1-Month Machine Learning Roadmap for Freshers

Week 1: Basics of Python and Mathematics for ML

Day 1-2: Learn Python Basics

- Topics: Variables, Data Types, Loops, Functions, Libraries (NumPy, Pandas).
- Task: Write a Python script to calculate the average of numbers in a list.

Day 3-4: Learn Linear Algebra and Statistics

- Topics: Matrices, Vectors, Mean, Median, Standard Deviation, Probability Basics.
- Task: Implement mean, variance, and standard deviation for a dataset using Python.

Day 5-7: Data Handling and Visualization

- Topics: Data Cleaning (handling missing values, duplicates), Exploratory Data Analysis (EDA).
- Tools: Pandas, Matplotlib, Seaborn.
- Mini-Project: Analyze a simple dataset (e.g., Titanic dataset) and visualize insights.

Week 2: Core Machine Learning Concepts

Day 8-9: Introduction to ML

- Topics: Supervised vs. Unsupervised Learning, Regression vs. Classification.
- Task: Categorize real-world problems into ML types.

Day 10-11: Linear Regression

- Topics: Cost Function, Gradient Descent, Overfitting vs. Underfitting.
- Task: Implement Linear Regression from scratch using Python.

Day 12-13: Classification with Logistic Regression

- Topics: Sigmoid Function, Loss Function, Decision Boundary.
- Mini-Project: Predict whether a student will pass/fail based on study hours (synthetic dataset).

Day 14: Data Preprocessing

- Topics: Feature Scaling, Encoding Categorical Variables.
- Task: Apply preprocessing techniques on a dataset.

Week 3: Advanced ML Concepts

Day 15-16: Decision Trees and Random Forest

- Topics: Gini Index, Entropy, Overfitting in Trees.
- Mini-Project: Build a Decision Tree to classify Iris flowers.

Day 17-18: K-Means Clustering

- Topics: Centroids, Inertia, Elbow Method.
- Mini-Project: Cluster customer data to find buying patterns.

Day 19-20: Model Evaluation

- Topics: Confusion Matrix, Precision, Recall, F1-Score, ROC-AUC.
- Task: Evaluate the classification model from Week 2's project.

Week 4: Neural Networks and Deployment

Day 21-23: Introduction to Neural Networks

- Topics: Perceptron, Activation Functions, Forward/Backward Propagation.
- Task: Build a simple 2-layer Neural Network from scratch.

Day 24-25: TensorFlow/Keras Basics

- Topics: Defining Models, Training, Loss Functions.
- Mini-Project: Train a neural network on MNIST digit classification.

Day 26-27: Hyperparameter Tuning

- Topics: Learning Rate, Batch Size, Epochs, Grid Search.
- Task: Optimize the neural network model for MNIST.

Day 28-30: Model Deployment

- Topics: Flask/Streamlit Basics, Exporting Models.
- Mini-Project: Deploy the MNIST model as a web app.