Dae Yon Hwang

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EDUCATION

University of Toronto	Ph.D. in Electrical & Computer Engineering, **GPA**: 4.0/4.0	Nov 2022
Texas A&M University	Master of Science in Electrical Engineering, **GPA**: 4.0/4.0	May 2016
Hanyang University	B.S. in Electronic Engineering, **GPA**: 3.56/4.0 ***(Cum Laude)***	Feb 2014

WORK EXPERIENCE

Amazon Science, Artificial General Intelligence - Applied Scientist II — Sep 2022 - Present

Amazon Science, Alexa Artificial Intelligence - Applied Scientist Intern — Sep 2021 - Dec 2021

- **Build Retrieval-Augmented Generation with Foundation Model for Recommendation System**
  - Customized the foundation model for RAG implementation based on continual pre-training and fine-tuning
  - Adapted LLMs in an online setting with continuously updating based on user's feedback
  - Investigated new ideas to enhance the human interpretability and reasoning in RAG framework
  - Optimized the prompts with chain-of-thoughts and suggested the new evaluation metrics for online evaluation
  - Successfully implemented a product recommendation system following positive results from online testing
- **Develop the Information Retrieval Model for Alexa Devices**
  - Considered LLM-based data generations and model bootstrap to build the generalized model in zero-shot
  - Customized the search strategies in traditional retrieval system like ElasticSearch according to the usage
  - Investigated the representation learning to find the transferrable and generalizable data representation
  - Developed the novel dimensionality reduction to save the computational costs and enhance the generalizability
  - Experienced the whole cycle of model implementation in production
- **Investigate the Data Augmentation for Information Retrieval**
  - Considered back-translation, dynamic in-context learning, GAN and VAE to enlarge the database
  - Developed the novel GAN approach using language models to suggest the proper and diverse synthetic data

University of Toronto, Biometrics Security Lab - Research Assistant — Sep 2018 - Sep 2022

- **Develop User Verification System using Heart Signal with CNN, RNN, GAN and VAE**
  - Applied various signal processing techniques in both time and frequency domain to build input dataset
  - Found time-stable and unique features from heart signals to establish the user verification system
  - Compared conventional machine learning model with deep learning model to find the best suitable one
  - Successfully developed the robust system against the adversarial attacks and security threats
  - Collected the physiological signals from 170 people to build a dataset (largest public dataset)
- **Investigate Human Activity Recognition with Wearable Device**
  - Used inertial and physiological sensors in wearable device to build the robust activity recognition system
  - Built the hierarchical deep learning model with multimodalities to recognize the diverse activities

Hyundai MOBIS, DAS Control Engineering - Research Engineer — Jul 2016 - Feb 2018

- **Test Recognition Rate and Design Driver Attention Warning Logic in Multi-Function Camera**
  - Assessed the recognition rate of camera in diverse situations such as downtown, local road, and highway
  - Designed and optimized the flow of logic for improving the quality of function
  - Drove a test car in problematic conditions to resolve the issues of a new vehicles

Texas A&M University, Laboratory for Optical Diagnosis and Imaging - Research Assistant — Sep 2014 - May 2016

- **Analyze Biomedical Image Data by Image Processing and Machine Learning Techniques**
  - Implemented deconvolution and various filters to enhance the image quality
  - Experimented feature selection methods to find out useful features in huge datasets
  - Optimized diverse classifiers (mainly, SVM with Gaussian kernel) to obtain lower error rate

RECENT PUBLICATIONS (Full list covered in Google Scholar)

Empirical Methods in Natural Language Processing (EMNLP) 2024
Link, Synthesize, Retrieve: Universal Document Linking for Zero-Shot Information Retrieval — Nov 2024
DY Hwang, B Taha, H Pande, Y Nechaev

The 4th Workshop on Multilingual Representation Learning 2024 @ EMNLP 2024
Unsupervised Text Representation Learning via Instruction-Tuning for Zero-Shot Dense Retrieval — Nov 2024
Q Zeng, Z Qiu, DY Hwang, X He, WM. Campbell

International Conference on Natural Language Generation (INLG) 2023
GAN-LM: Generative Adversarial Network using Language Models for Downstream Applications — Sep 2023
DY Hwang, Y Nechaev, CD Lichy, R Zhang

Association for Computational Linguistics (ACL) 2023
EmbedTextNet: Dimension Reduction with Weighted Reconstruction and Correlation Losses for Efficient Text Embedding — Jul 2023
DY Hwang, B Taha, Y Nechaev

2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)
Eeg Emotion Recognition Via Ensemble Learning Representations — Jun 2023
B Taha, DY Hwang, D Hatzinakos

IEEE Journal of Selected Topics in Signal Processing
EyeDrive: A Deep Learning Model for Continuous Driver Authentication — Jan 2023
B Taha, SNA Seha, DY Hwang, D Hatzinakos

2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)
Hierarchical Deep Learning Model with Inertial and Physiological Sensors Fusion for Wearable-based Human Activity Recognition — May 2022
DY Hwang, PC Ng, Y Yu, Y Wang, P Spachos, D Hatzinakos, KN. Plataniotis

Journal of Signal Processing Systems (Invited paper)
A New Score Level Fusion Approach for Stable User Verification System Using the PPG Signal — Mar 2022
DY Hwang, B Taha, D Hatzinakos

IEEE Transactions on Information, Forensics and Security
PBGAN: Learning PPG Representations from GAN for Time-Stable and Unique Verification System — Oct 2021
DY Hwang, B Taha, D Hatzinakos

2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)
Variation-Stable Fusion for PPG-based Biometric System — Jun 2021
DY Hwang, B Taha, D Hatzinakos

IEEE Transactions on Information, Forensics and Security
Evaluation of the Time Stability and Uniqueness in PPG based Biometric System — Jul 2020
DY Hwang, B Taha, DS Lee, D Hatzinakos

2019 IEEE Canadian Conference on Electrical & Computer Engineering
PPG-based Personalized Verification System: PPSNet — May 2019
DY Hwang, D Hatzinakos

HONORS

SGS Conference Grant - Outstanding student who do conference presentation — May 2019
Hanyang International Scholarship - Outstanding student who is studying abroad — Sep 2014 - May 2016
Full National Science & Engineering Scholarship - Outstanding engineering student: 5 times — Sep 2009 - Sep 2013
Full Grade Scholarship - Top student in major (Rank in 1/215) — Mar 2009

PROFESSIONAL SERVICE

Reviewer - EMNLP 2023-2024**,** ACL 2023-2024, ACL Rolling Review, RepL4NLP @ACL 2024, SyntheticData4ML @NeurIPS 2023, IEEE Journal of Biomedical and Health Informatics, IEEE Transactions on Information, Forensics and Security

Program Committee - EMNLP 2023 Industry Track

Talks - Career Guidance Seminar @Incheon National University (Dec 2023), GAN with LM @ML for Healthcare Roundtable in Amazon (Oct 2023)

SKILLS

Technical Skills - C, C++, Python (including TensorFlow, PyTorch), MATLAB (including Stateflow), AWS

Technical Areas - Signal Processing, Computer Vision, Natural Language Processing, Machine Learning, Deep Learning

Foreign Language - Native in Korean, Fluent in English

REFERRERS

At Amazon - Collaborated closely with **Sr. Applied Scientist Yaroslav Nechaev** remper@me.com

During Ph.D. degree - Supervised by **Prof. Dimitrios Hatzinakos** dimitris@comm.utoronto.ca

During Master degree - Supervised by **Prof. Javier A. Jo** javierjo@ou.edu