Sojeong Kim

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Education

The Hankuk University of Foreign Studies, Yongin, South Korea (Mar.2022 – Present)

Research Interests

- **Computer Vision: Object Detection, Segmentation, Clustering**
- **Pattern Recognition**
- **Medical Image Processing**
- **Generative AI**
- **Representation Learning**

Publication

1. **Sojeong Kim**, Jongum Yoon, Byunghwan Jeon, "Reinforcement learning-based fully automatic localization and segmentation of the left atrial appendage", IPIU2025 in Jeju (Feb. 2025)
   - This project proposes a fully automated method based on reinforcement learning to accurately localize the left atrium appendage (LAA) orifice in cardiac CT images.
   - Developed a fully automated pipeline combining 2D U-Net, Dueling DQN, and 3D U-Net for robust and anatomically consistent segmentation.
2. In Preparation
   - An extended journal version is currently under development for peer reviewed submission.

Internship

Research Student at Machine Intelligence Lab, Hankuk University of Foreign Studies, Korea (Apr. 2024 - Present)

- Participating in research for anatomical structure localization in CT images, focusing on segmentation of LAA with incomplete contrast.
- Contributing to system implementation, experiment design, and journal writing; currently planning a follow-up clustering study on segmentation results.

Research Student at Visual Information Processing Lab, Ulsan National Institute of Science and Technology, Korea (Jul. 2025 – Aug.2025)

- Participating in research on person re-identification (Re-ID) using deep metric learning.
- Contributing to model implementation, hard negative mining strategies and performance evaluation on benchmark datasets.

Research Experience

<Reinforcement Learning based Fully Automated Localization of LAA in CT images, Machine Intelligence Lab> (Apr.2024 – Feb.2025)

- Addressed the challenge of **incomplete contrast enhancement** in LAA regions of cardiac CT by developing a fully automated segmentation pipeline.
- Combined 2D U-Net for initial mask generation, Euclidean Distance Transform (EDT) and Dueling DQN for center localization, and 3D U-Net for refined segmentation.
- Achieved anatomically consistent and clinically useful masks; currently finalizing a journal submission.
- Planning a follow-up morphological clustering (e.g., k-means, PCA) on 3D segmentation outputs to identify shape patterns and support patient stratification.

<Fusion framework of federated and distributed reinforcement learning> (Mar.2025 – Jun.2025)

- Developing an integrated RL framework to overcome the limitations of isolated learning by aggregating diverse experiences from decentralized agents.
- Improves training efficiency, policy diversity, and generalization through a combination of federated structure with memory-based global optimization.

<Deep Metric Learning for Person Re-Identification, Visual Information Processing Lab> (Jul.2025 – Aug.2025)

- Conducting research on person re-identification with deep metric learning approaches.
- Implemented baseline models and applied hard negative mining and weighting strategies to improve discrimination.
- Evaluated models on benchmark datasets and analyzed ablation results to validate effectiveness.

Teaching & Advising

- **Mentor, SW Volunteer Group: Computer programming for Elementary students** (Mar.2023 – Jul.2023 & Sep.2023 – Jan.2024), Hankuk University of Foreign Studies
- **Tutor, HUFS Coding Mentoring Program** (Sep.2024 – Dec.2024), Hankuk University of Foreign Studies
- **AI Mentor (Team Lead) for PnP Society** (Sep. 2024 – Feb.2025), Hankuk University of Foreign Studies
- **Teaching Assistant, Design Patterns Course** (Mar. 2025 – Jun. 2025), Hankuk University of Foreign Studies

Other Experience

1. **HUFS Coding Festival** (Sep.2024), Hankuk University of Foreign Studies
2. **Participation in AI/SW short-term overseas training, Singapore & Vietnam**, Hankuk University of Foreign Studies (Mar.29.2024 – Apr.7.2024)
    - Visited academic and industrial institutions to study education systems and tech industry strategies.
3. Server Administrator for Machine Intelligence Lab Website (Feb.2024 – Present)

- Managing server operations, website updates, and security maintenance for the research lab.

Skills

- Python, C++, Java, R: Utilized for various purposes including data analysis, machine learning, system programming, embedded systems, performance-critical applications, object-oriented programming, and statistical analysis.
- TensorFlow, Keras, PyTorch, Scikit-Learn: Used for developing, training, and experimenting with machine learning and deep learning models.
- Pandas, Numpy, Matplotlib, Scipy: Applied in data manipulation, numerical calculations, and creating visualizations for scientific and technical data.
- Github, Slack, Notion: Tools for source code management, team communication, and project organization.