DHRUVIL KATHAROTIYA

AI Engineering M.Sc. | Machine Learning & Robotics | Software Engineering
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Professional Summary

Master's student in AI Engineering specializing in simulation-driven trajectory prediction and reinforcement learning for autonomous systems. Currently researching eco-driving strategies at signalized intersections (40% fuel efficiency gains) and optimizing process validation pipelines in production. Combine analytical rigor with hands-on software engineering to translate research concepts into reliable, scalable systems. Open to internships and full-time roles in AI/ML and robotics.

Technical Skills

- **Machine Learning & AI:** PyTorch, TensorFlow, Scikit-learn, Deep Learning, Reinforcement Learning (SAC, Q-Learning), Gaussian Process Regression, Neural Networks, Model Validation & Evaluation, Hyperparameter Tuning, Feature Engineering
- **Robotics & Autonomous Systems:** Trajectory Prediction, Path Planning, Collision Avoidance, Scenario-based Testing, MATLAB, Simulation Design
- **Data Science & Analysis:** NumPy, Pandas, Statistical Analysis, Model Stability Analysis, Monte Carlo Simulation, Data Visualization
- **Software Development:** Python, C++, JavaScript, TypeScript, Flask, Node.js, REST APIs, MongoDB, React.js
- **DevOps & Engineering Practices:** Docker, Git (branching, merging, workflow), CI/CD Pipelines, Unit Testing, Linux, macOS, Windows
- **Languages:** English (C1), German (B1)

Professional Experience

Working Student, Digital Systems & Process Operations
PVS Europe GmbH, Munich, Germany | Sep 2024 – Sep 2026

- Architected process validation logic for multi-step enterprise workflows, reducing exception escalation time by ~25% through proactive consistency checks across 1000+ daily operations.
- Debugged complex workflow interactions involving item identifiers and state machines; coordinated cross-team resolution of 20+ unresolved system issues, improving platform reliability and data accuracy.
- Ensured 99.5% process accuracy by validating critical workflow steps, identifying edge cases, and escalating system-level exceptions before they impact downstream dependencies.

Software Developer
Decode Softtech, Surat, India | Jul 2023 – Feb 2024

- Built Python backend services handling 1000+ daily transactions; integrated REST APIs with ML inference pipelines and optimized data processing workflows for reliable production deployment.
- Fixed critical backend bugs and refactored Python modules into reusable components, improving code maintainability and enabling faster feature deployment across teams.

MERN Stack Developer
Codept Solutions, Surat, India | Feb 2023 – Jun 2023

- Built and shipped production-facing features using React.js, Node.js, MongoDB, and JavaScript; developed backend APIs and state management to support data-driven workflows.
- Improved end-to-end integration by refactoring React components and connecting frontend interfaces to backend services, ensuring reliable data flow and component reusability.

Frontend Developer (React.js)

Rentech Digital, Surat, India | Jan 2022 – Feb 2023

- Developed reusable React.js components for production-facing features; integrated RESTful APIs with component state and backend data models for seamless user experiences.
- Improved frontend reliability and maintainability by structuring components around API responses and implementing error handling best practices.

Projects & Research

Eco-Driving Strategy Research at Signalized Intersections
Technische Hochschule Ingolstadt

- Designed and evaluated fuel-efficient driving strategies using Gaussian Process Regression and Soft Actor Critic reinforcement learning methods in controlled simulation environments.
- Achieved 40% fuel efficiency improvement in controlled simulations while maintaining stable speed profiles; documented limitations for real-world deployment without vehicle-to-infrastructure (V2I) communication.
- Analyzed feasibility of transferring simulation results to production environments through comprehensive cost-benefit analysis and real-world constraints evaluation.

Simulation Based Trajectory Prediction & Path Planning for Automated Vehicles, Master's Project

- Developed collision-avoidance and lane-changing strategies using scenario-based decision logic in Python; validated across 50+ realistic traffic scenarios.
- Achieved 3.2x improvement in trajectory smoothness using cubic spline interpolation; analyzed parameter sensitivity across speed ranges (30–130 km/h) to evaluate model robustness.
- Compared Polynomial Regression and Decision Tree models to assess sensitivity to input variations and identify optimal prediction approach for autonomous vehicle planning.

Flash Card Trainer Web Application, Personal Project

- Built Flask-based adaptive learning platform with user authentication, progress tracking, and spaced-repetition logic for optimized learning retention.
- Containerized application using Docker and implemented CI/CD workflows with GitLab for automated testing and streamlined deployment processes.

Education

Technische Hochschule Ingolstadt, Master of Science in AI Engineering of Autonomous Systems
Ingolstadt, Germany | 03/2024 – Present

Relevant Coursework: Machine Learning & Deep Learning, Reinforcement Learning & Decision Systems, Data Engineering & Software Engineering, Modeling, Simulation & Edge Computing, Sensor Data Fusion, System Identification

Thesis (Ongoing): Task-aware Grasp Selection and Path Planning for KUKA LBR iiwa Cobots

Gujarat Technological University, Bachelor of Engineering in Computer Science & Engineering
Gujarat, India | 07/2018 – 06/2022

Relevant Coursework: Artificial Intelligence, Machine Learning, Data Structures & Algorithms, Computer Networks, Cloud Computing, Cryptography & Security

Interests

AI Research, Stock Market Analysis, Driving, Sports

Dhruvil Katharotiya Ingolstadt, 21 September 2026