

Machine Learning 15 models

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> Machine learning 15 models

- 1) • KNN
Classify data points based on majority class of their nearest neighbours.
- 2) Naive Bayes
A probabilistic model based on Bayes' Theorem, assuming independence between features.
- 3) Gradient Boosting
Combine weak learners (usually regressions and decision trees) in sequence to improve model accuracy.
- 4) Ada boost
Boosts performance of weak classifiers by focusing on misclassified samples.
- 5) Ridge regression
Linear regression model that includes L_2 regularization to prevent overfitting.

6) Random forest

Combines multiple decision trees to improve prediction accuracy and reduce overfitting.

7) Support Vector Machine (SVM)

Finds the hyperplane that best separates classes in feature space.

unsupervised learning

8) Hierarchical clustering

Build tree-like hierarchy of clusters by merging or splitting them.

9) K-Means clustering

Groups data into clusters based on similarity or distance.

10) DBSCAN

(Density-Based Spatial Clustering)

⇒ Groups data points based on density, identifying noise as outliers (noise).

11) Gaussian Mixture Model (GMM)

Assuming data points based on

mixture of Gaussian distributions
for clustering.

12) Principal Component Analysis (PCA)

Reduces dimensionality by transforming
data into principal components.

13) t-SNE

t-Distributed Stochastic Neighbor
Embedding).

Visualizes high-dimensional
data in 2D or 3D while
preserving relationships.

14) Autoencoders

Neural networks that compress
and reconstruct data to learn
efficient representations.

15) Isolation forest

Detects anomalies by isolating
data points in a tree-based
structure.

CNN, RNN, LSTM,
GAN, DBN, MLP, Q-Learning
DQN, PPO, SARSA,
Actor-Critic Model.

Deep-learning (30 Models)

(CNNs) Convolution neural network

1.) LeNet

Earliest CNNs, handwritten digit recognition.

2.) Inception

Google Net: Inception modules with multiple filter sizes to capture diverse features.

3.) VGGNet

Uses very deep networks with small convolution filters for image classification.

4.) ResNet

Residual connections to solve vanishing gradient problem.

5.) AlexNet

A deep CNN that popularized deep learning ~~filters~~ ~~for image~~ ~~classifications~~ with its success in the ImageNet competition.

Recurrent Neural Networks (RNNs)

6. Vanilla RNN

Processes sequential data but suffers from short-term memory limitations.

7. LSTM (Long-Short-Term memory)

Overcomes the vanishing gradient issue by maintaining long-term dependencies.

8. GRU (Gated Recurrent Unit)

A simplified version of LSTM, with few parameters.

Transformer based

9. Transformer

Introduces attention mechanisms for parallel processing of sequences.

10. BERT (Bidirectional Encoder Representations from Transformers)

A pre-trained transformer model for natural language understanding.

11- GPT

Generative Pre-Trained
Transformer

A transformer model for
text generation and understanding.

Hybrid models (Special)

12- Deep Q-Network (DQN)

Combines deep learning with
reinforcement learning to play
games.

13- Deep Belief network (DBN)

A stack of restricted Boltzman
machine for unsupervised learning.

14- ESN (Echo state Network)

A type of RNN designed for
fast learning with fixed internal weights

15- Deep speech

An end-to-end deep learning
model for auto-speech recognition.

Others: IVTM (Generative = GAN, DCGAN, Cycle GAN,
Style GAN, VAE, Transformer = TS, VIT)