

Algorithm	Use Case	Category	Library/Technology
Linear Regression	Predicting house prices	Supervised Learning	scikit-learn
Logistic Regression	Spam email classification	Supervised Learning	scikit-learn
Decision Trees	Customer purchase classification	Supervised Learning	scikit-learn
Random Forest	Customer churn prediction	Supervised Learning	scikit-learn
Support Vector Machines (SVM)	Handwritten digit classification	Supervised Learning	scikit-learn
k-Nearest Neighbors (k-NN)	Movie recommendation	Supervised Learning	scikit-learn
Naive Bayes	Text classification	Supervised Learning	scikit-learn
Gradient Boosting Machines (GBM)	Loan default prediction	Supervised Learning	scikit-learn, xgboost
XGBoost	Customer classification in competitions	Supervised Learning	xgboost
Neural Networks (NN)	Stock price prediction	Supervised Learning	TensorFlow, PyTorch
k-Means Clustering	Customer segmentation	Unsupervised Learning	scikit-learn
Hierarchical Clustering	Document topic organization	Unsupervised Learning	scikit-learn, SciPy
DBSCAN	Anomaly detection in network traffic	Unsupervised Learning	scikit-learn
Principal Component Analysis (PCA)	Dimensionality reduction in facial recognition	Unsupervised Learning	scikit-learn
Independent Component Analysis (ICA)	Audio signal separation	Unsupervised Learning	scikit-learn
t-SNE	High-dimensional data visualization	Unsupervised Learning	scikit-learn
Autoencoders	Image compression	Unsupervised Learning	TensorFlow, PyTorch
Q-Learning	Robot navigation	Reinforcement Learning	OpenAI Gym, Stable Baselines3
Deep Q-Networks (DQN)	Video game AI	Reinforcement Learning	TensorFlow, PyTorch, Stable Baselines3
Policy Gradient Methods	Self-driving car decisions	Reinforcement Learning	TensorFlow, PyTorch, Stable Baselines3
Proximal Policy Optimization (PPO)	Robotic arm control	Reinforcement Learning	Stable Baselines3, TensorFlow, PyTorch
Actor-Critic Methods	Drone navigation	Reinforcement Learning	TensorFlow, PyTorch, Stable Baselines3

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SARSA	Cart-pole balancing	Reinforcement Learning	OpenAI Gym, Stable Baselines3
Convolutional Neural Networks (CNNs)	Image classification (cat vs dog)	Deep Learning	TensorFlow, PyTorch, Keras
Recurrent Neural Networks (RNNs)	Next-word prediction	Deep Learning	TensorFlow, PyTorch
Long Short-Term Memory Networks (LSTMs)	Stock market prediction	Deep Learning	TensorFlow, PyTorch
Gated Recurrent Units (GRUs)	Weather forecasting	Deep Learning	TensorFlow, PyTorch
Generative Adversarial Networks (GANs)	Image generation (fake faces)	Deep Learning	TensorFlow, PyTorch
Transformer Networks	Text translation	Deep Learning	Hugging Face Transformers, TensorFlow, PyTorch
Deep Belief Networks (DBNs)	Handwriting recognition	Deep Learning	TensorFlow, PyTorch
Restricted Boltzmann Machines (RBMs)	Movie recommendations	Deep Learning	scikit-learn, PyTorch
Gradient Descent	Loss minimization	Optimization	scikit-learn, TensorFlow, PyTorch
Stochastic Gradient Descent (SGD)	Real-time text classification	Optimization	scikit-learn, TensorFlow, PyTorch
Adam	Deep learning optimization	Optimization	TensorFlow, PyTorch
RMSProp	Deep learning optimization	Optimization	TensorFlow, PyTorch
Bag of Words (BoW)	Text classification	NLP	scikit-learn
TF-IDF	Document word importance ranking	NLP	scikit-learn
Word2Vec	Semantic word relationships	NLP	gensim
GloVe	Word embeddings	NLP	gensim
BERT	Q&A system	NLP	Hugging Face Transformers
PCA	Customer cluster visualization	Dimensionality Reduction	scikit-learn
t-SNE	Digit distribution visualization	Dimensionality Reduction	scikit-learn
LDA	Cancer type classification	Dimensionality Reduction	scikit-learn
UMAP	Gene expression visualization	Dimensionality Reduction	umap-learn