Machine Learning Basics
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Machine Learning adalah subset dari Artificial Intelligence yang memungkinkan komputer untuk belajar tan
explicitly programmed.

Jenis-jenis Machine Learning:

1. Supervised Learning
- Menggunakan labeled data untuk training
- Contoh: Classification, Regression
- Algoritma: Linear Regression, Decision Trees, Random Forest, SVM

2. Unsupervised Learning
- Menggunakan unlabeled data
- Contoh: Clustering, Dimensionality Reduction
- Algoritma: K-Means, PCA, Hierarchical Clustering

3. Reinforcement Learning
- Learning through interaction dengan environment
- Reward-based learning
- Contoh: Game playing, Robot control

Popular ML Libraries:
- Scikit-learn: General-purpose ML library
- TensorFlow: Deep learning framework by Google
- PyTorch: Deep learning framework by Facebook
- Pandas: Data manipulation and analysis
- NumPy: Numerical computing

Machine Learning Pipeline:
1. Data Collection
2. Data Preprocessing
3. Feature Engineering
4. Model Selection
5. Training
6. Evaluation
7. Deployment

Tahapan dalam ML Project:
- Problem Definition: Menentukan masalah yang ingin diselesaikan
- Data Collection: Mengumpulkan data yang relevan
- Data Exploration: Memahami karakteristik data
- Data Preprocessing: Membersihkan dan mempersiapkan data
- Feature Engineering: Membuat fitur yang berguna untuk model
- Model Selection: Memilih algoritma yang tepat
- Training: Melatih model dengan data training
- Validation: Menguji performa model
- Deployment: Menerapkan model ke production
- Monitoring: Memantau performa model di production

Machine Learning Algorithms:

Classification:
- Logistic Regression

- Decision Trees
- Random Forest
- Support Vector Machine (SVM)
- Naive Bayes
- K-Nearest Neighbors (KNN)
- Neural Networks

Regression:
- Linear Regression
- Polynomial Regression
- Ridge Regression
- Lasso Regression
- Elastic Net

Clustering:
- K-Means
- Hierarchical Clustering
- DBSCAN
- Gaussian Mixture Models

Evaluation Metrics:
- Classification: Accuracy, Precision, Recall, F1-Score, ROC-AUC
- Regression: MSE, RMSE, MAE, R-squared
- Clustering: Silhouette Score, Inertia

Deep Learning:
- Neural Networks
- Convolutional Neural Networks (CNN)
- Recurrent Neural Networks (RNN)
- Long Short-Term Memory (LSTM)
- Transformer Models
- Generative Adversarial Networks (GAN)