Lecture 1: General introduction

Introduction to Machine Learning

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What is Machine Learning ?

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 ?

What is Machine Learning ?

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

Example of classification problems include:

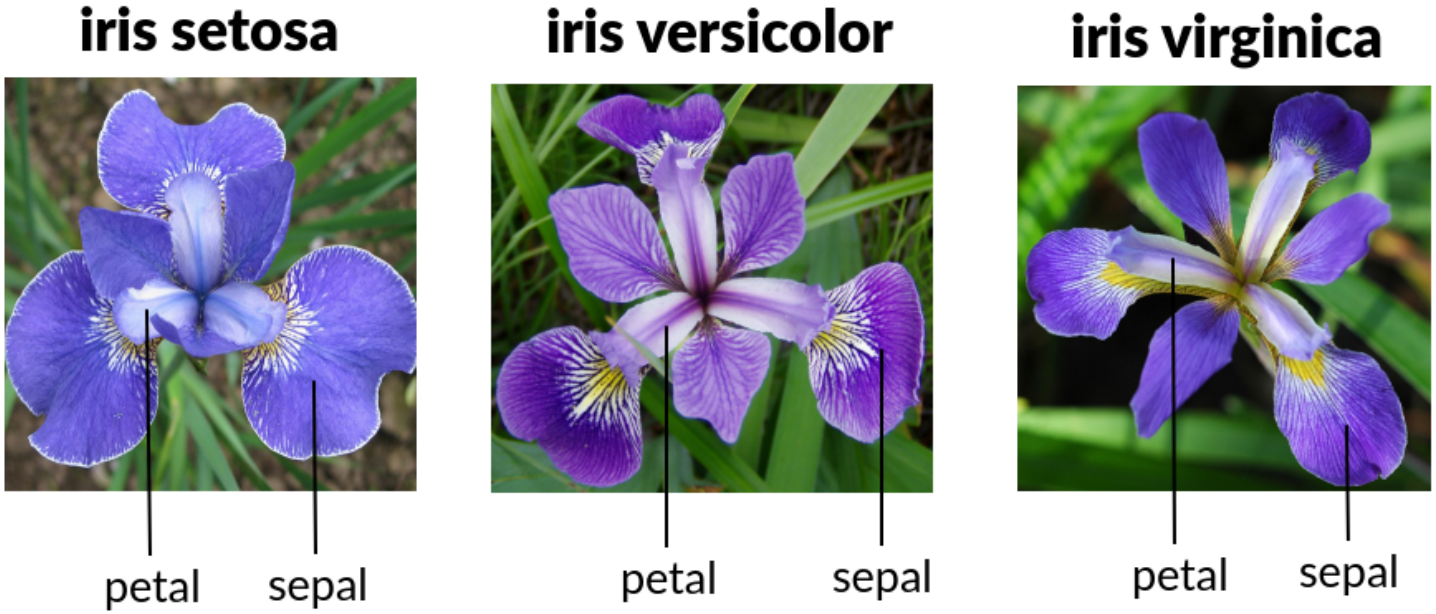
Handwritten number recognition (OCR)

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

Example of classification: flower species recognition

Flower species

Given flowers characteristics, predict their species.



Example of regression: prediction of housing pricing

Price predictions

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

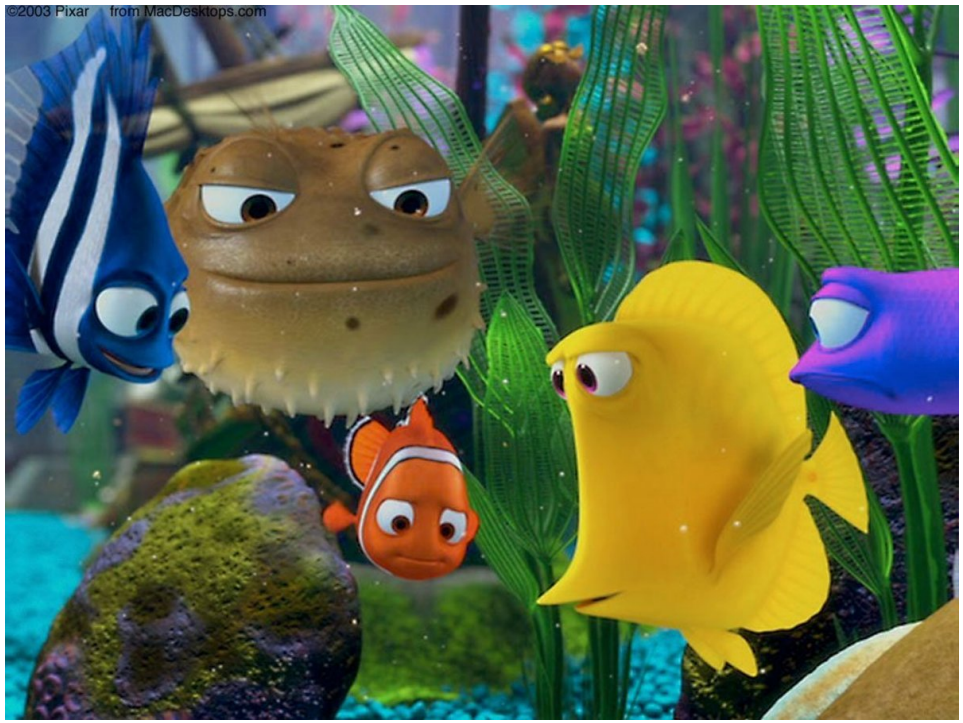
Example of clustering

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.

Can you infer the type of problem ?

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



Can you infer the type of problem ?

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

Can you infer the type of problem ?

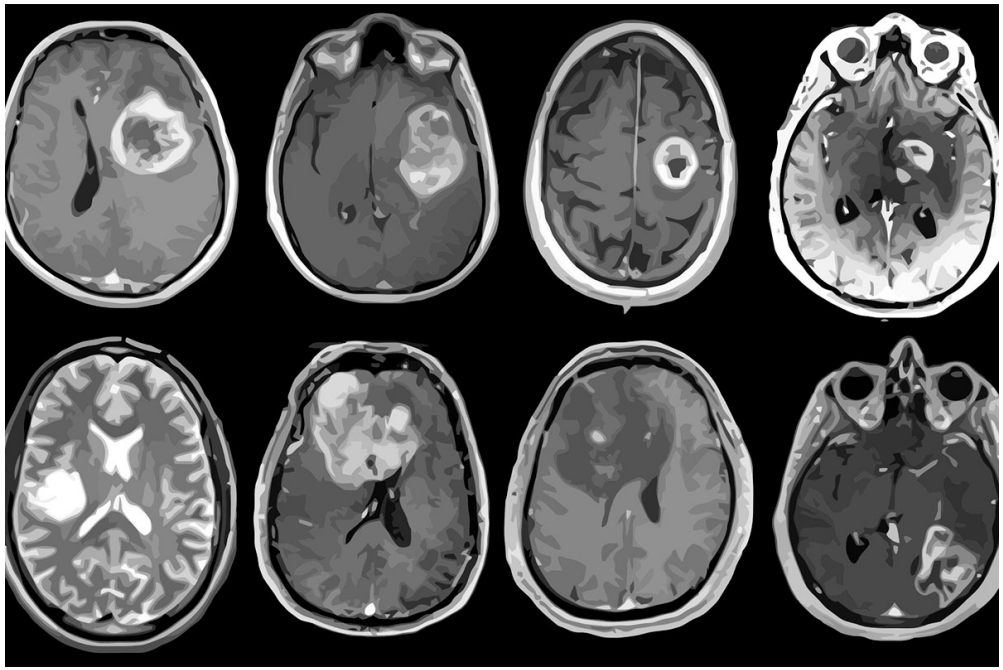
Given their medical records (weight, age, height, smoking status), predict patients with diabetes.

Can you infer the type of problem ?

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

Can you infer the type of problem ?

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



Can you infer the type of problem ?

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

Questions ?

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