5 Types of ML

Types of learning

Supervised	Unsupervised	Reinforcement
Train the algorithm by providing correct answers for the problem at hand. Learn with known targets.	Let the algorithm figure out the hidden patterns/structure in the data itself. Learn with unknown targets.	Algorithm is trained by receiving a reward/punishment for doing things right/wrong. Learn by experimentation.

Supervised learning

- Learn from labeled training data
  - Find structure between features and known targets

- Predict new unlabeled data
  - Regression / classification: predict quantity / quality

- Task-driven

Application	Input	Output
Online advertising	Ad and user info	Click? (yes/no)
Speech recognition	Audio fragment	Text transcipt
Visual inspection	Image of component	Defect (yes/no)

Unsupervised learning

- Learn from unlabeled data
  - Find structure in the data itself → data-driven

- Clustering
  - Find similarities in the data and group similar observations

- Anomaly detection
  - Find outliers that seem out of place compared to the bulk of the data

- Dimensionality reduction
  - Describe many features by a limited set, retaining most of the original information

Reinforcement learning

- Learn from past experience
  - Keep doing what works and stop doing what doesn't

- Decision process + reward system
  - Reward when doing good
  - Punishment when doing bad

- Learn series of actions to take given a certain state and environment

Exercise

Problem

- Customer segmentation
- Robot navigation
- Rainfall prediction
- Genome processing
- Loan default prediction
- Playing a videogame
- Fraud detection

Type of ML

- ...
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Solution

Problem

- Customer segmentation
- Robot navigation
- Rainfall prediction
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Type of ML

- Unsupervised – Clustering
- Reinforcement learning
- Supervised- Regression
- Unsupervised – Dimensionality red.
- Supervised - Classification
- Reinforcement learning
- Unsupervised - Anomaly detection OR Supervised - Classification