

# Sai Navaneet

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## About Me

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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

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<b>Kyungpook National University</b> , Masters in School of Electronics and Electrical Engineering Daegu, South Korea	Mar 2024 – Present
• GPA: 4.07/4.3	
<b>Kyungpook National University</b> , Bachelor of Science in School of Electronics Engineering (Double Degree) Daegu, South Korea	Mar 2022 – Feb 2024
• GPA: 3.8/4.3	
<b>Christ University</b> , Bachelor of Technology in Electronics and Communication Engineering Banglore, India	July 2019 – Dec 2021
• GPA: 3.7/4	

## Experience

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<b>Research &amp; Robotics Engineer</b> , Airobotics – Daegu, South Korea	April 2025 – Present
• Working on autonomous car manufacturing systems using <b>Yaskawa</b> 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.	
<b>Robotics Engineer</b> , Dexweaver – Daegu, South Korea	July 2024 – Dec 2024
• Developed a vision-guided tissue processing system using <b>ViperX robotic arms</b> 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.	
<b>Researcher</b> , Physical Intelligence Lab – Kyungpook National University, South Korea	Feb 2024 – Present
• Working on <b>state-space models</b> (e.g., <b>Mamba</b> ) to improve sequential modeling and trajectory prediction for robotic manipulation tasks.	
• Implementing <b>transformer-based</b> architectures to enhance robotic decision-making and adaptability in dynamic environments.	
• Leading development of <b>precision motion planning algorithms</b> 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

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**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

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**MambaVLA: Vision–Language–Action Model with Mamba State Space Architecture**

[github.com/MambaVLA](https://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](https://github.com/Harvesting)

- Developed an automation of tissue packing using ViperX robotic arms

**Action Chunck Transfomer on Franka Robot**

[github.com/ActFranka](https://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](https://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**

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**Languages:** Python, C++, HTML, CSS

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

## **AI / Machine Learning**

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**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)