Sai Navaneet

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About Me

Driven by curiosity and innovation, I will soon complete my Master's in Electronics and Electrical Engineering, specializing in NLP-based robotic control. My passion lies in blending machine learning with robotics to create intelligent systems that solve real-world challenges. I thrive on research, discovery, and turning complex ideas into practical solutions.

Education

Kyungpook National University, Masters in School of Electronics and Electrical Engineering — Mar 2024 – Dec 2025
Daegu, South Korea

- GPA: 4.07/4.3

Kyungpook National University, Bachelor of Science in School of Electronics Engineering (Double Degree) — Mar 2022 – Feb 2024
Daegu, South Korea

- GPA: 3.8/4.3

Christ University, Bachelor of Technology in Electronics and Communication Engineering — July 2019 – Dec 2021
Banglore, India

- GPA: 3.7/4

Experience

Research & Robotics Engineer, Airobotics – Daegu, South Korea — April 2025 – Present

- Working on autonomous car manufacturing systems using **Yaskawa** industrial robots.
- Developed and integrated object detection models to identify weld beads for quality assurance and robotic guidance.
- Collaborate on the automation of inspection processes within the vehicle assembly line.

Robotics Engineer, Dexweaver – Daegu, South Korea — July 2024 – Dec 2024

- Developed a vision-guided tissue processing system using **ViperX robotic arms** and the Action Chunking Transformer (ACT) algorithm.
- Implemented a leader-follower teleoperation setup for data collection and trained ACT for autonomous manipulation of deformable materials.
- Achieved an autonomous operation success rate of 85.7%, with performance comparable to human teleoperation (92.4%).
- Engineered multi-modal datasets (joint angles, gripper states, synchronized RGB feeds) and designed transformer-based policies for action prediction.

Researcher, Physical Intelligence Lab – Kyungpook National University, South korea — Feb 2024 – Present

- Developed **MambaVLA**, a scalable Vision-Language-Action framework built on state-space models (Mamba), achieving **94% success on LIBERO** and **88% on RoboCasa** benchmarks.
- Designed and implemented advanced **state-space model pipelines** for sequential decision-making and trajectory prediction in robotic manipulation.
- Built and optimized **transformer- and diffusion-based** policy architectures to improve adaptability and robustness in dynamic real-world environments.
- Led the development of **precision motion-planning and control algorithms** for manipulators, integrating perception, language understanding, and action generation.

- Collaborated on the end-to-end design, training, and deployment of robotic intelligence systems for both academic research and industrial applications.

Research Intern, Physical Intelligence Lab – Kyungpook National University, South Korea — Sep 2022 – Feb 2024

- Developed imitation learning algorithms for robotic arms to replicate human-like behaviors.
- Designed and tested iterative learning control (ILC) combined with model predictive control (MPC) for high-accuracy tasks.
- Applied reinforcement learning techniques to differential drive robots to improve navigation and obstacle avoidance.
- Enhanced aerial robotics by refining detection and tracking algorithms for UAVs.

Publications

MambaVLA: A Scalable and Efficient Vision-Language-Action Model with State Space Architecture — Jan 2026
Sai Navaneet, Manisha Lingala, Sangmoon Lee, Ju H. Park
Published at CCNC 2026

LegMamba: A Scalable and Efficient State Space model for Quadrapedal Locomotion — Nov 2025
Sai Navaneet, Manisha Lingala, Sangmoon Lee
POSTER IROS 2025

QROOT: An Integrated Diffusion Transformer and Reinforcement Learning Approach for Quadrupedal Locomotion — Dec 2025
Sai Navaneet, Manisha Lingala, Sangmoon Lee, Ju H. Park
To appear at NeurIPS 2025 (under review)

Vision-Guided Predictive Action Imitation Learning with Discrete Latent Encoding for Multitasking Robots — Jun 2025
Sai Navaneet, Manisha Lingala, Sangmoon Lee
Submitted to Neural Networks

Discrete Latent Diffusion Motion Planning — Jun 2025
Sai Navaneet, Manisha Lingala, Sangmoon Lee, Ju H. Park
Published at The International Conference on Nonlinear Dynamics (NODYCON 2025)

Vision-Guided Imitation Learning Using Action Chunk Transformers — Oct 2024
Sai Navaneet, Manisha Lingala, Sangmoon Lee, Hongseok Yoo
Published at IEMEK Symposium on Embedded Technology 2024 (IEMEK 2024)

Hybrid Model Predictive and Iterative Learning Control for Enhanced Leader-Follower Robotic Tracking — May 2024
Sai Navaneet, Sangmoon Lee
Published at KNU-EERC 2024

Projects

MambaVLA: Vision–Language–Action Model with Mamba State Space Architecture — github.com/MambaVLA

- Built an efficient VLA pipeline combining Mamba SSM, Eagle2 visual backbone, Qwen-7B encoder, and diffusion-based action generation.
- Achieved faster inference and lower compute requirements than Transformer-based models across multiple robotics benchmarks.

Transformer Based Vision Guided Tissue Processing github.com/Harvesting

- Developed an automation of tissue packing using ViperX robotic arms

Action Chunck Transfomer on Franka Robot github.com/ActFranka

- Implemented Act on Franka robot to do vision guided imitaion learnign on pick and place tasks

QROOT: An Integrated Diffusion Transformer and Reinforcement Learning Approach for Quadrupedal Locomotion

- Introduced a control stack that combines diffusion transformer with a reinforcement learning-based stabilizer(PPO), enabling smooth and robust execution on real-world hardware

Vision-Guided Predictive Action Imitation Learning with Discrete Latent Encoding for Multitasking Robots github.com/PAIL

- Introduced a control stack that combines diffusion transformer with a reinforcement learning-based stabilizer(PPO), enabling smooth and robust execution on real-world hardware

Technologies

Languages: Python, C++, HTML, CSS

Technologies: ROS, Gazebo , Mujuco , Isaac Sim , Pytorch ,LINUX(UBUNTU , ARCH , KALI , REDHAT)

AI / Machine Learning

Expertise: Vision–Language–Action (VLA) Models, State Space Models (Mamba), Transformers, Diffusion Models, Imitation Learning, Reinforcement Learning, Multimodal Learning

Frameworks: PyTorch, TensorFlow, HuggingFace

Specialization: Robot Learning, Policy Optimization, Multimodal Fusion, Vision Encoders (Eagle, DINO, CLIP, SigLip), Language Models