AYUSH SAXENA

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EDUCATION

Syracuse University, Syracuse, NY **Aug 2022 - May 2024**
Master of Science in **Computer Engineering** | Research Assistant for Prof. Zhenyu Gan *GPA:*3.4
Relevant Coursework: Adv. DSA, Database Management, Object Oriented Design, Intro to ML, Intro to AI

Dr APJ Abdul Kalam Technical University, Ghaziabad, India **Aug 2014 - May 2018**
Bachelor of Technology in **Electrical and Electronics Engineering** *GPA:*3.3
Relevant Coursework: Computer System and Programming in C, Digital Image Processing, Software Engineering

SKILLS

Languages: Python, C++, React.js, Vue.js, Node.js, Shell Scriptng, JSON, Restful API
Frameworks and Libraries: TensorFlow, PyTorch, OpenCV, Numpy, Flask, Scipy, Pandas, Matplotlib, ONNX, CI/CD Pipelines, Keras, Seaborn, Plotly
Cloud and Platform Tools: Git, Docker, Kubernetes, AWS, Prometheus, Grafana, SLAM, Spark(ETL)
Databases: SQL, MySQL, SQLite, PostgreSQL, Redshift, MongoDB, Firebase

EXPERIENCE

Research Assistant | Syracuse University DLAR Labs *DLAR* **Nov 2023 - Present**
Roomba Enviro Bot
- Developed a path planning system with (Simultaneous Localization and Mapping) SLAM for Roomba inspection wheel Robot with navigation and localization. Implemented LiDAR-based mapping and utilized RViz to generate and visualize maps, significantly enhancing navigation efficiency and coverage.
- Implemented YOLO-based object detection for real-time obstacle recognition, significantly improving path planning and dynamic avoidance capabilities. Utilized Python scripts to preprocess and clean sensor data for analysis and automated Roomba mapping, which further reduced setup time by 55% for a client.
- Set up Flask server for data transmission between Raspberry Pi systems, applying preprocessing and analysis on LiDAR and sensor data to enhance path planning, increasing air quality data collection efficiency by 98%.

Fleet Management and Monitoring System for Autonomous Robots
- Deployed and managed a fleet of 10+ virtual robots using Kubernetes autoscaling to orchestrate ROS2 nodes, achieving seamless scalability and real-time monitoring with Prometheus alerting and Grafana dashboards.
- Improved system reliability with zero-downtime updates and reduced downtime by 30% through automated alerting and efficient workflows on AWS CloudWatch and Lambda.

Assistant Engineer, CSRE | Autometers Alliance Ltd. - Hubli, Karnataka **Mar 2020 - Oct 2021**
- Developed and implemented a predictive maintenance system for **Indian Railways** to optimize maintenance schedules and predict equipment failures, ensuring operational efficiency.
- Leveraged Python, Spark, and SQL to analyze historical railways data, automate maintenance processes, and predict inverter failures. This included developing algorithms to enhance data processing and creating scripts to automate routine maintenance tasks.
- Coolaborated with cross-functional teams to design automated workflows and achieved 15% downtime reduction and a 10% profit increase by optimizing maintenance schedules and predicting issues, ensuring 100% electrical uptime across 95 coaches on 6000+ round trips.

ACADEMIC PROJECTS

USA Presidential Election Analysis and Prediction | Github **Jan 2024 - May 2024**
- Analyzed 11 U.S. presidential elections (1976-2020) using Python, Pandas, and Seaborn, identifying key swing states and national party trends across 50 states, visualizing results using Plotly and BokehJS.
- Built a predictive model simulating past elections, achieving 80% accuracy in correctly identifying key swing states and their impact on the national outcome.
- Deployed an interactive dashboard with Flask, Docker, and AWS(including S3 to store, EC2 for hosting and RDS for database management) to visualize party dominance and performance metrics, enabling real-time trend analysis for national election forecasts.

MoodSick | Github **Aug 2023 - Dec 2023**
- Designed a music recommendation framework based on user mood, genre, and age, and led MongoDB database design to cache user and track metadata for 500+ users.
- Led the Data Analysis for various genre-specific music features and performed sensitivity analysis for said music features. Dockerized the entire system for seamless communication between the component reducing deployment time by 40% and improving recommendation accuracy by 25%.

Gomoku AI | Github **Aug 2023 - Dec 2023**
- Designed, implemented, and deployed an AI-powered player for Gomoku. Integrated Monte Carlo Tree Search (MCTS) with a child selection mechanism, prioritizing fast attacking strategies and employing pattern recognition for a robust defensive approach.
- Optimized MCTS, integrating the Upper Confidence Bound (UCB) and heuristics evaluation. The AI demonstrated 50% win rate, 20% loss rate, and 30% draw rate against the baseline, showcasing its ability to attack and defend in Gomoku competitions strategically.

Power Saver HQ | Github **Jan 2023 - May 2023**
- Developed a full-stack web application, providing personalized energy-saving recommendations based on individual user energy usage. Built the app with Vue.js frontend and Java-Spring Boot backend.
- Implemented 20+ APIs, achieving 100% code coverage with JUnit, and designing a MySQL database with stored procedures for insights. The system successfully increased energy conservation by 20% locally.