

# Sharvil Oza

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## EDUCATION

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**Dhirubhai Ambani Institute of Information and Communication Technology** Gandhinagar, India  
*Bachelor of Technology in Computer Science and Engineering* Oct. 2022 – May 2026

## EXPERIENCE

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**Research Intern** December 2024 – April 2025  
*University of New South Wales, Business School* Remote

- Developing deep learning models for supply chain optimization, leveraging advanced algorithms to enhance forecasting accuracy and operational efficiency.
- Applying a variety of statistical techniques, including correlation analysis, VCF, and regression models, to derive insights and improve decision-making in supply chain management.
- Conducting crop yield prediction and optimizing supply chain processes using machine learning algorithms, aiming to improve resource allocation.

**Research Intern** May 2024 – Aug 2024  
*Georgia Tech Financial Services Innovation Lab (FSIL)* Remote

- Developed and backtested quantitative trading strategies, including Pairs Trading and arbitrage, for equities, enhancing algorithmic decision-making and performance analysis.
- Strengthened the algorithm's robustness by designing a Risk Metric class encompassing over 25 risk metrics, and optimized portfolio allocations while comparing results against benchmark returns.
- Built a custom data wrapper for seamless integration with the Polygon API, enabling real-time data fetching and improving data processing efficiency for strategy development and backtesting.

## PROJECTS

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**LMFusion Paper Implementation** | *Pytorch* March 2025 – March 2025

- Implemented the LMFusion framework to extend pretrained language-only LLMs with multimodal generative capabilities, integrating modality-specific attention and feedforward modules for text and image processing.
- Developed custom dataloaders and loss functions to support joint training on image-caption datasets using both cross-entropy for text and diffusion-based objectives for image generation.
- Engineered a modular multimodal training pipeline, preserving language capabilities by freezing text modules and training image modules, achieving efficient cross-modal attention and high-fidelity image generation.

**Trading Engine** | *Python, MySQL* June 2024 – July 2024

- Developed user profiles and portfolios with personalized features, enhancing user experience and enabling seamless tracking of trades and holdings.
- Engineered core trading functionalities by designing and implementing an L3 Order Book to manage real-time bid and ask prices for a set of stocks.
- Created efficient order-matching algorithms using a Queue Data Structure to ensure optimal performance and fast execution of trades in a highly dynamic market environment.

**Investment Portfolio Optimization** | *Python* Jan. 2025 – Feb. 2025

- Developed a Modern Portfolio Theory (MPT)-based asset allocation model to optimize risk-adjusted returns, incorporating key financial metrics such as expected returns, volatility, and correlation of asset classes.
- Designed and implemented Monte Carlo simulations to assess portfolio risk by simulating thousands of potential market scenarios.
- Automated financial reporting processes, creating dynamic dashboards and reports for real-time performance tracking, risk analysis, and portfolio adjustments.

**Quantitative Research Project** | *Python* Jan. 2025 – Feb. 2025

- Conducted in-depth analysis of emerging market inefficiencies, identifying pricing discrepancies, liquidity gaps, and structural market frictions across various asset classes, and developed cross-market arbitrage strategies to capitalize on these inefficiencies.
- Applied advanced statistical arbitrage techniques, such as cointegration, mean reversion, and pairs trading, to exploit short-term mispricings between correlated assets and generate alpha, enhancing risk-adjusted returns.

- Created a factor-based investment approach by integrating macroeconomic indicators, technical signals to systematically identify alpha-generating opportunities, while minimizing downside risk.

#### **RAG Pipeline with Local LLM** | *Python, PyTorch*

December 2024 – January 2025

- Developed a Retrieval-Augmented Generation (RAG) pipeline to preprocess PDF documents into text chunks, enabling efficient information retrieval and accurate context-based response generation.
- Integrated the local large language model (Google/GEMMA-2B-IT) to enhance the pipeline's ability to generate domain-specific, context-aware answers using external knowledge sources.
- Optimized the RAG pipeline's performance by refining data retrieval methods and improving response relevance and quality for real-world applications.

#### **Reinforcement Learning-Based Drone Stabilization Simulation** | *Python, PyBullet*

October 2024 – December 2024

- Developed a physics-based drone simulation in PyBullet, where a drone initially starts upside down and utilizes Reinforcement Learning (RL) to autonomously stabilize and regain its upright position.
- Engineered a robust RL-based reward algorithm, enabling the drone to stabilize and hover autonomously by dynamically adjusting its control inputs based on real-time environmental feedback.
- Created a detailed URDF file for the drone model and enhanced the RL algorithm by optimizing the reward function, incorporating 13 state variables to improve the stability and performance of the drone.

#### **Weather Prediction Model** | *Python, TensorFlow*

August 2024 – September 2024

- Developed an advanced weather prediction model tailored for the tropical Indian climate, leveraging LSTM and Attention mechanisms to achieve an accuracy of over 90%.
- Collected, cleaned, and preprocessed large-scale weather datasets, constructing a robust data pipeline to seamlessly integrate with the predictive model.
- Successfully deployed the model in a production environment using Flask, enabling real-time predictions through API integration with curl requests for seamless user interaction.

### TECHNICAL SKILLS

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**Languages:** Rust, Python, C/C++, SQL (Postgres,MySQL),CUDA

**Relevant Courses:** GPU Architecture, Deep Learning, Computer Vision, Quantum Machine Learning, Reinforcement Learning, LLMs

**Libraries:** Pytorch,TensorFlow