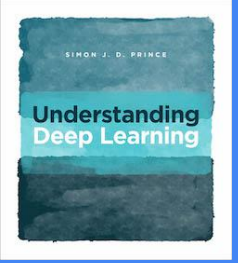
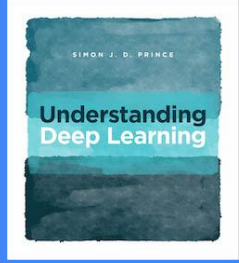
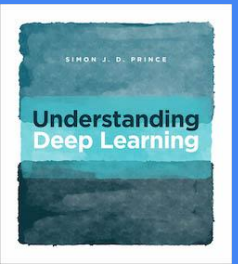
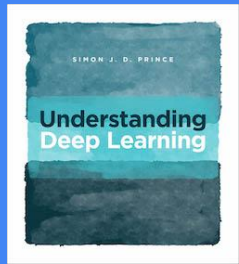




Machine Learning Paradigms





Supervised Learning

Algorithm learns from labeled data, and makes predictions based on that data

Unsupervised Learning

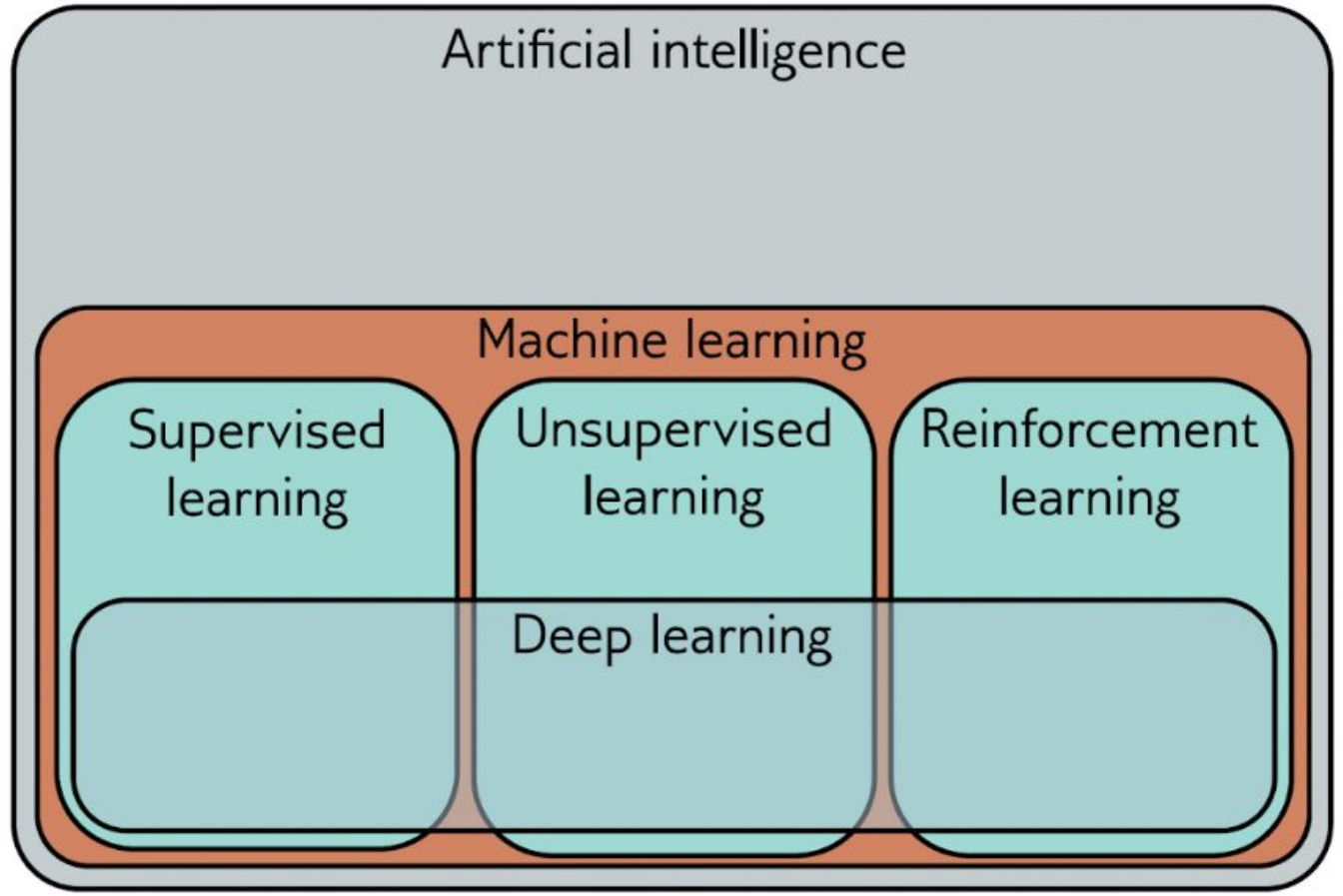
Algorithm learns from unlabelled data to find patterns in the data

- Example: Customer segmentation in marketing
  - Input: Customer data
  - Output: Groups of similar customers

Reinforcement Learning

Algorithm learns by interacting with an environment and receiving feedback in the form of rewards or penalties.

- Example: Teaching a robot to walk
  - Input: Robot actions
  - Output: Positive reward for balanced walk, negative reward for falling


Artificial intelligence
Machine learning
Supervised learning
Unsupervised learning
Reinforcement learning
Deep learning

Regression versus classification

Regression:

Predicting a continuous value

Example: House price prediction

- Input: Square footage, number of bedrooms, location, etc
- Output: Predicted price in dollars

Classification:

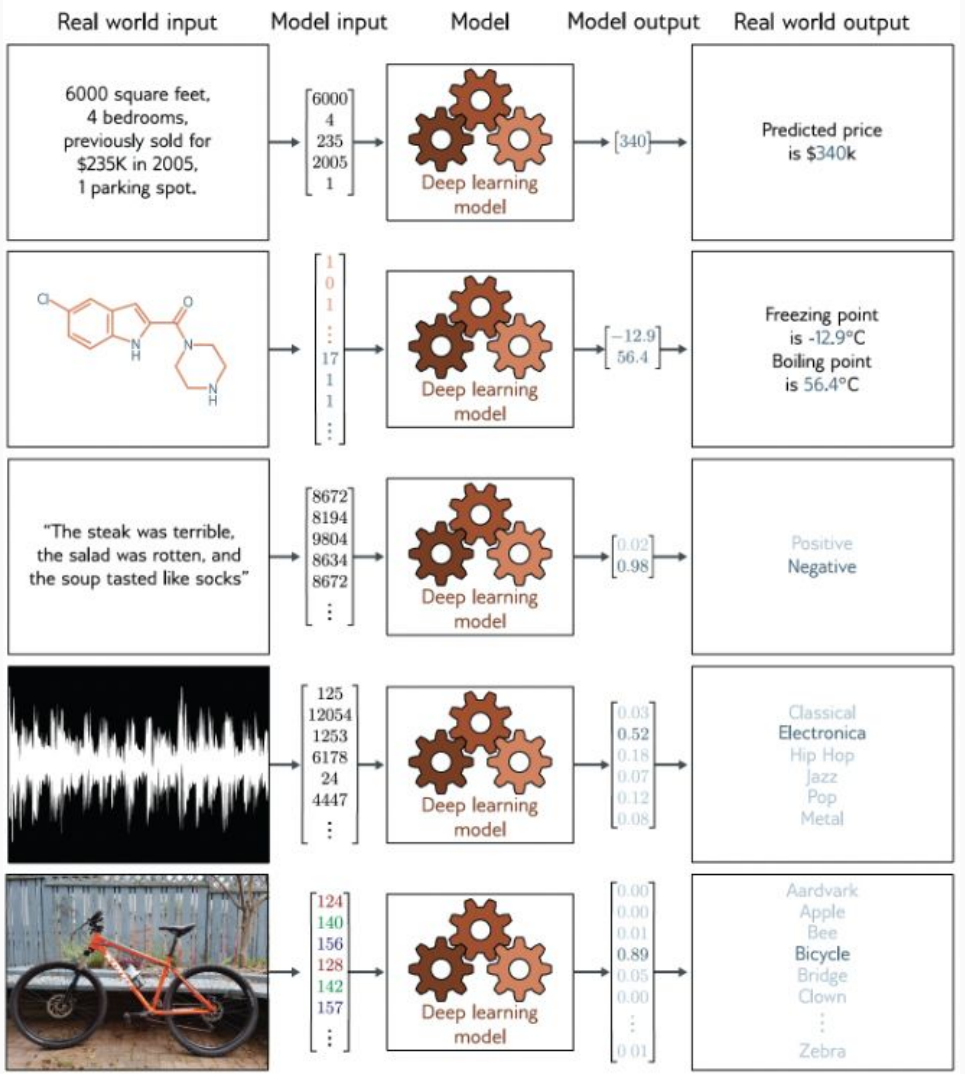
Predicting a nominal or ordinal value

Example: Email spam detection

- Input: Email content, sender details, etc
- Output: "Spam" or "Not spam"

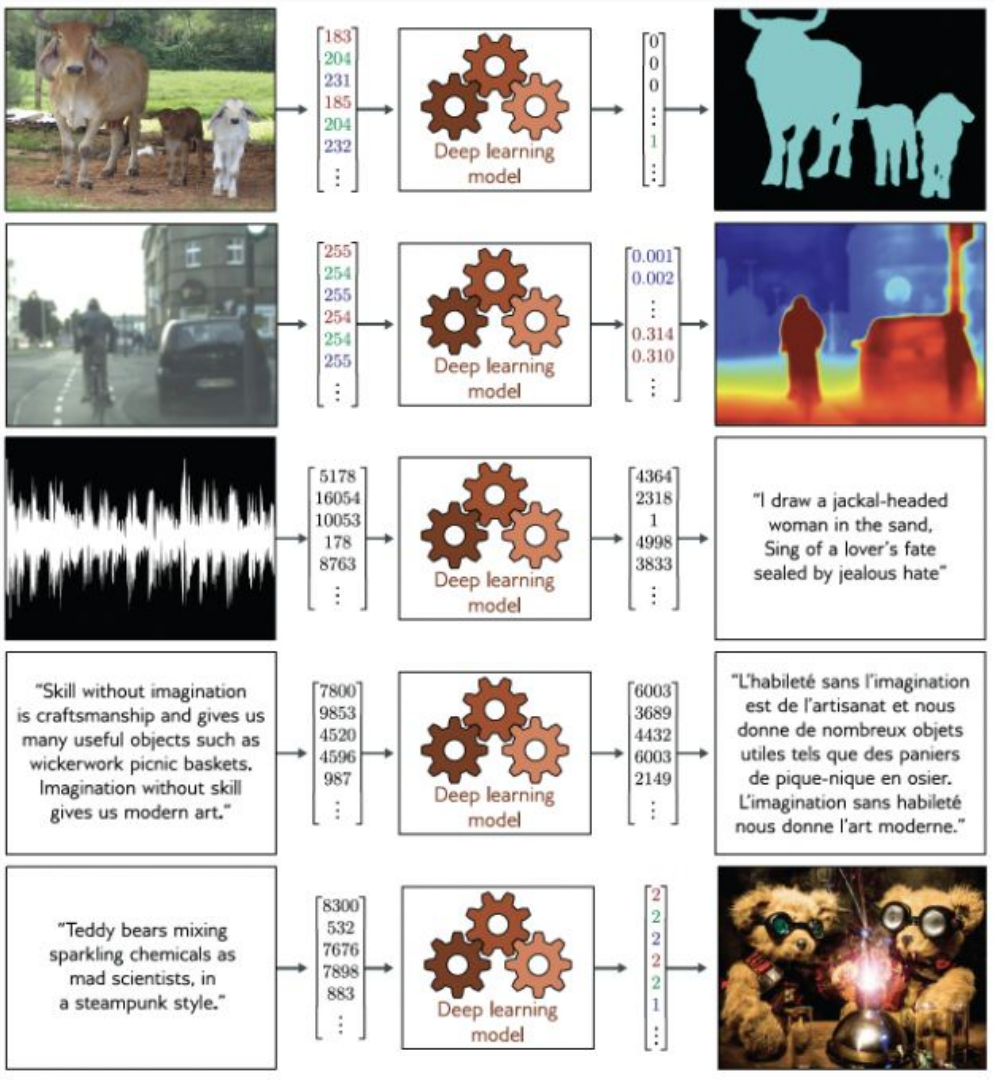
Representing Inputs and Outputs

Structured vs Unstructured



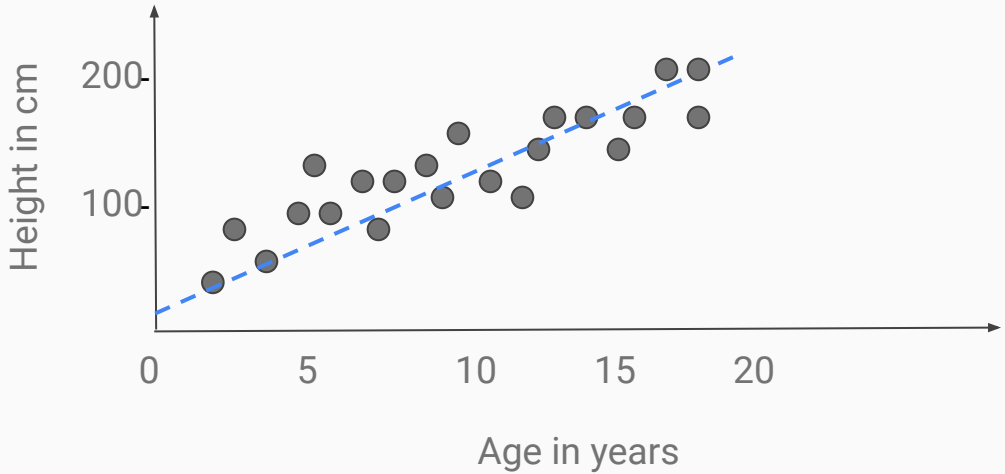
Representing Inputs and Outputs

Structured vs Unstructured

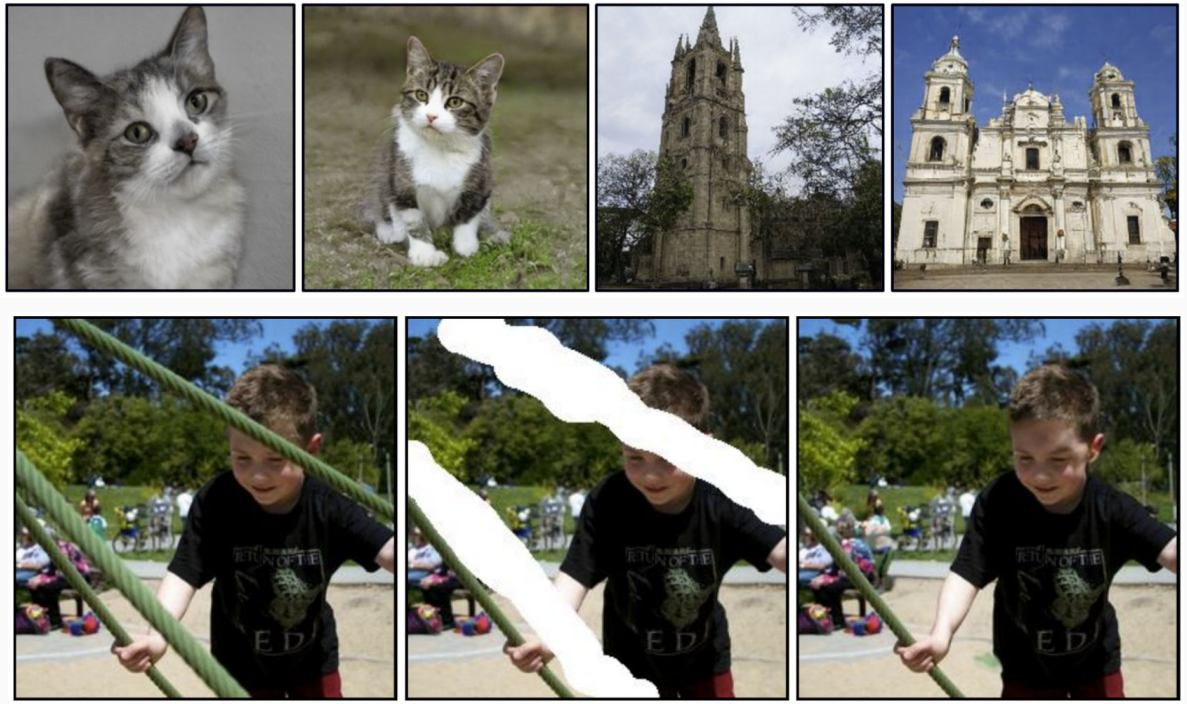


Model

Representing Association between input(s) and output(s)



Unsupervised Learning



On the first day of my deep learning class, the room buzzed with a mix of excitement and apprehension. As the professor began illustrating the marvels of neural networks, I found myself captivated, not just by the intricate algorithms and layers but by the sheer magic of what they could achieve. She showed us an AI-generated artwork, a piece so emotionally profound that I was stunned to learn no human hand played a role in its creation. At that moment, with the boundaries between art and code blurring before my eyes, I felt an unexpected stirring in my heart, realizing that deep learning was not just science, but also an art form. I was irrevocably in love.

Ethics

Bias and fairness

Explainability

Concentrating power