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HAH MIN LEW

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Professional Summary

- AI Researcher at Klleon for **2 years**, involved in various creative digital human projects (**Generative AI**).
- **M.S. degree in Electrical Engineering and Computer Science**, with **3.5 years** of experience in **Machine/Deep Learning**, Signal/Image Processing, and Data Analysis.
- Teamworked for **over 13 projects using programming** (**Proficient in Python and PyTorch**).
- Co-founded a data-driven startup with hands-on entrepreneurial experience.

Passionate about developing efficient AI-driven solutions to address diverse real-world challenges. Committed to continuous learning, innovative problem-solving, and proactive communication and collaboration with cross-functional teams to drive business impact and customer satisfaction.

Education

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

Klleon, AI Researcher Aug. 2022 - present

- Building efficient data pipelines and generative models for **a virtual human dialogue system**.
- Integrating external APIs (NVIDIA Audio2face, OpenAI ChatGPT, TTS) and an in-house generative model (3D Gaussian Splatting) for **a live streaming chat avatar system**.

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

- **Multimodal Biomedical Imaging and System Lab (MBIS Lab)**
- **Achievements**: 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

Expressive 3D parameterized live streaming chat avatar system Apr. 2024 - present

- Integrated NVIDIA headless Audio2face REST API, OpenAI ChatGPT API, TTS API and 3D Gaussian Splatting (GS) head avatar model for an interactable real-time chat avatar system (**25-28 FPS**).
- Implemented emotion message queue protocol for real-time natural emotional changes in an avatar.
- Used skills: Python, PyTorch, Docker, Containerd, Git, JavaScript, Node.js

Development of a real-time high-fidelity head swapping framework Aug. 2022 - Apr. 2024

- Built data processing pipelines and **the state-of-the-art ML model**, integrated **distributed data parallel for multi-GPU training**, devised an efficient inference pipeline.
- Improved inference latency to product-applicable level **from 10 seconds to 47 milliseconds per frame** and generative performances. (Related product: [Klleon Headswap API])
- Sped up in-house data preprocessing pipeline **from 3 FPS to 36 FPS**.
- Used skills: Python, PyTorch, Docker, Git, JavaScript

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]

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

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

Selected Publications

Hah Min Lew*, S. Yoo*, H. Kang*, G. Park, **"Towards High-fidelity Head Blending with Chroma Keying for Industrial Applications"**, In **WACV 2025**. [Paper] [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 Otoscope 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 μs 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.

Skills

Skills	Python, MATLAB, Bash | PyTorch, TensorFlow, Scikit, OpenCV | Docker, Git, Containerd
Basic	JavaScript, Node.js
Languages	Korean (native), English (professional working proficiency)