

PRATHESWARAN HARIHARAN

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Professional Summary

AI/ML Engineer and Data Science graduate with hands-on experience building LLM-driven, agentic AI pipelines, RAG and tool-use workflows, and confidence-aware inference systems in PyTorch. Skilled in structured/schema-validated LLM outputs, model evaluation, and building reliable, observable ML pipelines with dry-run and regression-catching safeguards. Strong software-engineering fundamentals in Python, REST APIs, and Docker-based deployment, with a keen interest in applying agent orchestration and LLM technology to advertising and recommendation systems.

Technical Skills

- **LLM & Agentic AI:** LLM Agents, RAG, Tool-Use & Agent Orchestration Concepts, Structured/Schema-Validated LLM Outputs, Prompt Engineering, Model APIs, Semantic Search, Vector Retrieval
- **Multimodal & Generative AI:** CLIP, ImageBind, BLIP, Confidence-Aware Inference, Evidence Retrieval & Fallback Mechanisms
- **Machine Learning:** Feature Engineering, Model Evaluation, Statistical Validation, Hypothesis Testing, Model Optimization
- **Deep Learning:** PyTorch, TensorFlow, Hugging Face Transformers
- **Programming & Data:** Python, SQL, Pandas, NumPy, PySpark, REST APIs, Asynchronous/Typed Code Design
- **MLOps & Tools:** Git, Docker, Model Inference Pipelines, Offline/Online Evaluation Pipelines
- **Visualization:** Tableau, Power BI, Excel

Experience

Graduate Research Assistant

Jan 2026 – May 2026

University of Massachusetts Dartmouth

- Built reliability-aware, agent-style AI pipelines in PyTorch for multimodal reasoning, visual classification, and confidence-aware inference — directly applicable to diagnosing model health and auto-tuning decisions in production systems.
- Designed confidence-calibrated inference pipelines using temperature scaling and Expected Calibration Error, producing auditable, quantified reliability signals analogous to account-health diagnostics.
- Implemented embedding-based evidence retrieval, tool-use, and fallback mechanisms (RAG-style) to improve prediction reliability, mirroring the retrieval + LLM strategy-generation pattern used in AI agent systems.
- Built offline evaluation pipelines and large-scale experimentation to measure robustness/reliability trade-offs and catch regressions before deployment — directly transferable to dry-run safeguards and quality monitoring for live optimization loops.

Learning and Development Associate – Data & Analytics

Mar 2023 – May 2023

Dr. Mahalingam College of Engineering and Technology

- Built Python-based analytical pipelines and automated reporting workflows to support data-driven institutional decision-making.
- Applied exploratory data analysis, statistical validation, and hypothesis testing to surface actionable trends in financial and operational datasets.
- Collaborated cross-functionally with stakeholders to translate data insights into concrete recommendations.

Research & Publications

- “From Weak Embeddings to Trustworthy Multimodality: Modality-Agnostic Learning with Confidence-Aware Fallback” — Accepted Conference Paper, IEEE SIEDS 2026, University of Virginia, May 2026

Projects

Unified Multimodal Learning Using Contrastive Embeddings

- Built a multimodal AI pipeline using CLIP and ImageBind embeddings combined with LLM-based generative reasoning workflows — an agentic pattern of retrieval + LLM decisioning.
- Integrated similarity-based vector retrieval and confidence estimation to improve usability and reduce high-confidence mispredictions, an approach directly applicable to auditable, safe automated decision-making.

SmartLeafNet Hybrid Deep Learning

- Implemented a hybrid CNN + ML framework for plant leaf disease classification, addressing class imbalance and improving minority-class recall through statistical validation.

Education

Master of Science, Data Science — GPA: 3.95

May 2026

University of Massachusetts Dartmouth

Post Graduate Program, Data Science — GPA: 3.68

2023 – 2024

VIT Bangalore

Bachelor of Engineering, Mechanical Engineering — GPA: 3.56

2019 – 2023

Dr. Mahalingam College of Engineering and Technology

Certifications

- Generative AI for Project Managers (PMI)
- Project Management (IIT Kanpur)
- Model-Based Systems Engineering (SUNY Buffalo)