

Siddharth Lakkoju

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EDUCATION

University of Virginia, Charlottesville, VA.

Expected Graduation: December 2024

Bachelor of Science | Computer Science and Mathematics Minor | GPA: 3.8

Relevant Courses: Data Structures and Algorithms, Natural Language Processing, 3D Computer Vision, Machine Learning, Artificial Intelligence, Software Development, Computer Systems and Organization, [Perception, Planning, Control], Cybersecurity, Cryptocurrency, Differential Equations, Linear Algebra, Probability

SKILLS

Languages: Python, C, C++, Rust, Java, Swift, JavaScript, TypeScript, Bash, MATLAB, R, x86 Assembly

Libraries/Frameworks: TensorFlow, PyTorch, OpenCV, ROS2, ReactJS, NumPy, Matplotlib, Plotly, Django, Warp, Flask, FastAPI

Software: Git, Docker, Kubernetes, AWS, Linux, CMake, Firebase, SQL, CAD Fusion 360, Github, Gitlab, Jira

EXPERIENCE

F1-Tenth University of Virginia – Teaching Assistant, Charlottesville, Virginia

August 2024 – Present

- Facilitate student learning via labs on PID, pure pursuit controllers, and particle filter SLAM localization.

Appian – Software Engineer Intern, Mclean, Virginia

June 2024 – August 2024

- Developed and deployed novel Rust and C-based authentication plugin for MariaDB, replacing the existing Java solution eliminating JVM overhead on RDBMS Kubernetes pod.
- Built asynchronous web server with Rust Warp for temporary password generation and management.
- Implemented unit and system tests, including mocking third-party APIs, and automated the build and deployment processes for authentication plugin via Gitlab CI/CD.

Appian – Software Engineer Intern, Mclean, Virginia

June 2023 – August 2023

- Implemented Grafana Loki Log-Based Alerting for company internal monitoring stack with AWS EC2 and S3 resulting in up to a 95% decrease incident detection time (compared to prior timeout-based detection).
- Created custom Retrieval-Augmented Generation AI assistant for internal engineering docs utilizing scikit-learn CountVectorizer for embeddings, similarity search, and AWS hosted Llama2 LLM with ReactJS UI.

The MITRE Corporation – Software Engineer Intern, Tysons, Virginia

May 2022 – August 2022

- Led R&D of Augment Reality (AR) navigation system for all MITRE campuses using iOS ARKit and Unity, reducing new employee navigation time by 50%.
- Implemented custom localization algorithm utilizing Cisco Spaces and spatially anchored reference image recognition and pose estimation allowing for centimeter accurate initial localization estimates.
- Designed to work with existing digital MITRE office maps (no remapping required), ports into existing MITRE iOS app.

PROJECT EXPERIENCE

UVA CRAL Lab - Undergraduate Researcher

August 2024 - Present

- Conduct research on decentralized multi-agent control, pioneering a non-invasive deadlock resolution strategy leveraging unsupervised learning with neural barrier certificates and controllers.
- Create custom loss function balancing agent safety, goal-oriented navigation, and liveness, ensuring optimal performance across cluttered, multi-agent environments.

UVA Cavalier Autonomous Racing, Indy Autonomous Challenge – Perception + Motion Planning

May 2023 - Present

- Optimize and evaluate MixNet LSTM using recorded bag data and synthesized simulator data bringing predicted opponent trajectory average displacement error <1.5 meters across a 5 second horizon.
- Implement new MPC controller utilizing linear time varying dynamic bicycle model approximation improving peak lateral and longitudinal acceleration by ~18% in Monza Road course simulation.
- Discovered and resolved sensor fusion object detection latency error improving detection accuracy by 4 meters.

Uvacourseexplorer.com – Lead Software and Infrastructure Engineer

July 2023 - Present

- Create a semantic search engine for UVA courses leveraging OpenAI text-embedding model and custom cosine-similarity algorithm (Vector Similarity Search).
- Deploy semantic search engine API with Docker and FastAPI with average search request times under 0.9 seconds.
- Design user interface prioritizing intuitive control with ReactJS and typescript deployed on Netlify with 18,000 page views and 1,600 new users within first three months.
- Automate with custom cron-jobs to scrape UVA course registry and update database embeddings and course information guaranteeing Course Explorer data maximum deviation of 15 minutes from real-time.

Deep-Q-Network Reinforcement Learning

December 2023

- Developed custom reinforcement learning (RL) DQN agents to solve OpenAI gym Cartpole and Racecar problems within 200 training episodes.
- Modeled RL algorithms after Deepmind's Atari Deep RL paper and utilized convolutional neural network model allowing agent to solve game problems using vision-based input.