

Sai Navaneet

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About Me

Driven by curiosity and innovation, I am currently pursuing a 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 – Present

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

Bangalore, 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

- Working on **state-space models (e.g., Mamba)** to improve sequential modeling and trajectory prediction for robotic manipulation tasks.
- Implementing **transformer-based** architectures to enhance robotic decision-making and adaptability in dynamic environments.
- Leading development of **precision motion planning algorithms** for robotic manipulators using advanced control strategies.
- Contributing to the collaborative design and optimization of robotic systems for both academic research and industrial deployment.

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

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 Chunk Transformer on Franka Robot github.com/ActFranka

- Implemented Act on Franka robot to do vision guided imitation learning 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 , Mujoco , 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 (Qwen, LLaMA)