Hardik Gupta

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Education

University of Minnesota - Twin Cities Minneapolis, MN
Master of Science, Robotics *Sep 2023 – Present*
Coursework: Data Structures and Algorithms, Computer Architecture, Operating Systems, Natural Language Processing, Computer Vision, Machine Learning, Artificial intelligence

Birla Institute of Technology and Science, Pilani Pilani, RJ, India
Bachelor of Engineering, Mechanical Engineering & Master of Science, Biological Sciences *Aug 2018 – Jun 2023*
Bachelor Thesis: Optimized Trajectory Generation and Collision Avoidance using Nonlinear Model Predictive Control

Skills

Languages: Python, C, C++, JavaScript, HTML, CSS
Technologies: MongoDB, MySQL, Flask, ReactJS, Django, TensorFlow, PyTorch Keras, Tableau, Scikit-learn, AWS, OpenCV, Git, GitHub, Bash Scripting, CUDA, MATLAB, Docker, LaTeX

Projects

Interactive Pathfinding & Maze Generation Visualizer Feb 2025
React, TypeScript, Vite, TailwindCSS *Live Website*
- Implemented BFS, DFS, Dijkstra, and A* algorithms with user-selectable speeds, generating real-time animations for visited nodes and the shortest path.
- Integrated multiple maze-generation methods (Binary Tree, Recursive Division), allowing users to draw walls and obstacles via interactive mouse controls.

Retrieval-Augmented Generation for Fact Checking @ AI x Journalism Hackathon
Python, FAISS, Sentence Transformers, LLaMA *Repository*
- Indexed 20K+ politician statements into a FAISS database for low-latency retrieval and combined with a locally hosted LLaMA model for real-time fact-checking.
- Achieved 2.08s average end-to-end latency (2.31s at p95) and a throughput of 0.32 QPS, peaking at 363 MiB memory usage during retrieval and generation.

End-to-End Machine Learning Model, Titanic Survival Prediction API Dec 2024
Python, Flask, Scikit-learn, Pandas, Docker, GitHub Actions, AWS EC2 *Repository*
- Built a Logistic Regression model achieving 94% accuracy on the classic Titanic survival dataset, including feature engineering and hyperparameter tuning.
- Containerized the application using Docker and deployed on AWS EC2 with GitHub Actions for CI/CD, ensuring sub-10-second response times under load.

RentFree, Short-term Property Listing and Management Web Application Jun 2024
React, Node.js, Express, MongoDB, AWS S3, Tailwind CSS *Live Website*
- Designed a React + Node.js (Express) + MongoDB application for property listing and booking, featuring a Tailwind CSS–based responsive UI.
- Implemented bcrypt.js for password hashing and JWT for secure user authentication, ensuring data privacy and session integrity.
- Achieved an average Lighthouse performance score of 81 across multiple global regions (US, Europe, Asia), demonstrating responsive UX and consistent site speed.

Apple Detection and Counting in Orchards Dec 2023
Python, YOLOv8, 3D Reconstrution, Filtering *Repository*
- Trained a YOLOv8 model on 1,000 images (41K+ annotated apple instances), achieving an F1 score of 0.79 in detecting apples.
- Integrated COLMAP for 3D reconstruction, used RANSAC for ground/trunk plane detection, and applied DBSCAN clustering to filter false positives and refine apple counts.

Work Experience

Union Bank of Switzerland Mumbai, MH, India
Financial Analyst Intern *Feb 2023 – Jun 2023*
- Designed and implemented Python and VBA Macros to automate Pension IPV analysis, reducing manual effort by 25% and saving ∼30 staff hours per month (staff member saved ∼1 hour/week).
- Built robust data pipelines using Pandas and NumPy to process a total of 50K pension entries (handling 10K entries monthly), integrating with PowerBI for real-time dashboards leveraged by the Rates-FX finance team.