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Machine Learning Research/Engineering

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Experience

- **C3 AI - Enterprise AI** — Redwood City, CA
  Senior Research Engineer; Python, Javascript — *Jul 2025 - Present*
  - **Autonomous Code Generation Agent**: Developed end-to-end ***coding agent*** for C3's internal tooling that generates, executes, and debugs code autonomously. Implemented ***tool use*** and ***self-correction loops***, achieving ***85% correctness*** on enterprise automation tasks and reducing manual scripting time by ***60%***.
  - **Gradient Boosting with Learned Embeddings**: Built hybrid prediction system combining ***XGBoost*** with ***transformer embeddings*** for structured enterprise data, improving model accuracy from ***72% to 81%*** on customer churn prediction by better capturing text field semantics that traditional features missed.
  - **Baker Hughes Inventory Optimization**: Built ***reinforcement learning system*** for multi-location inventory management using ***policy gradients*** and ***demand forecasting***. Deployed across Baker Hughes facilities, reducing excess inventory costs by ***$XX million annually*** while maintaining ***99% part availability***.
  - **Baker Hughes Sourcing Optimization**: Built procurement optimization system using ***constraint programming*** to balance cost and lead times across ***200+ suppliers***. Deployed in Baker Hughes supply chain, identifying ***$XX million in annual savings*** through better supplier allocation while reducing stockouts by ***35%***.
  - **Air Products Supplier Sourcing**: Developed ***constraint optimization system*** using ***graph neural networks*** to model supplier networks and relationships. Handles ***XXX+ suppliers*** and ***XXk+ SKUs***, identifying ***15% cost savings*** opportunities while meeting delivery and quality requirements.

- **Squark AI - Automated AI ML Solutions** — Boston, MA
  Machine Learning Engineer; Python, CUDA, SQL — *Mar 2025 - Jul 2025*
  - **Vision-Language Model for Financial Documents**: Built ***multimodal model*** combining ***CLIP encoders*** with ***transformers*** to extract structured data from earnings reports and financial statements. Improved extraction accuracy from ***68% to 89%*** on key metrics, reducing manual review time by ***45%***.
  - **Domain-Specific LLM Fine-tuning**: Fine-tuned ***Mixtral 8x7B*** for financial reasoning tasks using ***retrieval-augmented generation*** and custom financial datasets. Reduced hallucination rate from ***23% to 8%*** on numerical facts while maintaining response quality.

- **John Hancock - Manulife Investment Management** — Boston, MA
  Machine Learning Engineer; Python, CUDA — *Jan 2024 - Jan 2025*
  - **LLM Adaptation for Financial Risk Assessment**: Fine-tuned large language models using ***Low-Rank Adaptation*** for financial risk modeling, reducing inference costs by ***65%*** while maintaining prediction accuracy on portfolio risk metrics.
  - **Multimodal Risk Prediction**: Built ***multimodal fusion system*** combining market sentiment from news text, price charts, and numerical data using ***cross-attention transformers***, improving risk prediction accuracy from ***74% to 82%***.

- **Lennox International - Samsung America** — Chennai, India
  Software Engineer; C++, Java — *Aug 2022 - Dec 2022*
  - **Smart Home Integration**: Developed ***middleware*** connecting HVAC systems to ***Apple HomeKit*** and ***Amazon Alexa***, implementing voice control and automation features. Shipped to ***50K+ devices***, reducing customer support calls related to smart home setup by ***30%***.
  - **Protocol Optimization**: Optimized ***multi-threaded communication*** between IoT devices and cloud services by implementing ***connection pooling*** and better error handling, reducing average latency from ***850ms to 510ms*** and improving system stability.

- **Madurai Smart City - Industry Partnership** — Madurai, India
  Computer Vision Researcher; Python, C++, CUDA — *May 2020 - May 2022*
  - **Real-Time Face Mask Detection**: Deployed ***computer vision models*** on ***NVIDIA Xavier*** edge devices for city-wide mask compliance monitoring. Optimized with ***TensorRT***, achieving ***3x speedup*** (from ***12 FPS to 36 FPS***) for real-time processing across ***200+ cameras***.
  - **Distributed Video Analytics System**: Built ***distributed system*** processing ***500+ concurrent video feeds*** for city surveillance, implementing ***adaptive bitrate streaming*** and ***load balancing*** to handle peak traffic while maintaining ***sub-200ms processing latency***.

Research Experience

- **Northeastern University - Research Computing** — Boston, MA
  Graduate Researcher; Python, R, CUDA — *Sep 2023 - Dec 2024*
  - **Time Series Alignment with Deep Learning**: Developed ***Dynamic Time Warping*** alignment system integrated with ***graph neural networks*** and ***deep learning*** for multivariate time series. Applied to financial data, improving pattern matching accuracy from ***61% to 78%***.
  - **Advanced NLP Course Development**: Created and taught ***Advanced Natural Language Processing*** coursework for PhD students, covering ***transformer architectures***, ***attention mechanisms***, and ***large language model*** fine-tuning techniques with hands-on implementation.

Education

- **Northeastern University** — Boston, MA
  Master of Science in Data Science; *GPA: 3.73; Courses: Machine Learning, NLP, Geo-Spatial Analytics*

- **Anna University** — Madurai, India
  Bachelor Of Engineering in Computer Science and Engineering; *GPA: 3.89*

Leadership and Achievements

- **Best Project Winner 2018-2022 Batch**: Developed COVID-19 monitoring system for city-wide pandemic response, tracking 50K+ cases and improving response coordination efficiency by 50%.
- **IoT Traffic Management**: Built IoT-based traffic system using routing algorithms to prioritize emergency vehicles, reducing average response time delays by 50% across pilot deployment.
- **Blockchain Auction Mechanisms**: Published research on Ethereum-based auction systems, demonstrating 20% improvement in transaction efficiency through optimized smart contract design.
- **IoT Sensor Patent**: Co-inventor on patent for sand moisture IoT sensors with ML-based calibration, improving measurement accuracy by 15% in agricultural applications.