Machine Learning Prediction Functions

1. Linear Regression

Use: Predict continuous numeric values (e.g., house price)

Function: from sklearn.linear_model import LinearRegression

Why: Simple, fast, interpretable

Need: When relationship is linear

2. Logistic Regression

Use: Predict binary class (e.g., spam or not)

Function: from sklearn.linear_model import LogisticRegression

Why: Probabilistic output

Need: For classification problems

3. Decision Tree

Use: Regression and classification

Function: from sklearn.tree import DecisionTreeClassifier / Regressor

Why: Handles non-linear data

Need: When rules-based learning helps

4. Random Forest

Use: Both regression and classification

Function: from sklearn.ensemble import RandomForestClassifier / Regressor

Why: Ensemble of trees for better accuracy

Need: When robust, stable predictions are needed

5. Gradient Boosting (XGBoost, LightGBM)

Use: High-performance prediction for competitions

Function: import xgboost, import lightgbm

Why: Powerful ensemble methods

Need: When accuracy matters most

6. Support Vector Machine (SVM)

Use: Classification (and regression)

Function: from sklearn.svm import SVC / SVR

Why: Good for high-dimensional data

Need: When margin-based learning helps

7. K-Nearest Neighbors (KNN)

Use: Classification & regression

Function: from sklearn.neighbors import KNeighborsClassifier

Why: Simple, no training required

Need: When data is small & structured

8. Neural Networks (MLP)

Use: Regression, classification, image/text

Function: from sklearn.neural_network import MLPClassifier

Why: Handles complex patterns

Need: For large, non-linear data

9. Time Series Models (ARIMA, LSTM)

Use: Time-based prediction (e.g., stock prices)

Function: from statsmodels.tsa, keras.models

Why: Capture temporal patterns

Need: When data has a time dimension