

JOEL SUSHANTH MARKAPUDI

Boston, MA  617-510-2051  markapudi.j@northeastern.edu  linkedin.com/in/joemjs/  mjsushanth.github.io

EDUCATION

Northeastern University

M.S. in Artificial Intelligence (G.P.A - 3.9)

Relevant Coursework: MLOps, Deep Learning, Computer Vision, Machine Learning.

Boston, MA.

Jan 2024 – Present

KL University

Bachelor's in Computer Science

Vijayawada, India.

Jun 2016 – Jun 2020

SKILLS

Programming & ML/AI: Python (PyTorch, Pandas, Polars, NumPy, Scikit-learn, OpenCV), SQL, Java;

MLOps, LLM & Cloud: Docker, MLflow, Optuna; FastAPI, Flask, Streamlit; Airflow; ELK Stack.

AWS (S3, Lambda, Bedrock, S3 Vectors, ECS); GCP; GitHub Actions CI/CD.

Data & BI:

DuckDB, PostgreSQL, Power BI, Talend; ETL architecture, Data modeling.

ACADEMIC PROJECTS

FinSights: LLM RAG Financial Data Intelligence System

Sep 2025 – Dec 2025

- Built E2E RAG system for analyst-style queries over SEC Form 10-K data with hybrid retrieval architecture. Combines structured KPI tables and sentence-level vector search, powered by fuzzy entity extraction.
- Built token-aware, embedding pipeline processing 1,850 vectors/min with intelligent batching (96 texts/call, 15K token budget) and real-time cost tracking. Utilizes S3 Vector store with metadata filtering.
- Structured retrieval pipeline with query variant generation, triple retrieval regimes (filtered/global/union), sentence window expansion, deduplication, and stratified distance-based selection (0.35 cutoff). Includes provenance tracking.
- Deployed 3-tier production system (LLM orchestrator, FastAPI + Streamlit) with cost modeling that achieves \$0.017/query through S3 Vectors. Derived scaling formulas and example scenarios for cost analysis.
- Achieved 0.82-0.86 BERTScore F1 on business-realistic gold test. Validated retrieval quality through deterministic neighbor tests (98%+ Self@1, 70-92.5% Hit@5). Evaluation with multiple metrics (BLEURT-20, ROUGE-L).

Pose Synthesis With Cross-Modal Diffusion Architecture (PyTorch, CLIP)

Jan 2025 – Apr 2025

- Devised Conditioned UNet diffusion architecture processing 23.3K+ training samples with 8-head cross-attention & 4 resolution levels, generating 3D poses from 66-dimensional skeletal representations.
- Modeled hierarchical cross-attention with first-action syntactic segmentation and cluster-aware sampling, obtaining body-part and action-aware semantic conditioning. Achieved 0.69 final loss through 3-phase progressive training.
- Enforced biomechanical structure awareness, anatomy validation, forward kinematics constraints, tanh-bounded outputs (1.5× scaling) and CFG guidance scale 7.0. Achieved 70% visual alignment and topological consistency.

Late-interaction Image-Text Model: (ViT+CLIP, MaxSim retrieval, LoRA)

Nov 2025 – Dec 2025

- Implemented ColBERT-style late-interaction retrieval with ViT-base encoder (196 patch tokens, 768-d), CLIP, and learned projection head, using MaxSim scoring for fine-grained token-patch alignment over Flickr8k data.
- Applied LoRA parameter-efficient fine-tuning to ViT attention layers, training 1.3M/87M parameters (1.05%) with symmetric InfoNCE contrastive loss. Achieved 48% loss reduction with 82% retrieval accuracy.

EXPERIENCE

FP&A and SG&A Reporting

Mar 2020 – Nov 2023

- Led BI delivery for non-technical finance and operations stakeholders across multiple business units.
- Built scalable ETL pipelines (Talend, PL/SQL) and Power BI models supporting 11+ programs including Producer Commission, QBR dashboards, DSO Reports, Hiring Metrics, and SG&A reporting.
- Shipped 25+ dashboards covering 500+ metrics. Automated margin/audit workflows, cutting 70+ hours/month of manual Excel work. Implemented CI/CD upgrades across projects that reduced deployment time 50%.
- Developed forecasting logic for YTD actuals and projections using advanced DAX with multi-level attribution.
- Designed dynamic eligibility engine with multi-factor scoring (GP projections, new placements, total starts) and threshold-based qualification logic for a margin-based ranking dashboard.
- Partnered with data science and business teams on analytics improvements. Conducted 35+ interviews and mentored sub-teams of 2-4 to accelerate delivery. Earned the Innova Idol Award for being a top performer.

Operational Reporting

May 2022 – Nov 2023

- Architected enterprise data warehouse integrating Bullhorn/HGC/JobDiva/Oracle EBS with 25+ PL/SQL procedures across 40+ star-schema tables. Implemented SCD Type 2 historization.
- Engineered entity resolution using 6+ fuzzy patterns and dual-path PnL attribution, achieving 88% accuracy.
- Built a data governance & reliability layer with automated validation, duplicate detection, cross-system ID reconciliation, and role classification with tenure/designation mapping logic, reducing manual verification workflows.
- Delivered operational reporting dashboards serving 300+ KPIs with forecasting, actuals-vs-baseline tracking, and rollups across individual, team, and division hierarchies for executive/producer analytics.
- Enabled matrix-style drill-down for faster exploratory analytics, RCA and improved reporting accuracy.