KOLITHA WARNAKULASOORIYA

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Willing to relocate

Drives AI/ML innovation across UAV swarm intelligence and real-time systems; Research & Software Engineer with 6+ years spanning industry and academia. Expert in PyTorch, system design, and scalable cloud architectures.

Machine Learning & AI | Swarm Intelligence | System Design | Experimental Design | Python & PyTorch | Java & C++

- **Swarm Optimization Research:** Engineered a novel forest-inspired swarm intelligence optimization algorithm, outperforming 10 state-of-the-art algorithms by 67% across 62 benchmark tests, leading to publication in a top evolutionary intelligence journal.
- **Distributed Leader Selection:** Developed a distributed leader selection algorithm for heterogeneous UAV swarms (Parrot, Anafi, Tello), controlling 15 agents in formation—run 42+ times for real-world threat neutralization.
- **Research Project Leadership:** Managed three UAV research projects as a Research Assistant, increasing completion rates by 25% and building a multi-agent simulation platform embedding 26 algorithms and 76 benchmark problems.

Problem-solving & Experimental Design	Data Mining & NLP	Cloud (AWS, Azure, GCP)
Node.js & Java Spring Boot	Deep Learning & Research Paper Writing	CI/CD & DevOps
React & React-Native	Prototyping, POC & Agile Methodologies	Docker & Kubernetes

PROFESSIONAL EXPERIENCE

Research Assistant, University of South Alabama 01/22 – 05/25

Leads the design and implementation of cutting-edge AI and swarm intelligence projects within the Department of Computer Science, collaborating with cross-functional teams to translate theoretical concepts into production-ready research systems. Manages all phases of the research lifecycle, from literature reviews and experimental design to simulator development and UAV field trials, ensuring rigorous scientific methodology and reproducible results.

Machine Learning & Optimization

- Applied deep learning techniques and custom loss functions to refine the forest-inspired swarm optimization model, conducting 14 extensive experiments and 62 benchmark tests to validate performance gains.
- Tuned hyperparameters through automated pipelines, leveraging TensorBoard and custom logging to achieve a 67% improvement in 10+ leading algorithms in convergence speed and resource utilization.
- Authored research papers detailing algorithm architecture, experimental protocols, and results, submitting them to top-tier evolutionary intelligence journals and conferences.

Simulation & Evaluation

- Developed a multi-agent swarm intelligence simulator embedding 26 algorithms and 76 benchmark scenarios, featuring a custom GUI and automated data-set handling for reproducible testing.
- Automated large-scale testing and data analysis through Python scripts, collecting metrics on convergence, stability, and computational load across variable problem dimensions.

UAV System Architecture

- Engineered a heterogeneous UAV coordination framework in Java, enabling real-time control of up to 15 agents (Parrot, Anafi, Tello) using distributed leader-election protocols.
- Integrated real-time sensor data streams and robust communication channels to support formation control and social threat neutralization in 42+ live trials.
- Designed modular API endpoints and containerized microservices (Docker, Kubernetes) for scalable deployment and field integration in distributed systems.

Lead Engineer (Associate), SyscoLabs Technologies 08/21 – 01/22

Served as Epic Owner for the Sysco Shop CRM application, overseeing feature planning, sprint execution, and post-release performance analysis. Fostered collaboration across product, QA, and DevOps teams by applying scrum best practices and software engineering principles and maintaining comprehensive Confluence documentation.

- Guided a team of 10+ engineers to deliver six critical epics, enhancing the teamwork, and employing system design principles and thorough code reviews to maintain high-quality standards.
- Streamlined Agile processes by crafting detailed sprint roadmaps, facilitating daily stand-ups, and curating JIRA dashboards, resulting in a 50% reduction in administrative overhead.
- Acted as the first technical responder for production incidents, coordinating cross-functional troubleshooting efforts to achieve zero downtime for key business services.

Senior Software Engineer, SyscoLabs Technologies 12/19 – 08/21

Maintained and enhanced large-scale eCommerce platforms, working across front-end systems (React, Redux) and back-end microservices (Spring Boot, Node.js) within AWS environments. Drove improvements in predictive analytics, test automation, and CI/CD pipelines while mentoring junior engineers in best practices.

- Led the restructuring of the BFF microservice, implementing extensive unit and integration tests to achieve over 90% code coverage and integrating Docker/Kubernetes for seamless deployments.
- Conducted in-depth code reviews, troubleshooting critical issues, and provided leadership in on-call rotations, ensuring continuous availability and reliability.
- Enhanced arrival time estimation models by 15–20% through statistical analysis and algorithmic refinements in Python and Java.

Software Engineer, SyscoLabs Technologies 07/18 – 11/19

Developed responsive web and mobile applications using React, React Native, and ES6, emphasizing object-oriented design and state management patterns. Implemented RESTful, GraphQL, and WebSocket APIs within a microservice ecosystem, incorporating AWS Lambda and API Gateway for high availability.

- Engineered scalable UI components and backend services (Spring Boot, Express.js) within AWS environments, and developed an open-source in-memory mock service for ML testing, accelerating experimental workflows by 40% and ensuring high availability across front-end and microservice architectures.

*Additional experience with projects like **MineArc Service App** as a **Freelance Software Developer*** and TransformerLab, which is a playground for large language models, and generative AI models, as an open-source contributor

Education & Personal Development

PhD in Computing, Computer Science, University of South Alabama
Bachelor of Science in Information Technology, University of Moratuwa

Technical Skills

Programming Languages & Frameworks: Python, Java, C++, JavaScript/TypeScript, React, React Native, Node.js, Spring Boot, Express.js, ROS
ML, Data & Research Tools: Machine Learning, Deep Learning, PyTorch, TensorFlow, Keras, Data Processing, Data Mining, Training and fine-tuning large language models, Model Deployment, Experimental Design, Research Paper Writing, Conference Submissions.
Cloud, DevOps & Architecture: AWS, Azure, GCP, Docker, Kubernetes, Terraform, Jenkins, Git, GitHub Actions, CI/CD Pipelines, System Design, Microservices, RESTful & GraphQL APIs, Agile/Scrum, JIRA, Confluence, PostgreSQL, MySQL, MongoDB, Redis.