Rohit Chawla

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Education

The University of Texas at Austin August 2021 – December 2025
B.S. in Computer Science *GPA: 3.75/4.0*

- Relevant Courses: Natural Language Processing, Geometric Foundations of Data Science, Machine Learning, Systems for ML, Computer Vision, Regression Analysis, Operating Systems, Linear Algebra, Discrete Mathematics

Experience

Undergraduate Researcher September 2025 – Present
Machine Intelligence through Decision-making and Interaction (MIDI) Lab, UT Austin

- Researching multi-agent reinforcement learning (RL) approaches utilizing flow-matching and on-policy training
- Implementing a flow-matching method with PPO-style clipping to stabilize decentralized agents' flow-policy updates
- Investigated instability challenges in multi-agent systems, steering the project towards online, on-policy approaches

AI Engineer Intern May 2024 – August 2024
ArcOne AI *Austin, TX*

- Owned Competitor Watch service and designed functionalities for tracking structural and product changes in rival banks
- Developed RESTful APIs for seamless integration with internal services, ensuring efficient data retrieval and notifications
- Proposed and led text-to-SQL research initiative after identifying SQL accuracy issues, conducting literature review, designing evaluation metrics, and leveraging RAG, AI agents, fine-tuning, and prompt engineering to generate quality queries

Undergraduate Researcher February 2024 – July 2024
Computational Visualization Center, UT Austin

- Designed multi-agent RL extension of a 3D adversarial cloaking framework using teacher–student setup for learning efficiency
- Outlined co-evolving RL pipeline where teacher adaptively selects examples to enhance student robustness and efficiency
- Proposed algorithmic designs for reward shaping, curriculum building, active sampling, and continual-learning dynamics
- Conducted literature review on multi-agent RL, active learning, curriculum learning, and teacher–student frameworks

AI Tech Lead & Software Engineer January 2023 – January 2025
Texas Convergent - Build Team, UT Austin *Austin, TX*

- Led Convergent's AI Case (30 members), guiding 3 NLP products: an interview-practice AI, a real-time audio fact-checker with RAG sourcing, and a personal RAG-based teaching assistant
- Mentored and taught engineers NLP/software dev concepts, while guiding model selection, data strategy, and experiments
- Designed and developed interactive museum app with NFC tag scanning and audio guides using React, Flask, SQL, Docker
- Presented technical reviews and a public product pitch demoing our app to ~200 attendees in an entrepreneurial showcase

Undergraduate Researcher June 2023 – July 2023
Autonomous Mobile Robotics Laboratory, UT Austin *Austin, TX*

- Developed 3D object tracking using the ZED camera, leveraging ROS nodes and topics for live data exchange
- Collaborated on a Multi-Robot Navigation project which simulated autonomous vehicles in traffic

Projects

Safe Autonomous Driving Reinforcement Learning Agent | *Gym, Stable-Baselines, PyTorch, Google Colab, Python*

- Led research project applying Reinforcement Learning to a roundabout autonomous driving environment
- Explored various approaches including Deep Q-Network (DQN) and Trust Region Policy Optimization (TRPO)
- Integrated offline pre-training with online fine-tuning, maximizing policy learning efficiency and exploration safety
- Achieved 64% rollout reward increase compared to similarly aimed projects using Interval-Based Robust Control

Reward Design and Policy Gradient Methods for Summarization (Research Paper, 2025) | *PyTorch, Google Colab*

- Authored research paper analyzing the effects of custom reward functions in Reinforcement Learning-based summarization
- Built RL fine-tuning pipeline, implementing policy gradient (SCST and PPO) algorithm for sequence-level optimization to boost metric alignment for a small summarization model (FLAN-T5-small)
- Creatively weighted metrics (ROUGE, length, etc) to create reward functions and improve summarization behavior
- Engineered efficient training workflow under compute constraints, using short-loop RL phases and sampled mini-datasets

Autonomous Robotics Path Planning with Quintic Spline Trajectories and Nonlinear Control | *Java*

- Built custom motion-profiling pipeline for a differential-drive robot, constructing quintic-spline paths from waypoints, performing curvature-aware interpolation, and generating smooth, time-parameterized trajectories for 2D motion
- Applied linear algebra and geometric modeling techniques to compute spline coefficients, enforce acceleration/jerk limits, and shape dynamically feasible trajectories that the robot could reliably track
- Implemented nonlinear Ramsete feedback controller, integrating Control Theory concepts of differential-drive kinematics and feedforward/feedback velocity control to achieve consistent, accurate path-following
- Reduced autonomous path completion time by ~30% compared to prior "drive straight and PID pivot turn" paths

GenAI Restaurant Review Summarizer | *Falcon-7B, PyTorch, Pandas, Google Colab, React, Python*

- Developed Chrome extension that categorically summarizes food reviews, greatly enhancing user experience
- Built cost-effective summarization model by fine-tuning with generated dataset to retain sentiment and key info
- Utilized advanced prompt engineering techniques with Falcon-7B LLM to generate tailored summary dataset

Exploring AI-Based Dynamic Voltage and Frequency Scaling (DVFS) (Research Paper, 2024)

- Authored a comprehensive research paper comparing AI-driven DVFS methods and outlining future directions
- Conducted an in-depth review of techniques including Deep RL, standard RL, and Linear Regression
- Presented results to peers/faculty, highlighting new research such as Quantum DRL and ethical implications in AI systems

Mini Transformer | *PyTorch, NumPy*

- Implemented a Transformer from scratch with multi-head attention, residual blocks, layer norm, and positional encoding
- Ran ablation studies for positional encoding and visualized attention heatmaps, analyzing contextual representation effects

Computer Vision Projects | *Matlab*

- Performed unsupervised image segmentation by implementing K-Means and Mean Shift clustering on pixel feature similarity
- Built k-Nearest Neighbors and AdaBoost classifiers for CIFAR-10, benchmarking performance across feature representations
- Implemented the Seam Carving algorithm using dynamic programming to contentually resize images and preserve key pixels
- Developed circle detection algorithms (Hough Transform/RANSAC) to accurately find circles of desired radii

Storm Shelters | *React, Docker, Flask, SQL, AWS, Jest, Selenium, Postman, Python, JavaScript*

- Created website for resources in Harris County hosted by AWS Amplify and powered by React, SQL, and Flask
- Mirrored industry practices through design of custom API and rigorous testing (unit, Jest, Selenium)

Technical Skills

Languages: Python, Java, Matlab, C, C++, JavaScript, SQL
Developer Tools: React, Docker, Flask, Git, Azure, Jira, Linux, OpenAPI, Postman, Google Colab
AI/ML Libraries: PyTorch, JAX, LangChain, LlamaIndex, NumPy, Pandas, Gym, Google TensorFlow, LiteLLM, ROS

Relevant Extracurricular Activities

Software Lead & Assistant Project Manager
FRC/FTC Robotics Competition

- Led team of 5 to World Championship (placed 30th / 3,800) and awarded Control Finalist (Top 5 in Software)
- Coordinated project tasks between mentors and hardware, electrical, and software teams
- Developed autonomous and driver-controlled routines with advanced control algorithms (PIDF/Motion Profiling)
- Deployed Google TensorFlow Machine Learning model for object detection
- Programmed gyro correction loops, mathematical control, and used OpenCV for image filtering from robot camera

Robotics Mentor
FTC/FLL Robotics Competition

- Guided an inexperienced FTC team through biweekly meetings to place 3rd at Texas Regional
- Mentored FLL (Lego) team, teaching game strategy, leadership, and vital software/hardware skills

Founder & President
Teens of Tomorrow

- Led individuals through project plans including clothing drives and homemade meals for the homeless in Austin
- Sponsored young students in rural Indian villages with textbooks, meals, and transport
- Allianced with *Sparkle and Rise* to fundraise for children across the globe