ML Applications

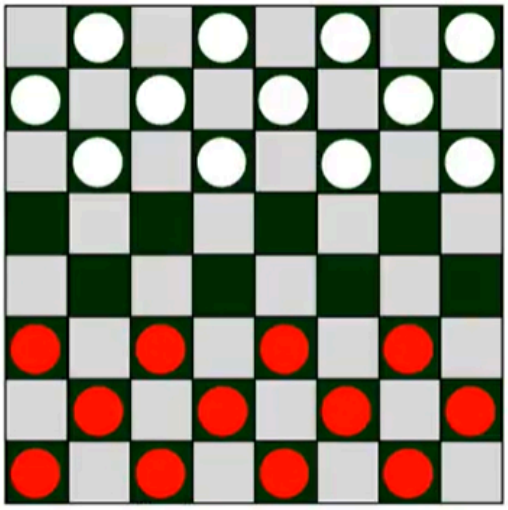
1. ChatGPT
2. Face ID and fingerprint
3. Predictive text and autocorrect
4. Voice assistants like Siri or Google Assistant
5. Personalized feeds
6. Spam Detection
7. Recommendation systems in Netflix, YouTube, and Spotify
8. Google Maps uses ML to predict traffic
9. Defects Detection in factories
10. and much more

What is ML ?

Machine learning

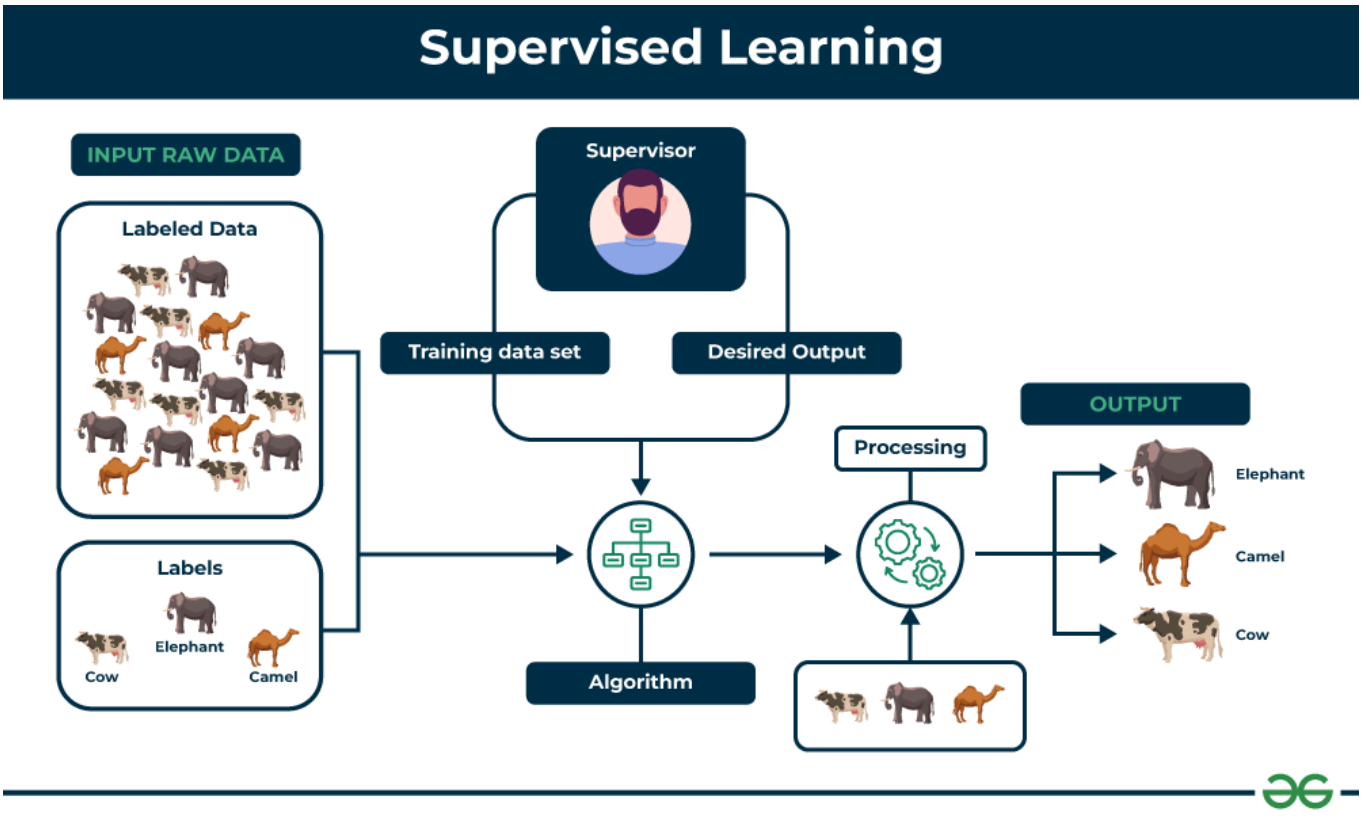
"Field of study that gives computers the ability to learn without being explicitly programmed."

Arthur Samuel (1959)



ML Algorithms

Supervised Learning



Supervised learning

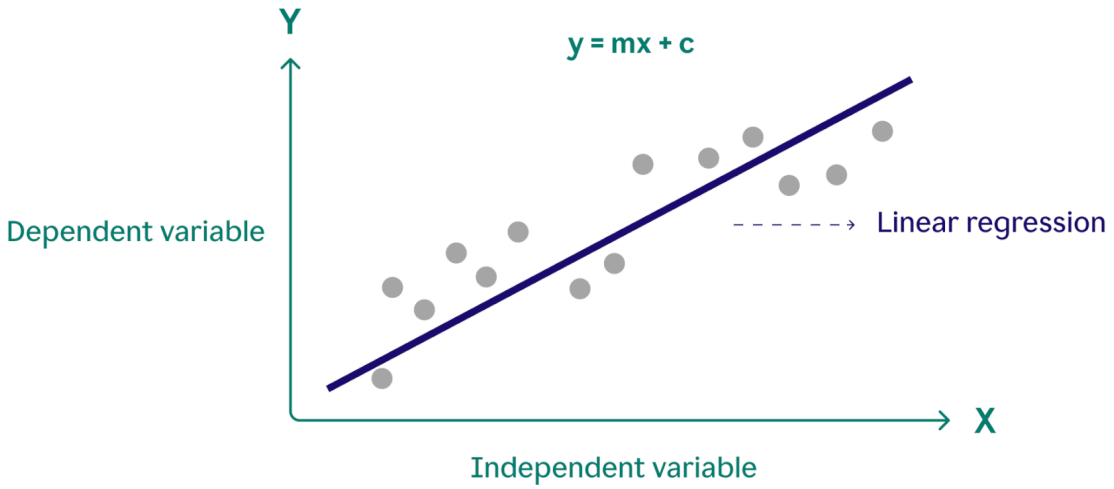
Learns from being given "right answers"

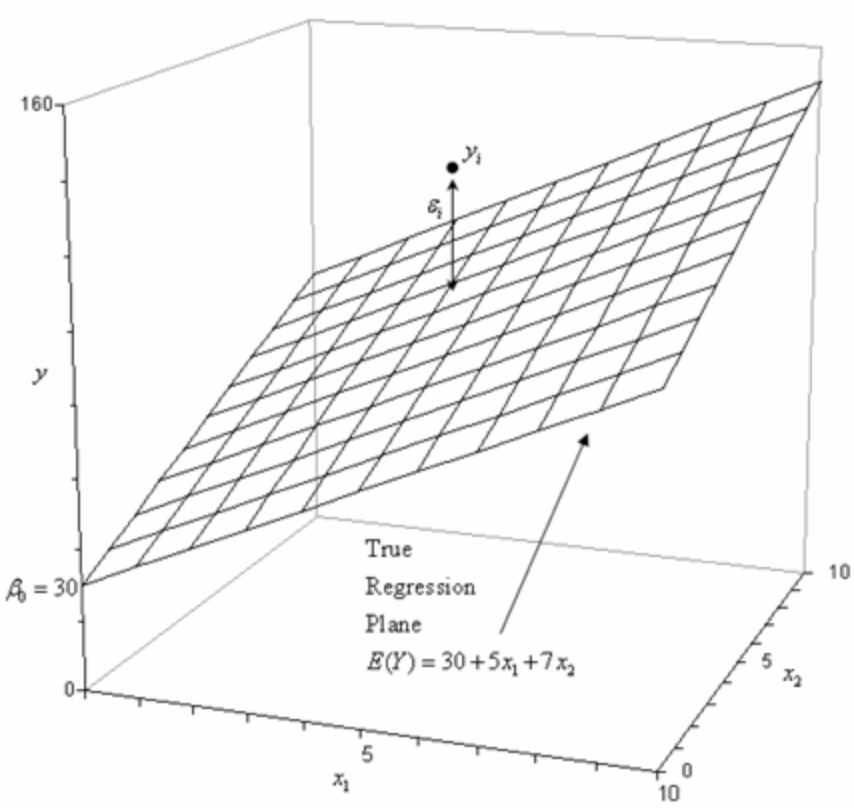
Regression
Predict a number
infinitely many possible outputs

Classification
predict categories
small number of possible outputs

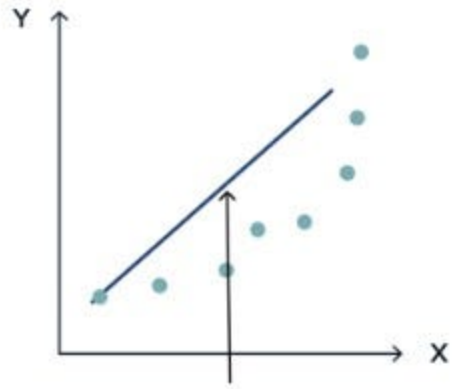
Input (X)	Output (Y)	Application
email	spam? (0/1)	spam filtering
audio	text transcripts	speech recognition
English	Spanish	machine translation
ad, user info	click? (0/1)	online advertising
image, radar info	position of other cars	self-driving car
image of phone	defect? (0/1)	visual inspection

Linear Regression



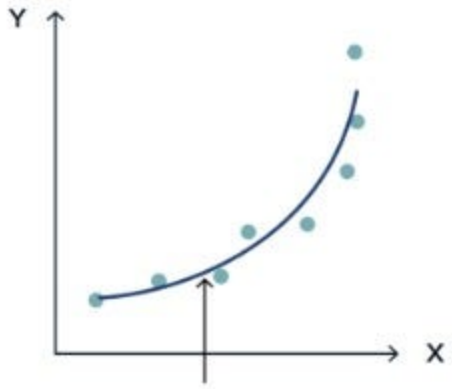


Simple linear model



$y=b_0+b_1x$

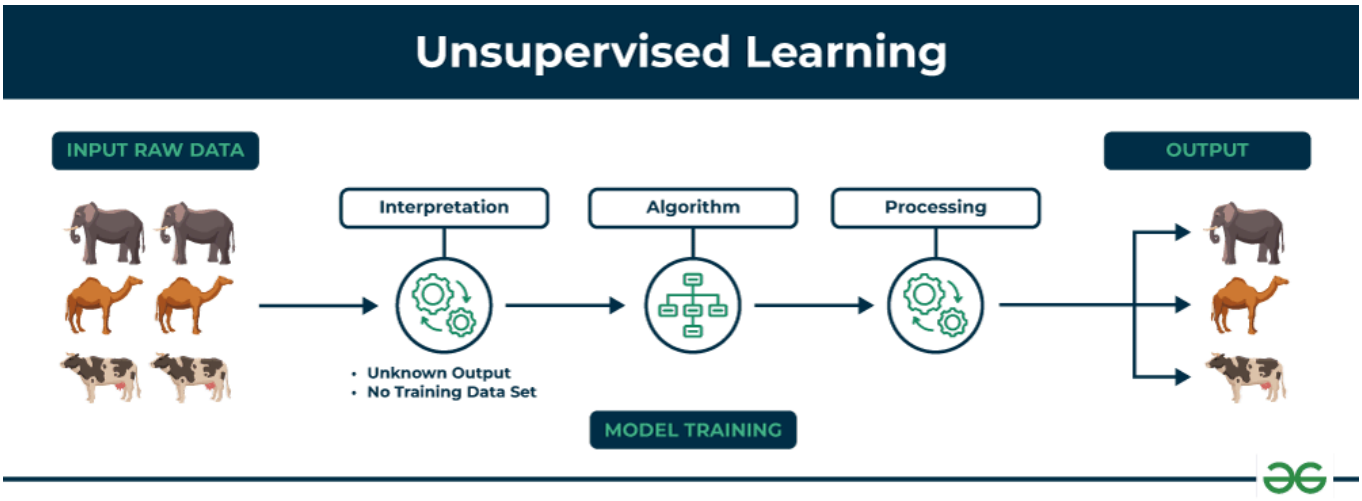
Polynomial model



$y=b_0+b_1x+b_2x_1^2$

Let's Jump to The Notebook

Unsupervised Learning



Unsupervised learning

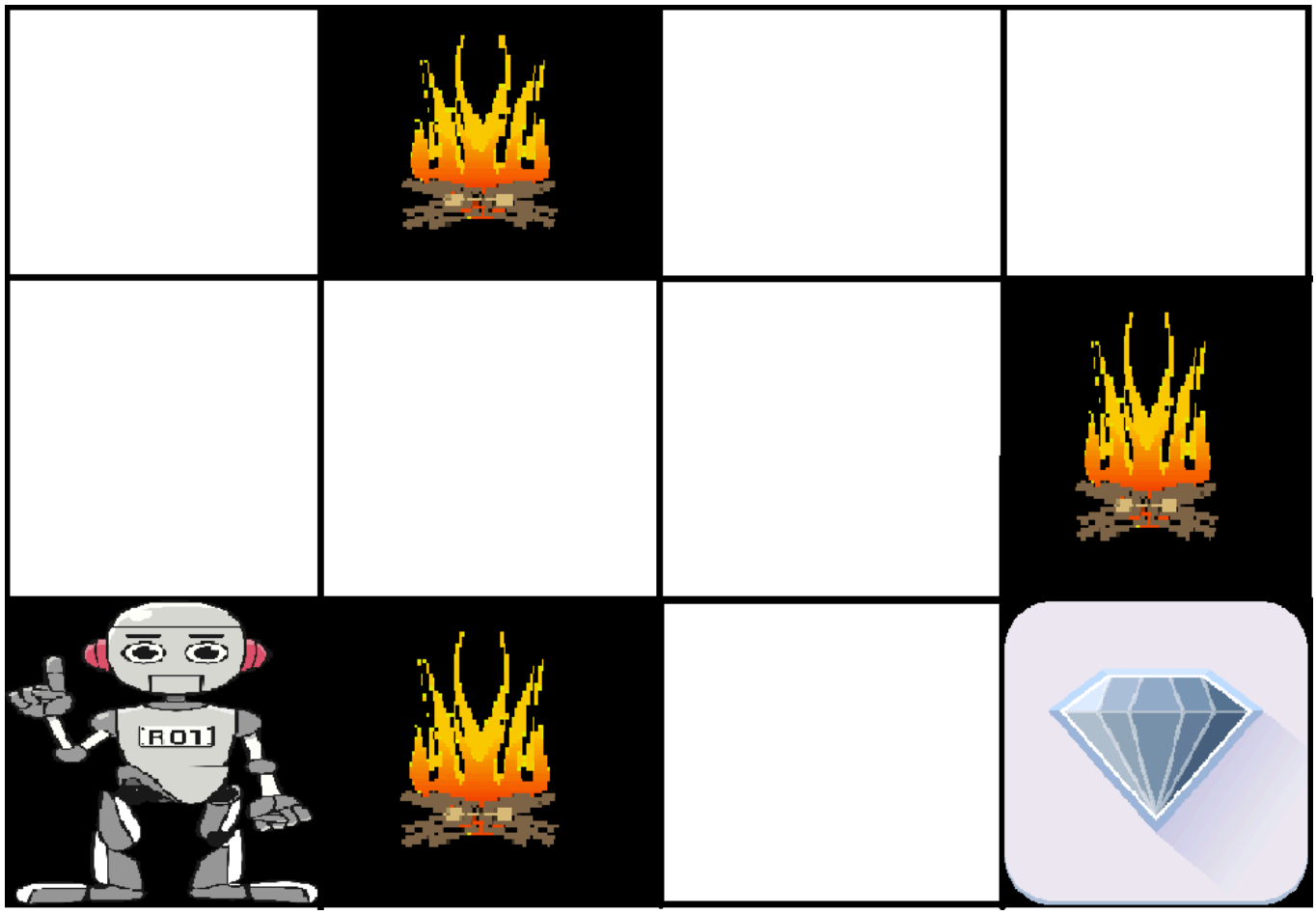
Data only comes with inputs x, but not output labels y.
Algorithm has to find structure in the data.

Clustering
Group similar data points together.

Dimensionality reduction
Compress data using fewer numbers.

Anomaly detection
Find unusual data points.

Reinforcement Learning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