

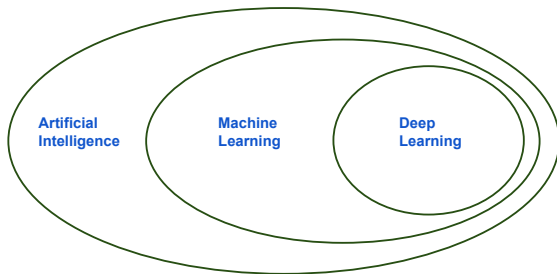
Introduction to Machine Learning

Introduction: What is Machine Learning?

compstat-lmu.github.io/lecture_i2ml

MACHINE LEARNING

Machine learning is a branch of statistics and computer science.



A computer program is said to **learn** from experience E with respect to some task T and some performance measure P , if its performance on T , as measured by P , improves with experience E .

Tom Mitchell, Carnegie Mellon University, 1998

MACHINE LEARNING IS CHANGING OUR WORLD

- Search engines learn what you want
- Recommender systems learn your taste in books, music, movies,...
- Algorithms do automatic stock trading
- Google Translate learns how to translate text
- Siri learns to understand speech
- DeepMind beats humans at Go
- Cars drive themselves
- Smart-watches monitor your health
- Election campaigns use algorithmically targeted ads to influence voters
- Data-driven discoveries are made in Physics, Biology, Genetics, Astronomy, Chemistry, Neurology,...
- ...

COMING UP

- In this course, we focus on so-called supervised ML, in a nutshell: using ML to predict something.
- In the first chapters, we will go through the fundamental terminology and concepts in supervised ML which are relevant for everything that comes next:
 - How can we formalize the goal of learning?
 - What kind of "data" do we learn from?
 - What is a "prediction model"?
 - How can we quantify "predictive performance"?
 - What is a "learning algorithm" and how can we operationalize learning?
- We will also look at a couple of fairly simple ML models to obtain a basic understanding and look at some concrete examples.
- More complex stuff comes later.