

# DAE YON HWANG

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

## EDUCATION

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<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

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**Amazon Science, AGI - Applied Scientist Intern** Sep 2021 - Dec 2021 / **Applied Scientist II** Sep 2022 - Present

- **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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<b>ACL Rolling Review (received strong positive reviews and will be committed to EMNLP 2024)</b>	
Link, Synthesize, Retrieve: Universal Document Linking for Zero-Shot Information Retrieval	Jun 2024
<i>DY Hwang, B Taha, H Pande, Y Nechaev</i>	
<b>International Conference on Natural Language Generation (INLG) 2023</b>	
GAN-LM: Generative Adversarial Network using Language Models for Downstream Applications	Sep 2023
<i>DY Hwang, Y Nechaev, CD Lichy, R Zhang</i>	
<b>Association for Computational Linguistics (ACL) 2023</b>	
EmbedTextNet: Dimension Reduction with Weighted Reconstruction and Correlation Losses for Efficient Text Embedding	Jul 2023
<i>DY Hwang, B Taha, Y Nechaev</i>	
<b>2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)</b>	
Eeg Emotion Recognition Via Ensemble Learning Representations	Jun 2023
<i>B Taha, DY Hwang, D Hatzinakos</i>	
<b>IEEE Journal of Selected Topics in Signal Processing</b>	
EyeDrive: A Deep Learning Model for Continuous Driver Authentication	Jan 2023
<i>B Taha, SNA Seha, DY Hwang, D Hatzinakos</i>	
<b>2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)</b>	
Hierarchical Deep Learning Model with Inertial and Physiological Sensors Fusion for Wearable-based Human Activity Recognition	May 2022
<i>DY Hwang, PC Ng, Y Yu, Y Wang, P Spachos, D Hatzinakos, KN. Plataniotis</i>	
<b>Journal of Signal Processing Systems (Invited paper)</b>	
A New Score Level Fusion Approach for Stable User Verification System Using the PPG Signal	Mar 2022
<i>DY Hwang, B Taha, D Hatzinakos</i>	
<b>IEEE Transactions on Information, Forensics and Security</b>	
PBGAN: Learning PPG Representations from GAN for Time-Stable and Unique Verification System	Oct 2021
<i>DY Hwang, B Taha, D Hatzinakos</i>	
<b>2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)</b>	
Variation-Stable Fusion for PPG-based Biometric System	Jun 2021
<i>DY Hwang, B Taha, D Hatzinakos</i>	
<b>IEEE Transactions on Information, Forensics and Security</b>	
Evaluation of the Time Stability and Uniqueness in PPG based Biometric System	Jul 2020
<i>DY Hwang, B Taha, DS Lee, D Hatzinakos</i>	
<b>2019 IEEE Canadian Conference on Electrical &amp; Computer Engineering</b>	
PPG-based Personalized Verification System: PPSNet	May 2019
<i>DY Hwang, D Hatzinakos</i>	

## **HONORS**

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<b>SGS Conference Grant</b> - Outstanding student who do conference presentation	May 2019
<b>Hanyang International Scholarship</b> - Outstanding student who is studying abroad	Sep 2014 - May 2016
<b>Full National Science &amp; Engineering Scholarship</b> - Outstanding engineering student: 5 times	Sep 2009 - Sep 2013
<b>Full Grade Scholarship</b> - 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**

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