

# RAJNISH SAHANI

Syracuse, NY | (315) 372-1054 | rsahani@syr.edu | linkedin.com/in/rajnish-sahani | github.com/rajnishsahani

## EDUCATION

### Master of Science in Computer Science

Expected: December 2026

Syracuse University, College of Engineering and Computer Science, Syracuse, NY

*Relevant Coursework:* Applied Agentic AI Systems, Design & Analysis of Algorithms, Hybrid AI, Introduction to Machine Learning, Principles of Operating Systems, Object Oriented Design

### Bachelor of Technology in Electronics and Communication Engineering

August 2023

Manipal University Jaipur, Rajasthan, India

## PROFESSIONAL EXPERIENCE

### Software Engineering Intern

January 2023 – June 2023

*Defence Research and Development Organisation (DRDO), Research Centre Imarat, Hyderabad, India*

- Designed and implemented a real-time object detection and depth estimation system using OAK-D stereo cameras under senior scientist guidance, enabling accurate target tracking and distance measurement
- Evaluated multiple single-stage deep learning object detection models (DETR, YOLOv5, YOLOv8) for real-time applications, comparing accuracy, speed, and robustness; optimized YOLOv5 to achieve **30% improvement in processing speed** while maintaining detection quality
- Developed depth estimation pipeline using OpenCV, template matching, and stereo vision techniques to compute object distances through disparity analysis

### Hardware Design Intern

June 2022 – July 2022

*Electronics Corporation of India Limited (ECIL), Hyderabad, India*

- Gained hands-on experience with Verilog HDL for digital circuit design and FPGA development
- Designed and implemented an Arithmetic Logic Unit (ALU) using Xilinx Vivado software for FPGA deployment

## PROJECTS

### SafeRL by Switching: Neuro-Symbolic Meta-Controller for MiniGrid | *Python, PyTorch, Stable-Baselines3*

- Developed hybrid neuro-symbolic architecture combining PPO reinforcement learning with symbolic reasoning for safe navigation in partially observable grid environments with hazards, walls, and dynamic obstacles
- Implemented uncertainty-gated meta-controller using policy entropy, ensemble disagreement, and hazard prediction to dynamically switch between fast neural actions and rule-aware symbolic interventions
- Achieved **35% improvement in episodic return** and **45% reduction in safety violations** compared to pure PPO baseline while maintaining low intervention frequency through confidence-based switching and hard safety shields
- Integrated Logic Tensor Networks (LTN) for differentiable high-level rule enforcement and deployed curriculum learning with domain randomization across multiple MiniGrid task variants

### S&P 500 Price Prediction Model | *Python, Scikit-learn, Pandas, NumPy*

GitHub

- Built forecasting model to predict S&P 500 prices for next three trading days using ensemble methods (Linear Regression and Random Forest) trained on historical data from multiple stock indices
- Engineered features including lag values, rolling averages, volatility measures, and day-of-week encoding to capture short-term market trends and cyclical patterns
- Achieved lowest Mean Absolute Error (MAE) of 29.5** among 50+ student submissions in semester-long forecasting competition

## LEADERSHIP EXPERIENCE

### Secretary General, SPIE Student Chapter

November 2021 – December 2022

- Led student chapter of 80+ members, organizing 12+ technical workshops and seminars on photonics, optical engineering, and instrumentation
- Coordinated cross-functional teams to execute international conference participation and networking events for engineering community

### Head of Research and Development, Electronics Society

May 2021 – August 2022

- Managed research initiatives focused on electronics, AI, and robotics; mentored and coordinated research efforts of 10 junior team members across multiple technical domains

## TECHNICAL SKILLS

**Programming Languages:** Python, Java, JavaScript, C/C++

**Web Development:** React, Angular, Node.js, Express.js, Spring Boot, HTML, CSS, RESTful APIs

**Database Management:** MongoDB

**Machine Learning & AI:** TensorFlow, PyTorch, OpenCV, Scikit-learn, NumPy, Pandas, Matplotlib, DepthAI, XGBoost, Stable-Baselines3

**Development Tools:** Git, GitHub, IntelliJ IDEA, PyCharm, VS Code, Bash, Xilinx Vivado, TensorBoard