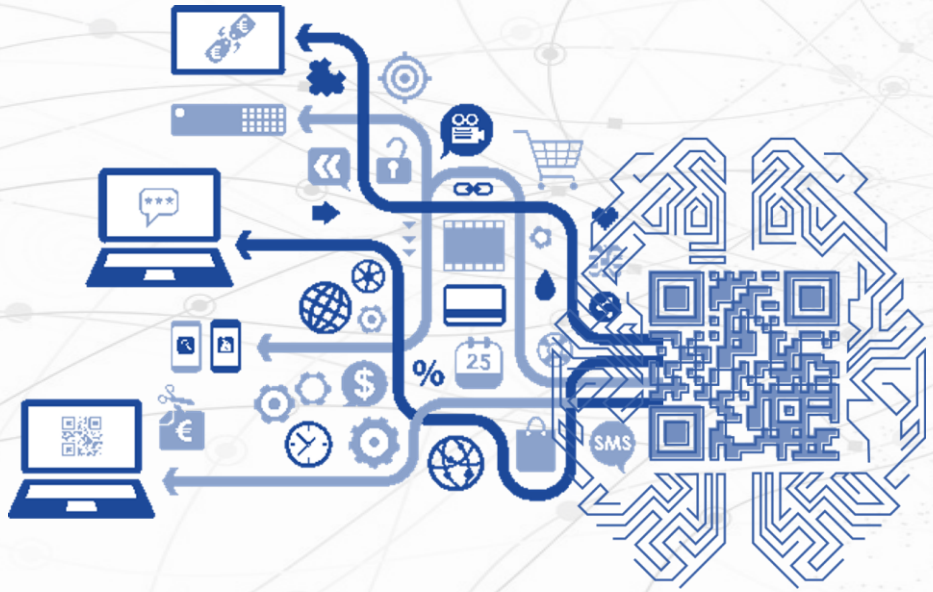
Introduction To AI & Data Science World



Session Outline

- Introduction To Artificial Intelligence.
- Introduction To Machine Learning.
- Introduction To Data Science.
- Data Different Jobs.
- Artificial intelligence Roadmap.
- CDSP Content.
- Certificate Path.
- Assignment Submission Process.

Introduction To AI

Introduction To AI
Outline

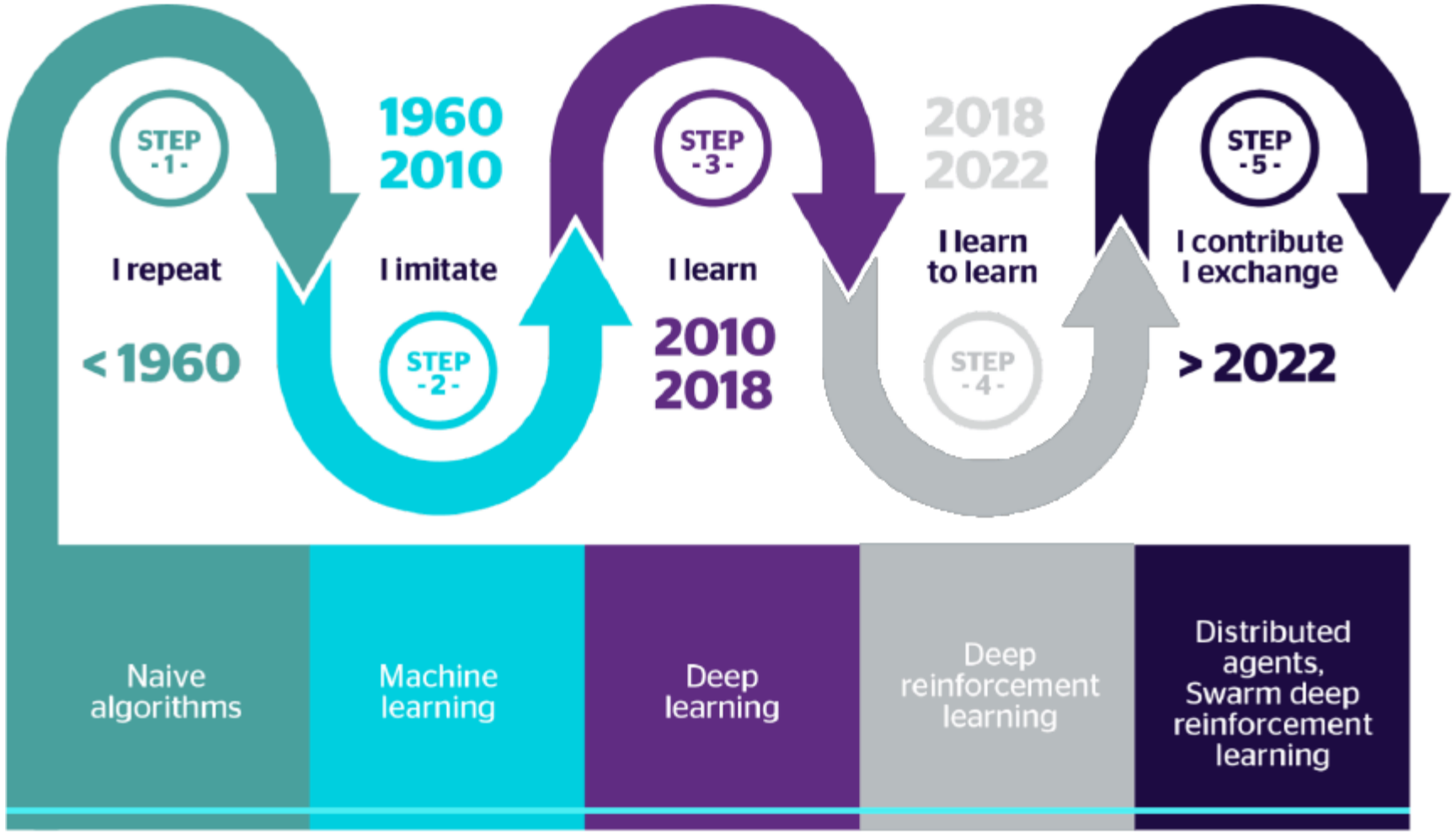
- Present applications of AI.
- Why is AI important?
- History of AI.
- Definition of AI.
- Ethics of artificial intelligence
  - (Why we need it?, what is it?, How to apply it ?)


ENGINEERED
ARTS

Why is AI important?

- Open Job opportunities.(Data Annotators, Machine Learning Engineers)
- Eliminates the need to perform tedious tasks (labor intensive task).
- Adds intelligence to Existing Products(Siri in apple products).
- Achieves incredible accuracies Because of deep learning (Speech Recognition, Image Classification) .

Brief History of AI



Artificial Intelligence (AI)

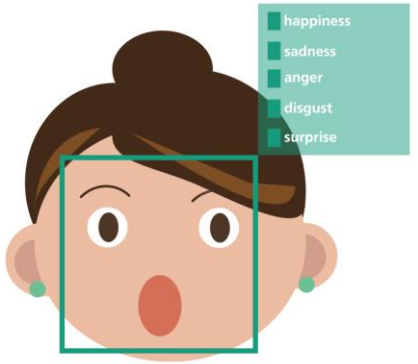
- “Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind”

IBM

Smart speakers: Alexa

Self driving cars

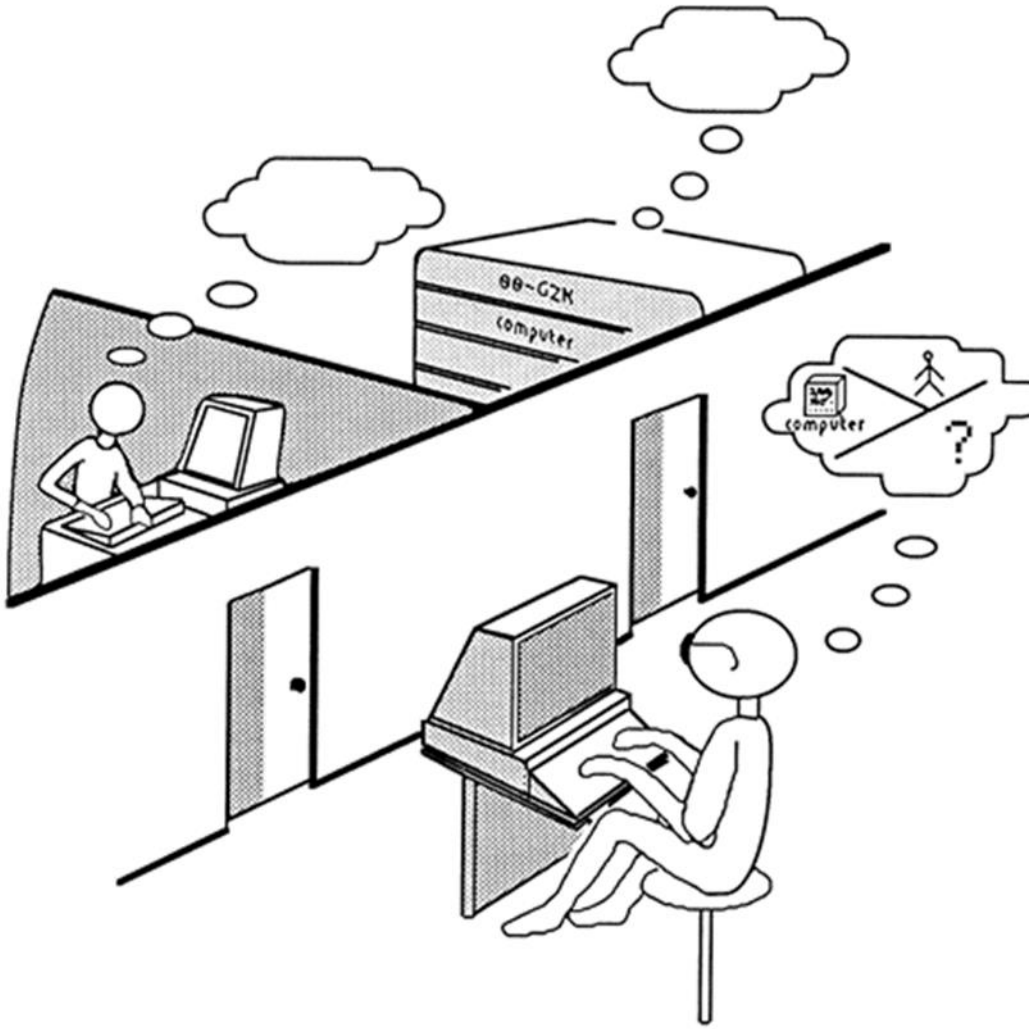
Emotion recognition



EPSILON AI
JOIN THE FUTURE OF AI

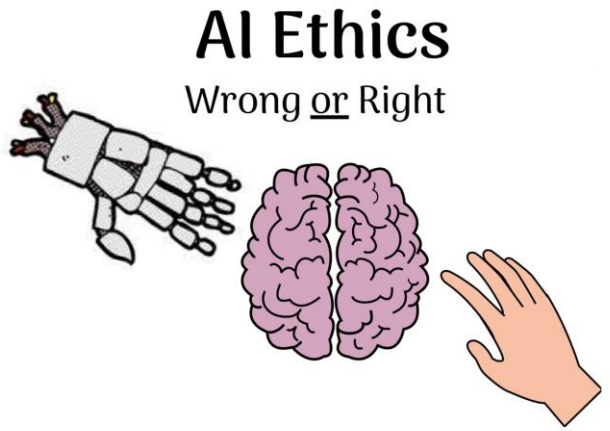
Artificial Intelligence (AI)

- Systems that think like humans.
- Systems that act like humans.
- Systems that think rationally.
- Systems that act rationally.



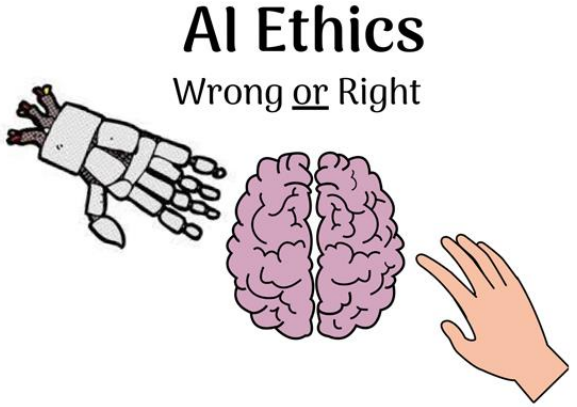
Alan Turing Test

Ethics of AI



- Ethics of AI is important Because of:
  - Concern with the moral behavior of humans as they make AI systems.
  - Concern with the behavior of machines, or machine ethics.
  - Ensures that the AI initiatives of the organization maintain human dignity and do not harm people.
  - Including fairness, anti-weaponization and liability, such as in the case of self-driving cars that encounter accidents.

Ethics of AI



- Ethics of AI is :
  - A branch of the ethics of technology specific to artificially intelligent systems.
- How it is applied:
  - At enterprise level, these companies can have what is called an ethical AI manifesto that their machine learning, and artificial intelligence initiatives follow.
  - This guidance differs from organization to organization.

Which of the following is an application of Artificial Intelligence?

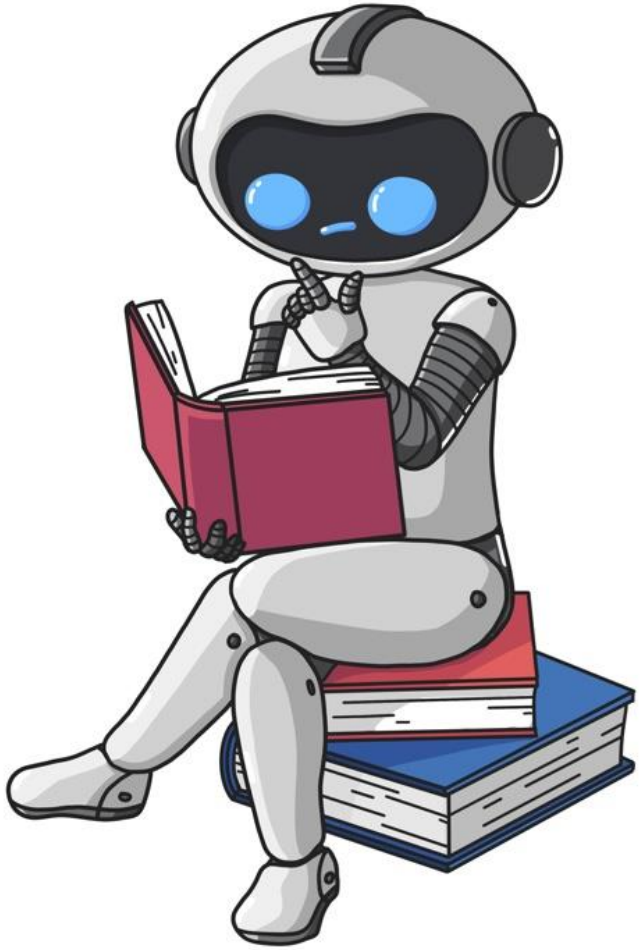
A. It helps to exploit vulnerabilities to secure the firm.

B. Language understanding and problem-solving.

C. Easy to create a website.

D. It helps to deploy applications on the cloud.

Multiple Choice



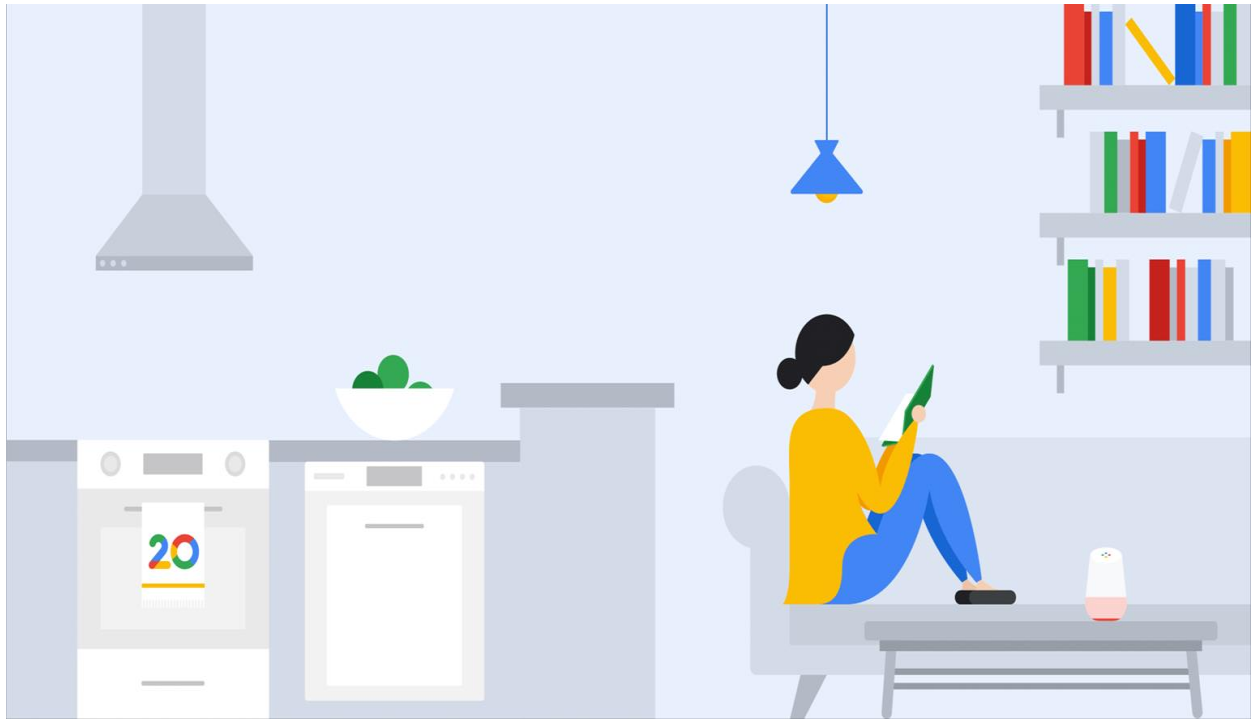
Introduction To Machine Learning

Introduction To ML Outline:

- Machine learning applications.
- What is Machine learning.
- Types of Machine learning.
- Deep learning.

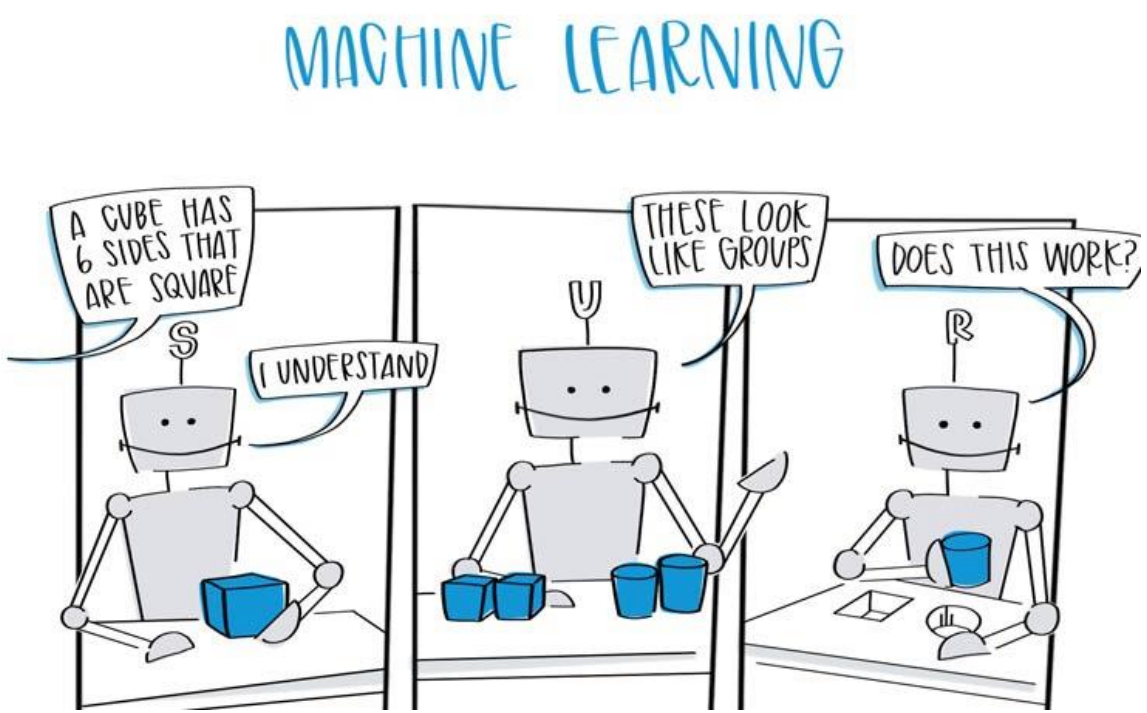
Video from still image by Samsung.

Virtual assistant: Google assistant



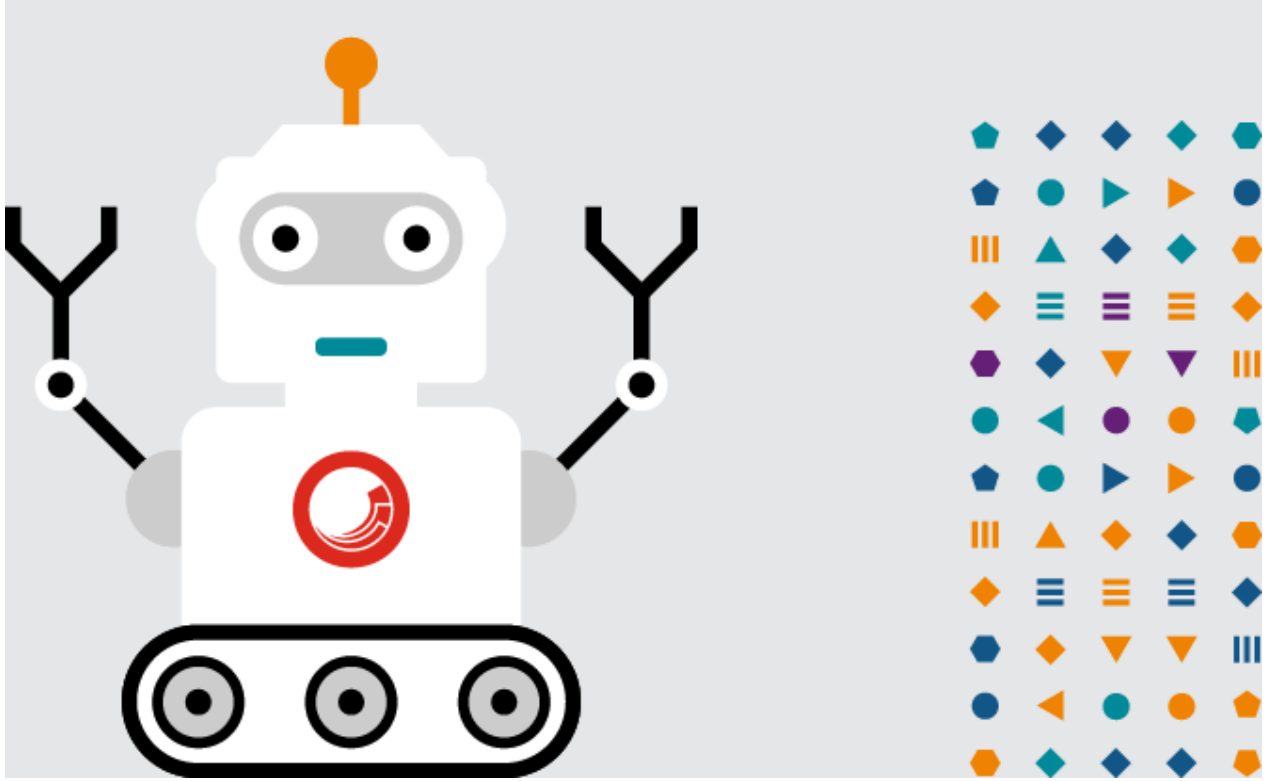
Machine learning is:

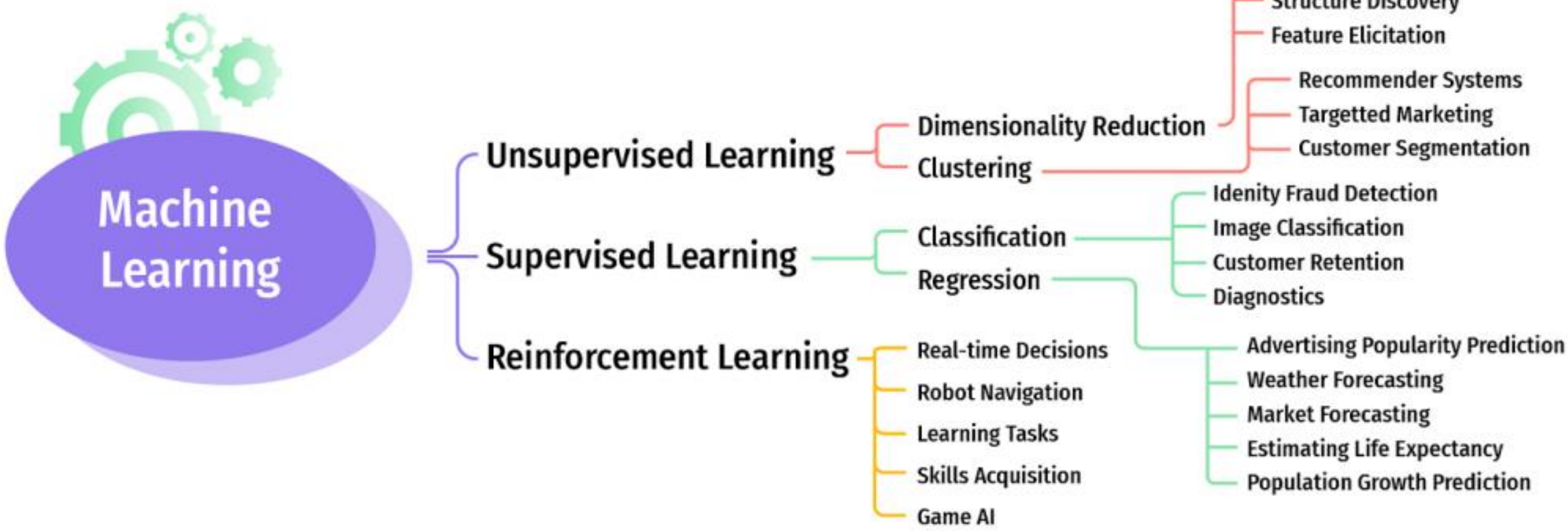
- The science of getting computers to act without being explicitly programmed.
- It is seen as a part of artificial intelligence.
- Machine learning is closely related to computational statistics.



Machine learning is:

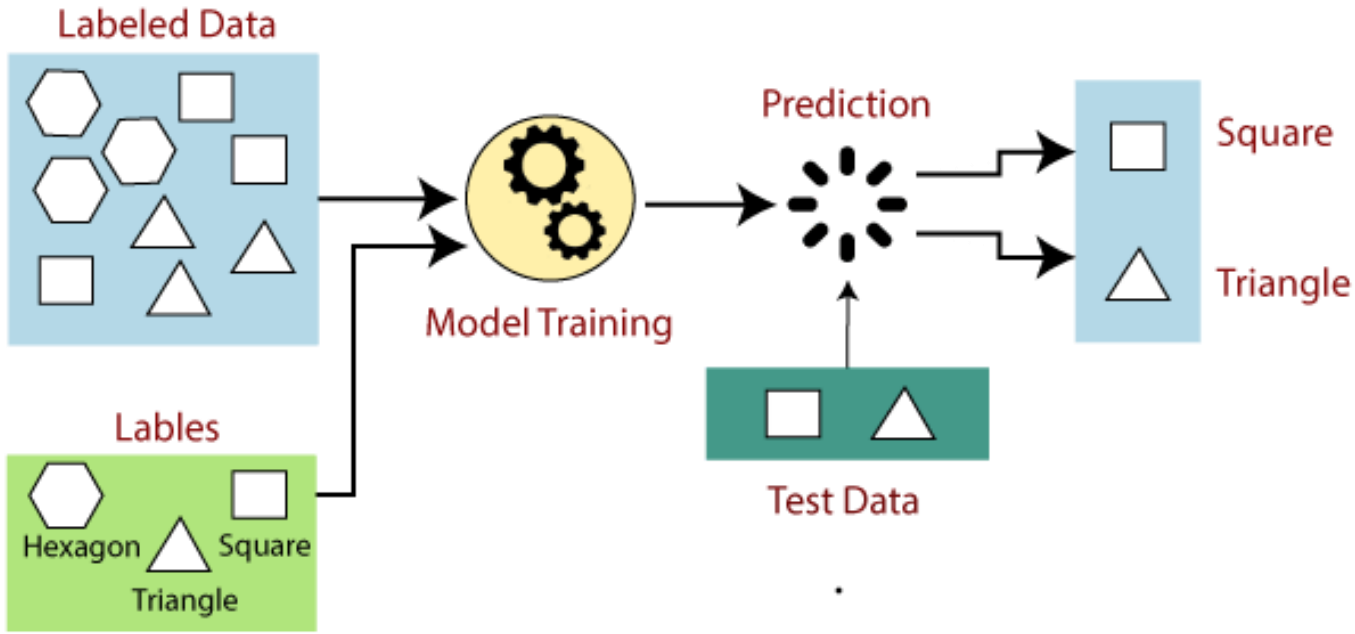
- Machine learning algorithms are the engines of machine learning
- Algorithms turn a data set into a model.
- Which kind of algorithm works best depends on:
  - The kind of problem you're solving.
  - The computing resources available
  - The nature of the data.





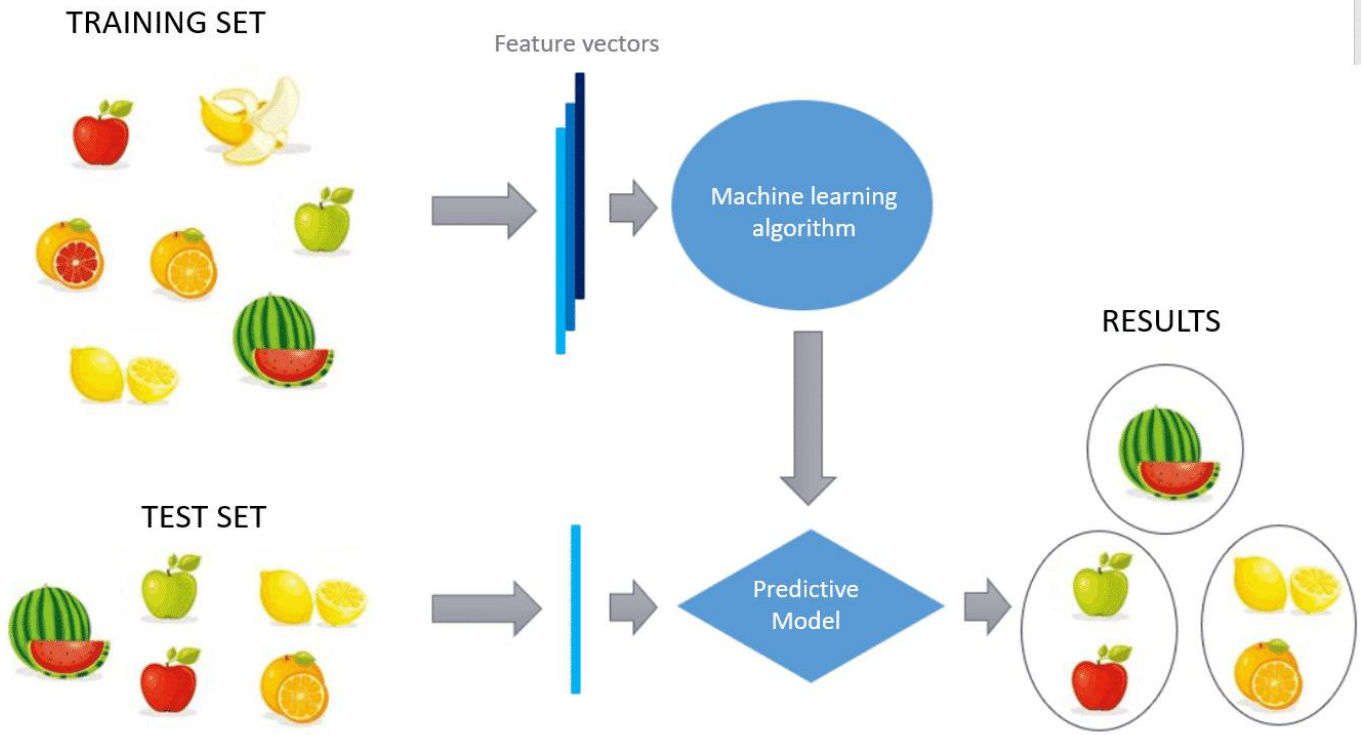
Supervised learning:

- Has the presence of a supervisor as a teacher.
- when we train the machine using data that is labeled.
- Machine is provided with a new set of examples(data) to see how well the algorithm is doing.



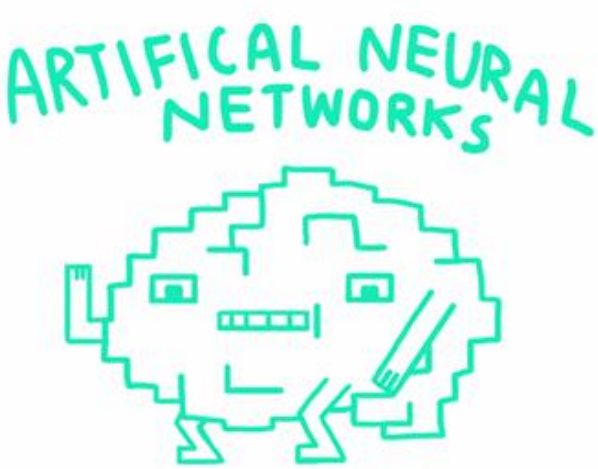
Unsupervised learning :

- Training of a model using information that is not labeled.
- Allowing the algorithm to act on that information without guidance.
- Model is restricted to find the hidden structure in unlabeled data by itself.



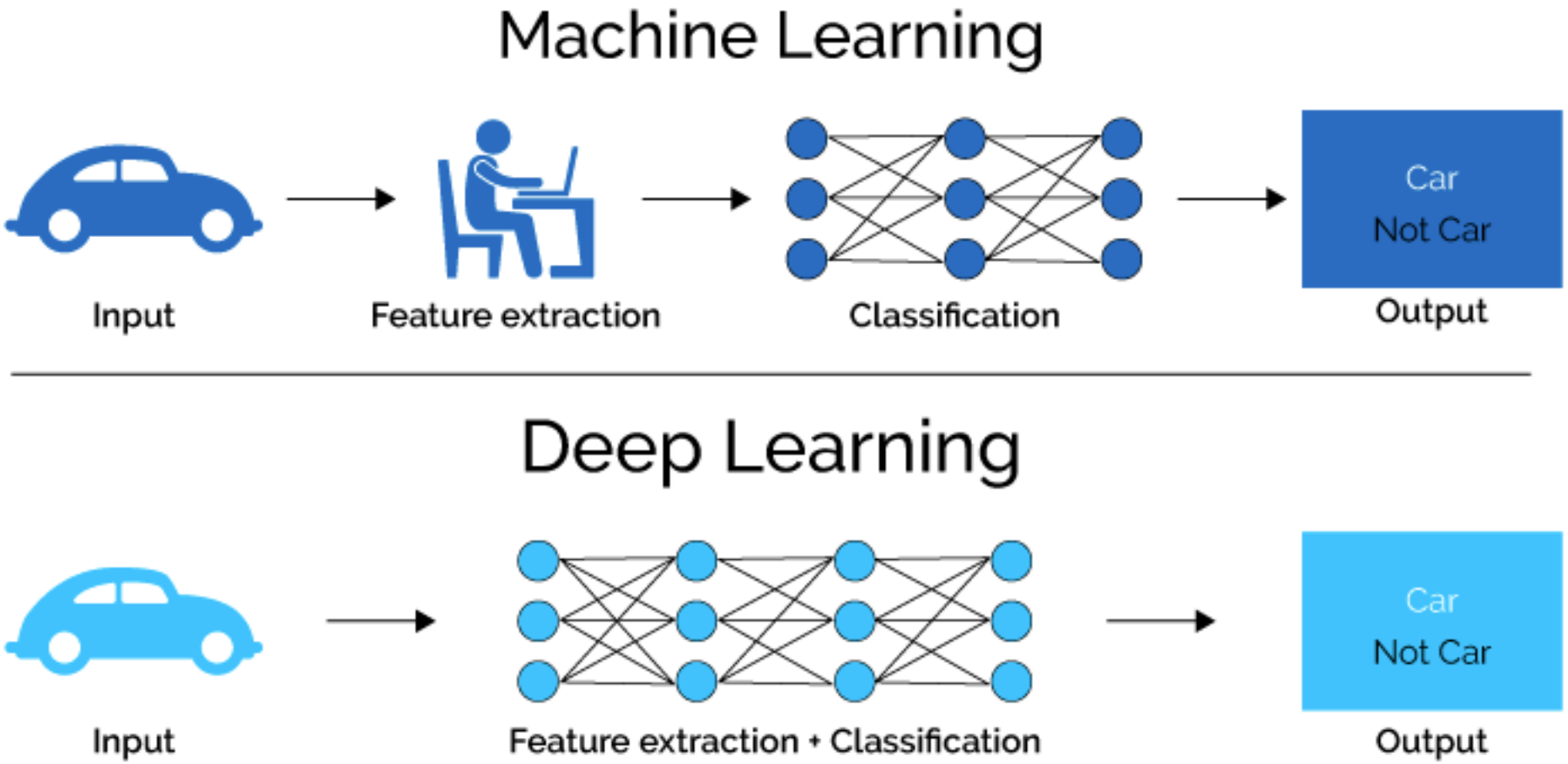
Deep learning is:

- Deep Learning is a subfield of machine learning.
- Concerned with algorithms inspired by the structure and function of the brain called artificial neural networks.
- We don’t need to extract Features as in machine learning.



Artificial neural networks (ANNs), usually simply called neural networks (NNs), are computing systems inspired by the biological neural networks that constitute brains.

What is Deep Learning?

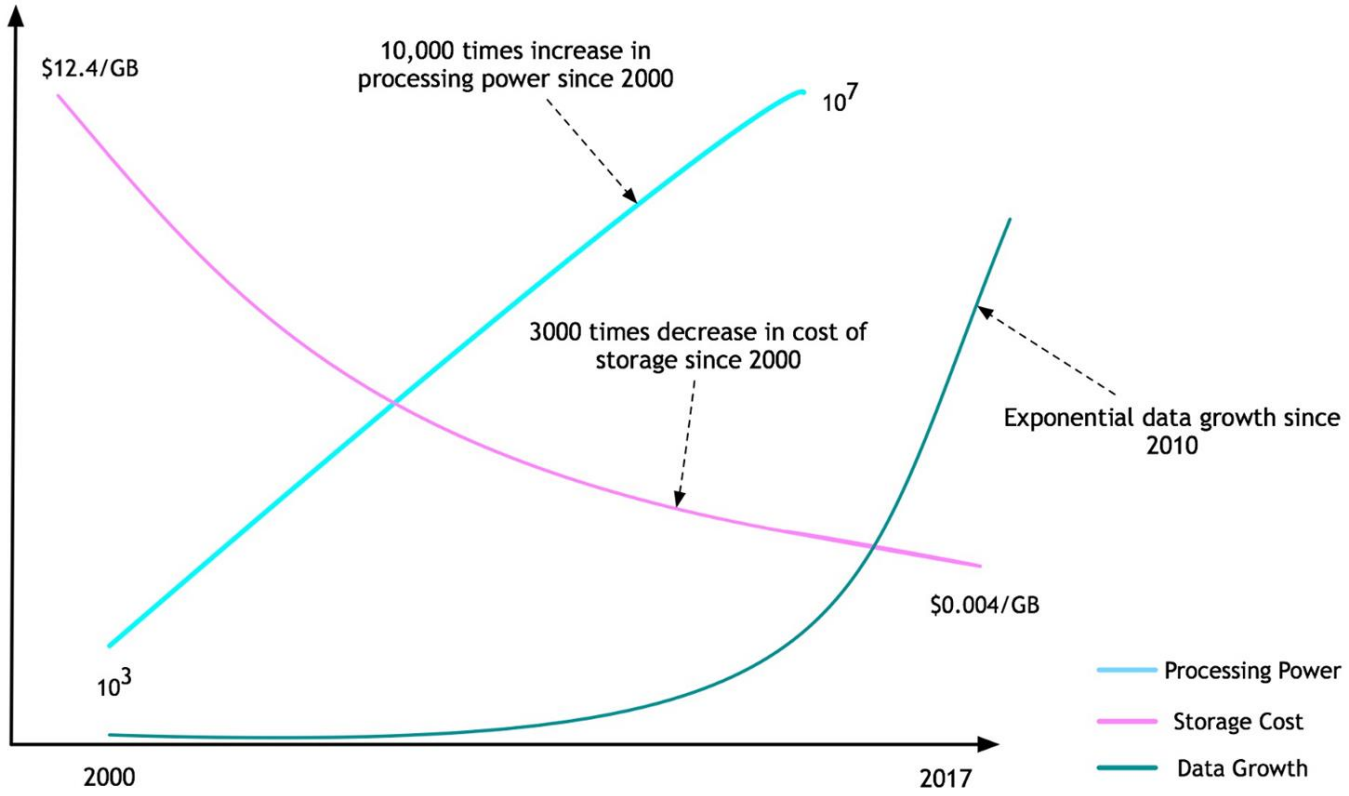


What made DL possible:

- Wider access to large volumes and varieties of data, “big data” (5Vs)

What made DL possible:

- Much more affordable data storage solutions.
- Big data sets for much wider variety of applications(Computer vision, NLP)
- Increasing processing power



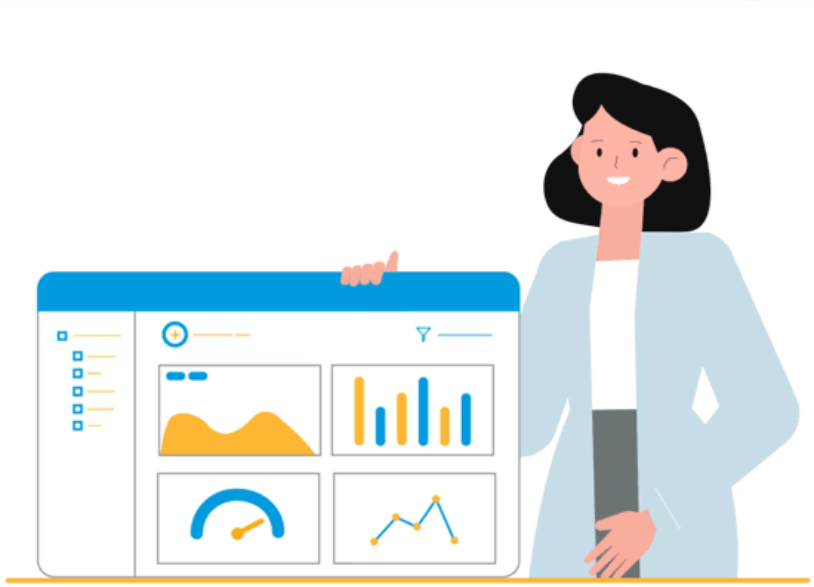
Which of these is not supervised learning?

A. Classification.

B. Representational Learning.

C. Clustering.

D. Regression.

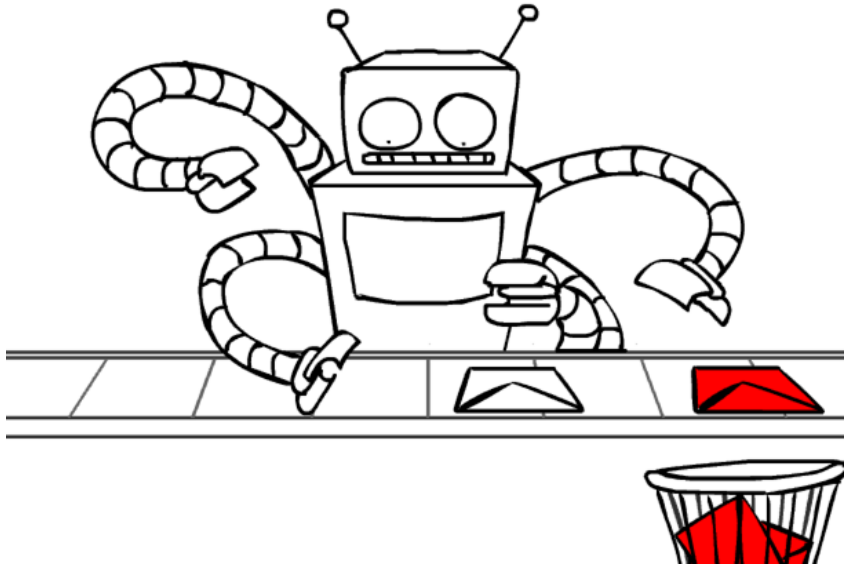


Introduction To Data Science

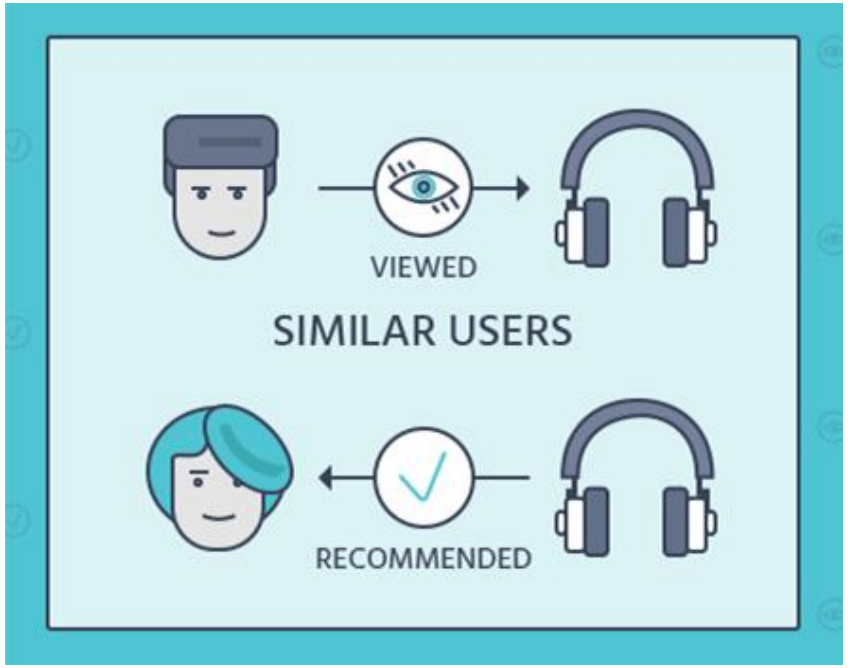
Introduction To Data Science outline:

- Data science in real world.
- Importance of Data science.
- What is Data science?
- Data science process.

How Gmail filters your emails in the spam and non-spam categories?



How Amazon suggest items for you to buy?



Why we need Data Science?

- Working with data means for business:
  - Maintaining a healthy Business.
  - Data is the Foundation of any successful Company in this era.
  - Getting insights from data helps companies to rise above their competition.

- Enriching Lives:
  - Ex. In healthcare to create products that helps customers with their health.
  - Data will help to create better customer experiences.

What is Data Science?

Data Science is:

- A Problem-solving approach that uses data to solve problem.
  1. The Problem could be making a decision (email is spam or not).
  2. Product recommendation (Recommending a movie)
  3. Predicting an outcome (who will when the soccer game)

- Interdisciplinary field that uses statistics, mathematics, data analysis, domain knowledge, informatics, and their related methods to extract knowledge and insights from noisy, structured and unstructured data.

“Consumer data will be the biggest differentiator in the next two to three years Whoever unlocks the reams of data and uses it strategically will win.”

-Angela Ahrendts, Senior Vice President of Apple.

Data Science Process

How to Data science:

- Gathering
- Colle

- explore and visualize data to uncover insights from the start
  - Helps you to know the problems of your data

Machine Learning Engineer

Use M… …uild intelligent

…e intelligent model in p…oductions to be actively use by consumers

MLOps Engineer

Data Collection

Explore Data (EDA)

Data Preprocessing

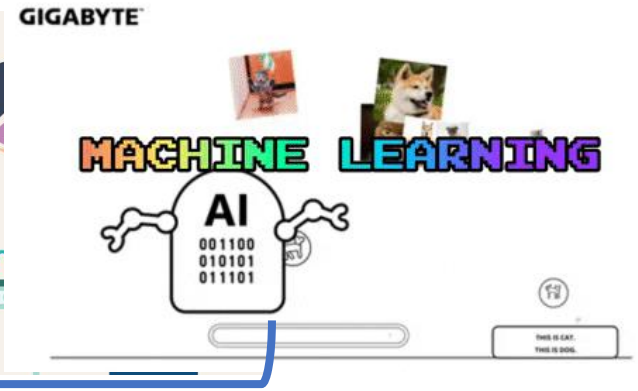
Data Understanding

Data Modeling

Model Deployment

Data Engineer

Data Analyst



Data Scientist

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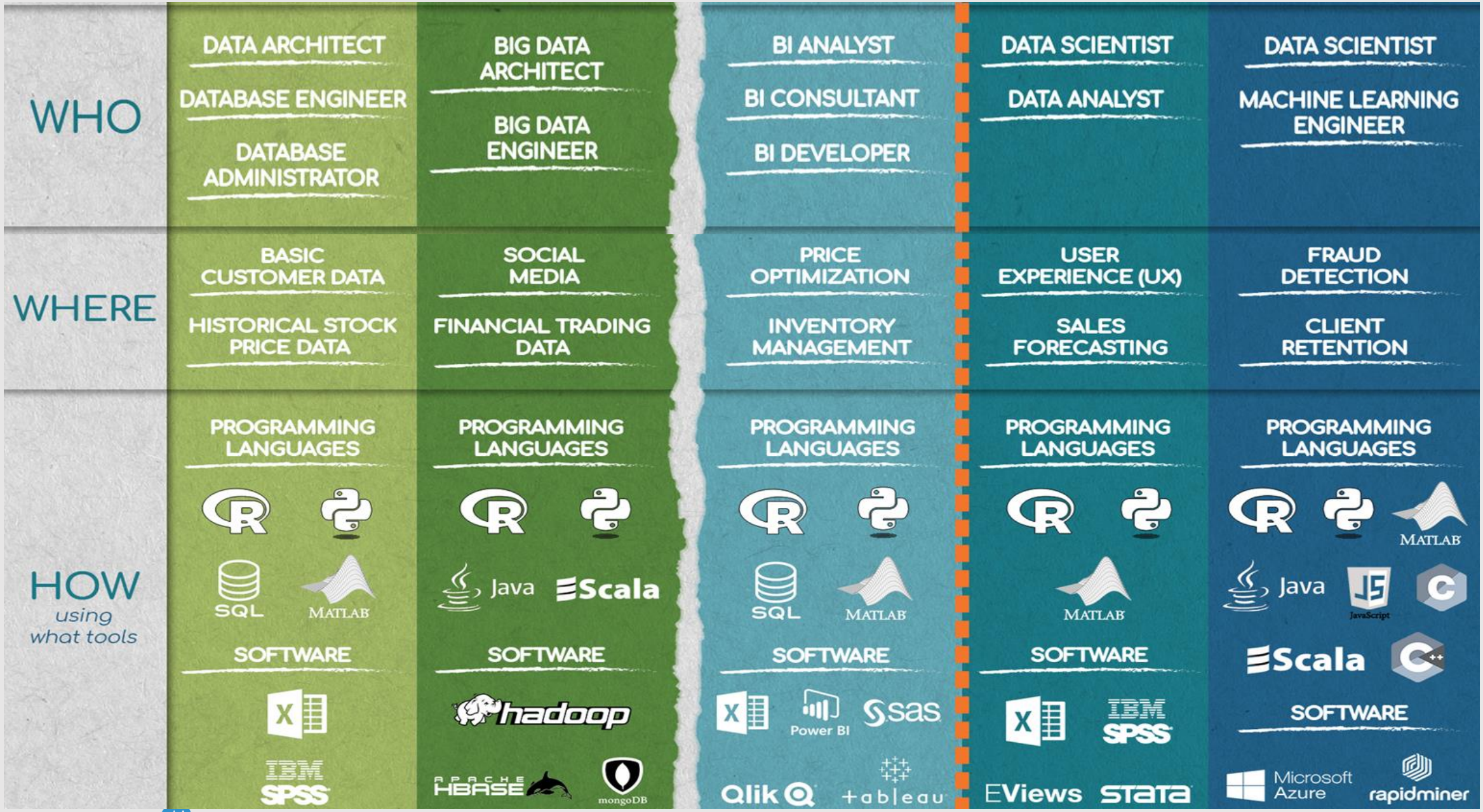
Data Different Jobs



WHO

DATA ARCHITECT
DATABASE ENGINEER
DATABASE ADMINISTRATOR

BIG DATA ARCHITECT
BIG DATA ENGINEER

BI ANALYST
BI CONSULTANT
BI DEVELOPER

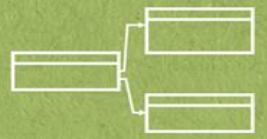
DATA SCIENTIST
DATA ANALYST

DATA SCIENTIST
MACHINE LEARNING ENGINEER

WHAT
techniques are involved

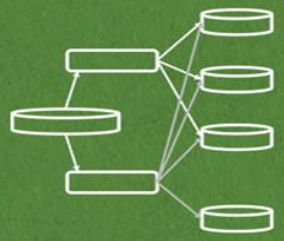
DATA COLLECTION
PREPROCESSING
- class labeling *(categorical vs numerical)*
- data cleansing
- dealing with missing values

CASE SPECIFIC
- e.g. balancing & shuffling datasets

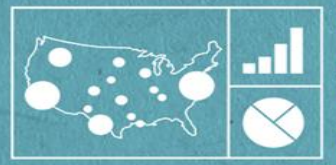


DATA COLLECTION
PREPROCESSING
- class labeling *(number, text, digital images, digital video data, digital audio data)*
- data cleansing
- dealing with missing values

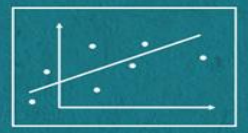
CASE SPECIFIC
- text data mining, confidentiality - preserving data mining techniques



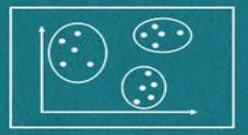
ANALYZE THE DATA
EXTRACT INFO AND PRESENT IT IN THE FORM OF:
- metrics
- KPIs
- reports
- dashboards



REGRESSION



LOGISTIC REGRESSION
CLUSTERING



FACTOR ANALYSIS
TIME SERIES

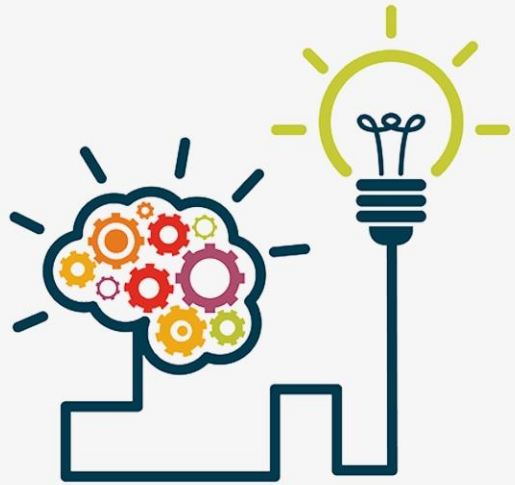
SUPERVISED LEARNING
- SVMs
- NNs
- deep learning
- random forests
- bayesian networks

ML

UNSUPERVISED LEARNING
- k-means
- deep learning

REINFORCEMENT LEARNING
similiar to supervised learning, but instead of minimizing the loss, one maximizes reward

What is a problem that data science solves in your daily life?



Short Answer

AI vs ML vs DL vs DS

AI is the broad concept of developing machines that can simulate human behavior.

ML is a subset of AI wherein computer systems learn from the environment.

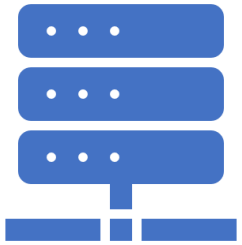
All machine learning is AI, but not all AI is machine learning.

DL is part of machine learning methods based on ANNs.

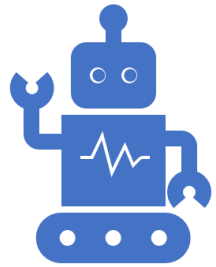
DL uses multiple layers to extract features from the raw input.

AI vs ML vs DL vs DS

Data Science is the processing, analysis and extraction of relevant assumptions from data.

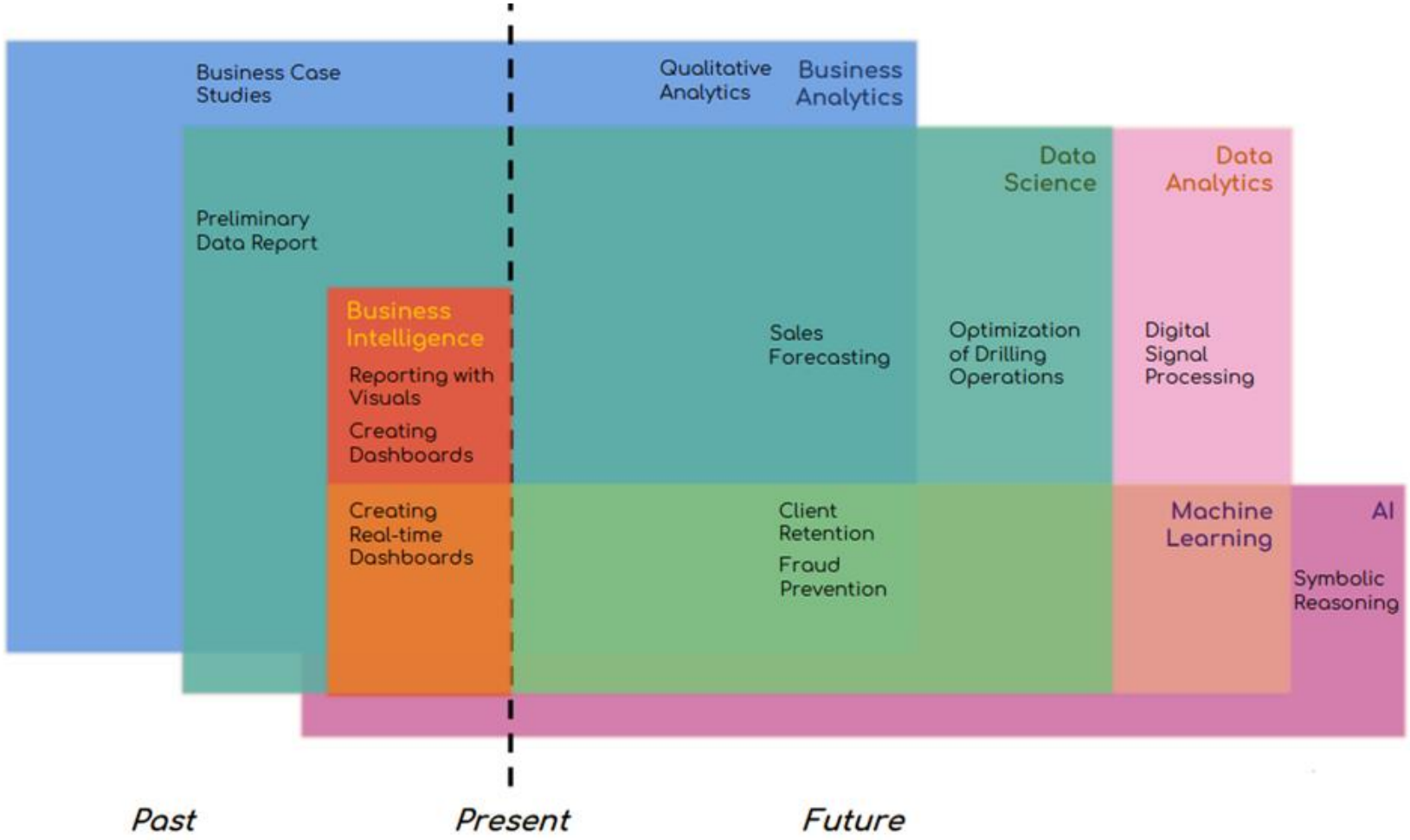


DS is all about finding hidden patterns in the data.



A Data Scientist makes use of machine learning in order to predict future events.

Analytics Vs Data Science




Artificial Intelligence Roadmap
EPSILON AI

AI Roadmap

Fundamentals

01

Data Science Roadmap

02

Machine Learning Roadmap

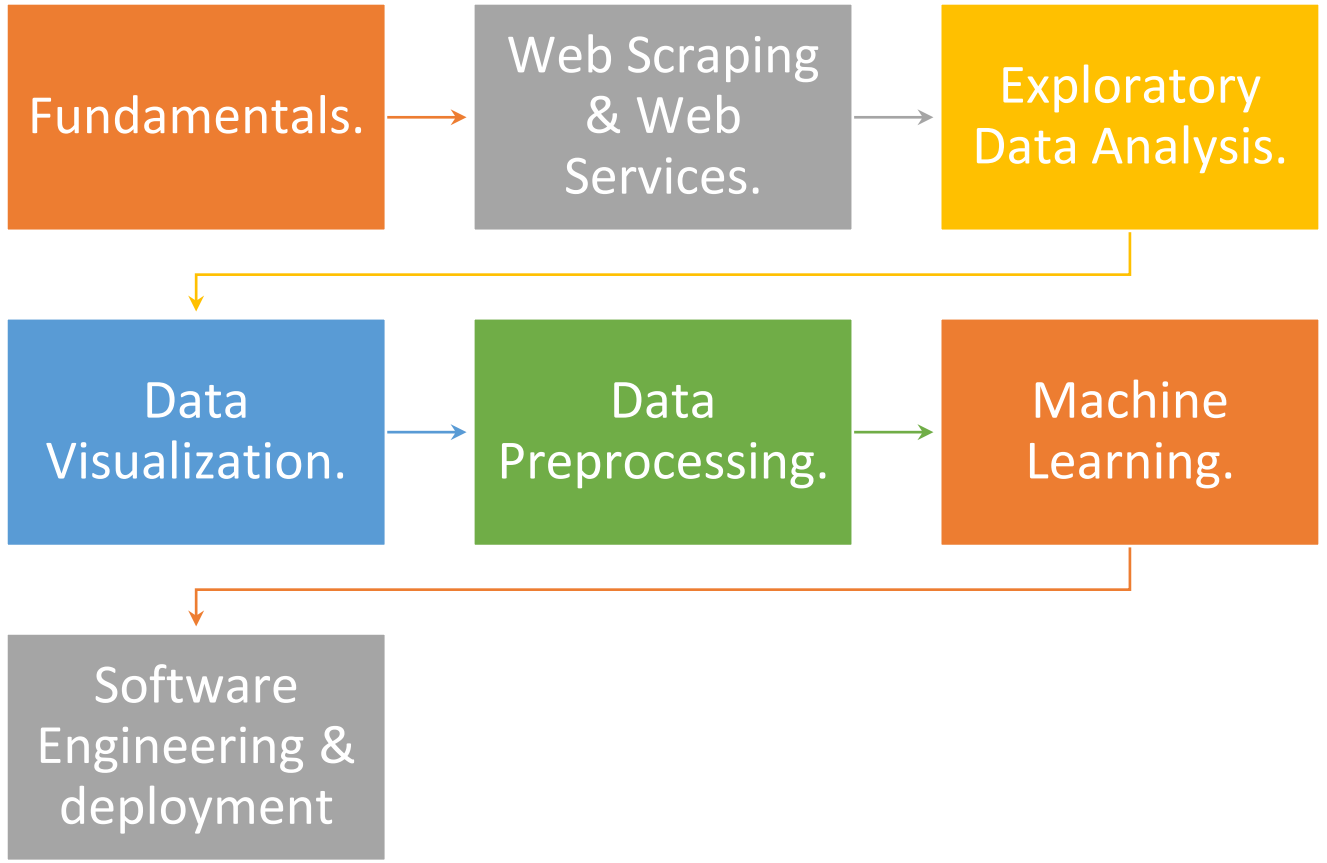
03

Deep Learning Roadmap

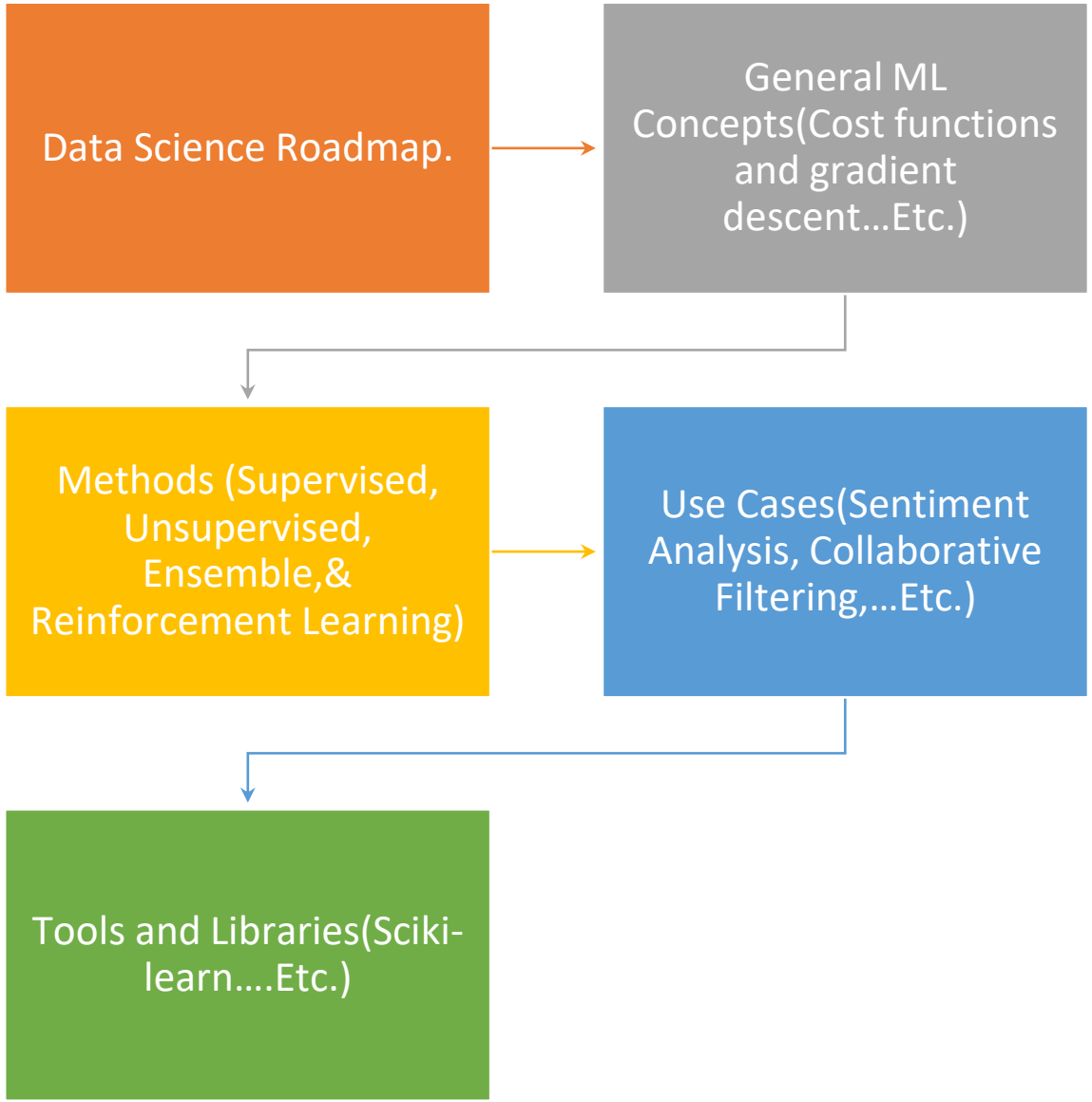
Fundamentals:

- Mathematics, statistics and Probability
- Database basics
- Programming

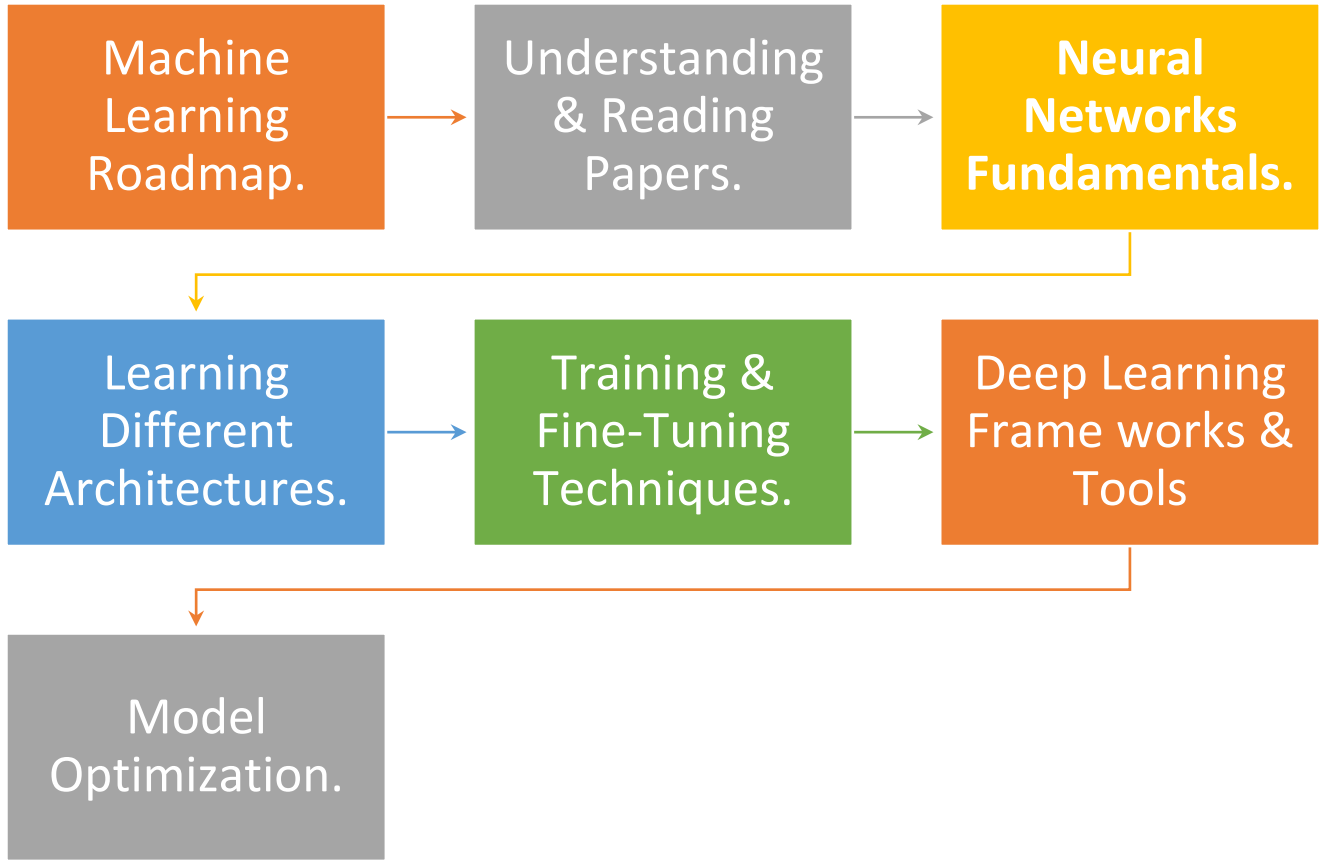
Data Science Roadmap



Machine Learning Roadmap



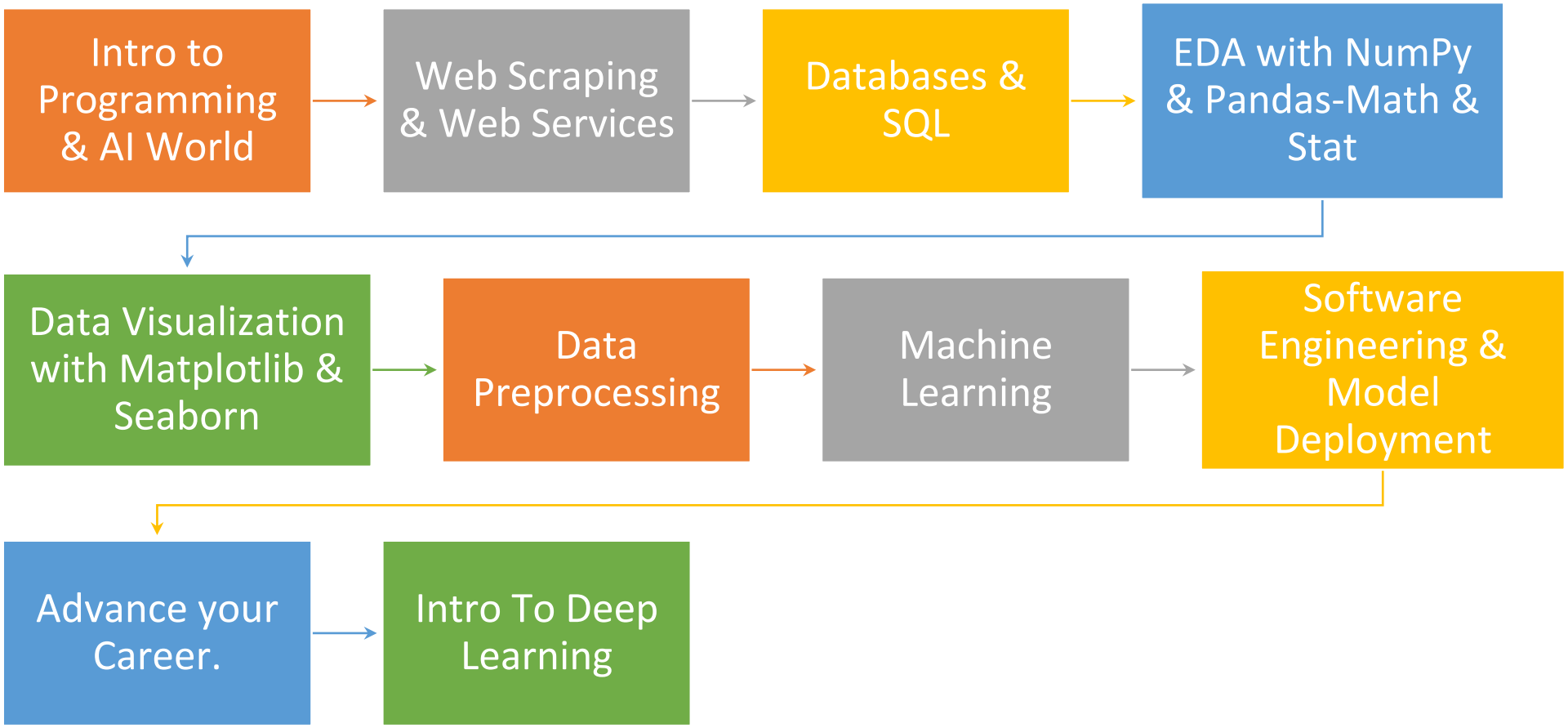
Deep Learning Roadmap



Which of the following isn’t correct:

A. All AI is machine learning.
B. DL uses multiple layers to extract features from the raw input.
C. A Data Scientist makes use of machine learning in order to predict future events.
D. DL uses multiple layers to extract features from the raw input.

CDSP Content



Graduation from CDSP:

- Participants will be granted a completion certificate from Epsilon AI Institute, Delaware, USA if they:
  1. Attend a minimum of 80 percent of the direct contact hours of the Program.
  2. After fulfilling program requirements (passing both Final Exam and Project to obtain the Certificate)

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Assignment Submission Process:

- Each group has a google classroom.
- Each Week there will be a Graded Assignment.
- Assignments are submitted via google classroom.
- Assignments are graded out of 100.
- Feedback on solutions will be sent by instructor on classroom.