**Must-Learn Machine Learning Algorithms (with Learning Type, Use Case, and Priority)**

| **S.No** | **Algorithm Name** | **Learning Type** | **Use Case** | **Famous Libraries** | **Priority** |
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| 1 | **Linear Regression** | Supervised – Regression | Predicting continuous values | Scikit-learn, StatsModels | ⭐ Must Learn |
| 2 | **Logistic Regression** | Supervised – Classification | Binary/Multi-class classification | Scikit-learn, StatsModels | ⭐ Must Learn |
| 3 | **K-Nearest Neighbors (KNN)** | Supervised – Class/Reg | Simple pattern recognition | Scikit-learn | ✅ High |
| 4 | **Decision Trees** | Supervised – Class/Reg | Interpretability-focused models | Scikit-learn, XGBoost | ✅ High |
| 5 | **Random Forest** | Supervised – Class/Reg | Ensemble, robust predictions | Scikit-learn, H2O.ai | ⭐ Must Learn |
| 6 | **XGBoost / LightGBM** | Supervised – Class/Reg | Kaggle/tabular data competitions | XGBoost, LightGBM | ⭐ Must Learn |
| 7 | **Support Vector Machine** | Supervised – Class/Reg | Margin-based classification | Scikit-learn | ✅ High |
| 8 | **Naive Bayes** | Supervised – Classification | Text/NLP, spam filtering | Scikit-learn | ✅ High |
| 9 | **Gradient Boosting** | Supervised – Class/Reg | Strong ensemble method | XGBoost, CatBoost | ⭐ Must Learn |
| 10 | **Principal Component Analysis (PCA)** | Unsupervised – Dim. Reduction | Visualization, noise reduction | Scikit-learn | ✅ High |
| 11 | **K-Means Clustering** | Unsupervised – Clustering | Segmenting data into groups | Scikit-learn | ✅ High |
| 12 | **DBSCAN** | Unsupervised – Clustering | Non-spherical clusters, noise handling | Scikit-learn | Medium |
| 13 | **Apriori / FP-Growth** | Unsupervised – Association Rules | Market basket analysis | MLxtend, Orange | Medium |
| 14 | **Autoencoders** | Unsupervised – Deep | Dimensionality reduction, anomaly det. | TensorFlow, PyTorch | Medium |
| 15 | **One-Class SVM** | Unsupervised – Anomaly Detection | Fraud detection | Scikit-learn | Medium |
| 16 | **Reinforcement Learning (Q-Learning, PPO, DQN)** | RL | Games, robotics, dynamic systems | Stable-Baselines3, RLlib | Advanced (Optional) |
| 17 | **Online SGD** | Online – Supervised | Real-time, streaming data | River, Vowpal Wabbit | ✅ High |
| 18 | **Hoeffding Trees** | Online – Supervised | Stream classification | River, scikit-multiflow | Medium |
| 19 | **LSTM / RNN** | Supervised – Sequence | Time series, NLP | TensorFlow, PyTorch | ⭐ Must Learn |
| 20 | **CNN (Convolutional Neural Network)** | Supervised – Deep | Image classification, vision | TensorFlow, PyTorch, Keras | ⭐ Must Learn |
| 21 | **Transformers (BERT, GPT)** | Deep Learning (NLP) | Text generation, understanding | HuggingFace, PyTorch, TF | Advanced (Future) |