Aathman Tharmasanthiran

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SUMMARY

Master's student in Computer Science at Purdue University with **6+ years** of combined research and industry experience **in AI/ML**, and Software Engineering. Skilled in developing and deploying **LLM** and **RAG**-powered applications, Vision-Language Models (**VLMs**), and **multimodal AI agents**. Proven track record in building **production-grade distributed systems** (Azure, Kubernetes, Docker) and cutting-edge Generative AI solutions for manufacturing and pharmaceutical domains.

EDUCATION

Purdue University, West Lafayette, IN — Aug 2023-Dec 2025

M.Sc. in Computer Science *(Specializing in AI & Machine Learning)* — (expected)

University of Moratuwa, Sri Lanka — Oct 2016-Mar 2021

B.Sc. Engineering (Hons) in Computer Science and Engineering

SKILLS

- **Programming:** Python, R, C, C++, Java
- **AI/ML:** PyTorch, TensorFlow, Hugging Face, Transformers, LLMs, VLMs, RAG, LangChain, CrewAI, Vector Databases, NumPy, Pandas, MLOps
- **Software Engineering:** Object-Oriented Programming, Distributed Systems, REST APIs, Agile, Testing (Unit/Integration)
- **Infrastructure:** Docker, Kubernetes, Linux, Azure Cloud

EXPERIENCE

AI Software Developer (LyoHub) | Purdue University — Nov 2024-Present

- Developed a **multi-modal RAG chatbot** to support a wide range of lyophilization-related tasks by **retrieving text explanations, images from research papers, and videos** demonstrating practical procedures—for example, showing how to properly load vials during freeze-drying.
- **Deployed the chatbot in a scalable Kubernetes environment**, ensuring high availability and scalability in the production environment.
- Created an **AI-powered visual inspection system** for freeze-dried pharmaceutical products, leveraging computer vision to detect defects and strengthen quality control.

Graduate Student Researcher (e-Lab) | Purdue University — May 2024-Present

- Developing a Vision-Language Action model that learns from human demonstration videos rather than traditional teleoperated imitation learning, reducing data collection costs and leveraging abundant internet video data to enable more scalable robot training.
- Researched **Vision-Language Agents** that perceive and interact with user environments.
- Fine-tuned LLaVA-Interleave (VLM) and Llama 3.2 (LLM) for improved object recognition and multimodal reasoning.

Software Engineer-Machine Learning | WSO2 LLC (Branch of WSO2, Santa Clara, CA, USA) — Apr 2021-Jul 2023

- **Led the development** of scalable distributed architectures for multiple ML-driven products on Azure Cloud in a production setting.
- **Built an MLOps pipeline** automating data preprocessing, training, evaluation, and deployment — cutting model update cycles from days to 1 hour.
- Delivered high-quality systems, including a real-time alerting service and an AI-powered code suggestion tool, collaborating in Agile teams with extensive testing and CI/CD.

Graduate Student Researcher (CoRAL Lab) | Purdue University — Sep 2023-Sep 2024

- Worked on multi-robot long horizon planning to efficiently allocate robots by evaluating multiple possibilities in the future to rearrange objects inside complex environments to desired target configurations.
- Developed an efficient motion planner in OMPL to ensure time-aware, collision-free navigation for multiple mobile robots, optimizing for high efficiency.

Graduate Research Assistant (Heartland BioWorks initiative) | Purdue University — May 2025-Present

- Building an **Apple Vision Pro VR** training application for BioTrain (Heartland BioWorks initiative) to accelerate biomanufacturing workforce development.

- Developing photorealistic cleanroom environments from 3D scans, enabling trainees to explore equipment and workflows virtually.
- Integrating a **multimodal RAG chatbot inside VR** that retrieves text, images, and videos from scientific literature and training materials on pharmaceutical manufacturing and lyophilization.
- Designing interactive VR modules (e.g., PPE checks, workstation disinfection, aseptic setup), reducing training costs and increasing workforce readiness.

Software Engineering Intern | WSO2 LLC (Branch of WSO2, Santa Clara, CA, USA) Jun 2019 - Dec 2019

- Experimented with the **automatic parameter tuning** of Ballerina microservices by taking into account the real-time load configurations and feeding them into the Gaussian Process Bayesian optimization model, improving the 99th percentile latencies up to 26%.

PROJECTS

Multimodal Multi-hop Reasoning on Knowledge Graphs | Purdue University Mar 2025-May 2025

- Leveraging **CrewAI** to orchestrate a team of specialized agents collaborating to retrieve and synthesize information via multi-hop reasoning from a knowledge graph containing information about science topics.
- Designed an Orchestrator agent capable of decomposing complex user queries into sub-tasks, and Graph traversing agents that can retrieve relevant subgraphs and synthesize answers through sequential agent collaboration.

Competitive taxi fare prediction | Data Mining Project, Purdue University Sep 2024-Dec 2024

- Designed a **predictive model** to provide competitive pricing estimates, aimed at helping a new company gain market share in New York's taxi industry.
- Performed extensive Exploratory Data Analysis (**EDA**) to discover key patterns, utilized geospatial mapping to visualize fare distribution across New York City, and identified factors such as distance, traffic patterns, and time of day influencing pricing.