Introduction to Machine Learning

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Agenda

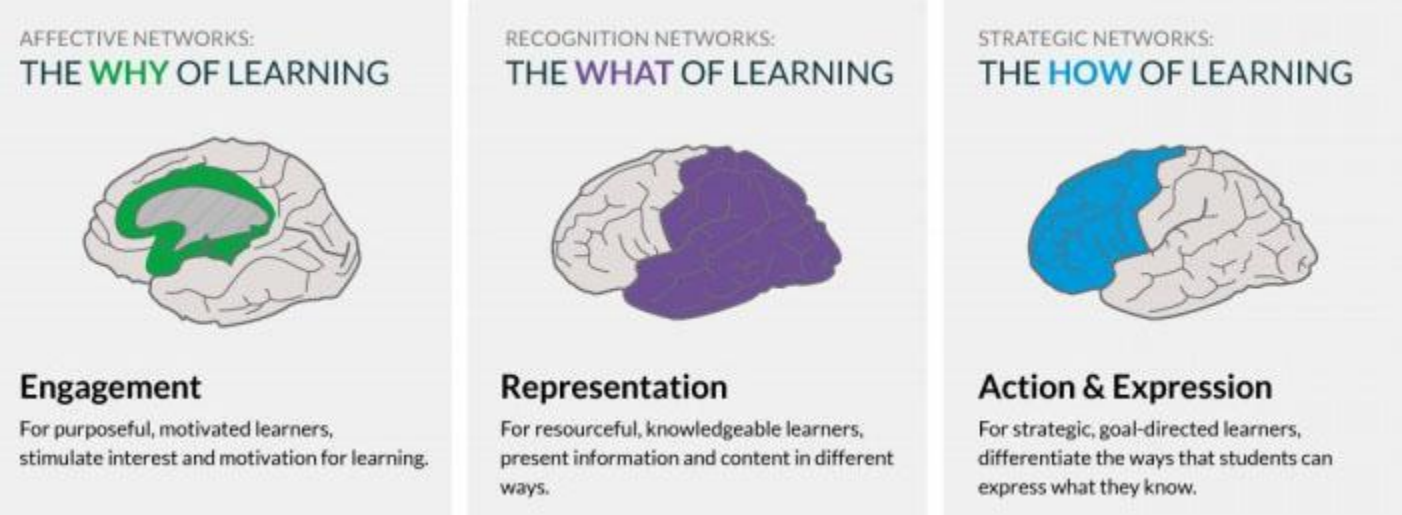
- ❏ What is learning?
- ❏ Learning styles
- ❏ How to learn?
- ❏ Machine Learning (ML)
- ❏ ML applications
- ❏ ML methods
- ❏ ML prerequisites
- ❏ Build your first ML application
- ❏ Iris Flower dataset

Learning Definition

Learning is the process of acquiring new, or modifying existing, knowledge, behaviours, skills, values, or preferences. The ability to learn is possessed by humans, animals, and some machines; there is also evidence for some kind of learning in certain plants.

Learning Styles

How to learn?



- ❑ Identify your goals.
- ❑ Define your resources.
- ❑ Develop your solutions or models

Machine Learning

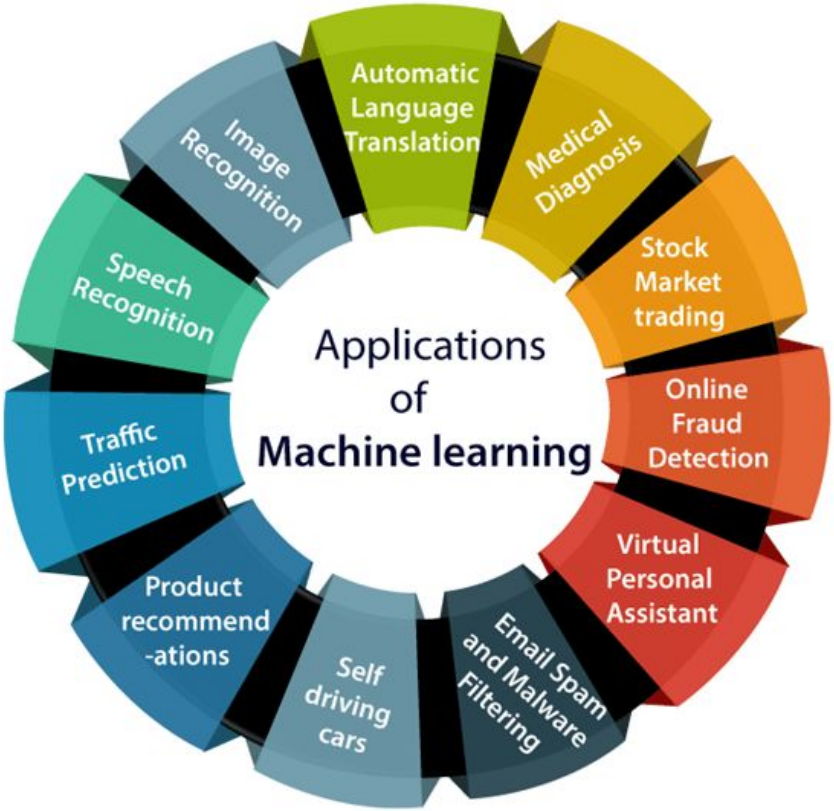
Machine learning (ML) is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.

ML vs traditional programming:

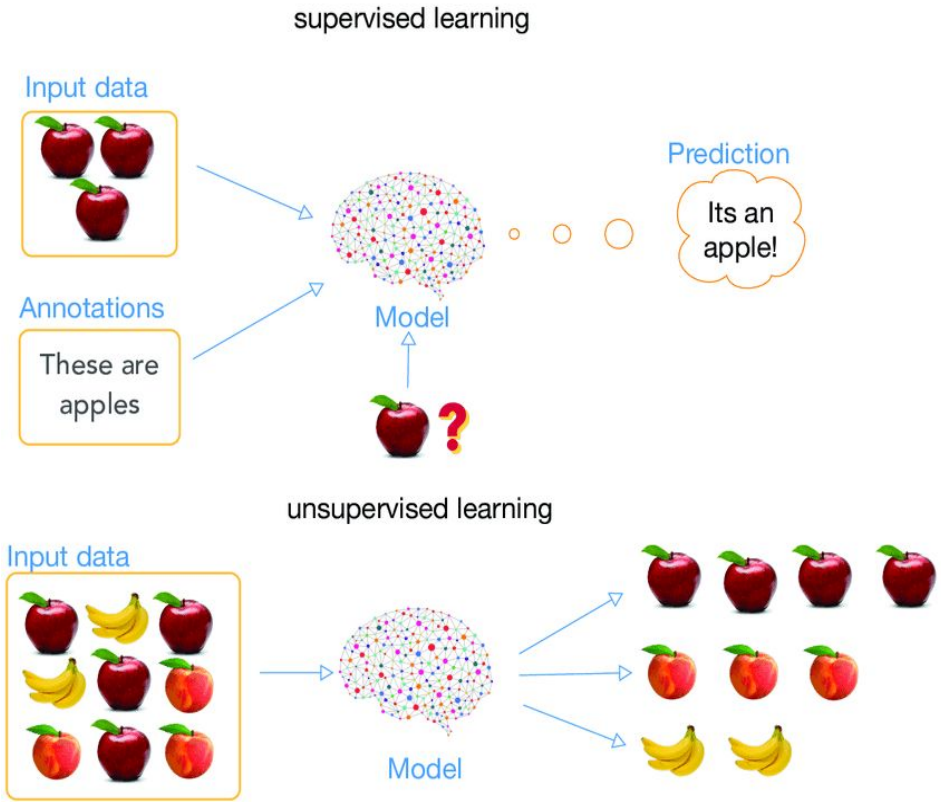
- ❑ Input + Rules →Output
- ❑ Input + Output →Rules

Examples: ?? Attari games, chess, AlphaGo

ML Applications

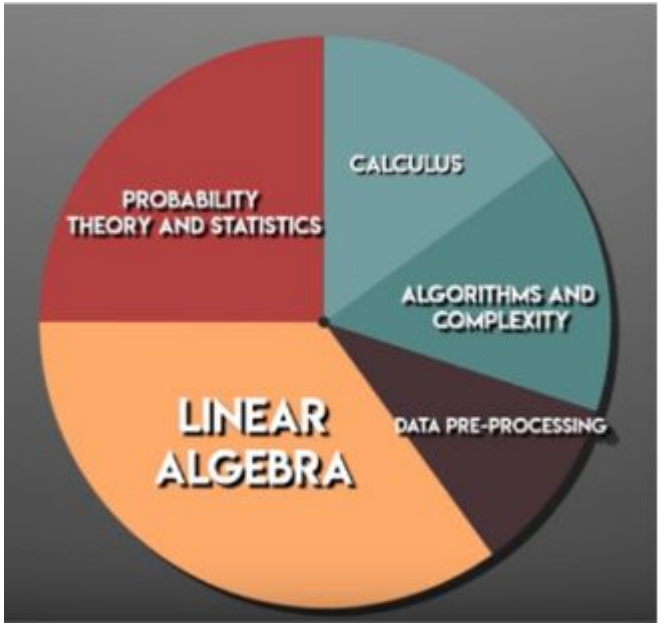


ML Methods



- **Supervised Learning**: learn by example and construct new rules that can be applied in unseen data.These methods used in solving prediction and classification problems.
- **Unsupervised Learning**:infer patterns from data without referring to neither labelled nor classified data. Clustering and anomaly detection is two of its applications.
- Semi-supervised learning.
- Reinforcement learning.

ML Prerequisites



- Linear Algebra by Prof. Gilbert Strang
- Essence of Calculus by 3blue1brown
- The Science of Uncertainty by edX
- Algorithm Design and Analysis by edX
- Machine Learning by Andrew Ng
- Siraj Raval Github

ML Example

Easy problem that can not be solved without ML: difference between apples and oranges.

Build your first ML application

Weight	Texture	Label
150g	Bumpy	Orange
170g	Bumpy	Orange
140g	Smooth	Apple
130g	Smooth	Apple
...	...	...

- Features: Weight and Texture
- Labels: Apples and Oranges
- Libraries: sklearn
- ML model (Classifier): Decision Tree Classifier (Box of rules).
- Training: fit()
- Testing: Predict()

Iris Flower Dataset

Classic ML problem to identify flower based on measurements, example petal length.

Iris dataset

- Features: Sepal length, sepal width, petal length and petal width.
- Labels: Setosa, Versicolor and Vergnica.
- Features + Labels = Dataset
- Libraries: sklearn, numpy
- ML model (Classifier): Decision Tree Classifier (Box of rules).
- Training: fit()
- Testing: Predict()

Thank you :)

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