Jinhee Lee

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RESEARCH INTERESTS

Surgical AI for intraoperative decision-making, **Medical image segmentation and interpretation** for preoperative diagnosis, **Surgical and assistive robotics** for healthcare applications, **Generation models** for media content creation

TECHNICAL SKILLS

Programming Languages: Python (Advanced), Java (Intermediate), C++ (Intermediate), MATLAB (Intermediate), C#
Software and Tools: Pytorch, Opencv, Git, Linux, Docker, Unity Engine, Android Studio, Blender, 3ds Max, LaTeX

PROFESSIONAL EXPERIENCE

AI Research Collaborator | Surgical Innovation & Machine Interface (SIMI) Lab, Stanford University & Bongseng AI Lab (BAIL), Bongseng Memorial Hospital | Remote

2024 - Present

- **Smart Surgeon Collaborative**
    - Conducted quantitative and qualitative model comparison experiments for Segment Anything Models (SAMs) in the neuro-surgical domain
    - Investigated state-of-the-art (SOTA) models for real-time 3D reconstruction from surgical videos

Junior AI Engineer | lululab Inc. | Seoul, Korea

2022 - Present

- **Segmentation, Detection, and Classification**
    - Contributed to develop a facial acne segmentation model by supplying additional data via generating fake acne patches using StyleGAN2
    - Developed a OCR module based on YOLO model to enable automatic blood pressure registration for Digital Therapeutics, and deployed it for the android environment with quantization
    - Implemented AI-driven personal color analysis model, and developed an demo app
- **Generative AI**
    - Developed facial wrinkle and pigmentation generation module using stable diffusion models with controlnet, and implemented facial disease progression module via image processing in Python and C++
    - Developed face anonymization module based on face landmark recognition module and diffusion models
    - Developed a ChatGPT based Skin Chatbot app. and integrated it with a facial skin analysis system and recommendation systems.
        - Conducted GPT fine-tuning, function calling, RAG, and prompt engineering
- **Recommendation Systems**
    - Designed recommendation systems for cosmetics, skin treatments, and life routines in Java and Python.
        - Implemented full scripts to match user and product properties, which are currently in service
        - Developed a deep learning based cosmetic ingredients analysis module and released it in the Java environment by converting it to ONNX runtime format with quantization

Aircraft Engine Researcher | Korea Aerospace Research Institute | Daejeon, Korea

2016 - 2018

- Conducted combustion stability and fuel injector tests for a Scramjet combustor, and implemented image processing and data analysis scripts for laser diagnostic data (PDPA and PLIF)in MATLAB
- Supported wet compression experiments to enhance turbo jet engine compressor efficiency

Research Intern | Korea Aerospace Research Institute | Daejeon, Korea 2014 Summer

- Investigated prior research on wet compression and supported relevant experiments

PROJECTS

Webtoon Character Generation and Classification | Personal Project

- Developed a webtoon face generation system based on the StyleGAN2-ADA model and implemented a webtoon style classification model for 6 distinct art styles, achieving 95.9% accuracy

Drug Discovery for Alzheimer's disease | Ohio State University

- Collected chemical compound data from PubChem and converted them to SMILES representation
- Performed data vectorization and implemented regression models to define active chemical compounds for beta-amyloid and tau proteins

Unmanned Aerial Vehicle (UAV) | Inha University

- Designed rocket-launched UAV with Aerodynamic and Structural analysis, including propulsion and control system design
    - Implemented propulsion system and PID feedback control system using MATLAB
- Created a scaled prototype aircraft with aerodynamic stability control system (Arduino, and C++)

Other Projects

- Kidney tissue cell segmentation in Kaggle - Team Project
- Created a tutorial on implementing an audio digit recognizer for a class material - Team Project
- Drug Discovery for MoA prediction in Kaggle - Team Project
- Data measurement project involving multiple sensors (pressure, temperature, gyroscope, accelerometer, and GPS) and analyzed data using MATLAB

EDUCATION AND QUALIFICATIONS

Ohio State University | Columbus, OH, USA
M.S. in Computer Science and Engineering 2019 - 2021
Project: ML based Drug Discovery for Alzheimer's Disease

University of Science and Technology | Korea Aerospace Research Institute | Daejeon, Korea
M.Eng. in Aerospace System Engineering 2016 - 2018
Thesis: Study on the Spray Characteristics of Fuel Injectors For Scramjet Engines

Inha University | Incheon, Korea
B.S. in Aerospace Engineering 2010 - 2016
Project: Unmanned Aerial Vehicle(UAV) Design and Flight Test of a Scaled Prototype
* Honors: Junior Year Top Student (Full Scholarship)

PUBLICATIONS AND CONFERENCE PRESENTATIONS

[**1**] Lee, J., Lee, H., Park, J. J., Htun, E., Xu, B. C., Cho, S. H., ... & Buch, V. P. (2025, June). Intraoperative Absolute Depth Estimation in MVD Surgery. In *2025 IEEE 38th International Symposium on Computer-Based Medical Systems (CBMS)* (pp. 341-342). IEEE Computer Society.

[**2**] Kim, S., Lee, J., Lee, C., Lee, J. (2024). Improving Facial Acne Segmentation through Semi-Supervised Learning with Synthetic Images. Journal of Korea Multimedia Society, 27(2), 241-249, 10.9717/kmms.2024.27.2.241

[**3**] Lee, J., Yoon, H., Kim, S., Lee, C., Lee, J., & Yoo, S. (2024). Deep learning-based skin care product recommendation: A focus on cosmetic ingredient analysis and facial skin conditions. *Journal of Cosmetic Dermatology*, *23*(6), 2066-2077.

[**4**] Lee, J., Lee, S., Lee, K., Kim, J., & Yang, S. (2017). Study on Spray Visualization and Atomization Characteristics of Air-assist Type Injector for Scramjet Engine. *Journal of the Korean Society of Propulsion Engineers*, *21*(5), 88-96.

EXTRACURRICULAR ACTIVITIES

Aircraft Mechanic | Republic of Korea Air Force | Gimhae, Korea 2011 - 2013

- Ground support and aircraft maintenance service for the E-737 AEW&C
- Honorably discharged after 24 months of service as an Air Force Sergeant

Mentoring | Lululab - Sungkyunkwan University 2022 - 2024

- Led 9 undergraduate students from Sungkyunkwan university for AI internships
- Mentored 3 AI Projects - Cosmetic Ingredients OCR, Chatbot in Dermatology, and Personal Color Estimation

PATENT

[**P1**] Method and Apparatus for Recommending Cosmetics Suitable for Users Based on the Efficacy of the User's Skin Type and Cosmetic Ingredients, Korean: *10-2022-0079131/10-2450424,* PCT: *PCT/KR2023/008926*