

# HAH MIN LEW

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## CORE VALUES

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Data-centric approaches leading to ML systems can solve valuable real-world problems. I value building efficient systems through agile trials and errors based on a clarified problem. Proactively growing, challenging, and sharing are my core values and attitude toward my life.

## EDUCATION

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Mar. 2019 - Aug. 2021 M.S. in Electrical Engineering & Computer Science (EECS) at **DGIST** (GPA: 4.06/4.3)  
Mar. 2014 - Feb. 2019 Bachelor of Engineering at **DGIST** ([Best Project Award](#))

## EXPERIENCE

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**Klleon, AI Researcher** Aug. 2022 - present

- Building efficient data preprocessing pipelines and generative models for a virtual human dialogue system.

**DGIST, Graduate Researcher, Advisor: Prof. Jae Youn Hwang** Mar. 2019 - Aug. 2022

- Multimodal Biomedical Imaging and System Lab (MBIS Lab).
- [6 SCIE publications](#), 7 international conferences, 9 projects, 6 patents, and [2 awards](#).
- ML-based anomaly detection and generative model design for biomedical applications under multimodal, class-imbalance, and multi-task problems.
- Development of application-specific systems integrating hardware and software.
- Advanced signal processing and computer vision skills.

**LANTERN, Co-founder** Nov. 2016 - July 2017

- Founded a data-driven personalized tutor matching service company. Co-working with **Class101**.

## SELECTED PROJECTS

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**Building a virtual human dialogue system** Aug. 2022 - present

- Built multimodal data preprocessing pipelines and the state-of-the-art ML model, integrated distributed data parallel for training, devised training & evaluation frameworks, and an efficient inference pipeline.
- Improved inference latency from 10 seconds to 47 milliseconds per frame and generative performances.
- Sped up in-house data preprocessing pipeline from 3 FPS to 36 FPS.
- Used skills: Python, PyTorch, Docker, Git

**Finetuning a large text-to-image model with a custom-built dataset maker** Oct. 2023 - Nov. 2023

- Full open source contributions of fashion product dataset creation with an ML-based captioning module, finetuning demo codes, and inferable text-to-image models.
- Used skills: Python, PyTorch, Git | Repositories: [\[Github\]](#), [\[Model\]](#), [\[Dataset\]](#)

**Multimodal data analysis for the mobile diagnosis of otitis media** Feb. 2020. - Jan. 2022

- Constructed clinical data into trainable matrices (4.98 billion pixels) from a proposed mobile otoscope.
- Enhanced diagnostic accuracy by a multi-layer perceptron (80%) exceeds that of expert clinicians (73%).
- Used skills: Python, Scikit

**A biomedical monitoring system with an optimized algorithm** Mar. 2019. - Mar. 2021

- Scored  $\pm 1.77\%$  average error rate compared to the conventional global monitoring products ( $\pm 1 \sim 5\%$ ).
- Developed a cost-effective 1-D time-series signal processing algorithm of time complexity  $O(N \log N)$ .
- Used skills: MATLAB, LabView, VHDL

## SELECTED PUBLICATIONS

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Hah Min Lew\*, S. Yoo\*, H. Kang\*, G. Park, “**Chroma-HS: High-Fidelity Industrial Head Swapping with Chroma Keying**”, In submission to **ECCV 2024**. [\[Project Page\]](#)

- Proposed a new virtual human generation pipeline for industrial applications.
- Designed a novel  $H^2$  augmentation method and Foreground Predictive Attention Transformer (FPAT).

Hah Min Lew\*, J. S. kim\*, et al., “**Deep Learning-based Synthetic High-Resolution In-Depth Imaging Using an Attachable Dual-element Endoscopic Ultrasound Probe**”, Arxiv Preprint 2023. [\[Paper\]](#)

- Data-centric and finetuning approach for high-resolution medical image generation using generative models.

K. Lee, Hah Min Lew, et al., “**CSS-Net: Classification and Substitution for Segmentation of Rotator Cuff Tear**”, In **ACCV 2022**. [\[Paper\]](#)

- Developed a multi-task network for detection of class-imbalanced regions.
- Proof reliability of generated data through t-SNE clustering.

M. H. Lee, Hah Min Lew, et al., “**Deep learning-based framework for fast and accurate acoustic hologram generation**”, IEEE TUFFC (IF: 3.267, [Frontal Cover Paper](#)), 2022. [\[Paper\]](#)

- Designed autoencoder architecture for unsupervised learning, loss functions for both accuracy and energy efficiency, and physical constraints layers for acoustic hologram generation in the real world.

T. C. Cavalcanti, Hah Min Lew, et al, “**Intelligent Smartphone-based Multimode Imaging Oscope for the Mobile Diagnosis of Otitis Media**”, Biomedical Optics Express (IF: 3.562, [Spotlight on Optics](#)), 2021. [\[Paper\]](#)

- Image classification via fundamental ML algorithms (*Multi-layer perceptron, Random forest, Logistic regression, Decision trees, Naïve Bayes*) for multimodal human data from clinical trials.
- Quantitative analysis using standard metrics.

Hah Min Lew, et al., “**Ultrasonic Blood Flowmeter with a Novel Xero Algorithm for a Mechanical Circulatory Support System**”, Ultrasonics (IF: 4.062), 2021. [\[Paper\]](#)

- Developed a biomedical monitoring system integrating hardware configurations and a proposed algorithm.
- Experience of FPGA programming to generate bipolar pulses with a clock frequency of 100 MHz and time intervals of 20  $\mu$ s to calculate real-time flow rates.

J. Kim, Hah Min Lew, et al., “**Forward-looking Multimodal Endoscopic System based on Optical Multispectral and High-frequency Ultrasound Imaging Techniques for Tumor Detection**”, IEEE TMI (IF: 11.037), 2020. [\[Paper\]](#)

- Classification of tumor from multispectral data through the spectral angle mapper algorithm.
- Proposed a multimodal tumor characterization system using both depth-wise and surface-wise data.

## AWARDS

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**Outstanding Poster Award** Aug. 2021

- 2021 Student Conference, DGIST

**Outstanding Paper Award** May. 2021

- 2021 Spring Conference, The Korean Society of Medical & Biological Engineering (KOSOMBE)

**Best Project Award** Mar. 2017

- 2016 Undergraduate Group Research Project (UGRP) Program, DGIST

## SKILLS

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Skills  Python,  MATLAB, Bash |  PyTorch,  TensorFlow, Scikit, OpenCV, Pandas |  Docker,  Git

Languages Korean (native), English (professional working proficiency)