# Yug Patel

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## Education

**Missouri University of Science and Technology** — Rolla, MO
*Bachelor of Science in Computer Science; GPA: **3.8*** — *Aug 2022 – Dec 2026*

## Experience

**Computer Vision/Data Science Co-op** — May 2025 – Present
*Hunter Engineering Company* — *Bridgeton, MO*

- Developing in-house **license plate recognition system** projected to save **$2M+ annually** by replacing a third-party vendor across **5,000+** automotive service centers nationwide.
- Raised accuracy from **78%** to **88%** on **1000+** plate designs by fine-tuning **YOLOv9** and adding a **ViT** for OCR.
- Created data augmentation pipeline generating synthetic plates, improving model robustness to edge cases.
- Reduced manual labeling by **75%** across **250K+ images** using active learning with uncertainty sampling.
- Achieved **3×** faster labeling and automated model retraining by building web annotation tool with REST APIs.

**Machine Learning Developer** — Jan 2025 – Aug 2025
*U.S. Geological Survey (USGS)* — *Remote*

- Processed **100+ TB** of satellite imagery and terrain data for nationwide water resource modeling.
- Built feature engineering pipeline extracting 50+ geospatial attributes for downstream predictive model training.
- Automated waterbody detection at **92% accuracy** across U.S. using supervised learning and clustering.
- Optimized hardware utilization for large-scale raster processing, enabling analysis of 10× larger datasets.
- Created Python library and CLI tools used by **10+ researchers** to analyze hydrographic data.

**AI Research Intern** — May 2024 – Aug 2024
*National Science Foundation* — *Rolla, MO*

- Developed testbed achieving sub-ms EEG/PPG synchronization, enabling high-fidelity cognitive workload analysis.
- Created **Spiking Neural Network** models for real-time cognitive workload detection on edge devices.
- Conducted systematic literature review of 30+ papers on neuromorphic computing for biosignal processing.
- First-authored paper on reconfigurable testbed design published in **ASEE conference proceedings**.

**Undergraduate Research Assistant** — Aug 2023 – May 2024
*CS & Biology Departments, Missouri S&T* — *Rolla, MO*

- Developed disaster tweet classifier with **89% F1-score** on 47K+ samples, outperforming baselines by **33%**.
- Built biological simulations for researchers to model population dynamics of microscopic organisms.
- Automated lifecycle detection using **YOLOv8** on 5K+ microscopy images, reducing manual classification by **90%**.
- Mentored **3** undergraduate students across both labs, and presented my work at university symposium.

## Projects

**FlightNet – Spatiotemporal Flight Delay Prediction** | PyTorch Geometric, XGBoost, Streamlit — Aug 2024

- Modeled **3M+ flights/300 airports** as a temporal graph with FAA schedules and NOAA weather data.
- Achieved **82% accuracy** for 3-hour delay forecasts with **Graph Attention Networks** and time-decayed edges.
- Outperformed XGBoost baseline by **25%**, validating graph neural networks for real-world delay prediction.

**HomeLab** | Docker, Linux, LLaMA, OpenWebUI, Jellyfin, Navidrome, Gitea, Nextcloud — Jan 2024

- Built a personal server on Linux with Docker-managed services for media, cloud, and development.
- Deployed tools like **Jellyfin (media)**, **Navidrome (music)**, **Gitea (code hosting)**, and **Nextcloud (cloud)**.
- Hosted **LLMs (LLaMA)** and **RAG pipelines**, integrating personal notes/Wikipedia into local AI assistants.

**PiNet – Raspberry Pi Edge Automation Hub** | Raspberry Pi, Home Assistant, Pi-hole, Grafana — Mar 2024

- Configured a **Raspberry Pi hub** with **Home Assistant** to automate IoT devices and sensors.
- Deployed **Pi-hole** for DNS-level filtering and integrated **Grafana** dashboards for network monitoring.

## Technical Skills

**Languages:** Python, Java, C/C++, JavaScript, SQL
**Frameworks & Libraries:** PyTorch, TensorFlow, Scikit-Learn, Transformers, XGBoost, Pandas, OpenCV, YOLO
**Tools & Platforms:** Docker, Git, Linux, CUDA, AWS, Azure, FastAPI, Node.js, Spring Boot, React, PostgreSQL, Redis