

# Machine Learning per la Fisica Applicata e la Fisica delle Alte Energie

Lezione 1: Uno sguardo d'insieme al Machine Learning

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4 ottobre 2022



**UNIVERSITÀ  
DI TORINO**

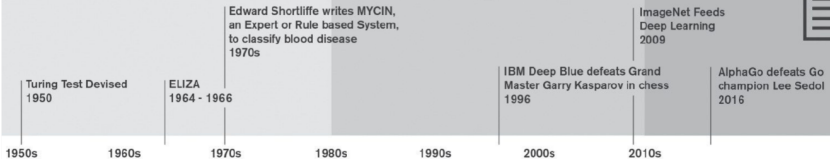
# ARTIFICIAL INTELLIGENCE

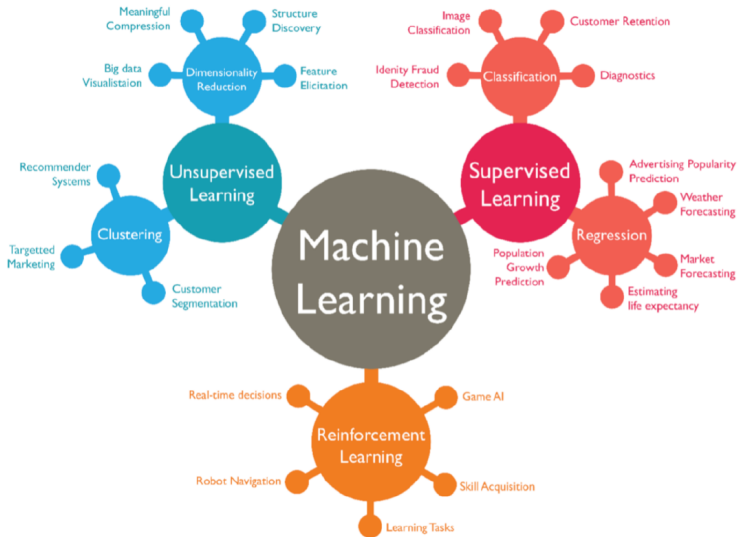


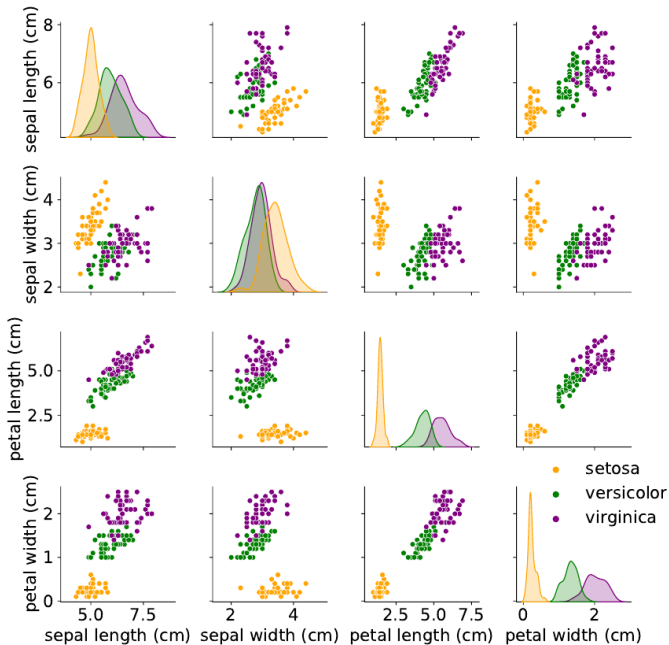
## MACHINE LEARNING

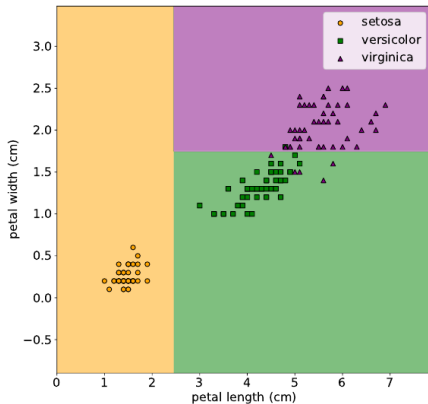
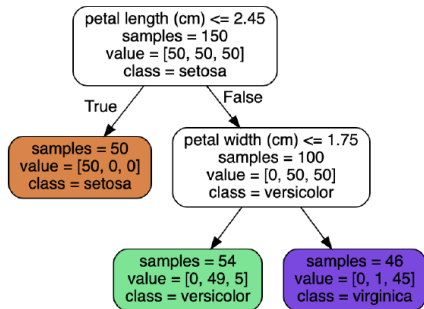


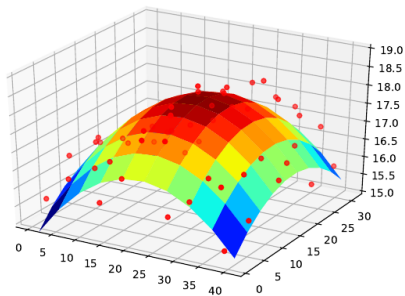
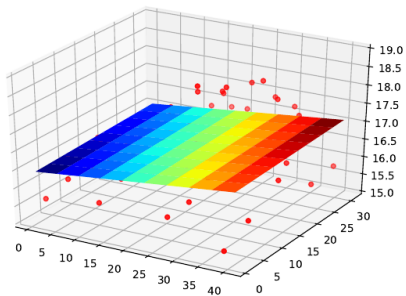
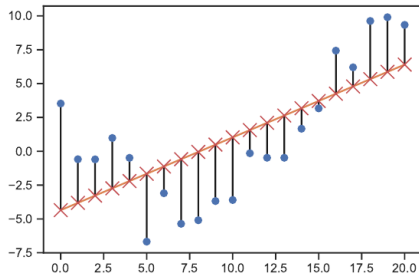
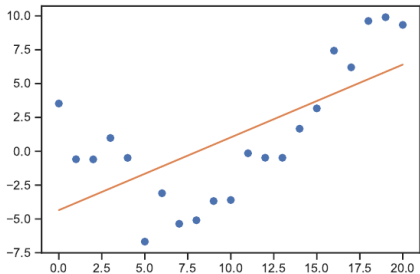
## DEEP LEARNING

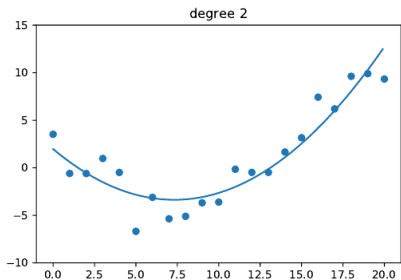




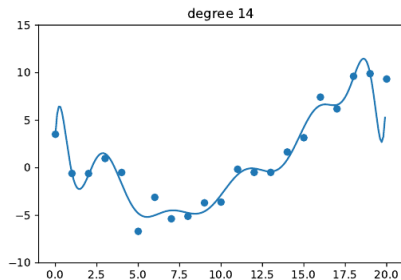




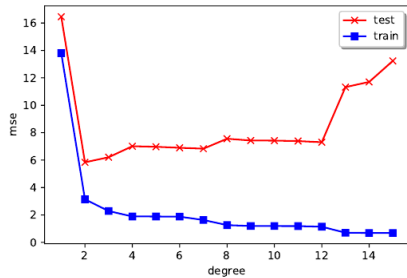
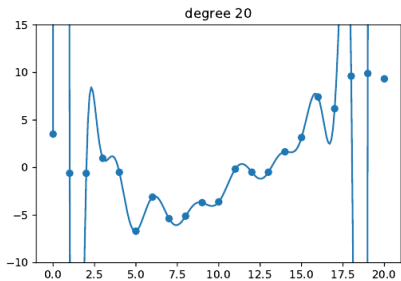


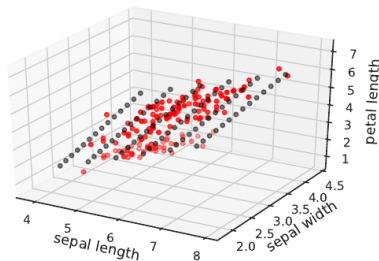
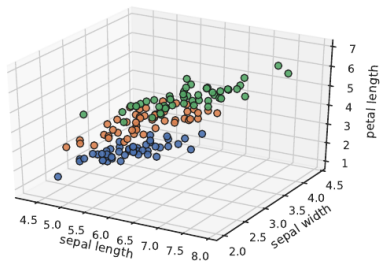
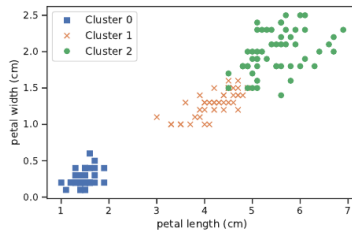
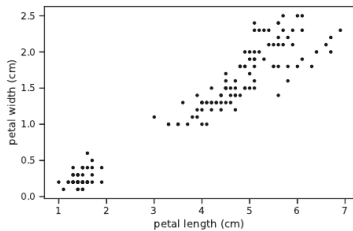


(a)



(b)







### ■ "Pure" Reinforcement Learning (cherry)

- ▶ The machine predicts a scalar reward given once in a while.
- ▶ **A few bits for some samples**

### ■ Supervised Learning (icing)

- ▶ The machine predicts a category or a few numbers for each input
- ▶ Predicting human-supplied data
- ▶ **10→10,000 bits per sample**

### ■ Unsupervised/Predictive Learning (cake)

- ▶ The machine predicts any part of its input for any observed part.
- ▶ Predicts future frames in videos
- ▶ **Millions of bits per sample**

