

WEEK 1 - LECTURE 1

A brief introduction to machine learning

What is Machine Learning?

An agent (Machine / Non Machine) is said to learn from experience with respect to some class of tasks, and a performance measure P , if [the learner's] performance at task in the class, as measured by P , improves with experience.

The three main components are

- (i) Defining class of task
- (ii) Defining performance measure
- (iii) Well defined experience

For eg.

Answering questions in exam = Class of task

~~Class of task~~ = No. of marks you get = Performance Measure

~~Performance Measure~~ = Writing more exams = Experience

ML Paradigms

1 Supervised Learning

Learn an input and output map

- Classification: categorical output
- Regression: continuous output

2 Unsupervised Learning

Discover patterns in the data

- Clustering: cohesive grouping
- Association: frequent cooccurrence

3 Reinforcement Learning

Learning control

Performance measure of different machine learning tasks.

	Task	Performance Measure
1	Classification	Error
2	Regression	Error
3	Clustering	Scatter / Purity
4	Associations	Support / Confidence
5	Reinforcement Learning	Cost / Reward

challenges faced

- How good is a model?
- How do I choose a model?
- Do I have enough data?
- Is the data of sufficient quality?
 - Errors in data . Eg. Age = 225
 - Missing values
- How confident can I be of the results
- Am I describing the data correctly?
 - How should I represent Age? As a no., or as young, middle age, old?