OneModel Academy

One AI

Supervised Learning

ML Models

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Topics Covered

- Overview of supervised learning
- Two types of supervised learning - classification & regression
- How supervised learning works at a high level
- Strengths & weaknesses of supervised learning

Learning Outcomes

- You gain a clear understanding of supervised learning as one of the main types of ML & its primary distinction from unsupervised learning
- You will be introduced to the two main types of supervised learning—classification & regression—& begin to understand their real-world applications
- You will familiarize yourself with the general process of supervised learning, laying the foundation for understanding how ML works
- You will understand its strengths & weaknesses, helping you to decide when it's suitable to use & when additional or different tools are more appropriate

Supervised Learning Overview

Overview

- ML models use algorithms to learn from data, identify patterns, make predictions, or perform tasks without explicit programming
    - An algorithm is the mathematical procedure, technique, or set of rules that the model follows to do so
- **Supervised learning** is a type of ML that uses **labeled datasets** to train algorithms
    - Utilizing **labeled training** datasets distinguishes it from unsupervised learning
    - **Goal:** understand relationships between input data & corresponding outputs, enabling the algorithm to make predictions when presented with unseen data
    - **Use cases**: categorizing data, pattern recognition, simplifying decision making, understanding relationships

Two Types of Supervised Learning

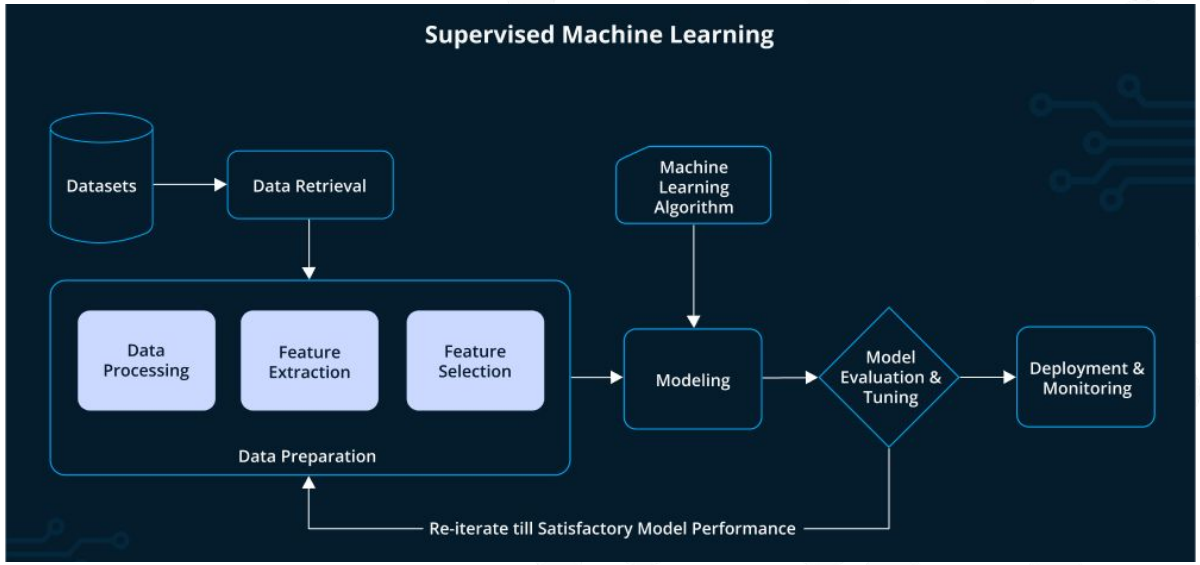
2 Main Types of Supervised Learning

1. **Classification**
    - Predicts a predefined discrete label or category; categorizes raw data based on learnings from training data
    - Learns a decision boundary that separates different classes in the input feature space
    - Example: predicting if an employee will terminate or not in the next year
2. **Regression**
    - Predicts a continuous output based on learnings from training data
    - Helps us understand the relationship between two or more variables
    - Example: predicting an employee's salary or performance score

How Supervised Learning Works

Supervised Learning Process

1. Data collection & retrieval
2. Data preprocessing
3. Feature extraction & selection
4. Selecting an algorithm
5. Model training
6. Model evaluation & tuning
7. Deployment & monitoring



Model-building is not always a linear process; it's **very iterative** & we often go back & forward steps as needed

Strengths & Weaknesses

Strengths & Weaknesses

Strengths

- Wide applicability
- Interpretability
- Effective performance
- Incremental learning

Weaknesses

- Bias & fairness concerns
- Data requirements (labeled data)
- Difficulty with unstructured data
- Limited performance with small datasets

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Thanks for watching!

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