

Machine Learning

Thursday, November 6, 2025 5:04 PM

"Field of study that gives computers the ability to learn without being explicitly programed" -- Arthur Samuel (1959)

1950 checkers game

Q: If the checkers program had been allowed to play only ten games(instead of tens of thousands) against itself, a much smaller number of games, how would this have affected its performance?

-> Would have made it worse.

Application of Machine learning

Thursday, November 6, 2025 4:57 PM

Sub field of AI

Artificial General Intelligence AGI

Supervised vs Unsupervised Machine Learning

Thursday, November 6, 2025 5:04 PM

- Supervised machine learning
 - Used in most real world applications
- Unsupervised machine learning
- Recommender system
- Reinforcement learning

Practical advice for applying learning algorithms.

Which tools to use for what problems.

Supervised Machine Learning

Thursday, November 6, 2025 5:14 PM

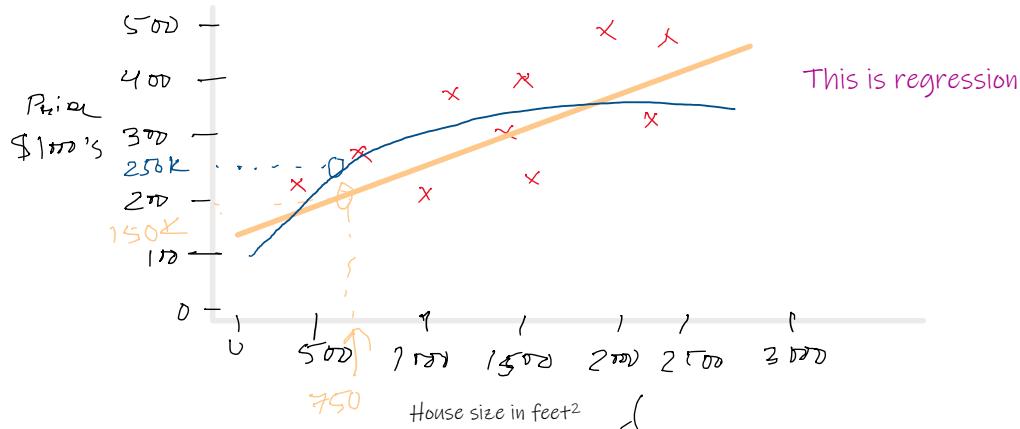


Learns from X to Y mapping

Learns from being given "right answers"/ output labels

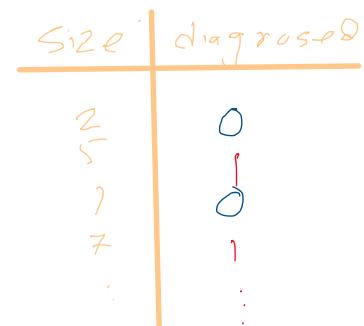
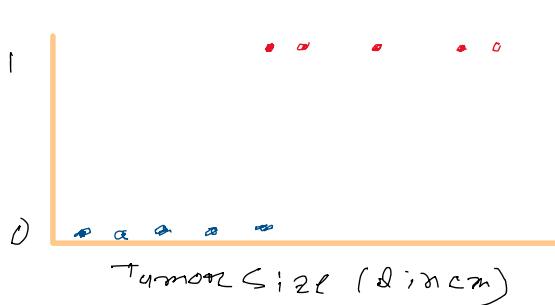
Input(x)	Output(Y)	Applications
email	Spam?(0/1)	Spam filter
Audio	Text transcript	Speech recognition
English	Spanish	Machine translation
Ad, user info	Click?(0/1)	Online advertising
Image, radar info	Position of other cars	Self-driving car
Image of phone	Defect?(0/1)	Visual inspection

Regression : housing price prediction

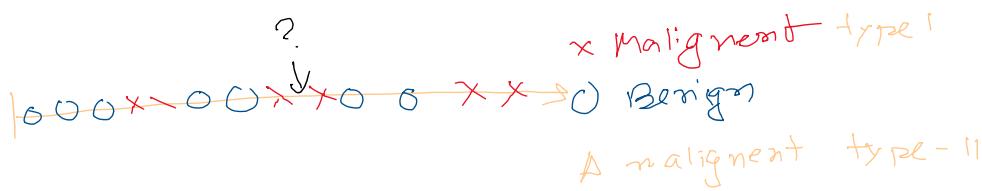


Predict a number from infinitely many possible outputs.

Classification:
Breast Cancer Detection
Malignant benign



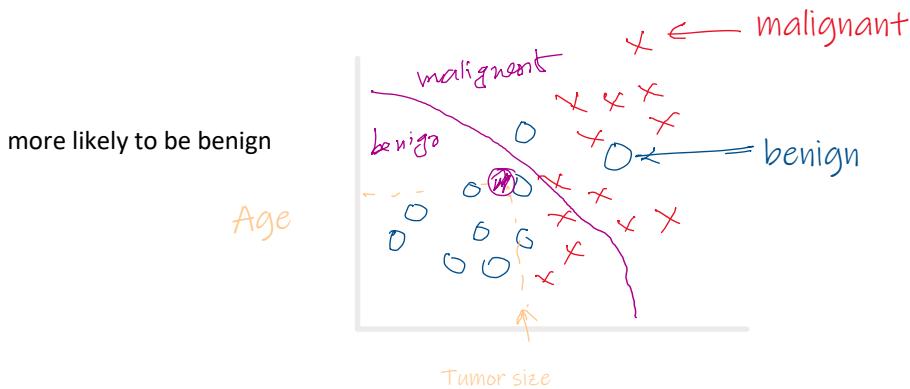
In classification problem can be more than two possible output categories



output categories/ class

class can also be numbers 0,1,2 cat, dogs

Two or more outputs



Here any two inputs

age, tumor size

Can have many more input values

- thickness tremor clump
- uniformity of cell size
- uniformity of cell shape

In summary:

Supervised Learning

Learns from being given "right answer"

Regression

Predicts a number

Infinitely many possible

outputs

Classification

Predicts categories

small number of possible outcome

Practice Quiz

Thursday, November 6, 2025 8:24 PM

1. Which are the two common type of supervised learning?

- Classification
- Clustering
- Regression

2. Which of these is a type of unsupervised learning?

- Regression
- Classification
- Clustering