GATE DA
MACHINE LEARNING

About Me

VENKATESH E

🎓 Master's in AI from IIT Hyderabad

💼 MLE-3 at PayPal (ex-Qualcomm)

🏅 3+ years of Machine Learning Engineering experience

📚 Taught GATE Data Science on RBR Sir's platform (Gate DA - 2024)

📝 Published research papers in AAAI 2021 & ACL 2023

🔗 LinkedIn: https://www.linkedin.com/in/venkateshelangovan/

📘 GATE Official Syllabus Breakdown

✅ Supervised Learning: regression and classification problems, simple linear regression, multiple linear regression, ridge regression, logistic regression, k-nearest neighbour, naive Bayes classifier, linear discriminant analysis, support vector machine, decision trees, bias-variance trade-off, cross-validation methods such as leave-one-out (LOO) cross-validation, k-folds cross-validation, multi-layer perceptron, feed-forward neural network.

✅ Unsupervised Learning: clustering algorithms, k-means/k-medoid, hierarchical clustering, top-down, bottom-up: single-linkage, multiple-linkage, dimensionality reduction, principal component analysis.

📝 Machine Learning Chapter Breakdown

1️⃣ Introduction to Machine Learning (4 hours)
Covers: What is Machine Learning, Types of Learning (Supervised, Unsupervised, Reinforcement), Real-world Applications

2️⃣ Regression Techniques (7 hours)
Covers: Simple Linear Regression, Multiple Linear Regression, Ridge Regression — Concepts, Equations, Intuitions, and GATE-Level Problems

3️⃣ Classification Algorithms (8 hours)
Covers: Logistic Regression, K-Nearest Neighbors (KNN), Naive Bayes Classifier, Linear Discriminant Analysis — Step-by-step explanation and Problem Solving

4️⃣ Advanced Supervised Learning (9 hours)
Covers: Support Vector Machine (SVM), Decision Trees, Bias-Variance Trade-off — Detailed Theory, Math, and Implementation Insights

5️⃣ Cross-Validation Methods (5 hours)
Covers: Leave-One-Out (LOO) Cross-Validation, K-Folds Cross-Validation — Why, When, and How to use these

6️⃣ Neural Networks (6 hours)
Covers: Multi-layer Perceptron (MLP), Feed-forward Neural Network — Deep Dive into Architecture, Activation Functions, and Weight Updates

7️⃣ Unsupervised Learning — Clustering (6 hours)
Covers: K-Means, K-Medoids, Hierarchical Clustering (Top-Down, Bottom-Up), Single-Linkage, Multiple-Linkage — Hands-on Explanation and GATE-Level Problems

8️⃣ Dimensionality Reduction (4 hours)
Covers: Principal Component Analysis (PCA) — Step-by-step Derivation, Visualization, and Practical Uses in ML

9️⃣ Problem Solving & GATE PYQs (7 hours)
Covers: Basic, Intermediate, and Advanced GATE Machine Learning Problems — Thorough Solutions with Tricks and Techniques