

# POOJA BARALU UMESH

[LinkedIn](#) [GitHub](#) [Portfolio](#)

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## SUMMARY

Machine Learning Engineer with **MS in Data Science** and **4+ years of experience** building and deploying production-grade ML systems in e-commerce, supply chain, and computer vision domains. Skilled in LLMs, vector embeddings, and end-to-end MLOps. Proven ability to design, deploy, and optimize scalable AI solutions that reduce latency, improve accuracy, and deliver measurable business impact.

## SKILLS

**Programming Languages:** Python(Pandas, NumPy), SQL

**Machine Learning:** Scikit-learn, TensorFlow, PyTorch, MLflow, Hugging Face Transformers

**ML Concepts:** Vector Embeddings, LLMs, Prompt Engineering, NLP, Feature Engineering, Evaluation Frameworks, Time Series Forecasting, Clustering, Dimensionality Reduction (PCA), Content-Based Recommendation, RAG, LangChain

**Statistics & Analysis:** ANOVA, Regression, GLM, Hypothesis Testing, Experimental Design

**Distributed Systems:** Apache Spark (SparkSQL, DataFrames), Airflow, Databricks, Snowflake

**Cloud Platforms:** AWS, GCP

**Databases:** MongoDB, Pinecone (Vector DB), NoSQL

**Visualization & Apps:** Matplotlib, Seaborn, Streamlit

**APIs & Tools:** SpaCy, NLTK, Cohere API

## CERTIFICATIONS

• **AWS Certified Machine Learning - Associate**, Amazon Web Services (AWS)

Issued Oct 2025, [Badge](#)

## PROFESSIONAL EXPERIENCE

**FlavorMetrics, Bay Area, CA**

Aug 2025 - Present

**Machine Learning Engineer**

- **Leading research and prototype development** of an AI-powered recommendation engine that will suggest optimal process adjustments (e.g., temperature, time, ingredient ratios) to maintain final product parameters within target limits.
- **Designed data ingestion and ETL frameworks** to automate collection and transformation of IoT, sensor, and ERP data into a unified data lake for model training.

**Drinks, Bay Area, CA**

Oct 2024 - July 2025

**Machine Learning Engineer**

- Designed & deployed a **Retrieval-Augmented Generation (RAG)** product search agent using **vector embeddings**, **OpenAI LLM**, and **Pinecone vector DB**.
- Built LLM-based **intent classifier** for user queries; used **cosine similarity** for semantic product matching and **Levenshtein distance** for fuzzy matching of product names to extract accurate attribute-level information.
- Integrated **Hugging Face cross-encoder reranker** to improve semantic match accuracy and implemented product filtration to reduce duplicates.
- Orchestrated **AWS Lambda**, **Cohere Reranker**, and **S3 storage** for embeddings, cutting response time from **~2 min to <30 sec**.
- Created evaluation framework with 250 curated queries for continuous performance monitoring; deployed solution site-wide via API.
- Presented the solution to the **Co-founder and CTO**; successfully deployed company-wide for end-user adoption and integrated it seamlessly into the e-commerce website through API orchestration.

**Harmony Food Pvt. Ltd., India**

Mar 2022 - Jan 2024

**Software Engineer**

- Designed and implemented **ETL pipelines** in Python/SQL to ingest production & quality-control data, cutting reporting time by 60%.
- Built **data validation scripts** and automated alerts for anomalies, improving issue resolution speed.
- Developed **interactive dashboards** for leadership to monitor real-time inventory, demand forecasts, and supplier performance.
- Integrated **APIs** from suppliers and logistics partners into the central database to enhance supply chain visibility.

**ABInBev, India**

Oct 2020 - Jan 2022

**Assistant Manager**

- Led a cross-functional analytics project that reduced extract loss by 9% and water usage by 5% through **time-series anomaly detection** on brewhouse sensor data.
- Developed and maintained **SQL data pipelines** to track Overall Equipment Effectiveness (OEE) metrics, enabling near real-time performance monitoring and driving a 25% productivity increase.
- Automated **report generation** and KPI tracking by integrating data from MES (Manufacturing Execution Systems) into dashboards.

## EDUCATION

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University of San Francisco,  
MS in Data Science

SF, CA, USA  
July 2024 - June 2025

## PROJECTS

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### Developed A(I)YE Chef, an end-to-end AI-powered culinary assistant

[Github](#)

- Fine-tuned YOLOv8 on 24k+ images for 120-class ingredient detection (>95% accuracy).
- Integrated Vertex AI Gemini LLM to generate JSON-structured personalised recipes.
- Exported and deployed the YOLOv8 PyTorch model via FastAPI in a Docker container, leveraging GCP Cloud Run for scalable, serverless inference.
- Implemented MLflow for artifact logging and model registration, resolving conflicts with YOLO's auto-logging to centralize metric tracking and optimize compute costs through transfer learning and serverless deployment.

### Tweet Popularity Predictor – End-to-end ML pipeline for social media analytics

[Github](#), [Blog](#)

- Multi-task pipeline for emotion classification (DistilBERT), hashtag generation (GPT-2), and popularity scoring (linear regression).
- Designed retrainable Python package with CLI & API; integrated with Snowflake for storage & dashboards.
- Optimized inference speed via batch processing, reducing runtime for large datasets; added unit test scaffolding and roadmap for FastAPI microservice deployment.

### Fine-Tuning Stable Diffusion 2.1 for Domain-Focused Image Generation

[Blog](#)

- Fine-tuned Stable Diffusion 2.1 on curated ArtBench-10 dataset, enabling stylistically coherent image generation aligned with domain-specific artistic prompts and style requirements.
- Designed robust preprocessing pipeline including deduplication via perceptual hashing, CLIP normalization, and UTF-8 text cleaning to ensure high-quality training data.
- Implemented memory-efficient training using WebDataset with 46 sharded tar files and LoRA-based PEFT on A100/4090 GPUs, optimizing resource utilization and training time.
- Evaluated model performance using CLIP similarity scores and human assessment, achieving improved prompt adherence and visual fidelity in generated artwork

### Webflix Browse Time Optimization

- Led a collaborative analysis using a two-stage factorial experiment and simulated user data to optimize recommendation settings (Tile Size, Match Score, Preview Length, Type) and minimize user browsing time.
- Applied statistical methods including ANOVA, partial F-tests, Bonferroni correction, and OLS regression to identify significant factors and interactions, determining an optimal configuration (Preview Type: TT, Length: 75s, Score: 72%).
- Delivered a data-driven strategy predicted to reduce mean browsing time by 20% (estimated ~9.98 min), enhancing user engagement.

### Movie Recommendation System Pipeline

[Github](#)

- Developed components of an automated data pipeline using Airflow, MongoDB, GCS, and Spark for content-based movie recommendation systems.
- Ingested data from TMDB APIs, performed data transformations (joins, aggregations) in MongoDB, and enabled scalable analytics using Spark DataFrames and SparkSQL.