# Dae Yon Hwang

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## EDUCATION

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

- **Build Retrieval-Augmented Generation Framework with Foundation Model**
  - Customized the foundation model for RAG implementation based on continual pre-training and fine-tuning
  - Investigated the ideas to enhance the human interpretability and reasoning in RAG framework
- **Investigate the Data Augmentation for Information Retrieval**
  - Considered word-level, character-level and back-translation approaches to enlarge the database
  - Developed the GAN approach using language models to suggest the proper and diverse synthetic data
- **Develop the Information Retrieval Model for Alexa Devices**
  - Considered LLM-based data generations and model bootstrap to build the generalized IR model in zero-shot
  - Customized the search strategies in ElasticSearch according to the usage
  - Experienced the whole cycle of model implementation 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
  - 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

**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 Jul 2023

Efficient Text Embedding
*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** - SyntheticData4ML @ NeurIPS 2023, EMNLP 2023**,** ACL 2023, ACL Rolling Review 2022-Present, IEEE Journal of Biomedical and Health Informatics, IEEE Transactions on Information, Forensics and Security
**Program Committee** - EMNLP 2023 Industry Track

## 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

**During Ph.D. degree** - Under the supervision of **Prof. Dimitrios Hatzinakos** — dimitris@comm.utoronto.ca
**During Master degree** - Under the supervision of **Prof. Javier A. Jo** — javierjo@ou.edu