UNIMORE

UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Digital Automation Engineering

Artificial Intelligence and Data Science

Marco Lippi, Stefania Monica

{marco.lippi, stefania.monica}@unimore.it

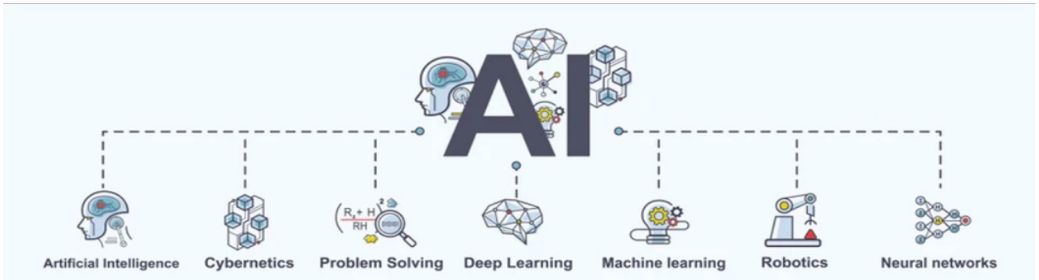
Artificial Intelligence

- *A computer would deserve to be called **intelligent** if it could deceive a human into believing that it was human.*

[A. Turing]

Several topics addressed during the course:

- Agents and multi-agent systems
- Search problems
- Games
- Image processing
- Constraint satisfaction problems
- Logic and logic programming



Data Science

- *Data science is the application of **computational** and **statistical** techniques to address or gain insight into some problem in the **real world***

  [J. Zico Kolter, Carnegie Mellon University]

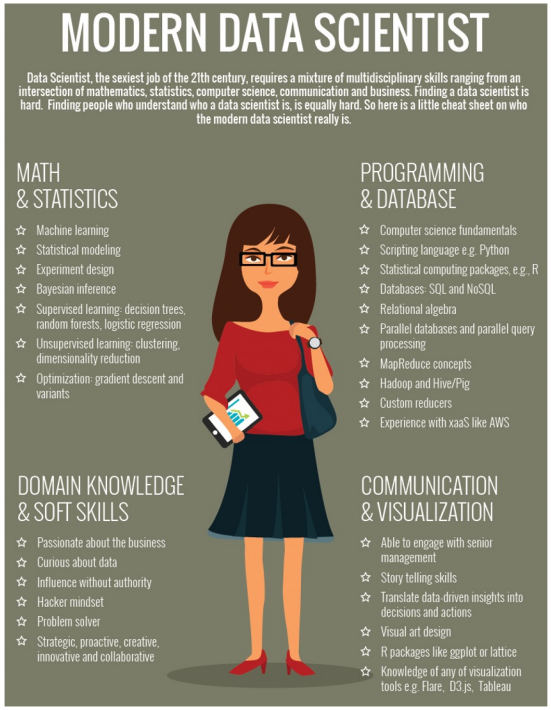
- *Observation, reason and experiment make up what we call the **scientific** method*

  [R. Feynman]

- *You do not get discoveries in the sciences by taking huge amounts of data, throwing them into a computer and doing statistical analysis of them... That's not the way you understand things... You have to have theoretical insights*

  [N. Chomsky]

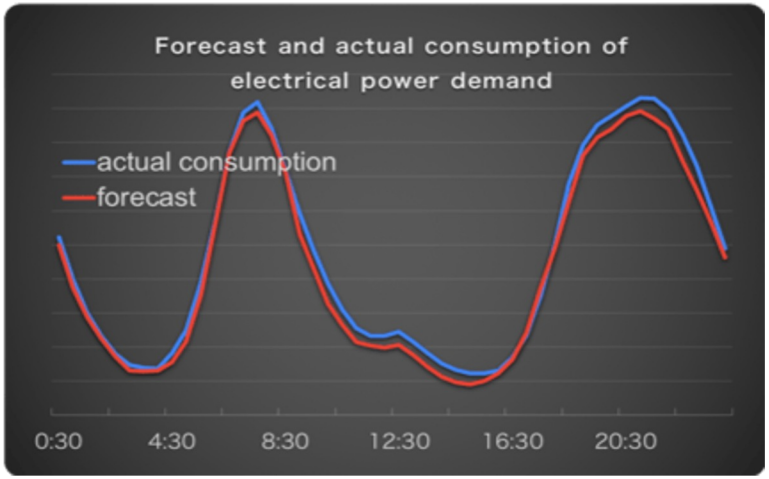
Data science requires critical thinking



Some examples

Predictive Maintenance

Given the raw data coming from sensors, predict whether a given machine will fail within a certain amount of time



Energy Consumption Forecasting

Given the historical time series data of energy consumption in a factory or building, forecast the future behavior

Aim of the course

- Give a solid knowledge and understanding skills in the main areas of Artificial Intelligence, Machine Learning, and Data Science
- Give the ability to solve problems in various contexts and application domains related to Artificial Intelligence
- Acquire the necessary skills to independently provide their own updating, particularly crucial in the field of Artificial Intelligence and Data Science, where technology is constantly evolving
- Give the ability to use specific tools and programming languages to implement the learned techniques of Artificial Intelligence and Data Science in diverse and heterogeneous scenarios

Exams

The exam consists of an **oral test** held in presence. The exam is held in English and lasts approximately 30/40 minutes. During the exam, students must be able to address theoretical **questions** on the entire program of the course and they must be able to solve **exercises** related to the topics addressed during the course.

In order to access the oral exam, students need to prepare a **project** on a **topic** previously **agreed** with the teachers. Details on the project and its delivery will be discussed in class and they will be indicated on the Moodle platform. Projects can be delivered only **once** in an academic year and they are valid for the entire academic year.