

# AYUSH MADHAV KUMAR

Ann Arbor, Michigan

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## Education

### University of Michigan

Bachelor of Science in Computer Science; Minor in Business and Entrepreneurship

Aug 2025 – May 2028

Ann Arbor, Michigan

## Technical Skills

**Programming Languages:** Python, JavaScript/TypeScript (ES6+, Node.js), Java, C/C++ (multithreading, memory optimization), Ruby, PHP, SQL

**AI/ML:** PyTorch, TensorFlow, JAX, HuggingFace Transformers, ONNX Runtime, Scikit-learn, OpenAI APIs, LLMs, NLP, Computer Vision, Reinforcement Learning, Edge AI deployment, Model Quantization and Optimization

**Software Development:** React, Next.js, React Native, Node.js, Django, Flask, FastAPI, REST, GraphQL, Flutter, Dart, WebSockets, Progressive Web Apps

**Databases & Data Engineering:** MongoDB, PostgreSQL, Redis, MySQL, Data Modeling, ETL Pipelines, Real-time Telemetry Integration

**DevOps & Cloud Infrastructure:** Docker, Kubernetes, CI/CD Pipelines, RabbitMQ, Linux, AWS (EC2, Lambda, S3), Google Cloud, Edge Deployment, Serverless Architecture, Scalable ML Inference Orchestration

## Experience

### CLAWS ( Collaborative Lab for Advancing Work in Space )

Fall 2025 – Present

Artificial Intelligence Engineer

Ann Arbor, Michigan

- Engineering **CORVUS**, a dual-inference AI assistant for **NASA SUITS** and **RASC-AL**, integrating lightweight transformers (TinyBERT) on **Jetson Orin Nano** via ONNX Runtime for sub-350 ms inference.
- Designing an adaptive edge-cloud architecture that routes inference dynamically based on query complexity, latency, and network state for reliable EVA autonomy.
- Implementing **DSPy**-based orchestration and **Pydantic**-validated NLP pipelines for type-safe command execution within Unity's Inference Engine.
- Integrating **MongoDB**, **WebSockets**, and **Whisper-based preprocessing** to synchronize telemetry and enhance speech reliability in high-noise environments.
- Preparing to present research and AI demonstrations at upcoming **NASA events in Houston and Florida**.

### Patch

June 2025 – August 2025

2025 Cohort Founder

Dublin, Ireland

- Built a startup in 7 weeks as part of the **Patch Summer Accelerator**, leading the end-to-end technical development of Caretether.
- Developed the mobile frontend using **React Native**, optimizing UI responsiveness and user experience.
- Implemented a scalable backend with **Django** and **PostgreSQL** to manage health data, authentication, and notifications.
- Collaborated with co-founders to refine product-market fit and present to investors.

### GIIT Solutions

Summer 2024 & April 2025

Associate Software Intern

Remote

- Engineered CI/CD pipelines on AWS, automating deployments and improving reliability.
- Developed Python scripts to streamline backend processes, reducing manual overhead.
- Collaborated with senior developers to optimize cloud infrastructure for cost efficiency.
- Deployed cloud-native solutions with AWS CI/CD, improving scalability and uptime.

## Projects

### Real-time Task Management Platform

- Engineered a full-stack system enabling users to create, update, and track tasks with sub-second updates.
- Built **Django REST APIs** for CRUD operations and secure authentication workflows.
- Integrated **MongoDB** for dynamic user data storage and efficient logging.
- Implemented a responsive **React** interface with real-time filtering, sorting, and progress tracking.

### Machine Learning Model Serving Microservice

- Developed a backend microservice to host and serve ML models through **Flask REST APIs**.
- Handled asynchronous inference requests using **RabbitMQ** for scalable task queuing.
- Persisted model outputs and user queries in **MongoDB** for analytics and audit logging.
- Containerized the service using **Docker** to ensure reproducible multi-environment deployment.