Lecture 1: General introduction

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Lecture 1: General introduction Introduction to Machine Learning

Sophie Robert

L3 MIASHS — Semestre 2

2022-2023

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Exercise

Machine Learning algorithms

Algorithms able to **learn** and **adapt** without following explicit instructions by **drawing inferences from patterns in data**.

Given a **training** dataset, Machine Learning* algorithms are able to **find patterns in data** to **predict** or **infer** information on new data.

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Machine Learning algorithms

Algorithms able to **learn** and **adapt** without following explicit instructions by drawing inferences from patterns in data.

Given a training dataset, Machine Learning* algorithms are able to **find patterns in data** to **predict** or **infer** information on new data.

Question

Can you give me some examples of Machine Learning models you have previously studied?

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Exercise

- Supervised learning*: the algorithm should learn from example data to predict the value for unseen data.
 - Classification* problems: a class (categorical variable*) is predicted
 - Regression* problems: a metric (numerical variable*) is predicted

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Exercise

- Supervised learning*: the algorithm should learn from example data to predict the value for unseen data.
 - Classification* problems: a class (categorical variable*) is predicted
 - Regression* problems: a metric (numerical variable*) is predicted
- Unsupervised learning*: the algorithm should find some patterns in the data to provide a better understanding of the data.

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Exercis

Problems can usually be divided into two main types:

- Supervised learning*: the algorithm should learn from example data to predict the value for unseen data.
 - Classification* problems: a class (categorical variable*) is predicted
 - Regression* problems: a metric (numerical variable*) is predicted
- Unsupervised learning*: the algorithm should find some patterns in the data to provide a better understanding of the data.

We will study both in this course!

Example of classification: handwritten recognition

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Example of classification problems include:

Handwritten number recognition (OCR)

Given pixel repartition, learn to match handwritten numbers with their true value.

Example of classification: flower species recognition

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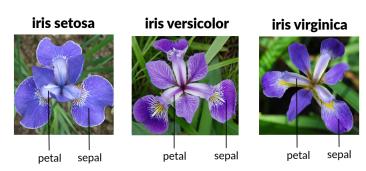
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Flower species

Given flowers characteristics, predict their species.



Example of regression: prediction of housing pricing

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Price predictions

Given house characteristics (size, location, number of bedrooms), predict the selling prices of houses.



Example of clustering

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Infer Netflix watching behavior

Given a set of user characteristics (time spent per day, number of different items watched, number of series and movies), group users into subgroups.



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Given their size, their weight, and their color, predict the fish specie.



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Given their previous results (number of race won, previous times, total training times . . .), predict athletes time in a race.



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Given their medical records (weight, age, height, smoking status), predict patients with diabetes.



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Given their spending habit (number of bought items, total money spent ...), identify different shopper behaviors.



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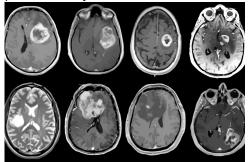
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Given tumors characteristics (size, height, width, color ...), predict if they are cancerous tumors.



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Given baby whales characteristics (specie, location, parents ...), predict their total adult weights.



Exercises

Questions?

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