Vignesh Saptarishi

Machine Learning Systems · Research, Algorithms & Engineering

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Extended resume: saptaxis.dev/resume

10+ years building production AI systems spanning computer vision, document intelligence, search and retrieval, generative models, agents, and ML platforms. **Founding algorithms engineer on three products that went from zero to revenue**; subsequently led their ML organizations while remaining hands-on. Earlier computational neuroscience researcher at Brandeis.

PROFESSIONAL EXPERIENCE

AI/ML Engineering Practice · Traitful AI Labs — Feb 2025 - Present

Independent practice delivering domain-specific AI systems for logistics, legal, and financial workflows.

- Built **hybrid retrieval and trusted write paths** over structured records and documents, combining domain taxonomies, Elasticsearch lexical/vector search, LLM-generated queries, and human approval gates.
- Engineered a **custom agent runtime** with explicit per-turn context, state, tool selection, and programmable memory; designed for predictable behavior, latency, and token costs.
- Developed a **scenario-based evaluation harness** using miniature simulated worlds to test retrieval, idempotency, write safety, and evidence recall.
- Fine-tuned ModernBERT with a shared encoder and dozens of classification heads for document section labeling, supporting retrieval, extraction, and prompt selection.

Senior ML Engineer → Director of ML (2020) · vue.ai / Mad Street Den — Feb 2017 - Oct 2024

Founding algorithms engineer across three product lines; later built and led ML and data teams and helped architect the shared AI platform. Continued writing production code as Director.

INTELLIGENT DOCUMENT PROCESSING

- Built an end-to-end document understanding platform, from OCR and layout analysis (**LayoutLM + geometric heuristics**) to structured extraction, supporting **millions of documents** across BFSI, government, and legal deployments.
- Developed **one-shot onboarding** using text/image registration to extract from new document types with a single annotated sample and no retraining.
- Engineered retrieval-augmented extraction under constrained context windows and optimized straight-through processing with customer-validated precision/confidence thresholds.

VIRTUAL DRESSING ROOM

- Developed early production **GAN-based virtual try-on**; reframed garment transfer as geometric deformation, scaling **512px predictions to photorealistic 4K output** using upsampled warp grids and original-image sampling.
- Trained garment transfer, lighting, and shadow models; built synthetic-data generation using Blender and garment simulation, plus human-in-the-loop editing workflows for production.

AUTOMATED PRODUCT TAGGING

- Built production visual classification for major retail clients, processing **hundreds of millions of catalog images**; unified taxonomy and per-client mappings enabled new-client onboarding in **one working day**.
- Architected shared feature extraction with lightweight classification heads serving hundreds of models; added taxonomy-aware confidence and automated retraining.

ENTERPRISE AI PLATFORM

- Co-architected a unified platform with shared data and ML abstractions, DAG-based orchestration, and no-code model training and workflow composition.

Computational Neuroscience · Brandeis University 2010 - 2015

- **Marder Lab, Brandeis (2013-15):** Modeled neuronal homeostasis during morphological growth using coupled nonlinear dynamics and feedback control.
- **Waran Research Foundation (2010-13):** Studied the role of cellular energetics in neural circuits through computational modeling; co-authored a 2012 publication.

PROJECTS

- **World-model ladder / audits:** trained and evaluated models from linear predictors to RSSMs; tested latent decodability, rollout quality, and action-conditioned consistency, including JEPA/RSSM architectures.
- **Latent world physics:** compared PPO controllers with and without explicit environment-physics access; observed smoother behavior but weaker generalization under distribution shift for physics-aware agents.
- **scad / orglens:** persistent work tracking, searchable histories, and cross-session handoffs for coding agents.

EDUCATION & RECOGNITION

- **M.S., Neuroscience**, Brandeis University (2015) · NIH-funded PhD fellowship · GPA 3.84/4.00
- **B.E., Electrical Engineering**, Anna University (2013) · Devaki Muthiah Award for Overall Best Student