RITHISH RAMAMOORTHY SATHYA

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PROFESSIONAL PROFILE

Published robotics researcher pursuing an MSc in Robotics at the University of Sheffield (expected Distinction), with a long term goal of a PhD in perception systems for extreme environments. Thesis work is on evaluating a simulation trained underwater object detection system and assessing domain randomization for improving sim to real transfer for AUVs that maps directly onto the I-SEE project's autonomy challenges. Hands on across the ROS2, embedded sensor fusion and edge perception, with a consistent record of rapid prototyping skills.

TECHNICAL SKILLS

Robotics	ROS2, SLAM, Odometry, Microcontroller Integration, Arduino/Jetson, Sensor Fusion
Programming	Python, C++, C#, Git version control
Simulation & CAD	Unity, Unreal Engine, NVIDIA IsaacSIM, OceanSIM, Fusion 360, Siemens NX
Machine Vision	Deep Learning, Object Detection, Image Segmentation
Languages	English C1

EDUCATION

MSc Robotics - **University of Sheffield** (*Sep 2025 – Present; United Kingdom)*

- **Expected Grade: Distinction**
- **Modules:** Foundations of Robotics; Manipulator Robotics; Mobile Robots & Autonomous Systems; Multi Sensor & Decision Systems; Machine Vision; Industry Training Program in Artificial Intelligence.
- **Thesis:** Developing and evaluating a simulation trained underwater object detection system and assessing domain randomisation for improving sim to real transfer for AUV applications.

BEng Mechatronics - **Kumaraguru College of Technology** (*Aug 2021 - Apr 2025; India)*

- **Grade: 7.9/10**
- **Modules:** Analog & Digital Electronics; Sensors & Instrumentation; Robotic Manipulators; Mobile Robotics; Fluid Dynamics; Artificial Intelligence; Material Science.
- **Thesis:** Comparative Analysis of 3D Path Planning Algorithms in Procedural Terrains.

WORK EXPERIENCE

Digital Innovation Zone Advisor - **Siemens Excellence Centre, Sheffield** (*Oct 2025 – Present; UK)*

- Operate a UR5e collaborative arm, enforcing safety standards in a Siemens standardised industry environment.
- Mentored 5 students on cobot operation, CAD design, and 3D printing.

Unity Developer (AR/AI) Systems - **Schnell Energy Equipments** (*Jul 2024 - Mar 2025; India)*

- Owned the development of a real time AR monitoring platform using Unity.
- Integrated YOLOv8 semantic segmentation with an accuracy of 92% to support street light monitoring.
- Established live sensor data pipelines and real time visualisation of operational state.

Graduate Innovation Engineer - **Forge Innovation & Ventures** (*Dec 2023 - Jun 2024; India)*

- Selected as Innovation Fellow under 100% scholarship;
- Led a multidisciplinary team of 7 to deliver a vision assisted delta robot MVP for high speed pick and place food packaging automation.
- Developed expertise in computer vision, ROS, and sensor fusion through structured industry expert led training programme.

RELEVANT PROJECTS

ROS Package for Turtlebot Waffle with SLAM Mapping

- Built a ROS package for Turtlebot Waffle using Jazzy Jalisco to navigate an arena within 90 secs.
- Implemented D star Lite algorithm for dynamic path planning and obstacle avoidance in the arena.
- Utilised 2D LiDAR point cloud data to generate occupancy grid SLAM map.

Explainable AI for Cancer Cell Classification using Microscopy Images

- Trained deep learning classification models using ResNet18 (97% accuracy) and DenseNet121 (94% accuracy) for cancer cell classification from microscopy images.
- Implemented model explainability analysis using GradCAM, GradCAM++, EigenCAM, and ScoreCAM to interpret model decisions and ScoreCAM performed the best.

Autonomous Mobile Manipulator Robot

- Designed a mobile manipulator robot using Fusion 360 and 3D printed the mechanical components.
- Integrated ultrasonic sensors and wheel encoders for odometry based localisation and environmental awareness.
- Implemented finite state machines for autonomous task execution and control. Added a 2 DOF manipulator with end effector control that held a pen to mark target on the board.
- Completes the task in 1 minute 45 seconds. Successfully navigated the arena, completed marking task, and returned to origin, demonstrating autonomous navigation and manipulation capabilities.

Comparative Analysis of 3D Path Planning Algorithms in Procedural Terrains (BEng Thesis)

- Implemented procedural terrain generation using perlin noise and evaluated A Star, RRT, RRT Star and D Star algorithms under partial environmental knowledge, analysing trade offs between computational efficiency, optimality, and adaptability.
- D star proved to be the best based on time taken to find the path.

Level 2 Digital Twin for Anomaly Detection in FDM Additive Manufacturing

- Built a real time digital twin for my 3D printer, establishing a 2 way data communication using Firebase to detect process deviations as they occur.
- Implemented Random Forest and XGBoost classifiers with an accuracy of 77% and 76% respectively for automated anomaly inspection.
- Developed a 3D app using Unity 3D for state visualisation and 2 way control of the 3D printer.

Vision Assisted Delta Robot MVP for Pick & Place Automation

- Owned and led team design and build of a high speed automated pick and place delta robot for food packaging, integrating RGBD camera object detection with an accuracy of 93%.
- Managed cross functional delivery across perception, electronics, and control system sub teams within a commercial MVP timeline by implementing agile project management and systems integration.

PUBLICATIONS (Scopus Indexed)

- Integration of UAV Systems with Machine Learning for Wildlife Monitoring [IGI Global, 2024]
- Collaboration of Mixed Reality for Interactive Visualization of Ocean Mapping [IEEE Xplore, 2023]
- Industry 5.0: Enhancing Human-Robot Collaboration through Collaborative Robots - A Review [IEEE Xplore, 2023]
- Enhancing Human Cobot Interaction with Mixed Reality: A Futuristic Review [IEEE Xplore, 2023]
- A Novel Adaptive Framework for Immersive Learning Using VR in Education [Wiley Scrivener, 2024]
- Digital Twin based Real-Time Anomaly Detection for FDM Additive Manufacturing [Accepted for Springer, ICAARS 2025]

OTHERS

- References available upon request.
- Strong swimmer.