Dev Patel

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EDUCATION

University of Michigan – College of Engineering, Ann Arbor, MI May 2026
B.S.E in Computer Science, Minor in Mathematics

- Relevant Coursework: Operating Systems, Machine Learning, Computer Organization, Linear Algebra, Web Systems, Data Structures & Algorithms, Foundations of Computer Science, Discrete Math, Design in Engineering
- Relevant Activities: Autonomous Robotic Vehicle Team, Michigan Data Science Team, HackDearborn, MHacks

SKILLS

Languages: Python, C/C++, Swift, SQL, Java, C#, R, JavaScript, Scala, HTML/CSS, TypeScript
Frameworks: React.js, Node.js, Angular.js, PyTorch, TensorFlow, SciKit-Learn, CUDA, Django, Pandas, LangChain
Technologies: AWS, Git, REST APIs, Linux, ML/AI, PostgreSQL, Azure, Jira, LLM, NLP, Docker, OpenAI, Excel

EXPERIENCE

Caterpillar Inc: *Software Engineering Intern,* Chicago, IL May 2024 – August 2024

- Maintained a backend **distributed system** on **AWS** for a customer application (Vision-Link) processing **IoT** sensor data from CAT machinery to assess predictive maintenance needs. Utilized Kubernetes, SnowFlake, EC2, Lambda.
- Architected **Isolation Forest** machine learning models in **scikit-learn** to enhance an ensemble of volume anomaly models by **12%** by detecting rare and complex anomalies, our original models missed, in over **1,500** data pipelines.
- Optimized **event correlation** algorithms to analyze ServiceNow tickets on Kibana, decreased incidents by almost **20%**, streamlining management and resolution. Collaborated with cross-functional teams to integrate advanced data processing techniques and deploy microservices architecture, ensuring data integrity and security compliance.

Subaru: *Machine Learning Engineer Co-op Intern,* Ann Arbor, MI January 2024 – Present

- Researched and implemented passive infrared (PIR) sensors for driver monitoring, developing algorithms for real-time temperature **gradient mapping** to detect impairment. Integrated PIR data with CNNs, applying signal processing techniques like **Fourier transforms** to enhance accuracy in sobriety and attentiveness detection.
- Integrated facial recognition and gaze estimation using advanced **convolutional neural networks** (CNNs). Leveraged 3D CNNs with **ResNet's Inception-V3** architecture to develop a distraction detection model, achieving **92%** accuracy. Utilized **transfer learning** on thermal data to enhance sobriety detection, achieving **89.5%** accuracy.

Harman International: *Software Program Management Intern,* Novi, MI May 2023 – August 2023

- Enhanced workflow efficiency by **9%** for engineering teams by utilizing **schemas, embedding generation**, and **cosine similarity** with **PyTorch**. Automated identification of redundant debugging tasks in JIRA server projects.
- Delivered an ECallBox bench for Subaru, ensuring compliance with rigorous requirements. **Fine-tuned GPT-3.5** model for monitoring online discussions, utilizing **web scraping** techniques to gather data. Implemented **NLP pipelines** for sentiment analysis and **topic modeling** to proactively identify potential product issues.

PROJECTS

Nostalgia - IOS App: Full-Stack & *AI Engineer [React Native, PyTorch, Figma, AWS, Kubernetes, NoSQL, Redis, EC2]*

- Developed an **IOS/Android app** for users to search and share memories (videos, photos, music, etc.) across social media apps, including Photos, Google Photos, Instagram, Snapchat, VSCO, TikTok, Netflix, YouTube, and Spotify.
- Utilized **FaceNet** and **CLIP** models to accurately identify and label people, objects, and landmarks in multimedia content. Developed a semantic search engine and chatbot using **OpenAI, Pinecone**, and **LangChain**, enabling users to explore & share memories through natural language (i.e. "show the last time my brother & I played soccer").
- Engineered a **gradient-boosting** machine learning model to prioritize results based on embeddings and similarity scores. Built a scalable cloud infrastructure using AWS to handle over **50** test users, with plans for expansion.

C++ Thread Library: *Software Engineer [C++, Unix, Linux]*

- Implemented a **C++ 17 threading** library on **Linux** for single or multi-core CPU management. Enables thread creation, termination, and synchronization using mutexes, condition variables, and scheduling policies for optimized resource utilization. Solidified my knowledge in concurrency control, low-level C++ constructs, and library design.

Sora Detection Analysis: *Machine Learning Engineer [PyTorch, Tensorflow, Optuna, Jupyter, Google Cloud]*

- Engineered **CNNs** to identify AI-generated videos from Sora and the Deepfake Detection Challenge, by extracting PRNU and ELA values from images & developing the CNNs on **TensorFlow** for over **85%** test accuracy.

WallStreetBets NLP Analysis - Website: *Software Engineer [Tensorflow, Pinecone, MySQL, FireBase, AWS, React]*

- Spearheaded the development of a predictive model using **sentiment analysis** and **statistics**, leveraging a fine-tuned **TensorFlow Hub** model and statistical models to analyze **financial** markets. Used AWS for our infrastructure.