

# Introduction to Machine Learning

- **Definition:**
- Enabling computers to learn patterns from data and make predictions/decisions.
  
- **Learning Paradigms:**
- *Supervised:* Learn from labeled examples (classification, regression).
- *Unsupervised:* Discover structure in unlabeled data (clustering, dimensionality reduction).
- *Reinforcement:* Learn via trial and error using rewards.
  
- **Core Process:**
- 1. Data collection & preprocessing
- 2. Model selection & training
- 3. Evaluation & validation
  
- **Challenges & Considerations:**
- Balancing overfitting/underfitting
- Managing bias-variance tradeoff
- Feature engineering & computational efficiency
  
- **Applications:**
- Image & speech recognition
- Recommendation systems
- Natural language processing