INTRODUCTION TO MACHINE LEARNING

LEC # 01

There are two types of AI

- AGI – Artificial General Intelligence
    - Can do all tasks that a human can do
- ANI – Artificial Narrow Intelligence
    - Machine Techniques
    - Classifications
    - Computer Vision etc.

Self-Learning

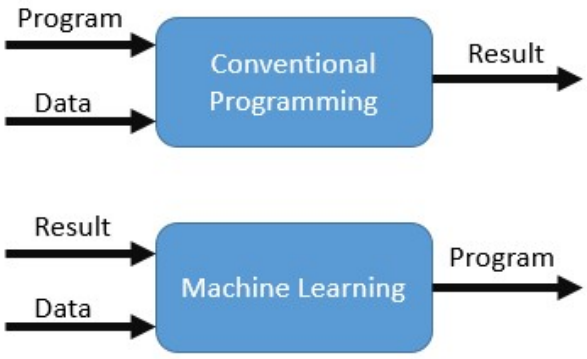
- Python with Type Hints
- SQL Model
- Vector Databases (Pinecone etc)
- Docker (Write Once, Run Anywhere)
- CNAI (Cloud Native AI)

LEC # 02

Artificial Intelligence:

Computer Programming VS Machine Learning

Convention programming / Symbolic AI – machine takes decision itself



ML Model > Knowledge Graph

BOOK: DEEP LEARNING WITH PYTHON

PyCaret – package use for machine learning

PyCaret is an open-source, low-code machine learning library in Python that automates machine learning workflows.

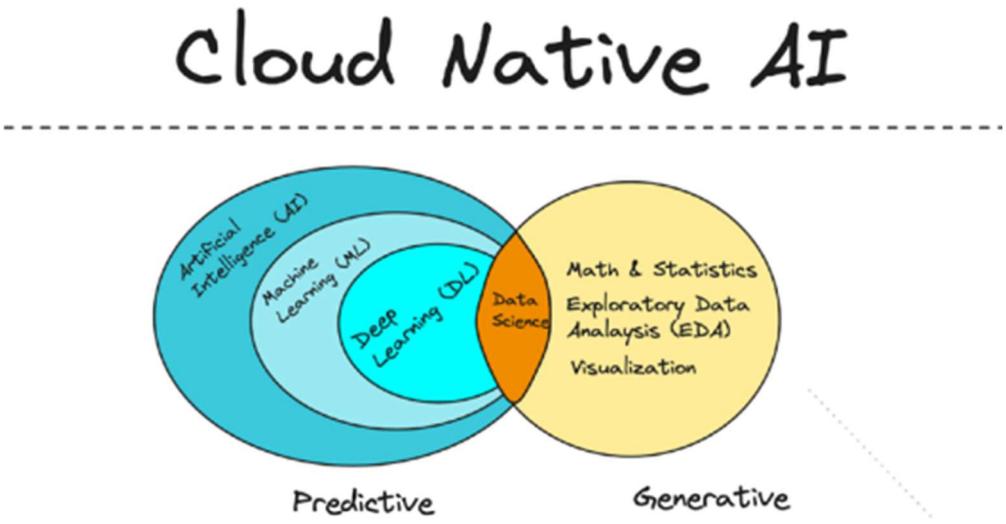
Provide ML Solutions in a single library.

Low Code solution.

Image net – data set

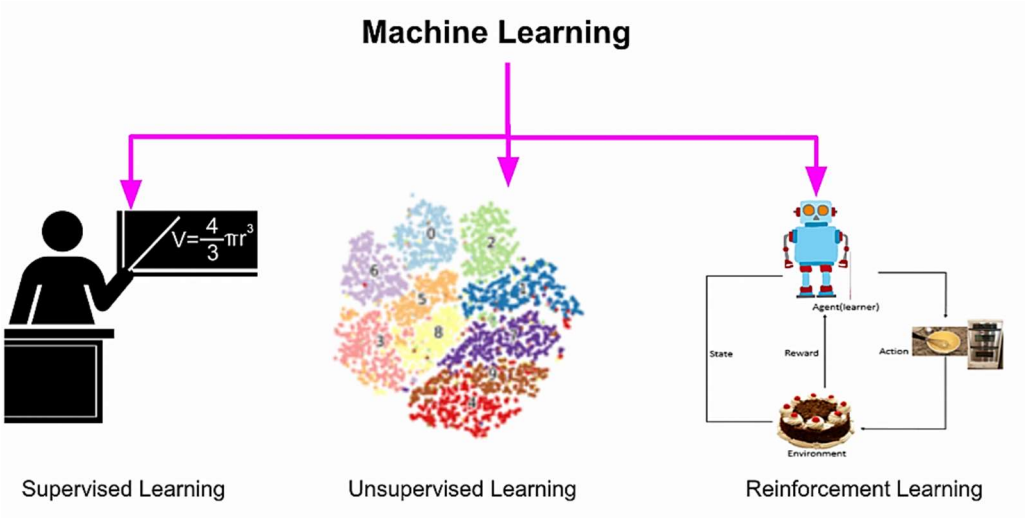
ImageNet is an image database organized according to the WordNet hierarchy (currently only the nouns), in which each node of the hierarchy is depicted by hundreds and thousands of images. The project has been instrumental in advancing computer vision and deep learning research. The data is available for free to researchers for non-commercial use.

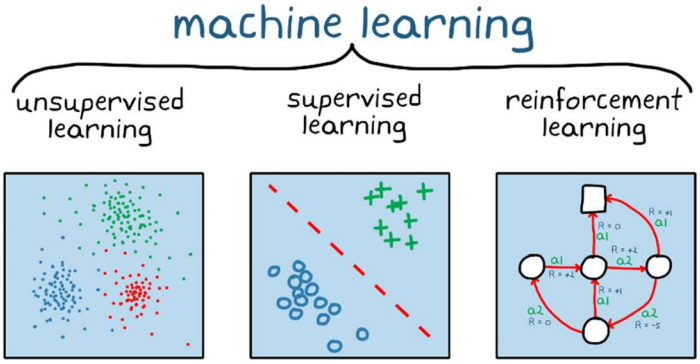
Cloud Native Artificial Intelligence



Types of Machine Learning

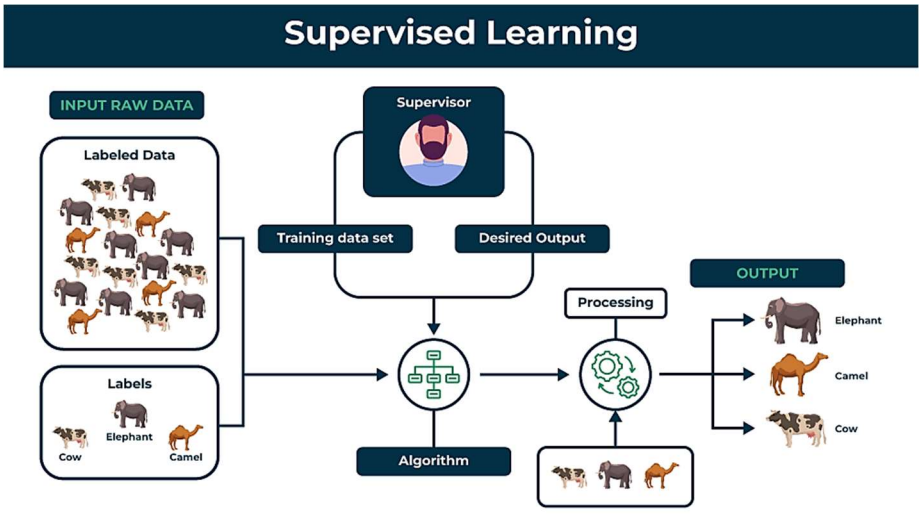
There are 3 types of machine learning





- *Supervised learning*

Supervised learning is a category of machine learning that uses labeled datasets to train algorithms to predict outcomes and recognize patterns.



Example of Feature Extraction

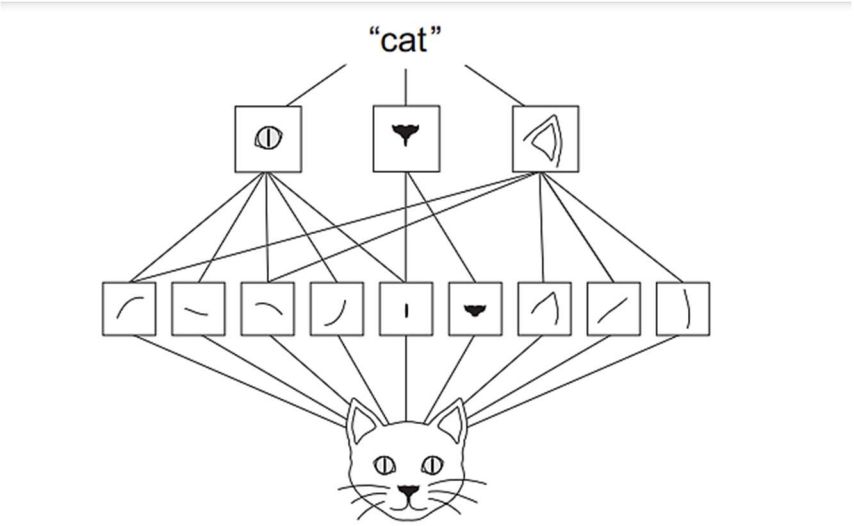


Figure 5.2 The visual world forms a spatial hierarchy of visual modules: hyperlocal edges combine into local objects such as eyes or ears, which combine into high-level concepts such as "cat."

Supervisor/ML Engineer will filter out all the non-essential information in input.

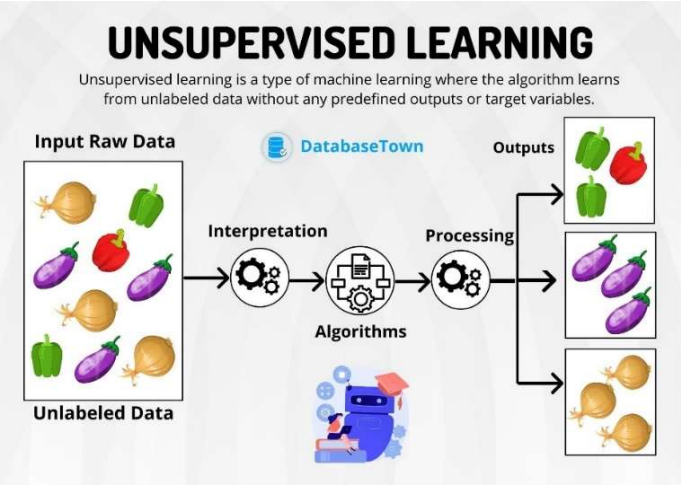
Supervised Learning is limiting because Human Intervention is required.

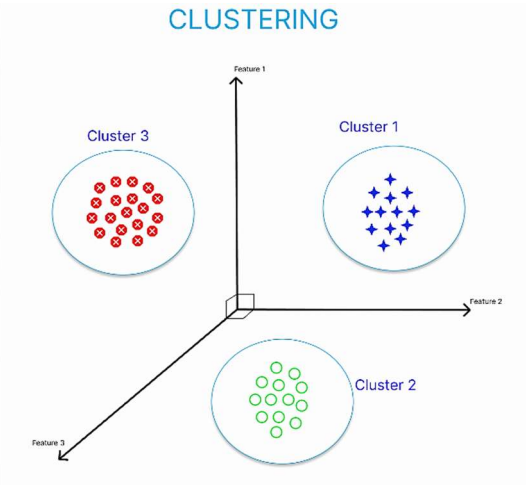
ML Engineer will perform Feature Extraction / Feature Engineering.

Solution is to use Deep Learning which uses ANN (Artificial Neural Networks) which automaticallyperforms

- *Unsupervised learning – means clustering*

Unsupervised learning in artificial intelligence is a type of machine learning that learns from data without human supervision. Unlike supervised learning, unsupervised machine learning models are given unlabeled data and allowed to discover patterns and insights without any explicit guidance or instruction.



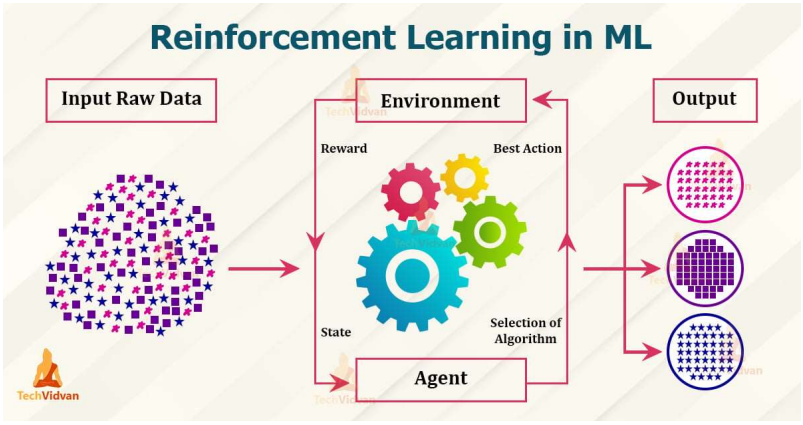


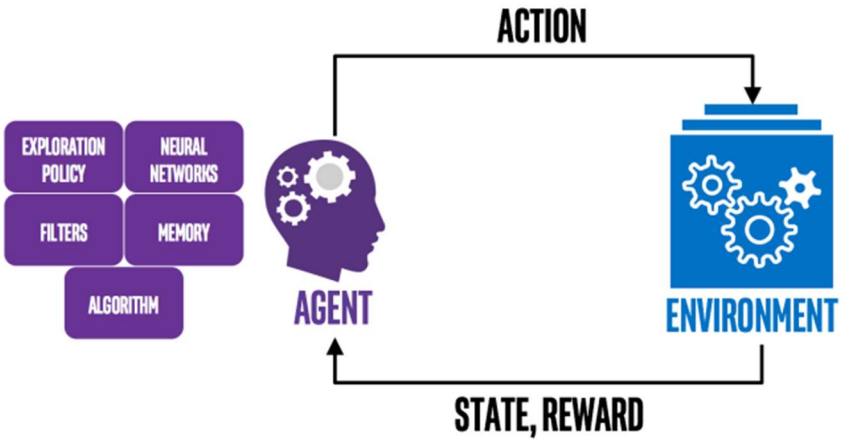
We do not provide labels/result with Data.

ML Algorithms apply labels itself.

- *Reinforced learning*

Reinforcement learning (RL) is a machine learning (ML) technique that trains software to make decisions to achieve the most optimal results. It mimics the trial-and-error learning process that humans use to achieve their goals.





AI Agent will get current State from Environment.

AI Agents perform some Action on Environment.

Environment will give some Reward (either Positive / Negative)

The AI Agent will change its future Actions based on previous Rewards.

Deep learning

Sub field of machine learning – Deep learning – ANN (Artificial Neural Network)

Sub field of deep learning – Genearive AI

Different types of neural networks

The different types of neural networks in deep learning, such as convolutional neural networks (CNN), recurrent neural networks (RNN), artificial neural networks (ANN), etc. are changing the way we interact with the world.

- CNN
- RNN – Transformers – attention model