

# DAE YON HWANG

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**Personal Website:** [eoduself.github.io/daeyonhwang/](https://eoduself.github.io/daeyonhwang/)

## EDUCATION

<b>University of Toronto</b>	Ph.D. in Electrical & Computer Engineering, <b>GPA: 4.0/4.0</b>	Nov 2022
<b>Texas A&amp;M University</b>	Master of Science in Electrical Engineering, <b>GPA: 4.0/4.0</b>	May 2016
<b>Hanyang University</b>	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

- **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](#))**

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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 International Workshop on Data-Centric AI @ CIKM 2024**

Unsupervised Text Representation Learning via Instruction-Tuning for Zero-Shot Dense Retrieval Oct 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)