Yashodhan Deepak Hakke

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Education

Virginia Tech University **Aug 2024 – May 2026**
Master of Science in Computer Engineering *Blacksburg, Virginia*

MIT Academy of Engineering **Aug 2020 – May 2024**
Bachelor of Technology in Electronics Engineering *Pune, India*

Experience

Virginia Tech **Oct 2024 – Ongoing**
Graduate Research Assistant *Blacksburg, USA*

- Developed a reinforcement learning-based control policy utilizing **Partially Observable Markov Decision Processes (POMDPs)** and multi-agent deep **Q-learning (MADDPG)** to regulate emotional state transitions during calamities and enhance resilience.
- Constructed a multi-time-scale dynamic model using singular perturbation theory, capturing fast and slow emotional dynamics through coupled nonlinear differential equations and stability analysis via Lyapunov functions.
- Designed a decentralized optimal control framework employing model predictive control (MPC) and game-theoretic resource allocation to enhance local stabilization and improve global coordination efficiency.

Devot AI **Nov 2023 – Jul 2024**
Machine Learning Engineer Intern *Bengaluru, India*

- Trained and fine-tuned LLMs like **LLaMA and GPT using LoRA**, improving model accuracy by 15%; applied vision transformers for multimodal tasks.
- Used **Snowflake** and **SQL** for scalable data warehousing and analysis; automated pipelines to streamline model training with cloud integration.

Ankureto Store **Oct 2021– Jan 2022**
Web Developer Intern *Pune, India*

- Developed an e-commerce website for Ankureto Store, improving online sales by 25% and user engagement by 40%, using a tech stack of React, **HTML, CSS, JavaScript, and GitHub**.
- Optimized website performance, reducing page load time by 50% and enhancing site functionality with seamless front-end and back-end integration, resulting in a 20% improvement in overall performance.

Projects

ChalBeyy | **Live Demo** **Jan 2025 - Mar 2025**

- Developed a **RESTful API** using **Node.js/Express** and integrated **PostgreSQL**; deployed on **AWS Railway** with **Docker**.
- Optimized ride-matching latency to under 2 seconds using geospatial indexing (PostGIS) and priority queues, achieving 100+ daily active users and 500+ successful ride matches during beta testing

DocuQ&A | *Personal Project* **Aug 2024 – Sep 2024**

- Developed a system to parse data from PDFs and answer user queries using the **GraphRAG** technique, integrating pipelines like **Rewoo** and **React** agents for scenario-specific handling.
- Implemented **Claude AI** in the backend to enhance natural language understanding and response generation, leveraging large language models (LLMs) for real-time query responses.
- Built a user-friendly **Gradio** interface, enabling PDF uploads and interaction through a chatbot with optimized query responses based on parsed data.

GraphDocuMind | *Personal Project* **Feb 2025 – Mar 2025**

- Designed a graph-based workflow using **LangGraph** to define modular actions (nodes) and decision flows (edges), integrating **Mistral (via Ollama)** for text generation and customized prompts to improve accuracy and relevance of responses.
- Built a hybrid retrieval system combining **Nomic Embeddings** for semantic document search and **Tavily API** for real-time web results, with **LangSmith** integrated to monitor, debug, and optimize the end-to-end flow.

MediMate | *Research Project* **Jun 2023 – Dec 2024**

- Developed a medical chatbot leveraging **BioBERT** to simulate doctor-patient interactions with high accuracy, ensuring precise understanding of medical terminology and diagnoses.
- Applied **Deep Question Generation** techniques to enhance the chatbot's ability to assess patient symptoms, achieving a 20% improvement in query relevance and contextual understanding.
- Fine-tuned BioBERT on curated medical datasets for reliable and context-aware diagnostic suggestions tailored to medical domain requirements.

LAGORI ROBOT | *Abu Robocon* | **Demo Video** **Aug 2021 – Jun 2022**

- Designed and built two Lagori Robots inspired by the Indian game Lagori for **Abu Robocon 2022**, an international tournament with global participation.
- Implemented **YOLO** for object detection, achieving 95% accuracy in real-time tracking. Worked on advanced electronics by actuating various motors with Raspberry Pi and Arduino, optimizing actuation to increase response speed by 20% through precise force calculations.

Technical Skills

Languages: Python, Java, C, JavaScript, TypeScript, Kotlin, MATLAB, SQL, HTML/CSS **Frameworks** **Libraries**: TensorFlow, PyTorch, scikit-learn, OpenCV, NLTK, LangChain, React.js, Node.js **Developer Tools**: VS Code, Docker, Git/GitHub, AWS, Google Cloud Platform, Snowflake, PostgreSQL, Redis **Domains**: Machine Learning, Reinforcement Learning, Deep Learning, Natural Language Processing (NLP), Robotics, Control Systems, Full-Stack Development **Specialized Skills**: Large Language Models (LLMs), Model Fine-Tuning (LoRA), Vision Transformers, REST API Development, Real-Time Systems, Geospatial Indexing (PostGIS), JWT Authentication