Last updated: 2024-08-01

Sangyun Lee

Phone: +82-10-9923-7457
Homepage: sylee-skhu.github.io
Email: sylee@skhu.ac.kr

Work Experience

Sungkonghoe University
Role **Date Sep.2021 – Present**

- Assistant Professor in Division of Future Convergence

Projects

- Making Action Detection Practical: Leveraging 2D CNNs for Real-Time and Online Applications (Sungkonghoe University, Aug.2024 – Jul.2025)
- Real-time monitoring technology for identifying hazardous situations for workers in industrial settings using video-based AI (Ministry of SMEs and Startups, Jul.2024 – Dec.2026)
- Development of Core Technology for Preventing Identity Theft (SecuChart Global, May.2023 – Dec.2023)
- A Context-aware Multiple Object Tracking with Temporal Shifted Transformer (Sungkonghoe University, Aug.2022 – Jul.2023)
- Research on AI integration technology for comprehensive context-aware multiple object tracking (Ministry of Science and ICT, Mar.2022 – Feb.2024)

Robot Center, Samsung Research, Samsung Electronics Co., Ltd.
Role **Date Mar.2019 – Aug.2021**

- Develop on-device AI models for robot perception
- Design SW architecture for human-robot interaction

Autonomous Machine Lab, Samsung Research, Samsung Electronics Co., Ltd.
Role **Date Mar.2018 – Feb.2019**

- Develop deep learning models for autonomous driving
- Develop multiple object tracking system with sensor fusion

Education

Yonsei University **Date Sep.2011 – Feb.2018**

- Ph.D. in Electrical & Electronic Engineering

- Advisor: Prof. Euntai Kim (etkim@yonsei.ac.kr)
- Dissertation "Deep Neural Network based Discriminative Feature Learning and Its Application to Multiple Object Tracking"

Yonsei University **Date Mar.2007 – Aug.2011**

- B.S. in Electrical & Electronic Engineering

Publications (main author only)

Journals

- S. Ryu, S. Hong and **S. Lee**, "Making TSM Better: Preserving Foundational Philosophy for Efficient Action Recognition," *ICT Express*, Jun, 2024.
- **S. Lee** and S. Hong, "Extended Siamese Convolutional Neural Networks for Discriminative Feature Learning," *International Journal of Fuzzy Logic and Intelligent systems*, vol. 22, no. 4, pp. 339-349, Dec, 2022.
- **S. Lee** and E. Kim, "Multiple Object Tracking via Feature Pyramid Siamese Networks," *IEEE Access*, vol. 7, pp. 8181-8194, Dec, 2019.
- **S. Lee**, M. Park and J. Baek, "Robust adaptive synchronization of a class of chaotic systems via fuzzy bilinear observer using projection operator," *Information Sciences*, vol. 402, pp. 182-198, Sep, 2017.
- **S. Lee**, S. Jang, M. Park and C. Yoon, "Circuit Modeling and Simulation for Thermoelectric Cooling System using Condensed Water," *Journal of Korean Institute of Intelligent Systems*, vol. 25, no. 2, pp. 161-167, Apr. 2015.
- **S. Lee**, H. Seo, C. Hyun and M. Park, "Fuzzy Disturbance Observer based Multiple Sliding Surface Control of Nonlinear Systems with Mismatched Disturbance," *Journal of Korean Institute of Intelligent Systems*, vol. 24, no. 4, pp. 385-391, Aug. 2014.
- **S. Lee**, M. Park, and J. Baek, "Modeling of Dynamic Hysteresis Based on Takagi-Sugeno Fuzzy Duhem Model," *International Journal of Fuzzy Logic and Intelligent Systems*, vol. 13, no. 4, pp. 277-283, Dec. 2013.

Proceedings

- **S. Lee**, S. Hong and E. Kim, "D-TSM: Discriminative Temporal Shift Module for Action Recognition," in *Proc. of The 20th International Conference on Ubiquitous Robots (UR 2023)*, Hawaii, USA, Jun, 2023.
- **S. Lee**, J. Kim, S. Hong, B. Kim, D. Noh and E. Kim, "Semantic Segmentation Using Superpixel and Fully Convolutional Network," in *Proc. of The 32th Institute of Control, Robotics and Systems Annual Conference (ICROS 2017)*, Sokcho, Korea, May, 2017, pp. 31-32.
- **S. Lee**, S. Kim and E. Kim, "Control of Camera Optical Image Stabilization System using Command Shaping Techniques and Feedback Controller," in *Proc. of Conference on Information and Control Systems (CICS 2016)*, Danyang, Korea, Oct, 2016, pp. 13-14.

- **S. Lee**, H. Eum, S. Jang, M. Park and C. Yoon, "Design of Fuzzy Controller for Thermoelectric Cooling System using Condensed Water," in *Proc. of Korean Institute of Intelligent Systems Spring Conference 2015 (KIIS 2015)*, Ansan, Korea, Apr, 2015, pp. 159-160.
- **S. Lee**, S. Jang, M. Park and C. Yoon, "Cooling System Control Based on Fuzzy Look-Up Table Using Temperature Sensor," in *Proc. of Korean Institute of Intelligent Systems Fall Conference 2014 (KIIS 2014)*, Gangneung, Korea, Oct, 2014, pp. 70-71.
- **S. Lee**, J. Baek and M. Park, "Design of Dynamic Hysteresis Model based on T-S Fuzzy Duhem Model," in *Proc. of The 14th International Symposium on Advanced Intelligent Systems (ISIS 2013)*, Daejeon, Korea, Nov, 2013.

Patents Applications

- "ROBOT AND METHOD FOR CONTROLLING THEREOF", **KR** 10-2020-0172983, Dec, 2020.
- "METHOD OF ASSISTING AUTONOMOUS VEHICLE AND APPARATUS THEREFOR", **KR** 10-2018-0094612, **CN** 201980054390, **EP** 19850615, **US** 201916539312, Aug, 2018.

Academic activities

Reviewer

- International Journal of Fuzzy Logic and Intelligent Systems
- The Journal of Korean Institute of Next Generation Computing

Honors and Awards

- 2023 Performance Evaluation Award, Sungkonghoe University
- 2022 Performance Evaluation Award, Sungkonghoe University

Others

Programming Language

- C/C++, Python, Java, Matlab

Deep learning frameworks

- TensorFlow, PyTorch, Caffe
- NPU SDKs (TFLite-EdgeTPU, SNPE, OpenVINO, ArmNN, TensorRT)

Computer vision / robotics libraries

- ROS/ROS2, OpenCV, PCL, Eigen, etc.

Team collaboration tools

- Git, Confluence, Jira, Notion, etc.

Research projects

[1] AI based Robot Perception System Development for Human-Robot Interaction

- Goal: Development of AI perception system for robot using deep learning
- Keywords: Human-Robot Interaction, Action Recognition, Object Detection
- Mar.2019 – Present
- Achievements
  - Developed deep learning models for object detection and action recognition
  - Compressed the models and applied them to target robots with limited resources
  - Developed overall SW architecture for robot perception

Figure 1. Robots (publicly available on https://research.samsung.com/robot)

[2] Vision based Perception System Development for Autonomous Driving Vehicle

- Goal: Development of AI perception system for autonomous driving vehicle
- Keywords: Object Detection, Re-Identification, Multiple Object Tracking
- Mar.2018 – Feb.2019
- Achievements
  - Developed deep learning models for object detection and tracking
  - Developed multiple object tracking algorithm using multiple cameras and lidars

[3] Multiple Object Tracking in Dynamic Environment

- Goal: Development of multiple object tracking algorithm in highly dynamic environment
- Keywords: Object Detection, Re-Identification, Multiple Object Tracking
- Mar.2016 – Dec.2017
- Achievements
  - Developed deep learning models for re-identification and tracking
  - Developed multiple object tracking algorithm
  - Ranked in second place on a representative benchmark (https://motchallenge.net/, accessed on 10/04/2017)
  - Showed the state of the art performance on both surveillance and robot views
  - Published in IEEE Access

Figure 2. Surveillance view

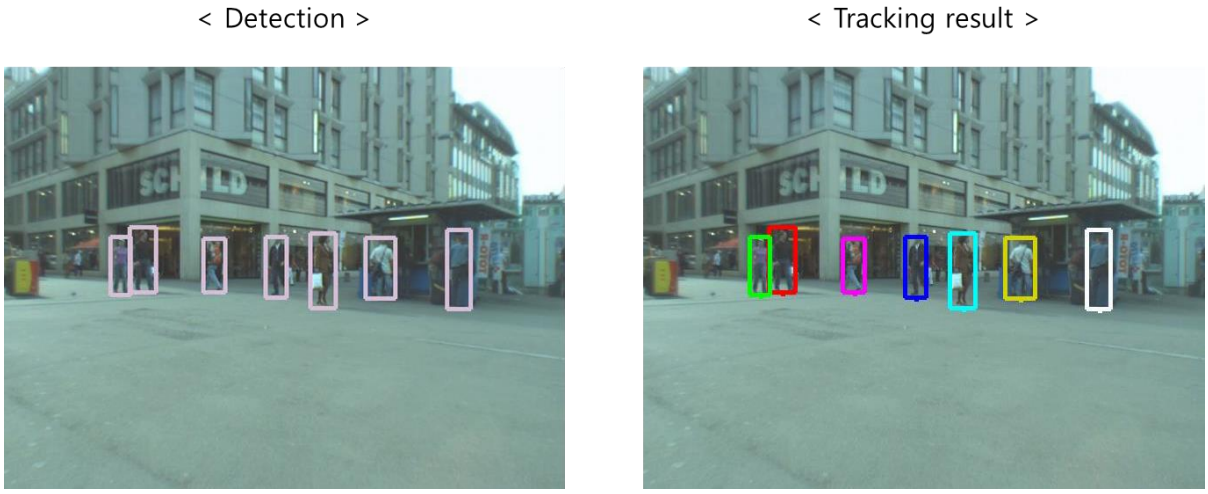

Figure 3. Robot view