RL: Introduction

The Big Picture

Marius Lindauer

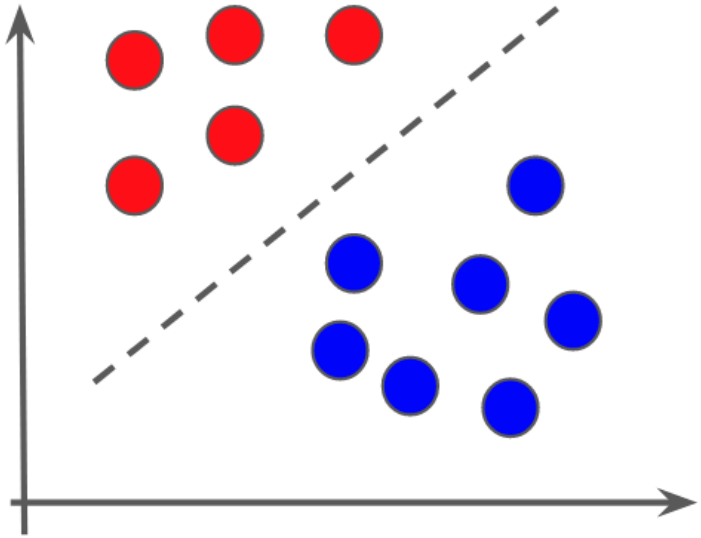
AutoML.org
Automated
Machine Learning
Hannover

Machine Learning

"Machine learning is the science of getting computers to act without being explicitly programmed."

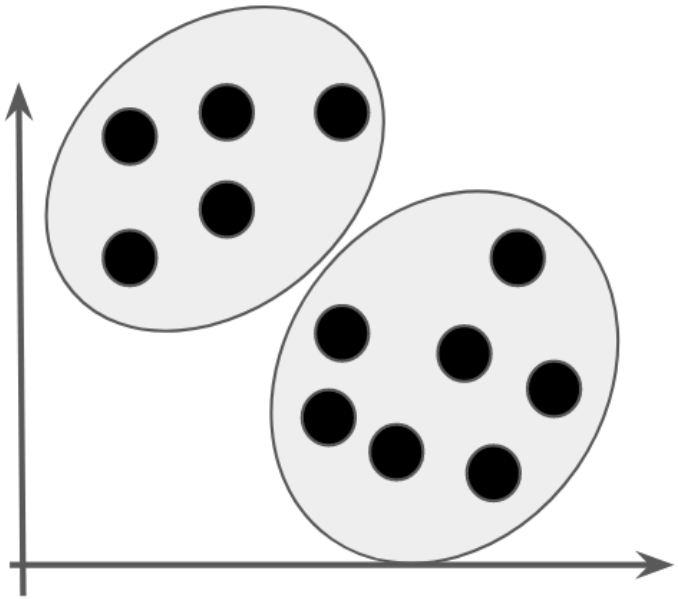
by Andrew Ng

Supervised Learning



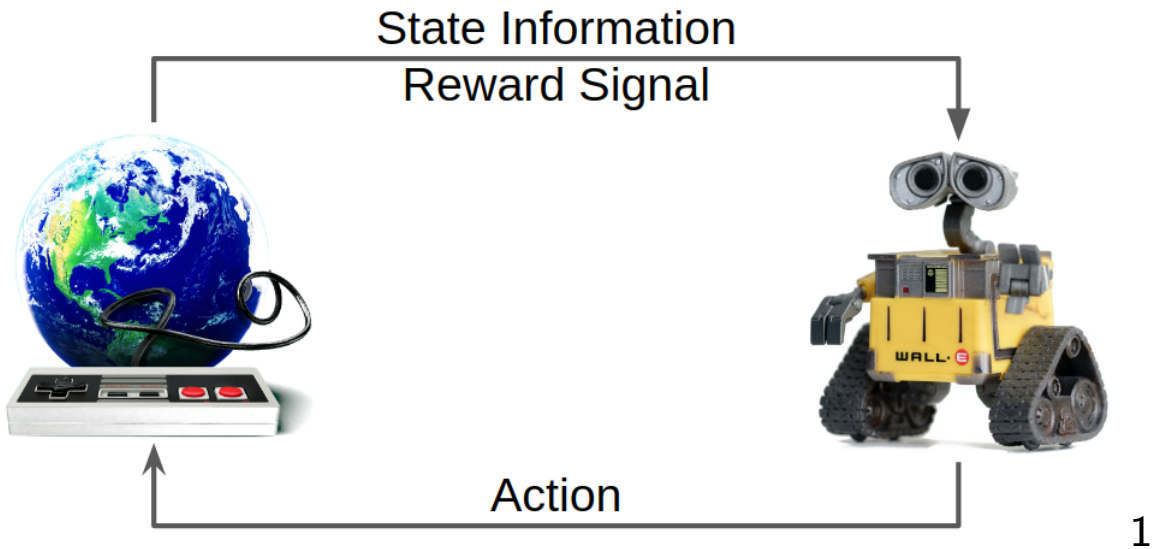
- Data: Features + Labels
- Task: Discriminate classes based on features

Unsupervised Learning



- Data: Features
- Task: Find structure in feature observations

Reinforcement Learning



[1]

- Data: Self-acquired observations + rewards
- Task: Learn how to behave s.t. reward is maximized

$\rightsquigarrow$ Not a single decision, but a sequence of good decisions

[1] Image source: Morning Brew and Marius Haakestad on Unsplash

The Future of AI?

- Sometimes we have a lot of labeled data
- Sometimes we have little labeled data
- Sometimes we can interact with our environment
- Sometimes we have well-defined reward signals

$\rightsquigarrow$ The future of AI will need a combination of many aspects

$\rightsquigarrow$ The recent breakthroughs in RL were triggered by breakthroughs in supervised DL