

MANIKANTA SIRUMALLA

Machine Learning Engineer | Applied ML + On-Device AI

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F-1 CPT-eligible | STEM OPT eligible after Dec 2026 (36 months) | Open to U.S. relocation

SUMMARY

M.S. Data Science candidate at UMBC with 3+ years of software engineering experience and applied ML work across computer vision, classical ML, LLM systems, and on-device model deployment. Trained an EfficientNet-B4 skin-lesion classifier on 61,694 dermoscopy images, achieving 0.806 balanced accuracy and 0.762 macro-F1 on validation, then exported the model to CoreML for iOS inference. Built RepTrack Pro's structured LLM generation pipeline with deterministic validators, provider failover, and on-device OCR inside a shipped App Store product that won 1st Place at UMBC CBIC 2026.

TECHNICAL SKILLS

Machine Learning: PyTorch, TensorFlow/Keras, scikit-learn, XGBoost, timm, EfficientNet, transfer learning, class imbalance handling, focal loss, weighted sampling, threshold optimization, ROC/PR analysis, stratified splits, leakage prevention

Data Science: Python, pandas, NumPy, SQL, matplotlib, statsmodels, feature engineering, model evaluation, VIF analysis, GridSearchCV

LLM/NLP: Groq Llama 3.3 70B, OpenAI API, structured prompting, LLM output validation, provider routing/failover, TF-IDF summarization, Apple NaturalLanguage

Model Deployment & Mobile AI: CoreML, coremltools, TorchScript tracing, .mlpackage authoring, FP32/FP16 conversion, embedded model metadata, on-device inference, Vision OCR

Software Engineering: Swift, REST APIs, Git, CI/CD, async/await, modular architecture

EDUCATION

M.S. Data Science | University of Maryland, Baltimore County (UMBC)

Jan 2025 – Dec 2026 (Expected)

Baltimore, Maryland, USA · GPA: 3.95 / 4.00

B.Tech. Computer Science | Vidya Jyothi Institute of Technology

2017 – 2021

Hyderabad, India · GPA: 3.45 / 4.00

RESEARCH & MACHINE LEARNING PROJECTS

DermaFusion — On-Device 8-Class Skin Lesion Classifier

M.S. Capstone Project | PyTorch, timm, EfficientNet-B4, TorchScript, coremltools, AMP

- Trained an ImageNet-pretrained EfficientNet-B4 classifier for 8-class skin-lesion classification, achieving 0.806 balanced accuracy and 0.762 macro-F1 on validation.
- Tuned an F2-optimized decision threshold of 0.30 to prioritize melanoma recall, reaching 78% melanoma recall; reported ISIC 2018 evaluation metrics of 79.8% top-1 accuracy, 80.1% sensitivity, 83.4% specificity, and 97.1% melanoma NPV.
- Unified 61,694 dermoscopy images from ISIC 2018, ISIC 2019, ISIC 2020, and PAD-UFES-20; handled a 164x class-imbalance ratio using patient-grouped splits and leakage checks.
- Implemented domain-specific preprocessing with Shades-of-Gray color constancy and DullRazor hair removal at 380x380 resolution.
- Trained with class-balanced focal loss, malignant-class alpha boosts, AdamW, cosine annealing, AMP mixed precision, and weighted random sampling.
- Exported the trained PyTorch model to CoreML using TorchScript tracing and coremltools, producing FP32 and FP16 .mlpackage variants with embedded class labels, normalization statistics, and decision-threshold metadata.

Customer Churn Prediction — Telecommunications

Python, scikit-learn, XGBoost, pandas, NumPy, matplotlib, statsmodels

- Compared 10+ classifiers including Logistic Regression, Random Forest, Gradient Boosting, XGBoost, SVM, KNN, Decision Tree, Naive Bayes, AdaBoost, and Neural Networks.
- Selected L2-regularized Logistic Regression after GridSearchCV and optimized the classification threshold to 0.20, achieving 85.3% recall and 45.7% precision against a business target of at least 85% recall.
- Engineered 12 continuous features from 3 original fields on the IBM Telco dataset of 7,043 customers and 21 features; applied one-hot encoding, stratified 80/20 splitting, and StandardScaler.
- Used VIF analysis to identify multicollinearity and controlled variance with L2 regularization instead of dropping potentially useful features.
- Identified top churn drivers including month-to-month contracts, short tenure, electronic-check payment, and high monthly charges, then translated model results into retention recommendations.

RepTrack Pro — Hybrid AI-Deterministic Fitness Platform | Sole Developer

Swift, SwiftUI, SwiftData, HealthKit, CoreML, Vision, WatchKit, StoreKit 2, Groq, OpenAI

[Live on App Store](#) | retrackpro.org | 300+ organic downloads | 1st Place, CBIC 2026

- Built a structured LLM generation system for personalized fitness plans using Groq Llama 3.3 70B with OpenAI failover through a custom AIProviderRouter.
- Designed deterministic validators to constrain LLM output and preserve structural correctness for training splits, progression rules, metabolic calculations, and plan quality checks.
- Encoded evidence-based fitness constraints into a runtime PlanValidator, including volume landmarks, RIR limits, and energy-availability floors.
- Implemented Vision OCR for multi-format document import across PDF, DOCX, CSV, XLSX, and images; routed extracted content into the plan-import pipeline.
- Deployed the AI system inside a shipped iOS product with a freemium model designed to keep free-plan generation at zero API cost and projected AI costs under 5% of net revenue.

SOFTWARE ENGINEERING EXPERIENCE

iOS Developer | ZetoStudio

Aug 2022 – Dec 2024

Hyderabad, India

- Delivered production iOS applications in Swift and SwiftUI from product requirements through App Store release.
- Built modular features with MVVM, protocol-oriented design, dependency injection, REST API integrations, async/await, Combine, and offline-first caching.
- Wrote XCTest unit/UI coverage, maintained CI workflows, and participated in code reviews to catch regressions before release.

iOS Developer | Grid Dynamics

Jul 2021 – Jul 2022

Hyderabad, India

- Built customer-facing iOS features for retail and e-commerce clients using Swift and UIKit, including catalog browsing, checkout, account management, REST API integration, push notifications, and analytics SDKs.
- Collaborated with backend, QA, and design teams in Agile/Scrum delivery and contributed to shared components reused across client projects.

HONORS & RECOGNITION

- **1st Place, Cangialosi Business Innovation Competition (CBIC) 2026** — bwTech@UMBC; \$4,000 prize; awarded for RepTrack Pro.
- **Apple WWDC 2026** — Selected for in-person attendance at Apple Park through the Apple Developer Program invitation.

PUBLICATIONS & RESEARCH

- **First-author manuscript in preparation:** “RepTrack Pro: A Hybrid AI-Deterministic Architecture for Personalized Fitness and Nutrition Plan Generation on iOS.”