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

EXPERIENCE

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 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.

Vertical Take-off and Landing Drone – Lead Software and Mechanical Engineer *May 2023 – October 2023*
- Developed high performance custom PID flight controller software with C++ utilizing OneShot-125 esc control protocol allowing UAV state sampling at up to 900 hertz and motor control actuation commands up to 500 hertz.
- Designed custom tilt-motor mechanism for fused-deposition manufacturing (3D-printing) using Fusion 360 CAD enabling VTOL and thrust vectoring capabilities with one 9 gram servo.
- Prototyped novel tandem wing VTOL design for quadcopter hover flight behavior and high aspect ratio wing horizontal flight efficiency resulting in up to a 20% increase in lift to drag ratio over conventional single wing VTOL.

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