Niranjani Komethagavel

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SUMMARY

Machine Learning and Biomedical Data Science professional with experience in developing, training, and deploying AI models for healthcare applications. Skilled in deep learning (CNNs, LLMs), data preprocessing, and cloud-based model deployment using Python, PyTorch, TensorFlow, and GCP. Experienced in bridging research and industry settings, and communicating with multi-disciplinary teams. Authorised to work in the United States.

EDUCATION

Johns Hopkins Whiting School of Engineering   2025–2026
M.S.E., Biomedical Engineering

Sri Ramachandra University   2019–2024
B.Sc. (Hons.), Biomedical Sciences | CGPA: **4.00**

TECHNICAL SKILLS

Programming & Languages: Python, R, MATLAB, SQL
Python Libraries & Frameworks: TensorFlow, PyTorch, Keras, scikit-learn, NumPy, pandas, FastAPI
Machine Learning & AI: Regression, Classification, Cross-Validation, Machine Learning, Deep Learning, Natural Language Processing, LLMs (Fine-Tuning, RAG)
Data Analysis & Visualization: Statistical Analysis & Modelling, Data Analysis & Visualization, Microsoft Excel, Power BI
Cloud & Tools: Google Cloud Platform, Model Deployment, Dialog Management

CERTIFICATIONS

Applied Data Science (MIT PE); Master's Program – AI Engineering (Simplilearn x IBM); Data Analysis for Biologists (IITG)

PROFESSIONAL EXPERIENCE

Graduate Research Assistant | JHUSOM – Baltimore, MD, USA   Sep 2025 – Present

– Developed a **3-class DeepLab (ResNet-50) segmentation pipeline** for **pancreatic intraepithelial neoplasia (PanIN)** on **H&E whole-slide images**, introducing a **probability-gradient mapping framework (LG → HG)** to capture lesion progression.
– Curated and quality-controlled > **80 NDPI/XML annotations**, resolving mapping inconsistencies and standardizing labeling across **epithelial, stromal, and PanIN layers**.
– Achieved **81% macro F1** and > **93% recall** for LG/HG classes across **6M+ pixels**; identified **PanIN 2.5** as a data-limited class and refined thresholding (**0–25–75–100 vs 0–33–66–100 scales**).
– Systematically evaluated **LG–PanIN2.5–HG** severity thresholds using cutoff simulations, quantifying trade-offs across **accuracy, macro-F1, and PanIN-2.5 F1**, and motivating a **0–33–66–100** severity projection to reduce class bias.
– Extended to a **13-class combined tissue-type segmentation model** (≈**89% precision / 86% recall**) integrating **PanINs, ductal, stromal, immune, and PDAC regions**.

Jr. Data Scientist | Mindsprint – Chennai, TN, India   Dec 2024 – Apr 2025

– **Led** the development of a **clinical pedigree charting tool**, **collaborating with healthcare stakeholders** who reported strong usability gains, delivering **70–80% operational efficiency improvements** compared to PowerPoint workflows.
– **Developed and presented** a proof-of-concept **healthcare chatbot**, implementing **parameter-efficient fine-tuning** and **RAG** on medical data to validate the **strategic feasibility** of cost-efficient, open-source models for clinical Q&A.
– Built a **cloud-based pipeline** for a symptom-to-diagnosis assistant, enabling end-to-end **data preprocessing**, orchestration, and **LLM response generation**, laying the foundation for **scalable deployment**.

Data Science Intern | Mindsprint – Chennai, TN, India   Sep 2024 – Dec 2024

– Developed **machine learning models** in **Python** and **R** to predict **customer payment timelines**, applying extensive **EDA** to guide model design and generate **business insights for decision-making**.
– Trained and evaluated multiple ML algorithms (**Decision Trees**, **Random Forests**, **XGBoost**, **Artificial Neural Networks**) using **MAE**, **MSE**, and residual analysis, while tuning hyperparameters to improve robustness.
– Improved model accuracy by **20%** through implementation of **ANNs** and advanced **feature engineering techniques**, strengthening classification performance in payment date prediction.
– Performed **customer segmentation** with **K-Prototypes clustering** and **mixed-type dimensionality reduction**, **providing actionable recommendations** and richer insights through **customer-level feature extraction**.

Research Trainee | Harvard Medical School – Boston, MA, USA   Apr 2023 – Oct 2023

– Investigated **tumor–immune interactions**, revealing mitochondrial transfer from **macrophages to T24 bladder cancer cells** via nanotubules—a novel **metabolic hijacking mechanism**.
– Evaluated a therapeutic strategy for **TNBC**, showing enhanced **mRNA–protein complex** presentation and improved assay reproducibility through optimized protocols.
– Authored and presented a **first-author poster**, "*Unravelling the Dynamics between Immune Cells and Metastatic Cancer Cells*," at the **Orthopedic Research Retreat 2023**.