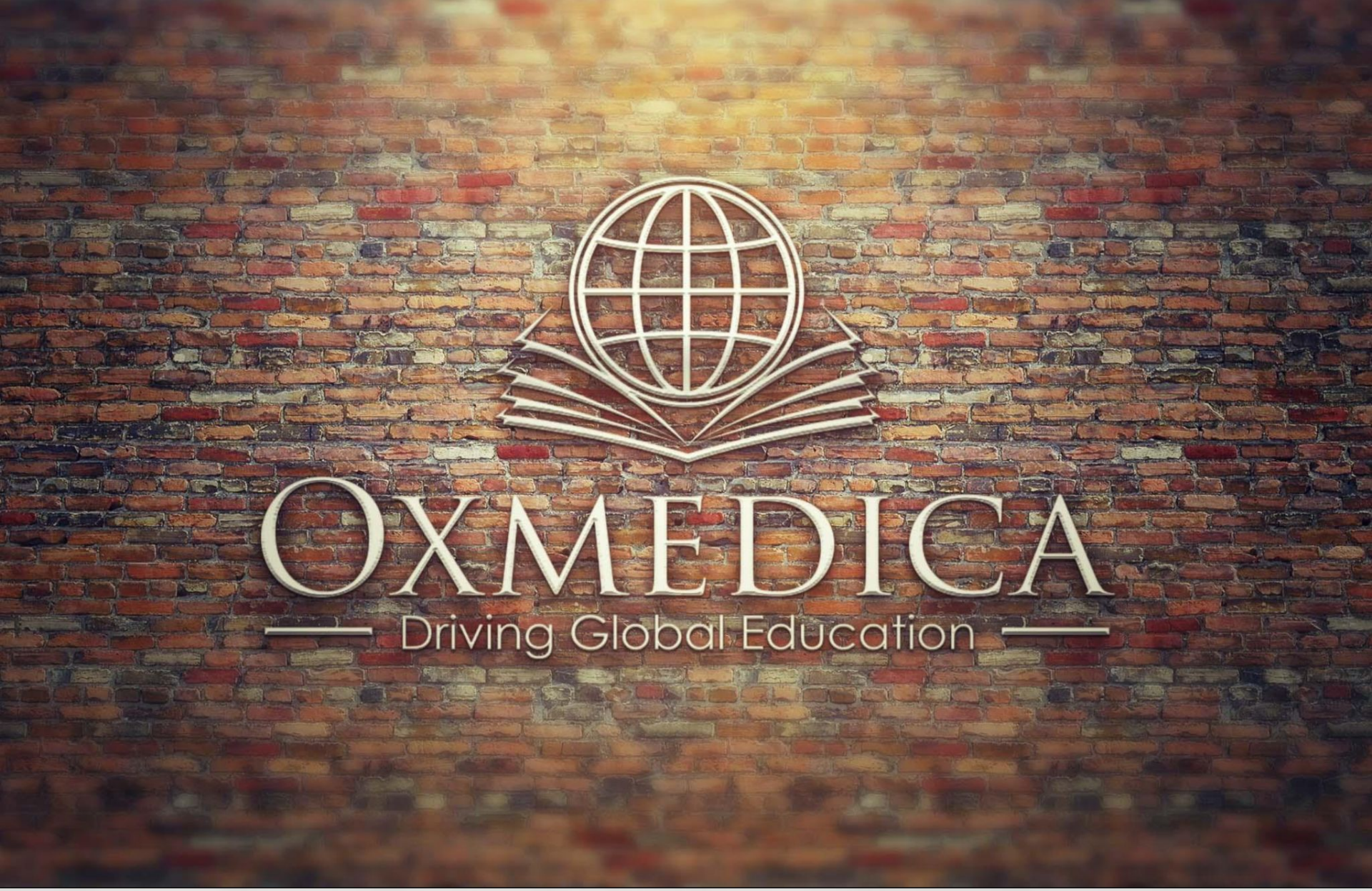


Introduction to Machine Learning Algorithms

Plan

1. Recap on AI vs ML
2. Different types of machine learning
3. Examples of machine learning

The focus this class is about:

A) getting an overview of machine learning

B) understanding the maths notation

Recap: What is AI vs machine learning

Artificial Intelligence (AI)

- “Intelligence exhibited by machines/computer systems”
- E.g. visual perception, speech recognition, decision-making, and language translation.
- (Everything)

Machine Learning

- A subfield of AI, which involves learning patterns from lots of data
- Learns rules without the rules being explicitly programmed
- Behind almost all modern AI systems

This class will be on the whiteboard

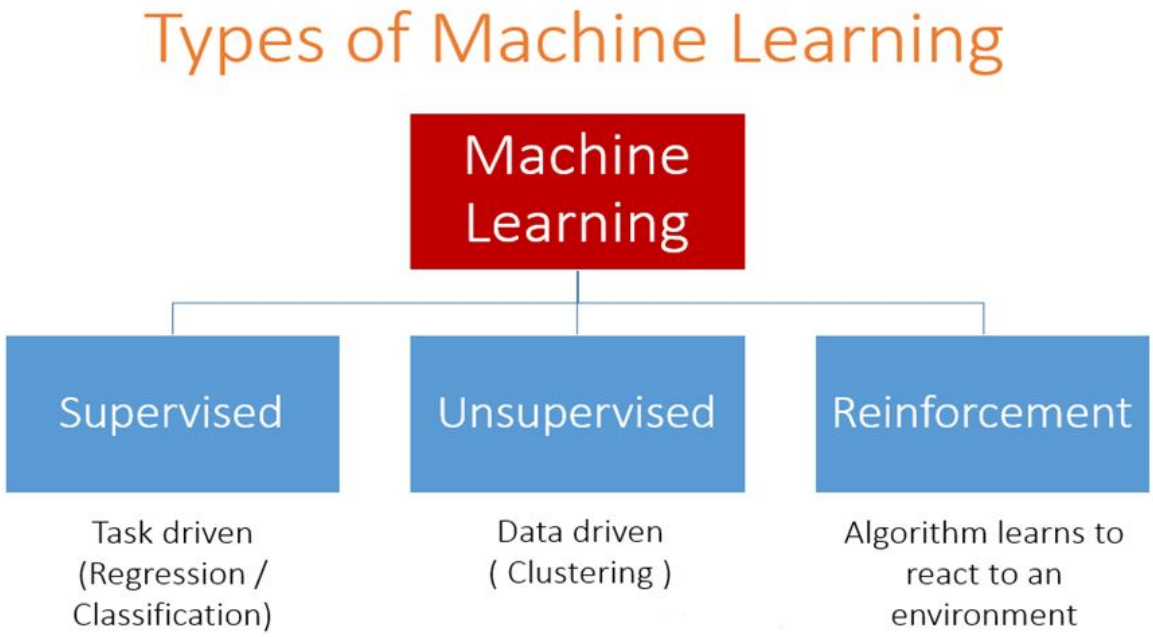
Datasets

- Variables/Features and examples (notation)
- Target variables
- Size of dataset
- Mathematical description of datasets (see board)

Types of machine learning

- Unsupervised machine learning
- Supervised machine learning (most applications)
- Reinforcement learning (RL) (won't cover in this course)

Types of machine learning



Source

Unsupervised machine learning

- Unlabeled data - no target variable

X1 (feature)	X2 (feature)	X3 (feature)	X4 (feature)

- Aim is to find patterns in the data
- E.g. clustering or dimensionality reduction

Examples of unsupervised machine learning

Supervised machine learning

- Dataset includes a target variable

X1 (feature)	X2 (feature)	X3 (feature)	X4 (feature)	Y (target)

- Aim is to use the feature to predict the target
- Have lot of ‘training’ examples and have to learn the pattern. Then given ‘test’ examples and you have to predict the target

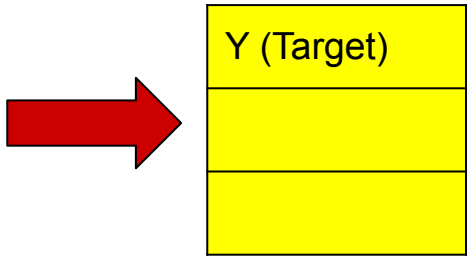
Supervised Learning

Training Examples

X1 (feature)	X2 (feature)	X3 (feature)	X4 (feature)	Y (target)

Test Examples: Use the features to predict the target

X1 (feature)	X2 (feature)	X3 (feature)	X4 (feature)



Examples of supervised machine learning

Reinforcement Learning

- Very different
- Learn from the environment
- Predict a policy (moves for every possible set of states of the world). Then as you learn more information you update your policy
- Examples? AlphaGo

Any other types…?

- Yes… but we're not going to worry about them for now
  - Self-supervised learning (import for language models)
  - Semi-supervised learning

Task in pairs: How do you interact with machine learning algorithms?

- In pairs, think of all of the ways you interact with a machine learning model everyday. I guarantee that there are more than you think!

Discussion

Recap questions

1. What is machine learning?
2. What are the three main types of machine learning?
3. How are they different?
4. Provide examples of all three types.