

Lecture 1 - Intro

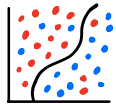
What is machine learning?

↳ **Extracting** knowledge from previous experiences

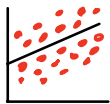
Machine learning tasks:

Supervised Learning

- classification, regression
- structured prediction
- **trained on labeled dataset**
- $f: X \rightarrow Y$



classification



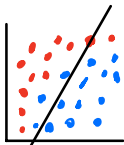
regression

Unsupervised Learning

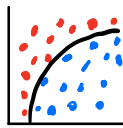
- clustering
- dimension reduction, anomaly detection
- **unlabeled dataset, just looking for patterns**
- $X \xrightarrow{f} Y$
- $X \xrightarrow{\textcircled{f}} \underline{X}$

- examples

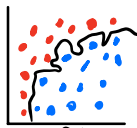
- ↳ image classification
- ↳ flight delay
- ↳ house \$s
- ↳ drug treatment effectiveness
- ↳ recommender systems
- ↳ classifying documents (i.e. spam)



underfitting
(too simple)



good fit



overfitting
(too complex)

key challenge: trading goodness of fit
and model complexity