

LECTURE 1: MACHINE LEARNING

Pre-requisites: Big O, queues, stacks, binary trees,

Probability: Random Variable, Expected value of a RV

Basic linear algebra: Matrix, Vector

→ What is Machine Learning?

Gives computer ability to learn without being explicitly programmed.

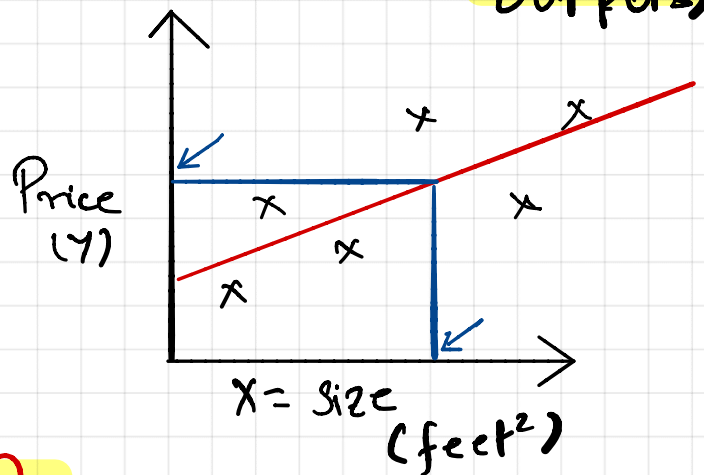
→ Supervised Learning

Q. Predict house prices based on size
(Continuous outputs)

Regression:

Mapping: $X \rightarrow Y$

⇓
Choose different Models

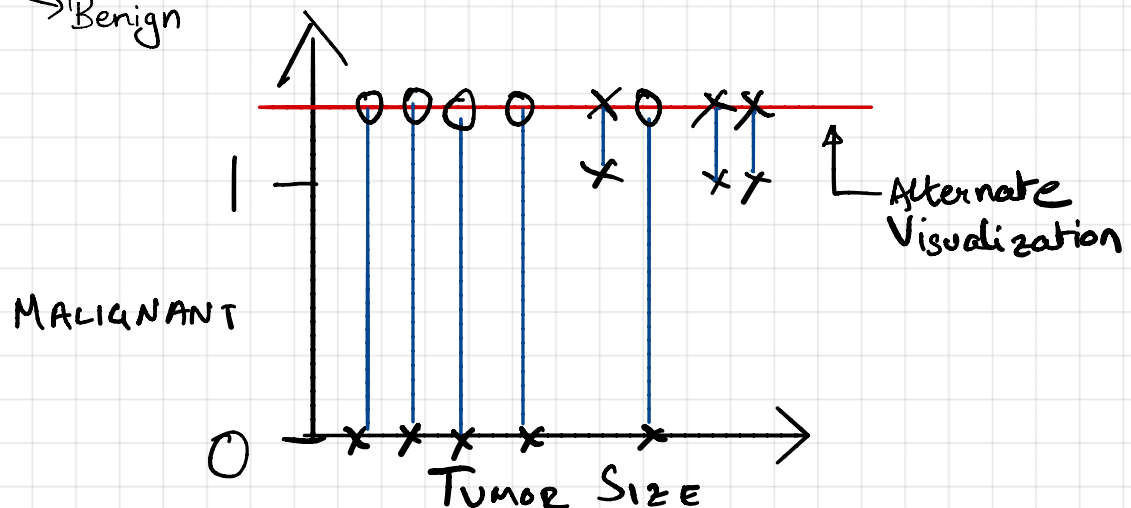


Classification

Q. Breast Cancer Classification.

(Discrete output)

Tumor → Malignant/Cancerous
 → Benign



→ Input 'X' was 1 dimensional in the previous examples.
↳ However, will be Multidimensional in most cases.

e.g.

Patient → Age
 → Tumor Size

e.g. SVM uses ∞ -dimension space to represent a patient via kernels

→ Machine Learning Strategy
 (Learning Theory)

- Machine Learning decisions.

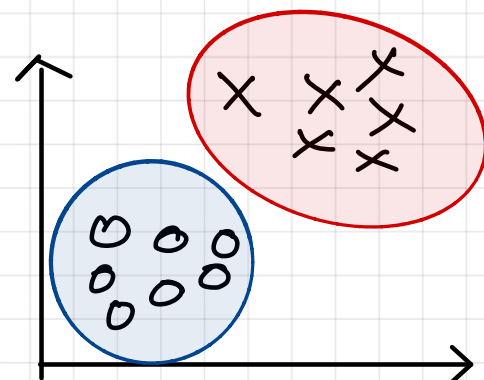
- Debugging ML models.
- From black box to a systematic engineering process.
- Strategizing in building ML systems.

→ Deep Learning.

↳ Neural Networks (CS 230)

→ Unsupervised Learning

- ↳ Unlabeled Data (just X, no Y)
- ↳ Make structures.
- ↳ k-means



- eg - Google news is unsupervised.
Groups similar articles together.
- Cocktail Party Problem.
 - ↳ Independent Component Analysis
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→ Reinforcement Learning.

