NANDHAKUMAR VADIVEL

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EDUCATION

University at Buffalo - SUNY — **August 2024 - December 2025**
Master's Artificial Intelligence — *GPA: 3.4/4*

Easwari Engineering College — **August 2020 - June 2024**
Bachelor's, Information Technology (First Class with Distinction) — *CGPA: 8.9/10*

SKILLS

Programming: Python, R, C++, SQL, Java, JavaScript
ML/DL Frameworks: PyTorch, TensorFlow, Scikit-learn, JAX (familiar), Ray, CatBoost , MXNet , HuggingFace
AI/ML Techniques: Neural Networks, CNNs, RNNs, Transformers (BERT, GPT), RL, Bayesian Optimization (coursework)
Computer Vision Models: YOLOv5, SSD, Faster R-CNN ,OpenCV, Albumentations, CVAT , LabelImg
Data Tools: Pandas, NumPy, Matplotlib, Seaborn, PySpark, Airflow, Tableau, Grafana
Deployment & Platforms: Flask, FastAPI, Streamlit, Docker, AWS, CI/CD, Pinecone, FAISS, Git ,Oracle Database , Kubernetes

WORK EXPERIENCE

InCtrl LLC — **New York, USA**
AI Developer — *June 2025 – August 2025*

- Analyzed large-scale e-commerce datasets using predictive analytics and **PostgreSQL/AWS** pipelines, improving sales forecast accuracy by 25% and enabling optimized pricing strategies that boosted revenue growth by 15%.
- Developed and deployed AI-driven solutions, including an **LLM-powered RAG** chatbot with **Pinecone** vector search and **OpenAI/Anthropic APIs**, reducing customer support response time by 40% and boosting engagement by 30% through personalized, context-aware interactions.
- Built agent-based workflows with **LangChain, FastAPI**, and **TypeScript/Next.js/React** frontends, enabling seamless integration of generative AI products.
- Collaborated with cross-functional teams in a fast-paced, **agile environment**, demonstrating adaptability and teamwork to integrate scalable machine learning applications into production, **automating workflows** and improving overall efficiency by 35%.

Opeinapp — **Chennai, India**
Jr Machine Learning Intern — *July 2023 - October 2023*

- Enhanced multilingual video translation by integrating **Facebook's M2M-100 model**, improving accessibility by 18%.
- Fine-tuned **NMT** models using **PyTorch**, reducing translation errors by 25% and increasing global content accessibility.
- Optimized ML pipelines with parallel processing & **PySpark**, reducing inference latency by 30%, improving user experience.
- Conducted comparative analysis of **BERT, GPT, and T5** models for **NLP**-based applications, improving translation accuracy.

PROJECTS

DocMate-AI: AI-Powered Medical Chatbot | **NLP | BERT | RAG | LLM | Vector Database | LangChain**

- Developed an AI-driven medical chatbot integrating **BERT, GPT**, and **LLaMA**-based LLMs for real-time NLP processing, achieving 90%+ accuracy in medical entity recognition.
- Implemented retrieval-augmented generation **(RAG) pipelines** using FAISS and **Pinecone**, optimizing vector search and reducing query response latency by 40%.
- Engineered an end-to-end voice AI flow by combining Whisper **(Speech To Text),** LLM reasoning, and **Text To Speech**, enabling **natural, real-time voice conversations** with enterprise-grade reliability.

Blurred Realities: AI-Generated Image Detection System | CNN | Computer Vision | Image Analysis

- Developed a deep learning model using Vision Transformers (ViTs), **CNNs**, and Contrastive Learning to detect AI-generated images with 92%+ accuracy.
- Enhanced model robustness by evaluating against **adversarial perturbations (JPEG compression, blur, FGSM attacks)** and achieved consistent performance across diverse datasets.

E-commerce User Behavior Analysis | Time-Series Forecasting | Deep Learning |Financial Data Analysis

- Built an end-to-end big data pipeline using **Hadoop, Spark**, and **Kafka** to process and analyze 10M+ e-commerce user logs, supporting both batch and real-time analytics.
- Implemented scalable data ingestion, transformation, and storage workflows (**HDFS**, **PySpark**, Spark Streaming, **PostgreSQL**), achieving ~35% faster query performance and sub-second latency for streaming transactions.

PUBLICATIONS & ACHIEVEMENTS (RESEARCH PROJECTS)

- **AI-Driven Produce Management and Self-Checkout System for Supermarkets (IEEE 2023) (As First Author with 4 Citation)**
  Designed an AI-powered system to automate produce recognition and checkout, enhancing efficiency in retail environments.
- **Gazecon – Assistive control system for paralyzed people using a vision-based eye-gaze tracking (IEEE 2024)**
  Developed a vision-based eye-gaze tracking system to enable hands-free device control for individuals with mobility impairments.
- **Intelligent system for online Hand Gesture Prediction (IEEE 2023)**
  Developed a CNN-based real-time hand gesture recognition system with data augmentation for improved accuracy and robustness.