

JUSTIN VARGHESE JOHN

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SUMMARY

Master's student in Robotics and Autonomous Systems (AI) with a passion for advancing robotic through AI-driven solutions with expertise in **computer vision, deep learning, robotic perception, embedded systems & real-time robotics control**. Experience in **semantic segmentation, LiDAR-based perception, and 3D scene understanding** for autonomous navigation and robotic applications. Skilled in **training large-scale vision models**, optimizing ML pipelines, and deploying real-time perception solutions. Passionate about **enhancing robot-environment interaction through real-time perception, 3D reconstruction, and multimodal sensor fusion for humanoid robotics**.

EDUCATION

Master of Science in Robotics and Autonomous Systems(AI)

Ira A. Fulton Schools of Engineering

Arizona State University, Tempe

GPA: **3.89/4.0**

August 2024 - Expected May 2026

AZ, USA

Bachelor of Technology (Honors) in Robotics and Automation

Minor in Computer Science and Engineering (AI)

APJ Abdul Kalam Technological University

CGPA: **3.721/4.0**

August 2019 - August 2023

Kerala, India

KEY SKILLS

Technical Skills

- **Programming Languages:** Python, C, MATLAB, SQL, C++
- **Machine Learning & AI:** TensorFlow, Machine Learning, Deep Learning, Computer Vision, PyTorch, AI for Perception, AI Deployment/Real-time systems, Large-scale data processing, Optimization, Neural Networks, Embedded AI
- **Robotics:** ROS, SLAM, Gazebo, Simulink, PLC, SCADA, PID Control, Autonomous Systems, OpenCV, Robotic Hardware
- **Software & Tools:** SolidWorks, Linux, Arduino IDE, Edge Computing

Soft Skills

- Communication skills, Critical Thinking, Leadership skills, Teamwork, Problem-solving, Project Management, Adaptability, Creativity, Decision-making, Resilience, Time management.

Leadership & Volunteerism:

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

EXPERIENCE

Artificial Intelligence Intern

Acmegrade

February 2023 - April 2023

Bangalore, India

- Learned machine learning algorithms, neural networks, and natural language processing through intensive AI training, garnering advanced skills in data analysis and predictive modeling.
- Collaborated with professionals to implement AI solutions, acquiring hands-on experience in real-world applications.

Process Automation and Robotics Intern

ABB India Ltd

October 2022

Bangalore, India

- Collaborated with engineers on **industrial automation workflows**, acquiring proficiency in PLC and SCADA systems.
- Garnered hands-on experience with professional engineers in robotics and automation.

College Research Affiliate

International Institute of Information Technology

December 2021 - May 2022

Hyderabad, India

- Conducted hands-on experimentation with **IoT protocols** to optimize communication between devices, contributing to research findings.
- Gained practical experience in IoT systems, bridging theoretical research with practical applications.

PROJECTS

Autonomous Maze-Solving Robot System

August 2024 - December 2024

- Designed and implemented a **digital twin** simulation for **MyCobot Pro 600 in MATLAB-Simulink**, validating **forward and inverse kinematics** to optimize robotic motion planning for **autonomous maze solving**.

- Developed a **vision-based robotic system** integrating **BFS pathfinding**, **inverse kinematics**, and **real-world execution**, enabling the MyCobot Pro 600's end effector to autonomously navigate and solve a maze.

Multi-Robot Exploration and Mapping

August 2024 - December 2024

- **Developed a multi-robot exploration system** integrating **modified Lévy walk strategy** with **potential field navigation**, ensuring efficient coverage, collision avoidance, and seamless map merging.
- **Validated over 90% map coverage efficiency** and system stability through **MATLAB-based simulations**, optimizing multi-robot coordination for autonomous exploration.

Real-Time Incident Detection for Intelligent Transportation

July 2022 - June 2023

- Trained a **Deep Learning model** using **TensorFlow** on a **high-performance server**, enabling high-accuracy road incident detection with **95% precision**.
- **Optimized the model for edge deployment** using **Edge Impulse**, reducing its size by **75% while maintaining accuracy**, and deployed it on **Arduino Nano 33 BLE**, enhancing real-time emergency response efficiency and scalability.

Road Marking System Simulation

January 2023 - June 2023

- **Developed a MATLAB-based road marking system** utilizing **semantic segmentation** to identify and highlight lane boundaries on unmarked rural roads, enhancing autonomous driving capabilities and improving navigation safety.
- **Designed and implemented a lane departure warning mechanism**, leveraging image processing techniques to detect vehicle position relative to generated lane markings, significantly reducing the risk of unintended lane deviations and improving road safety in unstructured environments.

Autonomous Surveillance Vehicle

January 2022 - June 2022

- Developed an **autonomous vehicle** using **Nvidia Jetson Nano**, implementing **ML-based scene understanding** with a camera for **road-following**, **collision avoidance**, and **environmental monitoring**.
- Designed and integrated an **embedded system for real-time motor control**, utilizing **Python** and **deep learning models** to process visual inputs and enable adaptive navigation.

RESEARCH INTERESTS

- **Vision-Language Models for Robotics**
- **3D Perception & Scene Understanding**
- **Autonomous Navigation & Multi-Robot Systems**
- **Humanoid Robot Perception & Learning**