JUSTIN VARGHESE JOHN

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SUMMARY

Robotics and AI graduate researcher specializing in **machine learning**, **robot planning, learning-based autonomy and large-scale simulation**. Experienced in developing **symbolic and learning-driven planning systems**, high-fidelity simulators, and real-time robotic pipelines that scale from simulation to real-world deployment. Currently conducting thesis research in the AAIR Lab at Arizona State University

EDUCATION

Master of Science in Robotics and Autonomous Systems (AI)	**August 2024 - Expected May 2026**
Ira A. Fulton Schools of Engineering	**AZ, USA**
Arizona State University, Tempe	
GPA: 4.0/4.0	
Bachelor of Technology (Honors) in Robotics and Automation	**August 2019 - August 2023**
Minor in Computer Science and Engineering (AI)	**Kerala, India**
APJ Abdul Kalam Technological University	
GPA: 3.721/4.0	

RESEARCH & PROFESSIONAL EXPERIENCE

Graduate Services Assistant (GSA) & Graduate Researcher	**July 2025 - Present**
Autonomous Agents and Intelligent Robots (AAIR) Lab, Arizona State University	**Tempe, AZ**

- Conducting master's thesis research on learning symbolic and relational abstractions for long-horizon robot planning from raw, unannotated demonstrations under **Prof. Siddharth Srivastava**
- Developing logic-based world models and high-level actions enabling zero-shot generalization to larger and more complex tasks. Integrating symbolic representations with PDDL-based task and motion planning frameworks and continuous execution pipelines.
- Developing advanced simulation and data analysis tools; designing new simulation domains integrated with OpenRAVE and NVIDIA Isaac Lab.
- Implementing parallelized, high-performance data processing pipelines for scalable, reproducible experiments.
- Manuscript under submission to the Conference on Robot Learning (CoRL 2025).

Robotics Engineering Intern – EPICS Program	**May 2025 - Aug 2025**
Cartken	**Tempe, AZ**

- Collaborated with **Cartken** through ASU's EPICS program to analyze the **lifecycle and environmental impact** of autonomous delivery robots, focusing on sustainable reuse and recycling of components.
- Supported robot prototyping, electrical troubleshooting, and programming, contributing to the development of circular design practices for future robotic systems.

KEY SKILLS

Technical Skills

- **Programming:** Python, C++, C, MATLAB, SQL
- **Robotics & Planning:** ROS, OpenRAVE, Isaac Lab, SLAM, Task & Motion Planning, Autonomous Systems, 3D Perception
- **AI / Machine Learning:** PyTorch, TensorFlow, Deep Learning, Computer Vision, Reinforcement Learning
- **Systems & Performance:** Linux, CUDA, TensorRT, Parallel Computing, Embedded & Real-Time Systems

Certifications

- Fundamentals of Engineering Project Management from Arizona State University
- Inter-Personal Skills in Engineering Project Management from Arizona State University

Leadership & Volunteerism

- Robotics Department Representative, SESA | May 2020 – Apr 2021.
- National Service Scheme (NSS): Active volunteer (2017-2019).

SELECTED RESEARCH & TECHNICAL WORK

- **Real-Time Robotics & Embedded AI:** Designed and deployed vision-based robotic systems for real-time perception and control on embedded platforms (e.g., NVIDIA Jetson, raspberry pi), leveraging monocular depth estimation, Kalman filtering, and ML-based scene understanding under hardware constraints.
- **Autonomous Systems & Control:** Developed autonomous behaviors including object evasion, precision drone landing, maze solving, and surveillance, integrating vision-based control, kinematics, path planning, and closed-loop execution.
- **Simulation, Digital Twins & Validation:** Built custom simulators and digital twins in MATLAB/Simulink to model robots, drones, and environments, enabling algorithm validation, motion planning optimization, and mission-level testing prior to deployment.
- **Multi-Robot Systems & Environment Modeling:** Implemented multi-robot exploration and mapping frameworks, combining stochastic exploration strategies, potential fields, collision avoidance, and map merging, achieving high coverage and system stability in simulation.
- **AI/ML for Perception & Edge Deployment:** Trained and optimized deep learning models for perception tasks like incident detection, semantic segmentation, achieving high accuracy and efficient edge deployment through model compression and hardware-aware optimization.