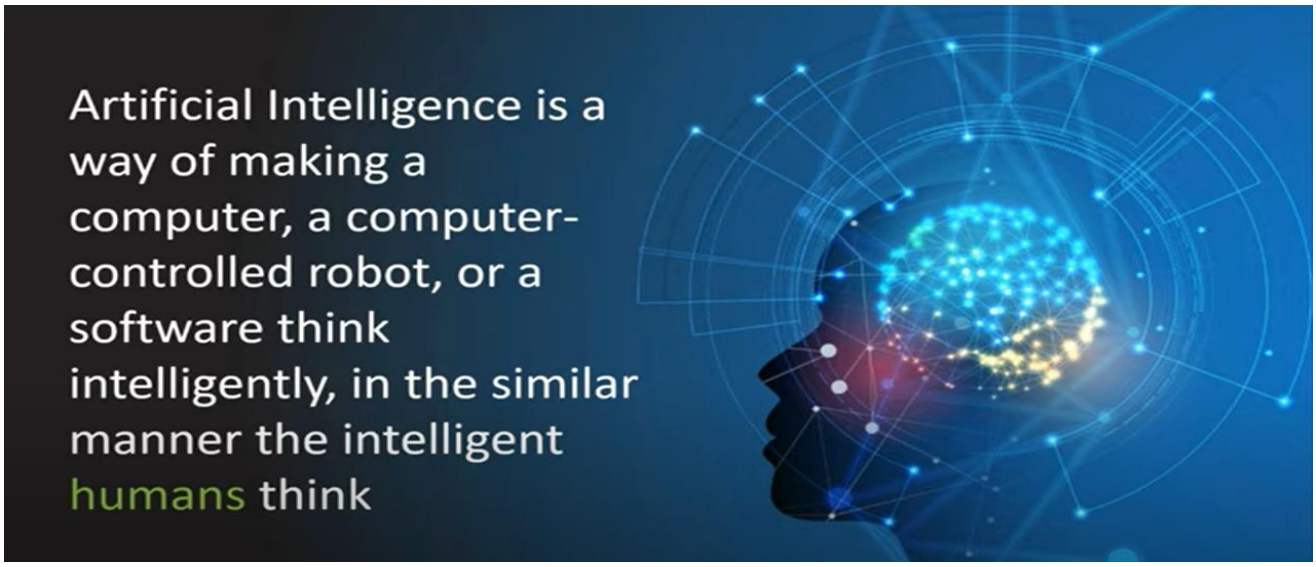
Artificial Intelligence

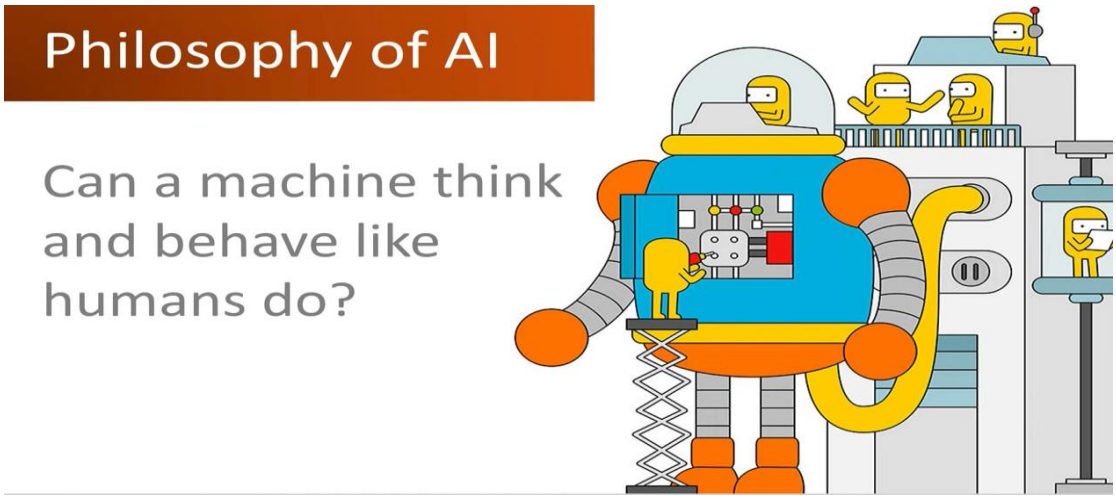
Lecture - 1

ENG/ Yaser Alshaeri

What Is Ai :


The science and engineering of making intelligent machines, especially intelligent computer programs

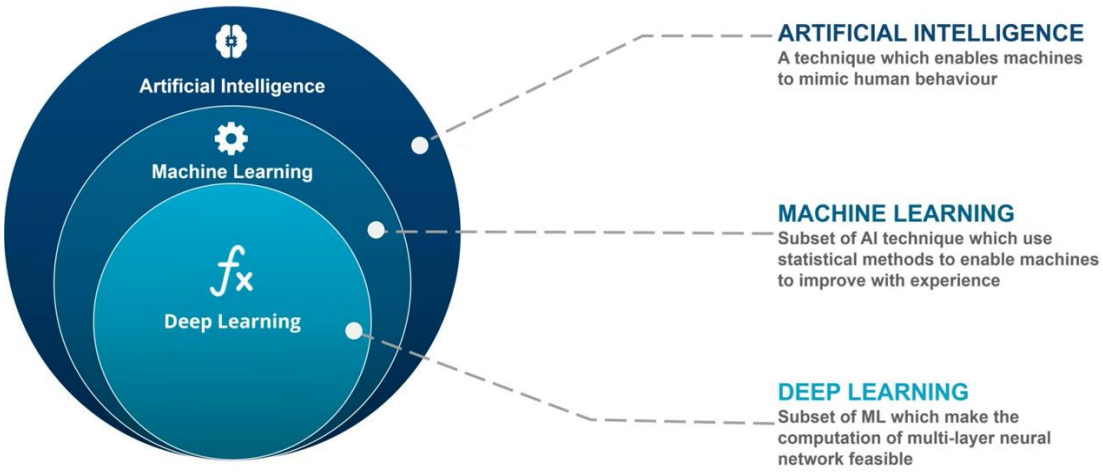

Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think


Philosophy of AI
Can a machine think and behave like humans do?

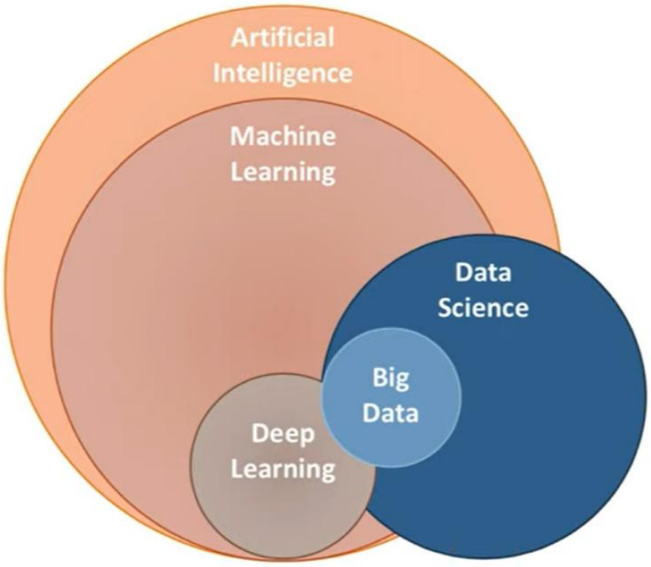
Programming Without and With AI

Programming Without AI	Programming With AI
A computer program without AI can answer the specific questions it is meant to solve.	A computer program with AI can answer the generic questions it is meant to solve.
Modification is not quick and easy. It may lead to affecting the program adversely.	Quick and Easy program modification.

- Parts of artificial intelligence

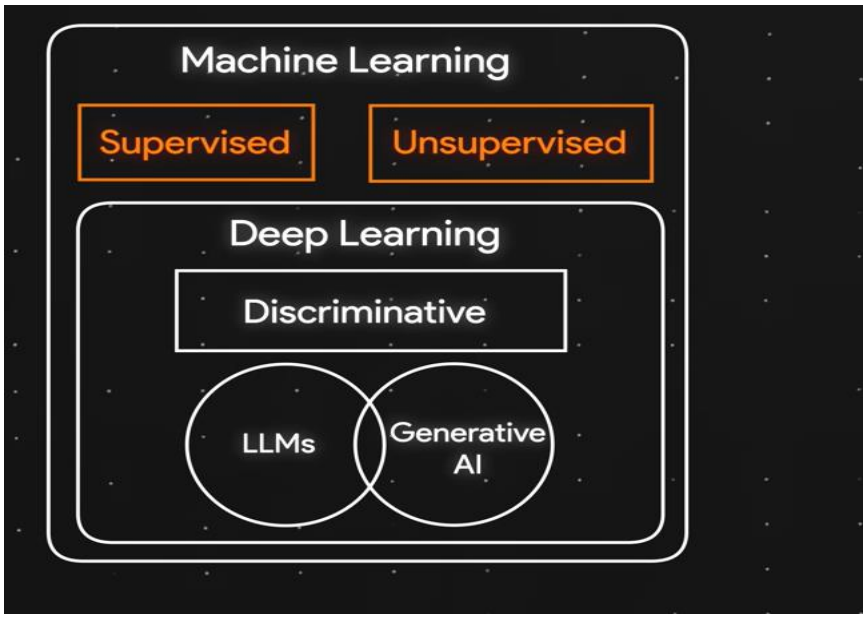


-Artificial Intelligence and Data Science



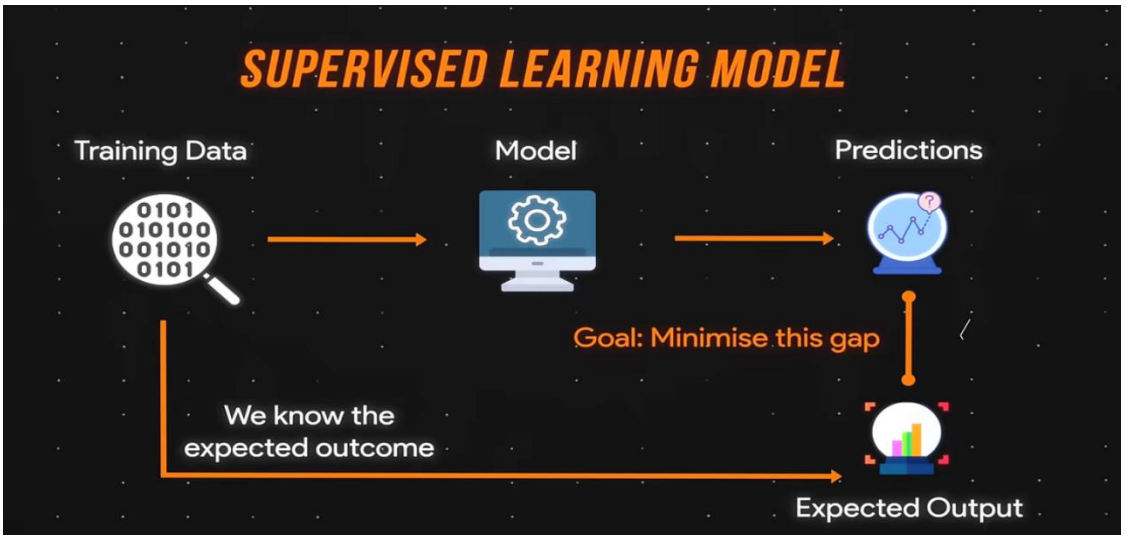
What is ML?

Machine learning (ML) is a branch of artificial intelligence (AI) and computer science that focuses on the using data and algorithms to enable AI to imitate the way that humans learn, gradually improving its accuracy

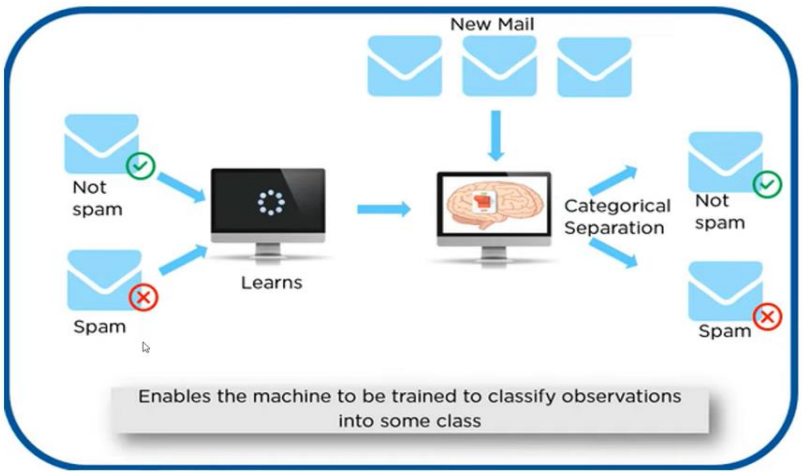


What is Supervised learning?

Supervised learning is a type of machine learning algorithm that learns from labeled data. Labeled data is data that has been tagged with a correct answer or classification



Example- 1:



Types of Supervised Learning:

Supervised learning is classified into two categories of algorithms:

1-Regression: A regression problem is when the output variable is a real value, such as “dollars” or “weight”.

Regression is a type of supervised learning that is used to predict continuous values, such as house prices, stock prices, or customer churn. Regression algorithms learn a function that maps from the input features to the output value. Some common regression algorithms include:

- Linear Regression
- Polynomial Regression
- Support Vector Machine Regression
- Decision Tree Regression
- Random Forest Regression

2- Classification: A classification problem is when the output variable is a category, such as “Red” or “blue” , “disease” or “no disease”.

Classification is a type of supervised learning that is used to predict categorical values, such as whether a customer will churn or not, whether an email is spam or not, or whether a medical image shows a tumor or not.

Classification algorithms learn a function that maps from the input features to a probability distribution over the output classes.

Some common classification algorithms include:

- Logistic Regression
- Support Vector Machines
- Decision Trees
- Random Forests
- Naive Baye

Applications of Supervised learning:

Supervised learning can be used to solve a wide variety of problems, including:

- Spam filtering: Supervised learning algorithms can be trained to identify and classify spam emails based on their content, helping users avoid unwanted messages.

- Image classification: Supervised learning can automatically classify images into different categories, such as animals, objects, or scenes, facilitating tasks like image search, content moderation, and image-based product recommendations.

-Medical diagnosis: Supervised learning can assist in medical diagnosis by analyzing patient data, such as medical images, test results, and patient history, to

identify patterns that suggest specific diseases or conditions.

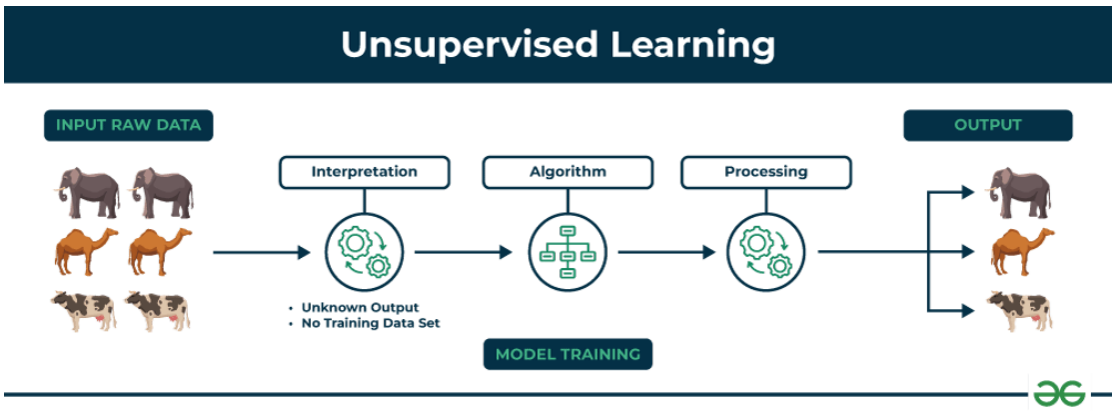
- Fraud detection: Supervised learning models can analyze financial transactions and identify patterns that indicate fraudulent activity, helping financial institutions prevent fraud and protect their customers.

- Natural language processing (NLP): Supervised learning plays a crucial role in NLP tasks, including sentiment analysis, machine translation, and text summarization, enabling machines to understand and process human language

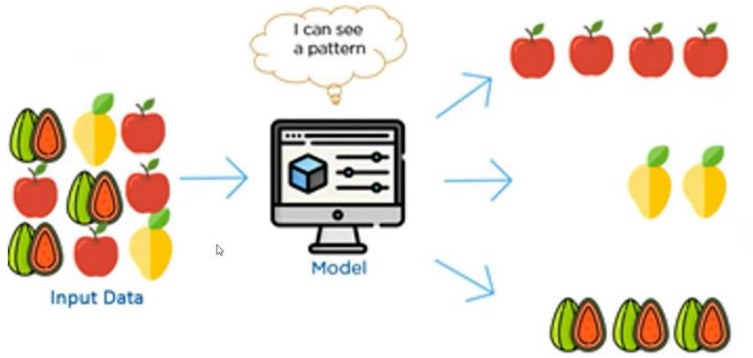
What is Unsupervised learning?

Unsupervised learning is a type of machine learning that learns from unlabeled data.This means that the data does not have any pre-existing labels or categories.The goal of unsupervised learning is to discover patterns and relationships in the data without any explicit guidance.

Unsupervised learning is the training of a machine using information that is neither classified nor labeled and allowing the algorithm to act on that information without guidance. Here the task of the machine is to group unsorted information according to similarities, patterns, and differences without any prior training of data.



Example :



Types of Unsupervised Learning

Unsupervised learning is classified into two categories of algorithms:

Clustering: A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behavior.

Clustering is a type of unsupervised learning that is used to group similar data points together. Clustering algorithms work by iteratively moving data points closer to their cluster centers and further away from data points in other clusters.

Clustering Types:

- Hierarchical clustering
- K-means clustering
- Principal Component Analysis
- Singular Value Decomposition
- Independent Component Analysis

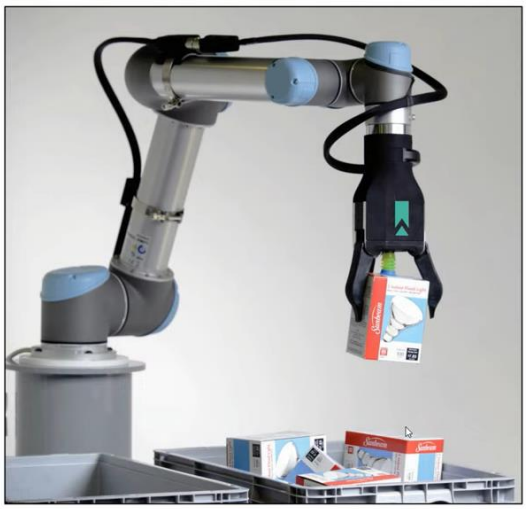
Association: An association rule learning problem is where you want to discover rules that describe large portions of your data, such as people that buy X also tend to buy Y. Association rule learning is a type of unsupervised learning that is used to identify patterns in a data.

Association rule learning algorithms work by finding relationships between different items in a dataset.

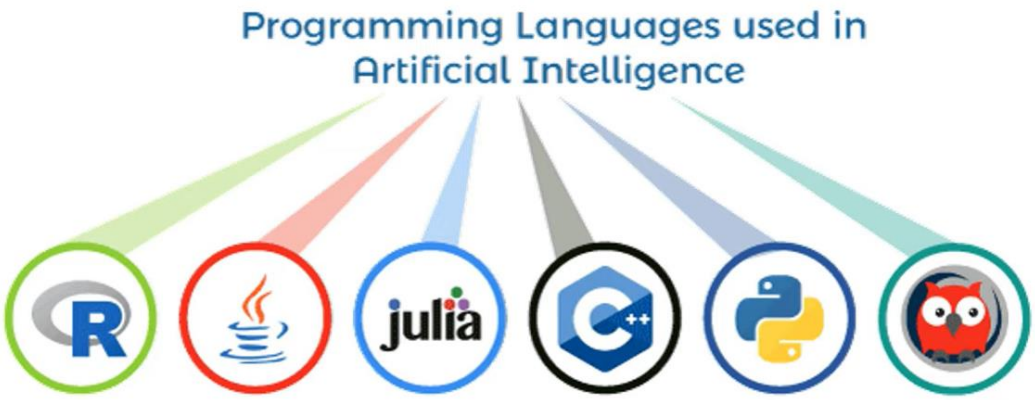
Some common association rule learning algorithms include:

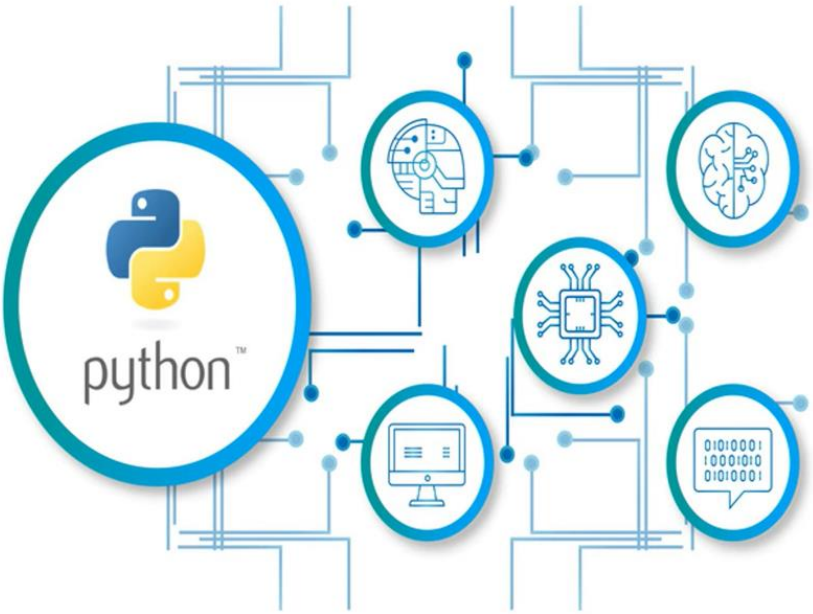
- Apriori Algorithm
- Eclat Algorithm
- FP-Growth Algorithm

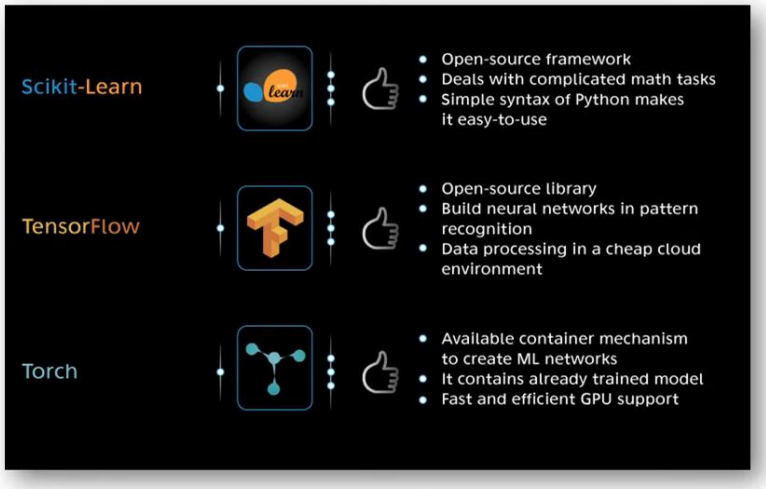
Full Example




Best Programming
Language For
Artificial Intelligence
and Machine Learning


Programming Languages used in
Artificial Intelligence
R
julia
C++


python™


Scikit-Learn
Open-source framework
Deals with complicated math tasks
Simple syntax of Python makes it easy-to-use
TensorFlow
Open-source library
Build neural networks in pattern recognition
Data processing in a cheap cloud environment
Torch
Available container mechanism to create ML networks
It contains already trained model
Fast and efficient GPU support