

# DAE YON HWANG

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## EDUCATION

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

- **Post-Training of Multimodal Foundation Models for General and Specialized Applications**

- Employed LLM-as-a-Judge techniques for data cleaning and quality assurance
- Conducted pre-training, fine-tuning, and preference optimization with considering domain-specific knowledge
- Applied chain-of-thoughts reasoning for reliable and explainable model outputs
- Achieved the promising performances and integrated the models into live products

- **Build a Recommendation System with Foundation Models**

- Customized foundation model with pre-training, instruction fine-tuning, and preference optimization
- Adapted recommendation system for online environments with continuous updates based on user feedback
- Integrated RAG to ensure accurate and up-to-date recommendation without retraining
- Optimized prompts with chain-of-thoughts and proposed novel evaluation metrics for online assessments
- Successfully deployed a product recommendation system following positive results from online testing

- **Develop an Information Retrieval Model for Alexa Devices**

- Generated diverse synthetic data using LLM-based methods and fine-tuned models for zero-shot scenario
- Developed a novel GAN-based augmentation approach to produce high quality synthetic data
- Customized traditional retrieval systems, such as ElasticSearch, for specific usage scenarios
- Advanced the representation learning to develop transferrable and generalizable data representation
- Designed a novel dimensionality reduction to reduce computational costs and improve the generalizability
- Experienced the end-to-end implementation and deployment of the model in production

**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](#))

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### 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

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**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**

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**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**

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**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**

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**At Amazon** - Collaborated closely with **Sr. Applied Scientist Yaroslav Nechaev**

[remper@me.com](mailto:remper@me.com)

**During Ph.D. degree** - Supervised by **Prof. Dimitrios Hatzinakos**

[dimitris@comm.utoronto.ca](mailto:dimitris@comm.utoronto.ca)

**During Master degree** - Supervised by **Prof. Javier A. Jo**

[javierjo@ou.edu](mailto:javierjo@ou.edu)