Ashwani Rawat

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EXECUTIVE SUMMARY

Machine Learning and Deep Learning practitioner with hands-on experience in designing CNN-based architectures, multimodal learning frameworks, and structured experimentation pipelines using TensorFlow/Keras. Strong foundation in model validation, cross-validation strategies, class imbalance mitigation, and performance evaluation using metrics such as ROC-AUC and F1-score. Experienced in developing reproducible, high-performance AI systems with a focus on analytical rigor, interpretability, and scalable solution design.

EDUCATION

SRM Institute of Science & Technology, Chennai, India 2022 – 2026
Bachelor of Technology – Electronics & Communication Engineering (Data Science)
CGPA: 7.19

SKILLS SUMMARY

- **Programming:** Python, Java, C
- **Deep Learning:** TensorFlow, Keras, CNN, EfficientNetB0, DenseNet121, Transfer Learning, Multimodal Learning, Grad-CAM
- **Machine Learning:** Classification, Feature Engineering, SMOTE, Stratified Cross-Validation, Hyperparameter Tuning
- **Evaluation:** Accuracy, Precision, Recall, F1-Score, ROC-AUC, Confusion Matrix
- **Optimization:** Adam Optimizer, EarlyStopping, ReduceLROnPlateau, Model Checkpointing
- **Tools:** NumPy, Pandas, Matplotlib, Jupyter Notebook, Kaggle (Tesla T4 GPU), Git
- **Core Strengths:** Experimental Design, Model Validation, Reproducibility, Analytical Problem Solving

PROJECTS

Multimodal Deep Learning-Based Precision Treatment for Lung Cancer
TensorFlow/Keras — EfficientNetB0 — Multimodal Fusion — Explainable AI

- Developed a multimodal deep learning framework integrating 3818 CT scans (TCIA dataset) with structured clinical features for 3-class lung cancer classification.
- Utilized EfficientNetB0 for automated ROI-based feature extraction (224×224 preprocessing).
- Designed a clinical neural network (Dense + BatchNorm + Dropout) to model nonlinear patient attributes.
- Implemented feature-level fusion by concatenating image and clinical embeddings.
- Applied stratified 5-fold cross-validation and SMOTE with weighted categorical loss for class imbalance handling.
- Integrated EarlyStopping, ReduceLROnPlateau, and model checkpointing for stable training.
- Compared VGG16, ResNet50, DenseNet121, and EfficientNetB0 architectures.
- Achieved **96.86% Accuracy — 96.75% F1-score — 0.996 ROC-AUC**.
- Implemented Grad-CAM visualization for interpretable tumor region analysis.

Medical Supply Chain Analytics and System Modeling
Python — Data Modeling — Healthcare Logistics

- Analyzed and modeled medical supply chain workflows to understand inventory flow, demand variability, and distribution inefficiencies.
- Designed structured data representations for suppliers, warehouses, distribution nodes, and healthcare facilities.
- Identified bottlenecks and optimization opportunities in pharmaceutical and medical equipment distribution pipelines.
- Applied data-driven analysis techniques to improve visibility, traceability, and decision-making in healthcare logistics systems.

Genetic Algorithm for Vehicle Routing Problem (VRP)
Python — Metaheuristic Optimization — Combinatorial Optimization

- Developed a genetic algorithm to solve the NP-hard Vehicle Routing Problem (VRP) for minimizing total transportation cost and route distance.
- Designed custom chromosome encoding to represent delivery routes with depot constraints.
- Implemented selection, crossover, and mutation operators to efficiently explore solution space.
- Engineered a fitness function incorporating route distance minimization and constraint handling.
- Applied parameter tuning (population size, mutation rate, crossover rate) to improve convergence stability and solution quality.
- Benchmarked multiple runs to evaluate optimization consistency and performance robustness.

CERTIFICATIONS & COURSES

- Oracle Cloud Infrastructure 2025 Certified – Generative AI Professional
- Generative AI Foundations – upGrad & Microsoft
- AWS Cloud Practitioner Practice Modules
- AICTE – Java Full Stack with React.js & AI