

Machine Learning for Applied Physics and High Energy Physics

Lecture 1: An Introduction to Machine Learning

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DI TORINO**

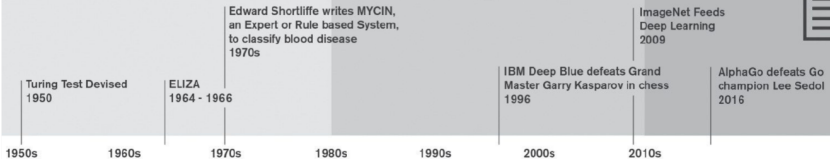
ARTIFICIAL INTELLIGENCE

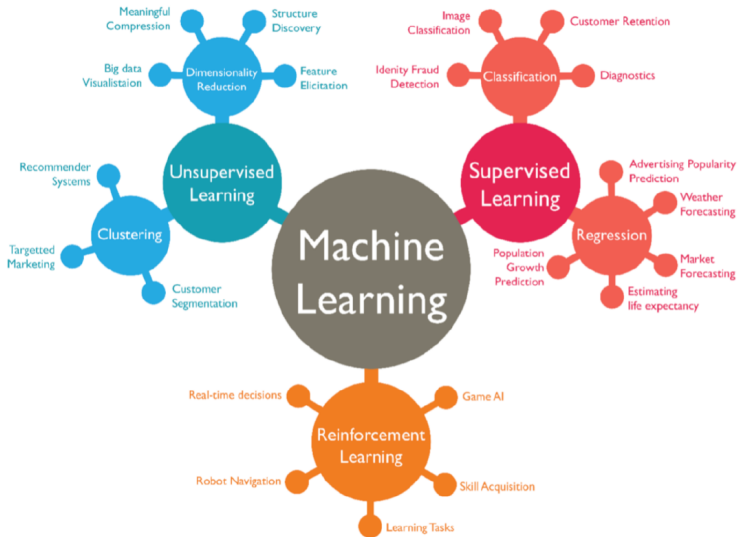


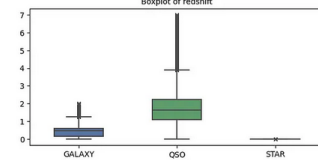
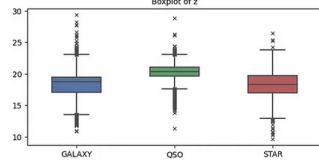
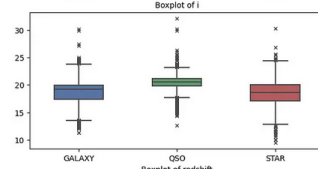
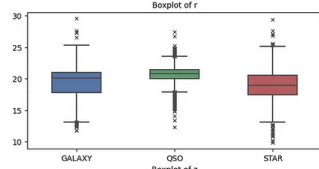
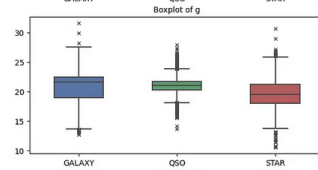
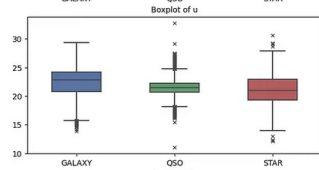
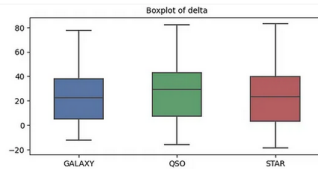
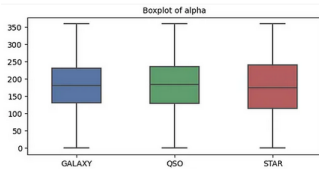
MACHINE LEARNING



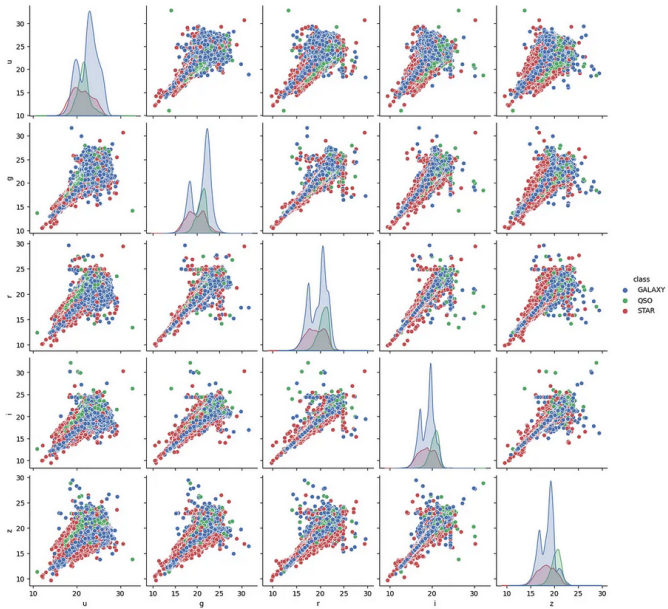
DEEP LEARNING

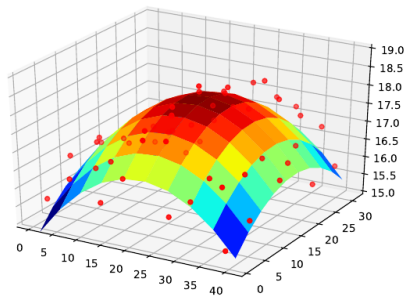
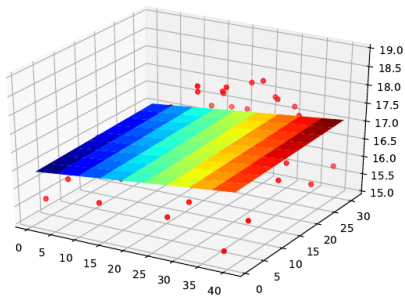
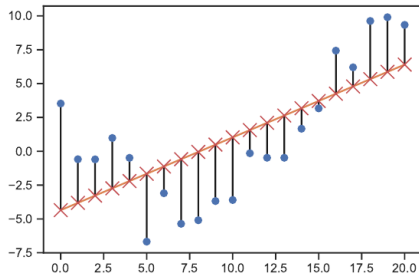
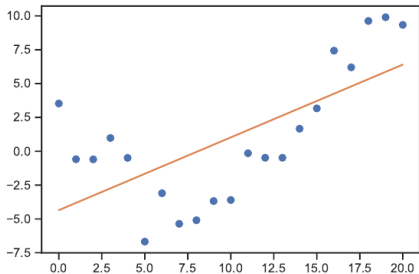


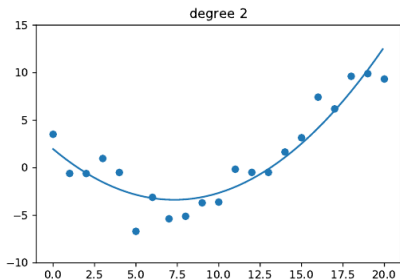




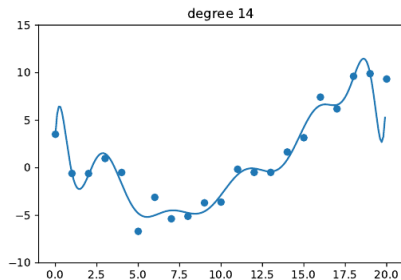
Pair Plot - Stellar Data



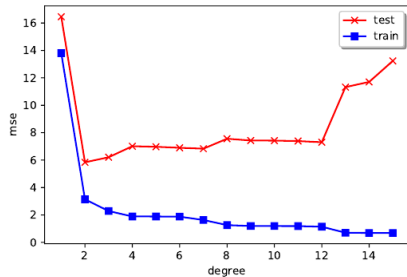
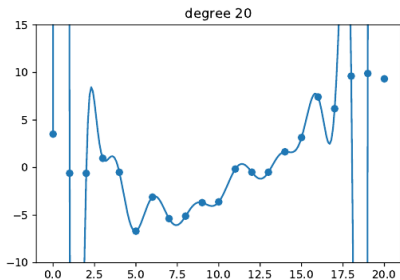




(a)



(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**

