

Sai Krishna Ghanta

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PhD candidate in AI working on robot learning and spatial cognition. I build learning-driven systems that integrate perception, scene understanding, and decision-making for real-world sensing and robot collaboration, with publications at IROS, ICRA, RAL, and IEEE T-AI.

Education

- University of Georgia, Athens, GA** August 2024 - Present
PhD in Artificial Intelligence GPA: 3.90/4
- Dr. SPM International Institute of Information Technology, India** November 2020 - June 2024
Bachelor of Technology in Data Science and Artificial Intelligence GPA: 8.96/10
 - Dean's List of Academic Excellence Award 2021, 2023

Work Experience

- Heterogeneous Robotics Lab, School Of Computing UGA** August 2024 - Present
Graduate Research Assistant, Advisors: Dr. Ramviyas Parasuraman Athens, Georgia
 - Investigating on distributed world models for multi-robot systems that enable each robot to model teammates' beliefs, intentions, and future actions for cooperative decision-making with reinforcement learning, imitation learning and generative models (VLAs).
 - Developed FLaME, an embodied spatial-reasoning framework that grounds LLMs in hierarchical scene and spatial-field memory to reason over partially observed physical processes (e.g., Wi-Fi, gas, temperature) and predict their evolution under interventions, achieving a 19.9-point improvement over the strongest baseline.
 - Developed an LLM-driven informative sampling pipeline that converts scene semantics into belief priors and performs receding-horizon replanning from model uncertainty to prioritize decision-relevant measurements and mapping actions.
 - Developed MGPRL for distributed multi-robot localization using uncertainty-aware Gaussian Processes over Wi-Fi RSSI, and Policies over Poses, a multi-agent RL framework for non-convex trajectory optimization.
 - Developed a multi-robot spatial exploration framework (SPACE) to mitigate ghosting trail effects in 3D reconstructions.
- Louisville Automation & Robotics Research Institute** January 2023 - June 2024
Visiting Research Intern (Summer 2023), Advisor: Dr. Sabur Baidya, Dr. Madan Mohan Kentucky, USA
 - Developed 3DS-SLAM, a real-time pipeline integrating 3D object detection into visual semantic SLAM, enabling object-level mapping and dynamic object filtering in dynamic scenes.
 - Studied the reliability of camera-LiDAR calibration for sensor-fusion robotics pipelines.
 - Built a digital twin testbed with a Franka Emika Panda arm and Haption Virtuose 6D RV for manipulation.
- Samsung R&D Institute, India** July 2022 - January 2023
AI Research Intern Remote
 - Designed and Developed Deep Learning based Generative Adversarial Networks (GAN) approaches for synthetic data generation for Optical Character Recognition (OCR) in Bixby Vision.
 - Streamlined ViTGAN, designed morphological operations for handwritten text synthetic data generation for OCR.
- SOIL Ltd - School of Innovation and Leadership** September 2021 - December 2021
Machine Learning Intern Hyderabad, India
 - Worked on implementing an NLP-based curation engine to assess the educational materials with OCR.
 - Constructed an integrated NLP and CV pipeline to recognize the hand-written text and text summarization consolidated with harmful corpus detection in educational materials for 6D educational model.

Professional Service and Activities

- President for Indian Student Association at UGA Jan 2025 - Present
- Secretary of Artificial Intelligence and Machine Learning Club, IIIT Naya Raipur June 2021 - June 2022
- Student Volunteer at National Service Schema, NSS - IIIT Naya Raipur December 2020 - June 2021
- Technical Reviewer of IEEE Robotics Conferences 2023-Present

Techincal Skills

1. **Programming Languages:** Python, C, C++.
2. **ML Frameworks:** OpenCV, Open3D, NLTK, Tensorflow, PyTorch, Pyspark, LLaMA Factory.
3. **Robotic Frameworks:** ROS, ROS2, Gazebo, RViz, PCL, MoveIt, V-REP, Webots.

Honors, Awards, and Achievements

1. Recipient of the James L. Carmon Honorable Mention Scholarship Award – University of Georgia 2026–27
2. Recipient of the 2026–27 NSF Chishiki AI Fellowship (\$49,000+) – University of Texas at Austin 2026–27
3. Team Lead of 1st Prize Winner at the IROS 2026 Competition on Intelligent Information Gathering for Multi-Robot Systems 2026
4. Recipient of NSF Travel Grant for the NHERI SPARC Program at TACC, UT Austin 2026
5. Winner of IROS 2026 Competition on Intelligent Information Gathering for Multi-Robot Systems 2026
6. Selected for the KTH RPL Summer School and awarded a Travel Grant to attend in Stockholm, Sweden 2026
7. Recipient of Travel Grants to attend IEEE IROS 2025 in Hangzhou, China, and IEEE ICRA 2025 2025
8. Recipient of International Travel Grant Award (\$10,000) – IIITNR's TEQIP II 2023, 2024
9. 1st Position (2,400+ developers) – Ernst & Young GDS (EY-GDS) Hackpions 3.0 2021
10. Recipient of the 100% Scholarship Honor in 10+2 Pre-University Programme – FIITJEE 2016

Peer-Reviewed Publications

Journals

1. **Sai Krishna Ghanta** and Ramviyas Parasuraman. “SPACE: 3D Spatial Co-operation and Exploration Framework for Robust Mapping and Coverage with Multi-Robot Systems.” *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 12, pp. 13074–13081, 2025. doi: 10.1109/LRA.2025.3627118 and presented at the *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2026*.
2. Praneeth Nemani, **Sai Krishna Ghanta**, Nikhil Ramisetty, Bodicherla Digvijay Sri Sai, and Santosh Kumar. “Deep Learning-Based Holistic Speaker Independent Visual Speech Recognition.” *IEEE Transactions on Artificial Intelligence*, vol. 4, no. 6, pp. 1705–1713, 2023. doi: 10.1109/TAI.2022.3220190.
3. Mallikharjuna Rao K, **Sai Krishna Ghanta**, and Kundrapu Supriya. “Data Preprocessing Techniques: Emergence and Selection Towards Machine Learning Models – A Practical Review Using HPA Dataset.” *Multimedia Tools and Applications*, vol. 82, no. 24, pp. 37177–37196, 2023. doi: 10.1007/s11042-023-15087-5.
4. Praneeth Nemani, **Sai Krishna Ghanta**, Kundrapu Supriya, and Santosh Kumar. “Speaker Independent VSR: A Systematic Review and Futuristic Applications.” *Image and Vision Computing*, vol. 138, Art. no. 104787, 2023. doi: 10.1016/j.imavis.2023.104787.

Conferences

1. **Sai Krishna Ghanta** and Ramviyas Parasuraman. “FLaME: Grounding Large Language Models for Embodied Reasoning of Spatial Processes.” Under review at the *41st AAAI Conference on Artificial Intelligence (AAAI 2027)*.
2. **Sai Krishna Ghanta** and Ramviyas Parasuraman. “SK: Semantic Kernel for Robotic Information Gathering.” Accepted to the *2026 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.
3. **Sai Krishna Ghanta** and Ramviyas Parasuraman. “Policies Over Poses: Reinforcement Learning Based Distributed Pose-Graph Optimization for Multi-Robot SLAM.” In *2025 IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS)*, pp. 1–7, 2025. doi: 10.1109/MRS66243.2025.11357260.
4. **Sai Krishna Ghanta** and Ramviyas Parasuraman. “MGPR: Distributed Multi-Gaussian Processes for Wi-Fi-Based Multi-Robot Relative Localization in Large Indoor Environments.” In *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 974–981, 2025. doi: 10.1109/IROS60139.2025.11247180.

5. **Sai Krishna Ghanta**, Kundrapu Supriya, and Sabur Baidya. “3DS-SLAM: A 3D Object Detection Based Semantic SLAM Towards Dynamic Indoor Environments.” In *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 7178–7185, 2025. doi: 10.1109/IROS60139.2025.11247204.
6. Mohammad Helal Uddin, **Sai Krishna Ghanta**, Liam Seymour, and Sabur Baidya. “CAMP-HiVe: Cyclic Pair Merging Based Efficient DNN Pruning with Hessian-Vector Approximation for Resource-Constrained Systems.” In *2025 IEEE International Conference on Machine Learning and Applications (ICMLA)*, pp. 91–98, 2025. doi: 10.1109/ICMLA66185.2025.00019.
7. **Sai Krishna Ghanta**, Kundrapu Supriya, Sanskar Singh, and Sabur Baidya. “Adversarial Security and Differential Privacy in mmWave Beam Prediction in 6G Networks.” In *2023 7th Cyber Security in Networking Conference (CSNet)*, pp. 5–11, 2023. doi: 10.1109/CSNet59123.2023.10339703.
8. Prathistith Raj Medi, **Sai Krishna Ghanta**, Praneeth Nemani, Satyanarayana Vollala, and Santosh Kumar. “A Novel End-to-End Framework for Occluded Pixel Reconstruction with Spatio-Temporal Features for Improved Person Re-Identification.” In *2023 8th International Conference on Business and Industrial Research (ICBIR)*, pp. 865–870, 2023. doi: 10.1109/ICBIR57571.2023.10147408.
9. **Sai Krishna Ghanta**, Dyavat Sumith, and Garika Akshay. “Epersist: A Two-Wheeled Self Balancing Robot Using PID Controller and Deep Reinforcement Learning.” In *2022 22nd International Conference on Control, Automation and Systems (ICCAS)*, pp. 1488–1492, 2022. doi: 10.23919/ICCAS55662.2022.10003940.
10. Buchammagari Avinash Reddy, **Sai Krishna Ghanta**, Kaniganti Priyanka Saraswathi, Indala Sadhvik, Venkanna Udutalapally, and Debanjan Das. “dScout: Unmanned Ground Vehicle for Automatic Disease Detection and Pesticide Atomizer.” In *2022 IEEE 7th International Conference for Convergence in Technology (I2CT)*, pp. 1–6, 2022. doi: 10.1109/I2CT54291.2022.9824236.

Workshop Papers & Presentations (Lightly Reviewed)

1. **Sai Krishna Ghanta** and Ramviyas Parasuraman. “SPACE: 3D Spatial Co-operation and Exploration Framework for Robust Mapping and Coverage with Multi-Robot Systems.” Presented at the *IEEE ICRA 2025 Workshop on Block by Block: Collaborative Strategies for Multi-Agent Robotic Construction*, Atlanta, GA, USA, May 2025.
2. **Sai Krishna Ghanta**. “Spatial Intelligence Models for Robotics and Environmental Reasoning.”, poster presentation at the *RPL Summer School 2026*, KTH Royal Institute of Technology, Stockholm, Sweden, 2026.

Internet/Open-Source Code and Dataset Contributions

1. **Ghanta Sai Krishna**, Ramviyas Parasuraman. “Policies over Poses: Reinforcement Learning-Based Distributed Pose-Graph Optimization for Multi-Robot SLAM.” <https://github.com/herolab-uga/policies-over-poses>
2. **Ghanta Sai Krishna**, Ramviyas Parasuraman. “MGPR: Distributed Multi-Gaussian Processes for Wi-Fi-Based Multi-Robot Relative Localization in Large Indoor Environments.” <https://github.com/herolab-uga/MGPR>
3. **Ghanta Sai Krishna**, Ramviyas Parasuraman. “SPACE: 3D Spatial Co-operation and Exploration Framework for Robust Mapping and Coverage with Multi-Robot Systems.” <https://github.com/herolab-uga/SPACE-MAP>
4. Indala Sadhvik, Kaniganti Priyanka Saraswathi, B. Avinash Reddy, **Ghanta Sai Krishna**. “IoT-Based Robotic Leaf Disease Detection for Precision Agriculture.” https://github.com/hii-saikrishna/Leaf_disease_Detection
5. Kundrapu Supriya, **Ghanta Sai Krishna**, B. Avinash Reddy. “Sunday: Intelligent Voice Assistant and Desktop Automation System.” <https://github.com/hii-saikrishna/Sunday-Voiceassistant>
6. **Ghanta Sai Krishna**. “Interactive Computer Vision Web Application Using MediaPipe and OpenCV.” https://github.com/hii-saikrishna/MP_web_cv