering, Minor: Automation System Design. Second Upper Honour
- Thesis title: Applying of Fuzzy Logic Algorithm on Legged Locomotion Robot.

Certifications

- Coursera - Generative AI with Large Language Models
- Coursera - Machine Learning Specialization
- Coursera - Data Structures and Algorithms Specialization
- Coursera - Discrete Optimization
- Udacity - Machine Learning Engineer Nanodegree