**Cheatsheet**

**Supervised Learning:**

**What we will learn:**

* How to train a model to make predictions or classify data by providing labeled examples.
* The goal is to minimize the difference between predicted and actual values using an objective function.

**Key concepts:**

* Requires labeled training data.
* Common applications include image recognition, natural language processing, and fraud detection.
* Examples of supervised learning algorithms include linear regression, logistic regression, decision trees, and neural networks.

**Unsupervised Learning:**

**What we will learn:**

* How to find patterns or structure in data without explicit labels.
* The goal is to group similar data points together or identify underlying patterns.

**Key concepts:**

* Does not require labeled training data.
* Common applications include clustering, dimensionality reduction, and anomaly detection.
* Examples of unsupervised learning algorithms include k-means clustering, principal component analysis (PCA), and autoencoders.

**Self-Supervised Learning:**

**What we will learn:**

* How to train a model using only the input data itself as the label.
* The goal is to learn useful representations of the input data that can be used for downstream tasks.

**Key concepts:**

* Does not require labeled training data, but creates labels from the input data.
* Common applications include natural language processing, computer vision, and speech recognition.
* Examples of self-supervised learning algorithms include word2vec, BERT, and contrastive learning.

**Reinforcement Learning:**

**What we will learn:**

* How to train an agent to take actions in an environment to maximize a reward signal.
* The goal is to learn a policy that maps observations to actions to maximize cumulative rewards over time.

**Key concepts:**

* In reinforcement learning, the agent interacts with the environment and receives feedback in the form of rewards or penalties.
* The agent's goal is to learn a policy that maximizes the expected cumulative reward.
* Reinforcement learning is commonly used in robotics, game playing, and autonomous driving.