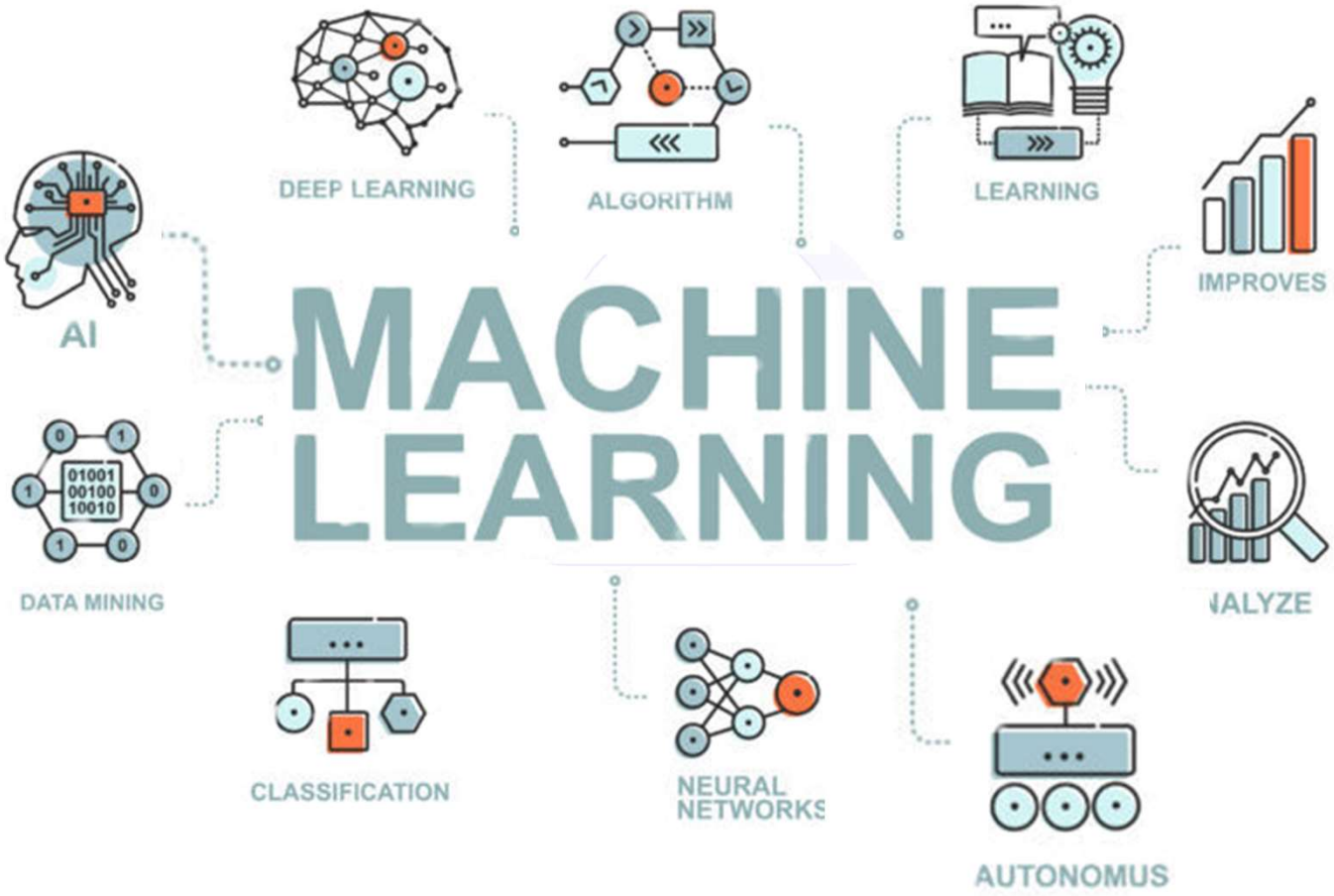
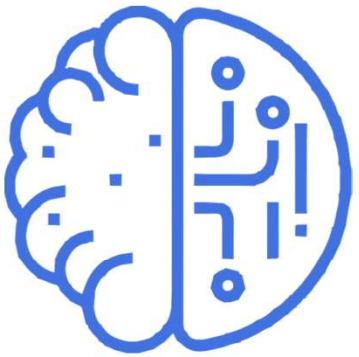
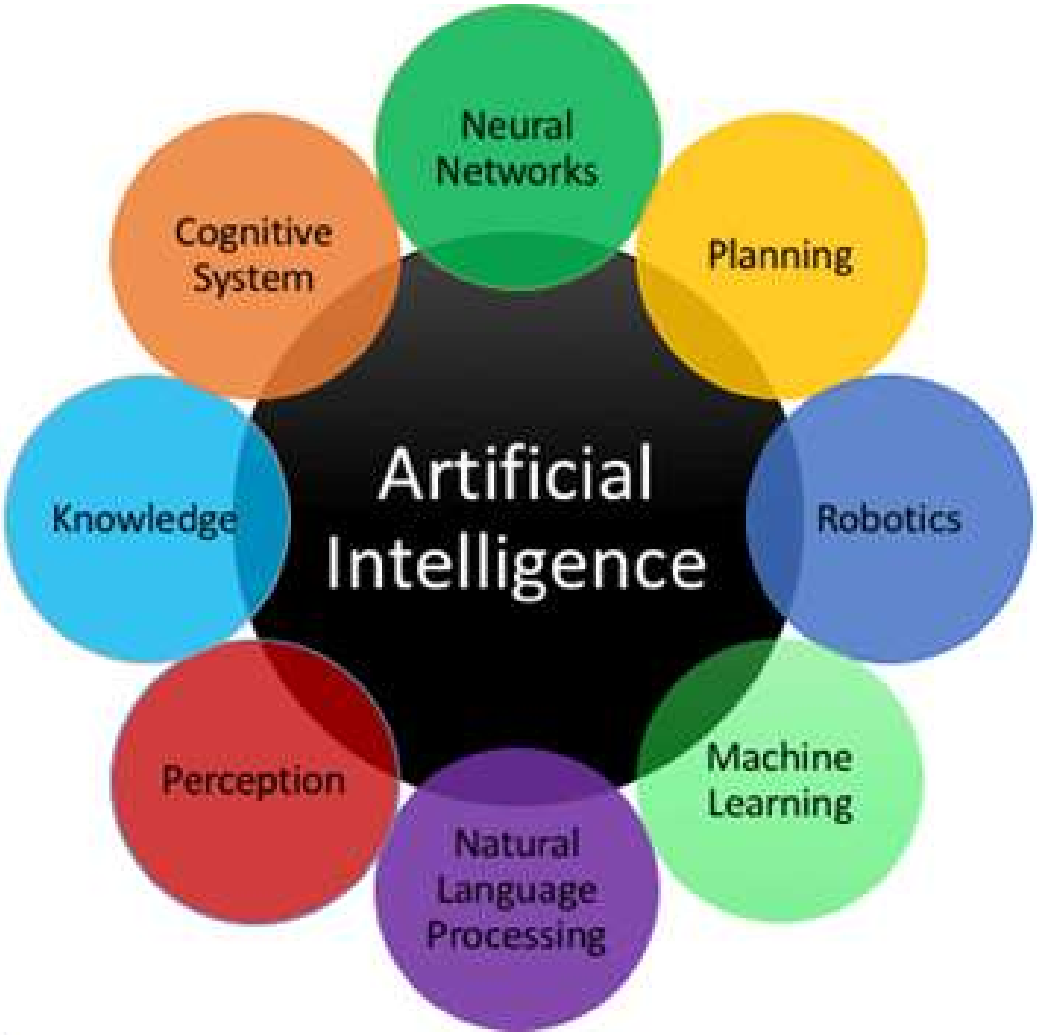

MACHINE
LEARNING
AI
DEEP LEARNING
ALGORITHM
LEARNING
IMPROVES
DATA MINING
ANALYZE
CLASSIFICATION
NEURAL
NETWORKS
AUTONOMUS

OBJECTIVES

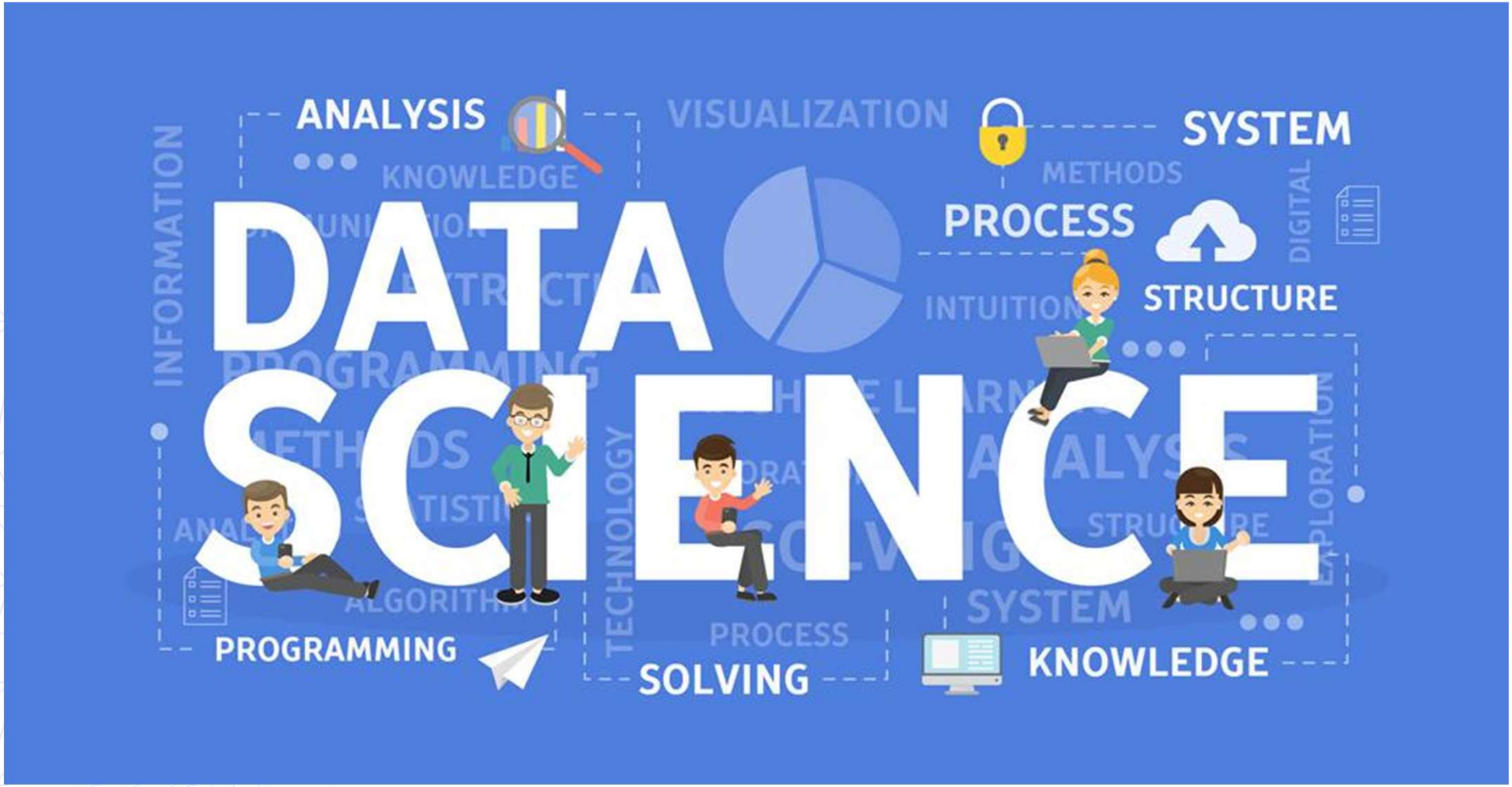
- Data Science
- Artificial Intelligence
- What is Machine Learning?
- ML Algorithms Types
- ML Use Case Types



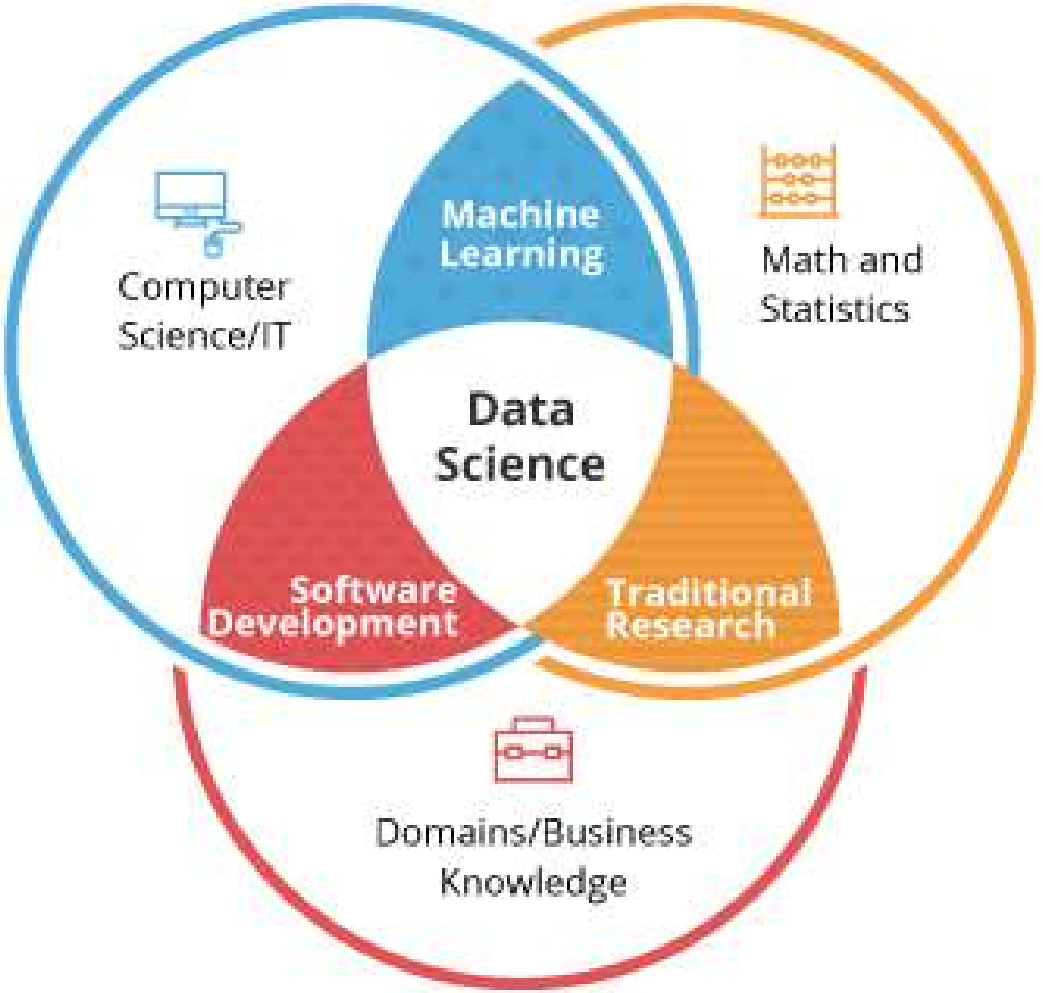
Artificial Intelligence(AI)



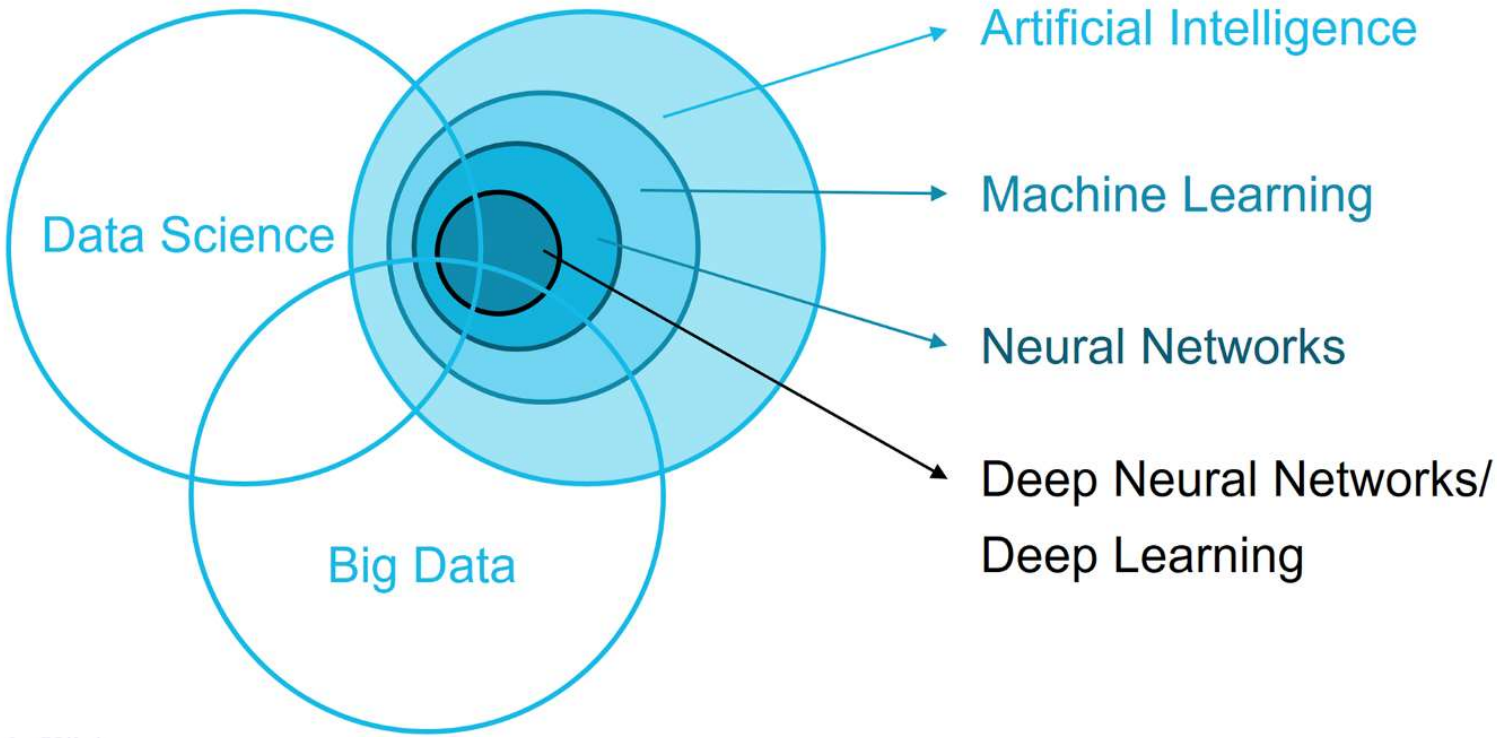
Data Science



Data Science Components



AI vs Data Science

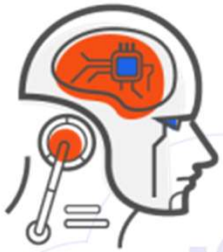


Types of AI

Narrow AI

Dedicated to assist with or take over specific tasks.

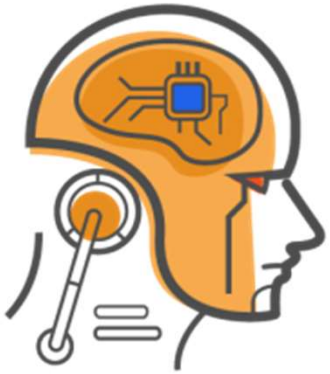
- Google Assistant
- Siri
- Alexa



General AI

Takes knowledge from one domain, transfers to other domain.

- Boston Dynamic Robot
- Sophia



Super AI

Machines that are an order of magnitude smarter than humans.

- Higher then Human
- Age of AI(Tony Stark)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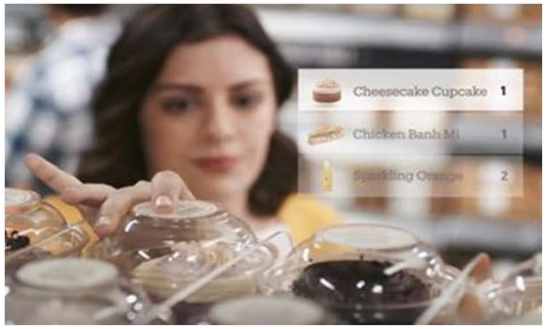
RECORDED


INTERACTIVE

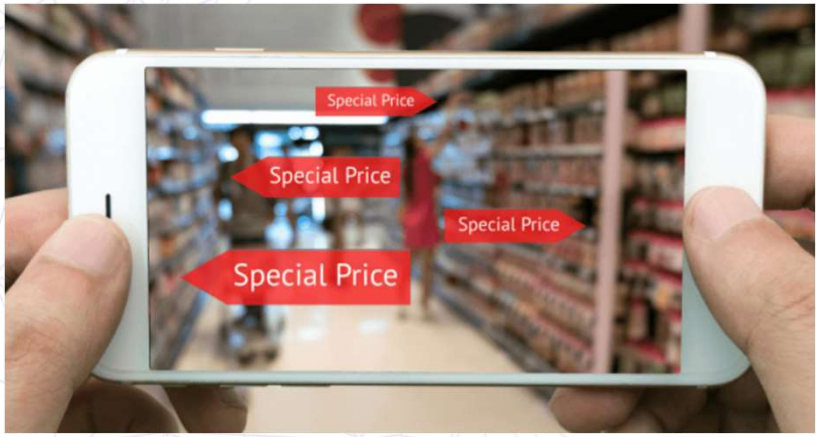
AI Projects: Moley Robotic Kitchen

AI Projects: Self driving car

AI Projects: Amazon Go



amazon go

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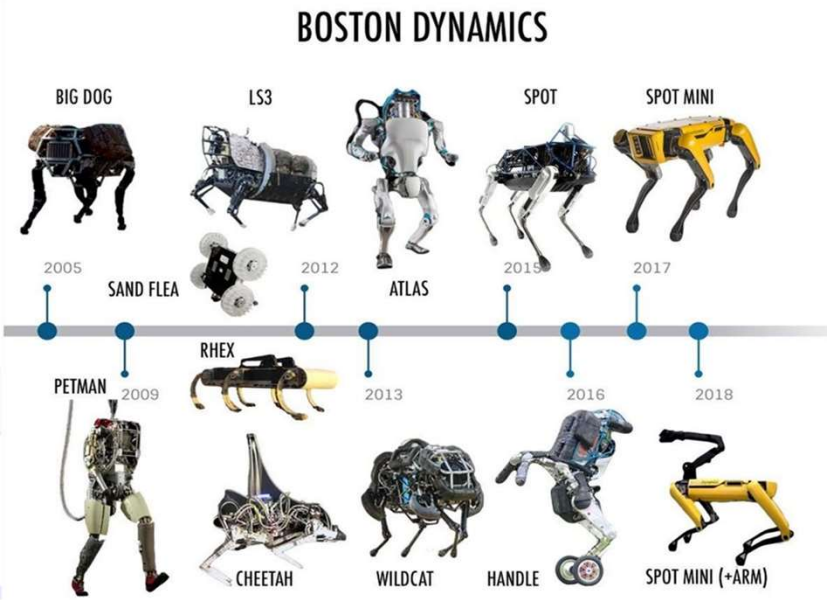
AI Projects: Boston Dynamics Robots



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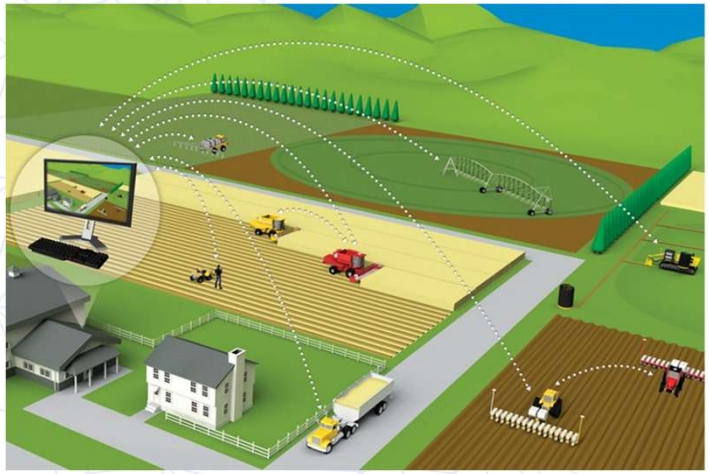
AI Projects: Future farming

Precision Agriculture

Aquaponics

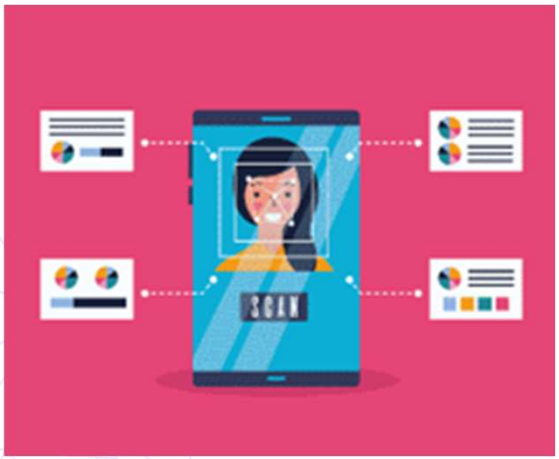


Vertical Farming

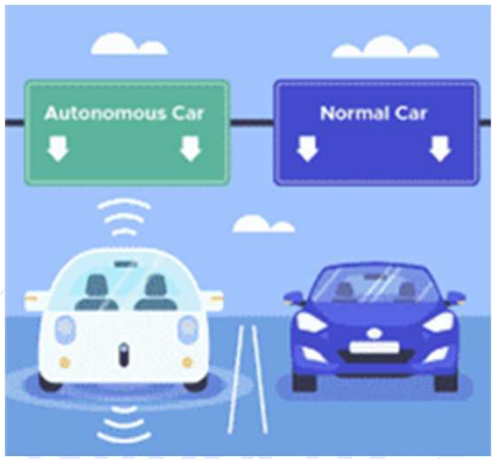
Artificial Intelligence(AI)

- Artificial Intelligence
  - Machine Learning
    - Reinforcement Learning
    - Supervised Learning
    - Unsupervised Learning
  - Computer Vision
    - Classification
    - Segmentation
      - Localization
      - Detection
  - Natural Learning Processing
    - Speech
      - N.L. Understanding
      - N.L. Generation
    - Text
      - N.L. Classifier
  - Robotics, etc.

Computer Visions(CV)



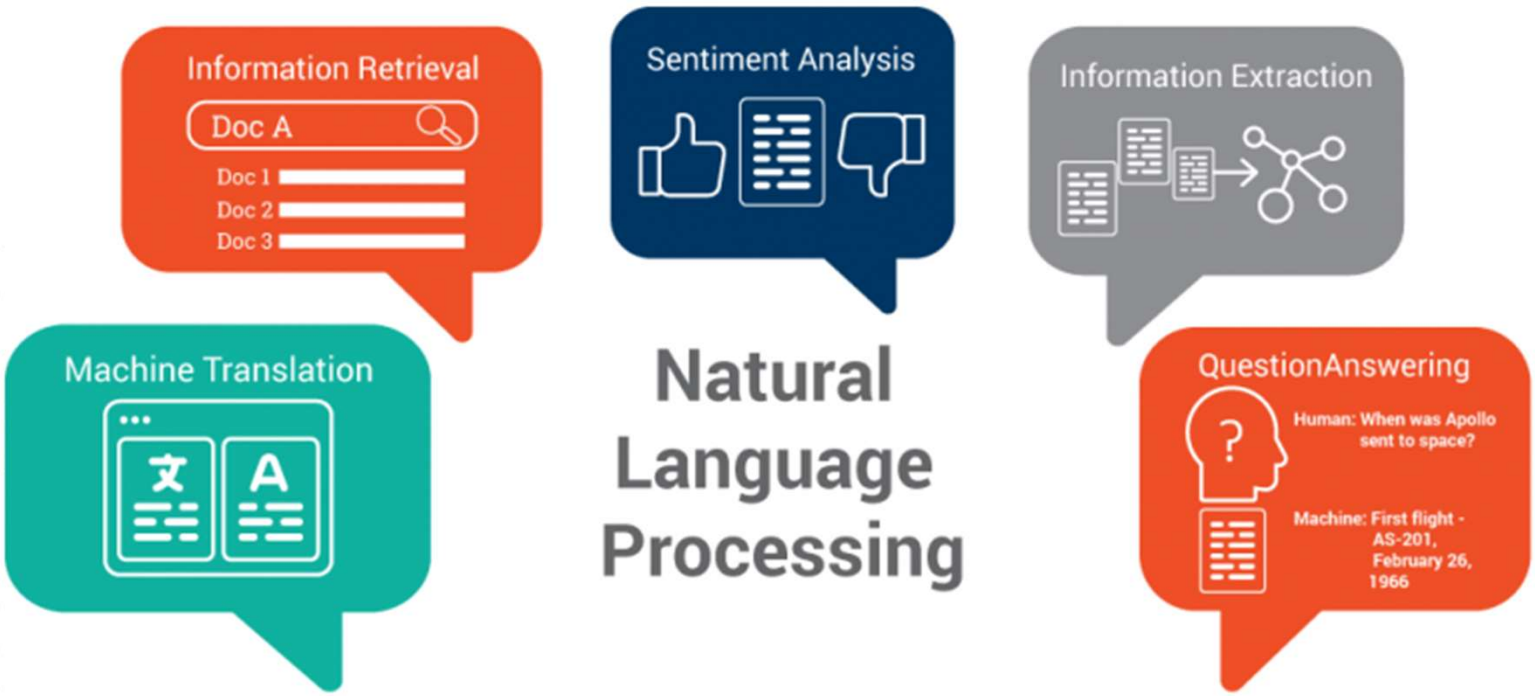
Facial Recognition Software



Self driving cars

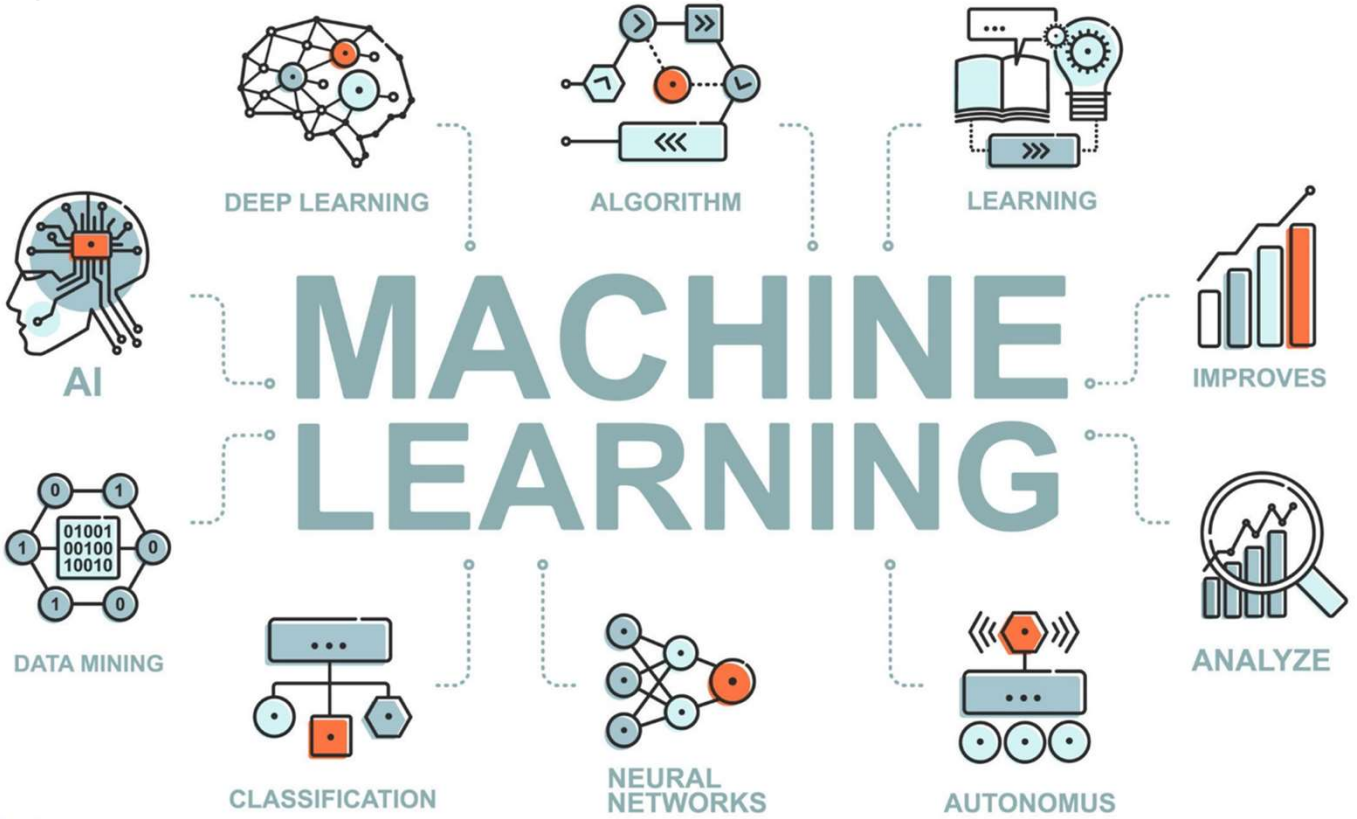
Manufacturing production line

NLP

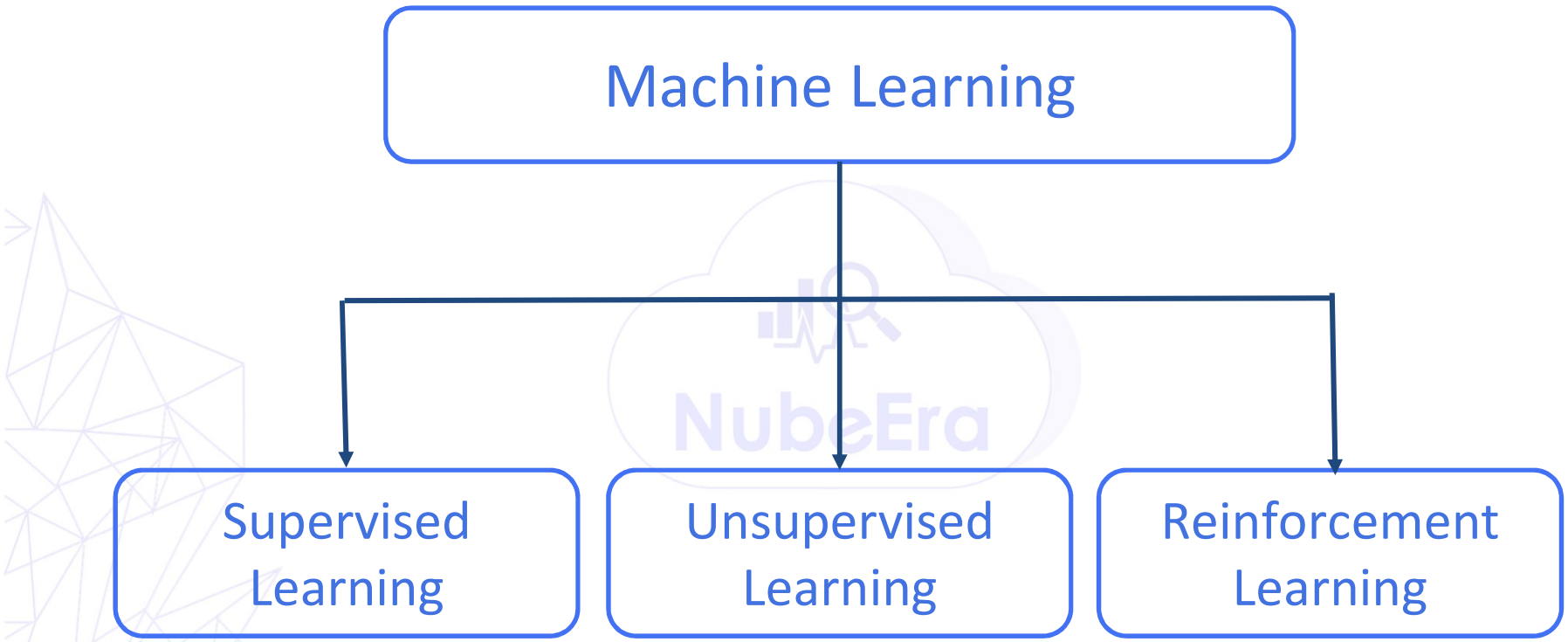


What is Machine Learning?

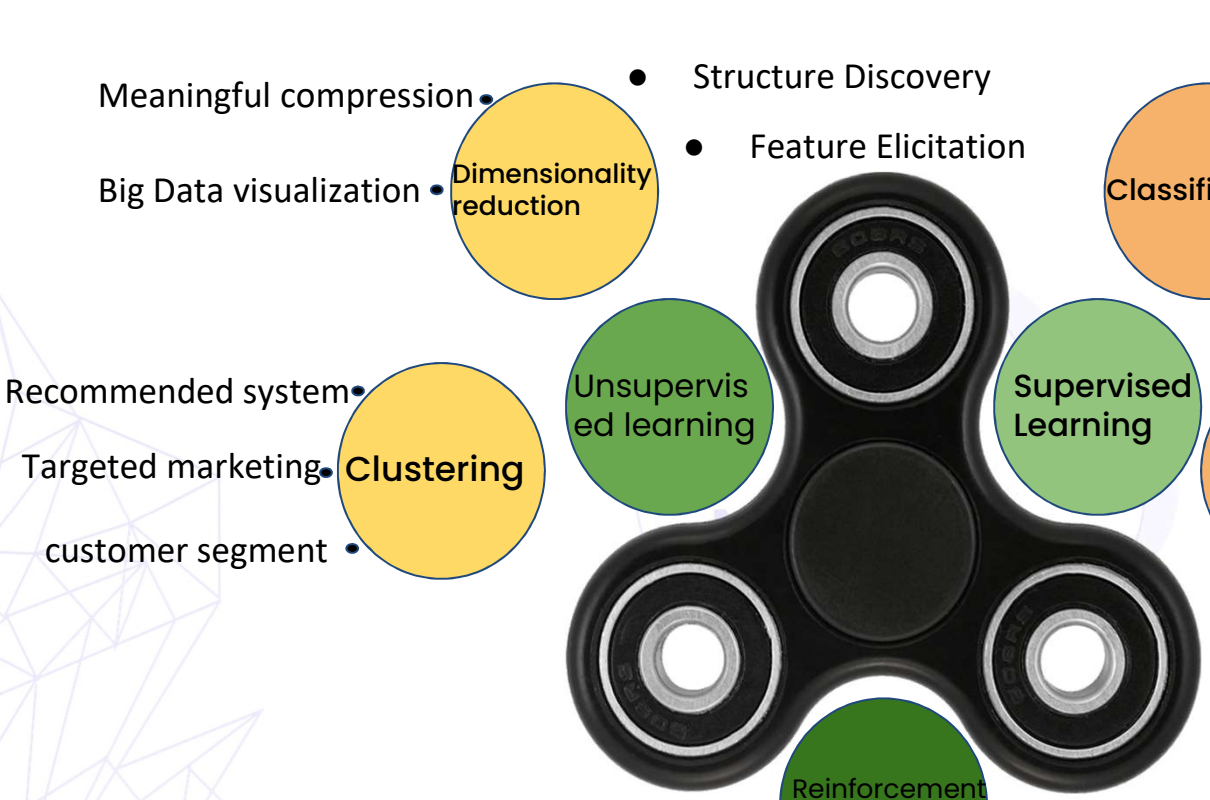
- Science of getting computers to learn & act like humans do.
- Learning can done by feeding them data & information.



Machine Learning



ML Applications



- Meaningful compression
- Big Data visualization
- Dimensionality reduction
- Structure Discovery
- Feature Elicitation
- Fraud detection
- Image classification
- Customer retention
- Diagnostics
- Classification
- Recommended system
- Targeted marketing
- customer segment
- Clustering
- Unsupervised learning
- Supervised Learning
- Regression
- New Insight
- Forecasting
- Prediction
- Reinforcement Learning
- Game AI
- Real time decision
- Robot Navigation
- Skill acquisition
- Learning task

System

Input
(Camera)

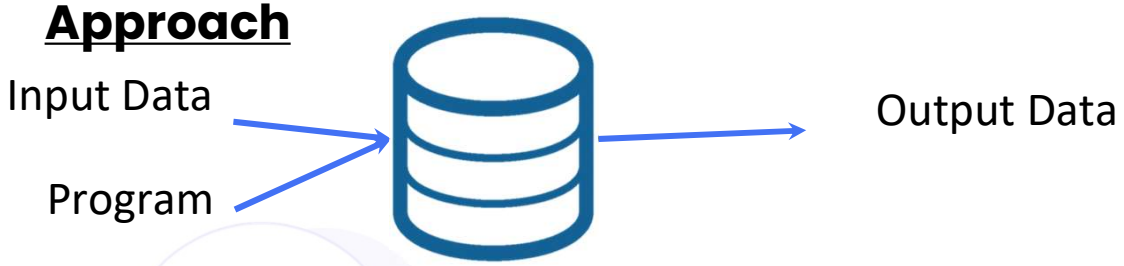
Processor
(Computer and program)

Output
(Robot)

Traditional Vs. ML Approaches

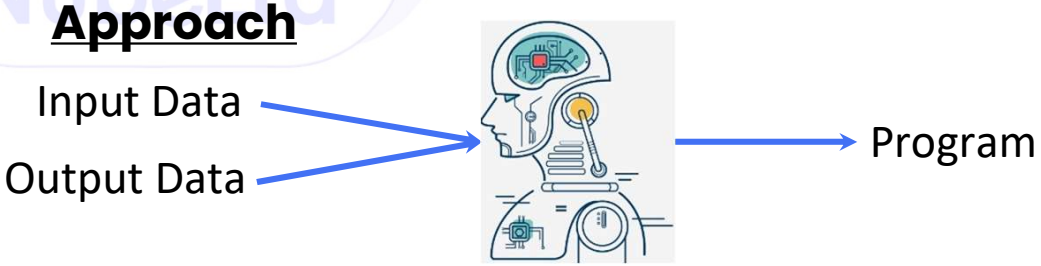
Dump System

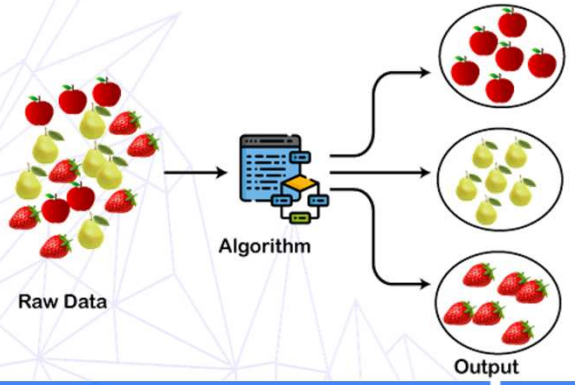
Traditional Programming Approach



Intelligence System

Machine Learning Approach





Machine Learning Types

SUPERVISED LEARNING

UNSUPERVISED LEARNING

REINFORCEMENT LEARNING

When to use ML Algorithm

- Representation
  - A set of classifiers
  - The language that a computer understands.
- Evaluation
  - Objective/scoring function
- Optimization
  - Search method

ML Algorithm Types & Use Cases

Supervised Learning

- Labelled data
- Direct feedback
- Predict outcome/future

Unsupervised Learning

- No Labels
- No feedback
- Find hidden structure

Reinforcement Learning

- Decision process
- Reward system
- Learn series of actions

Categorical

Classification

- Fraud detection
- Spam detection
- Diagnostics
- Image classification

Dimensionality Reduction

- Text Mining
- Face Recognition
- Big data Visualization
- Image Recognition

Recommendation Engine

- Gaming
- Finance Sector
- Manufacturing
- Inventory Management
- Robot Navigation

Continuous

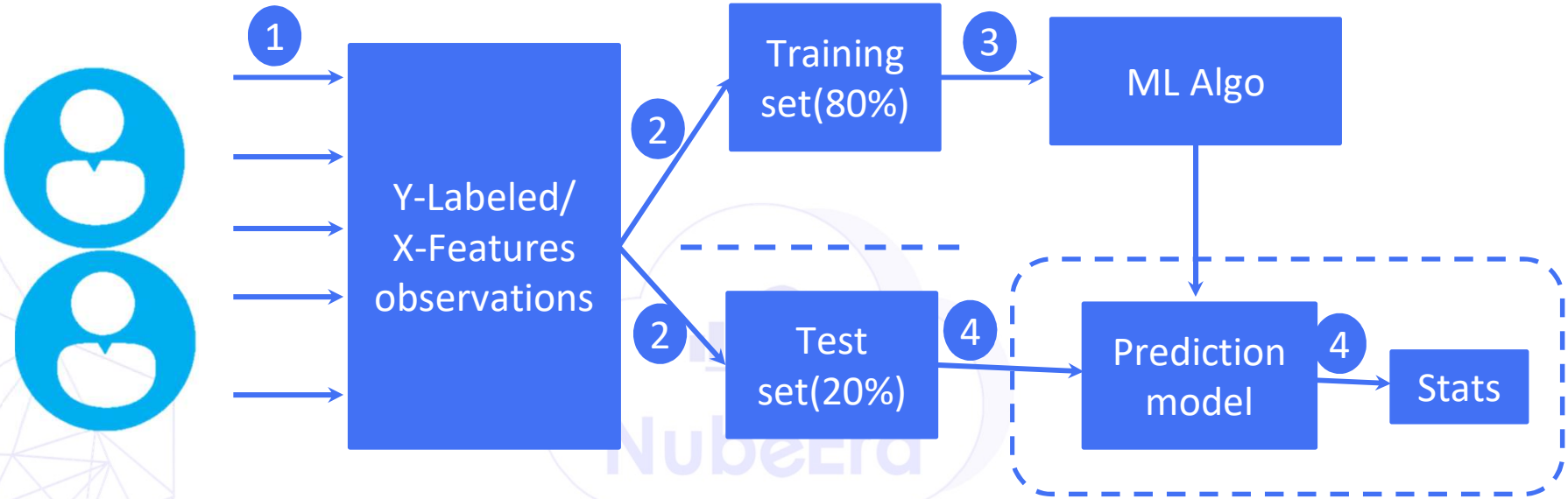
Regression

- Risk Assessment
- Score Prediction

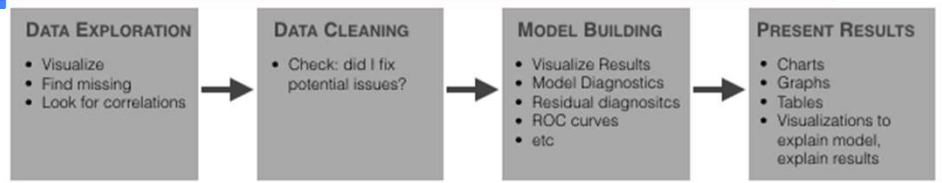
Clustering

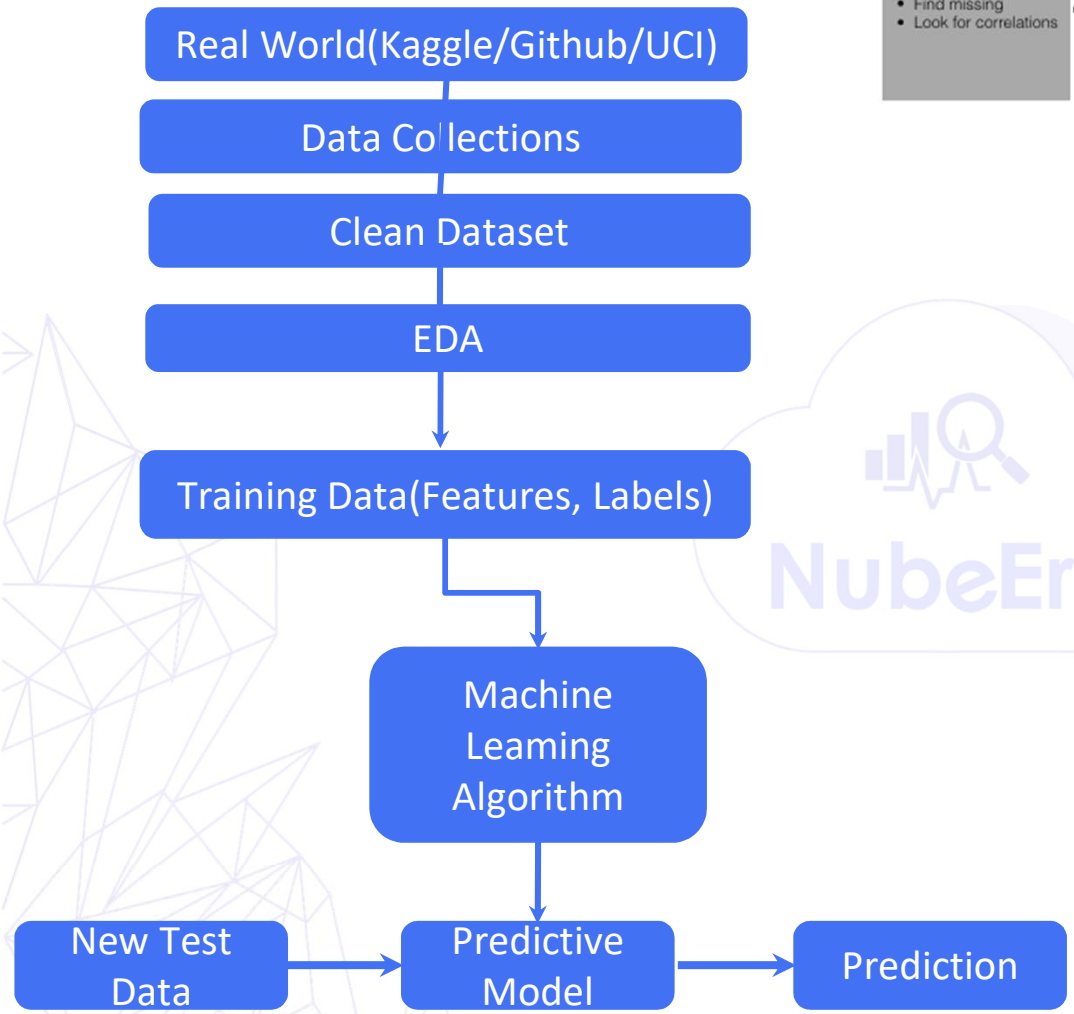
- Biology
- City Planning
- Targeted Marketing

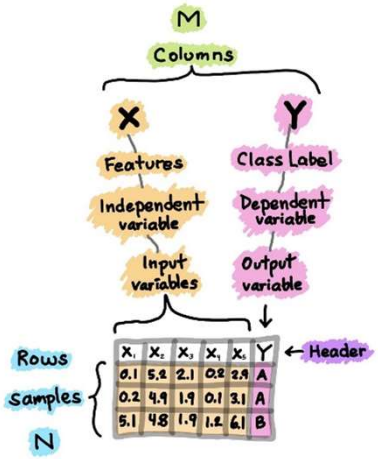
How Supervised Works



Supervised Learning Model



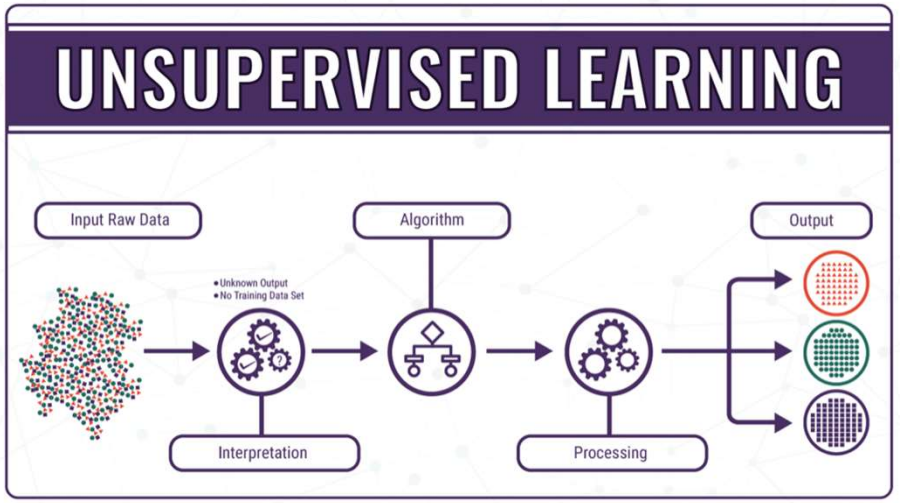


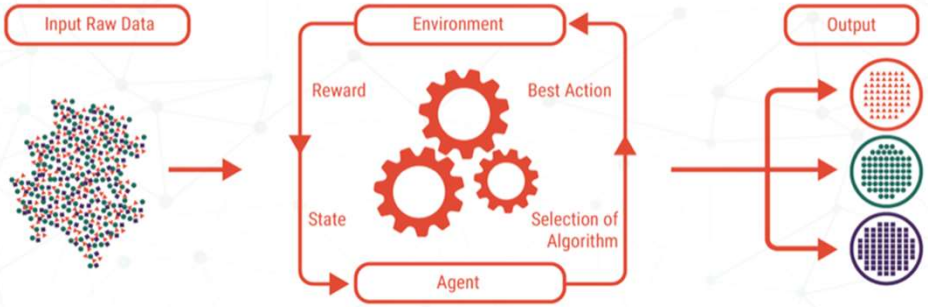


[Exploratory Data Analysis]

Unsupervised Learning

Input Raw Data





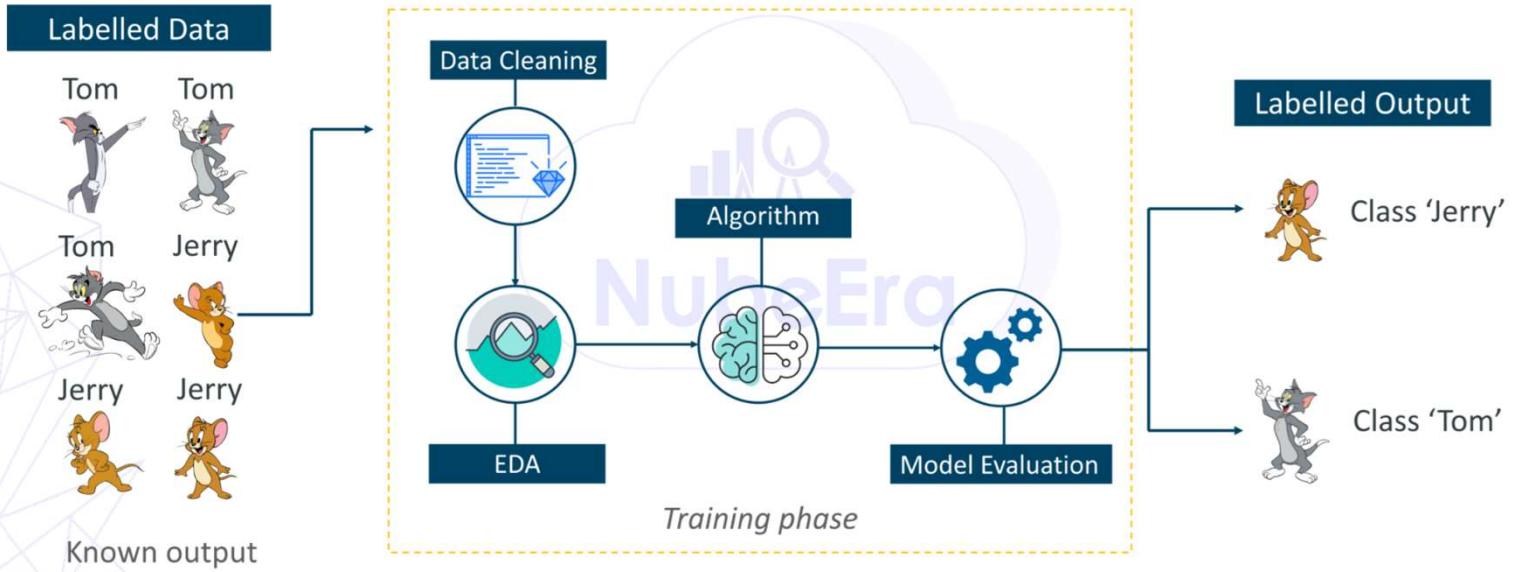
Reinforcement Learning

Types of Regressions

- **Linear Regressions**
  - Simple Linear Regression
  - Multiple Linear Regression
- Polynomial Regression
- **Logistic Regression**
- Ridge Regression
- Lasso Regression
- Bayesian Linear Regression
- **Decision Tree Regression**
- **Random Forest Regression**

Classifications

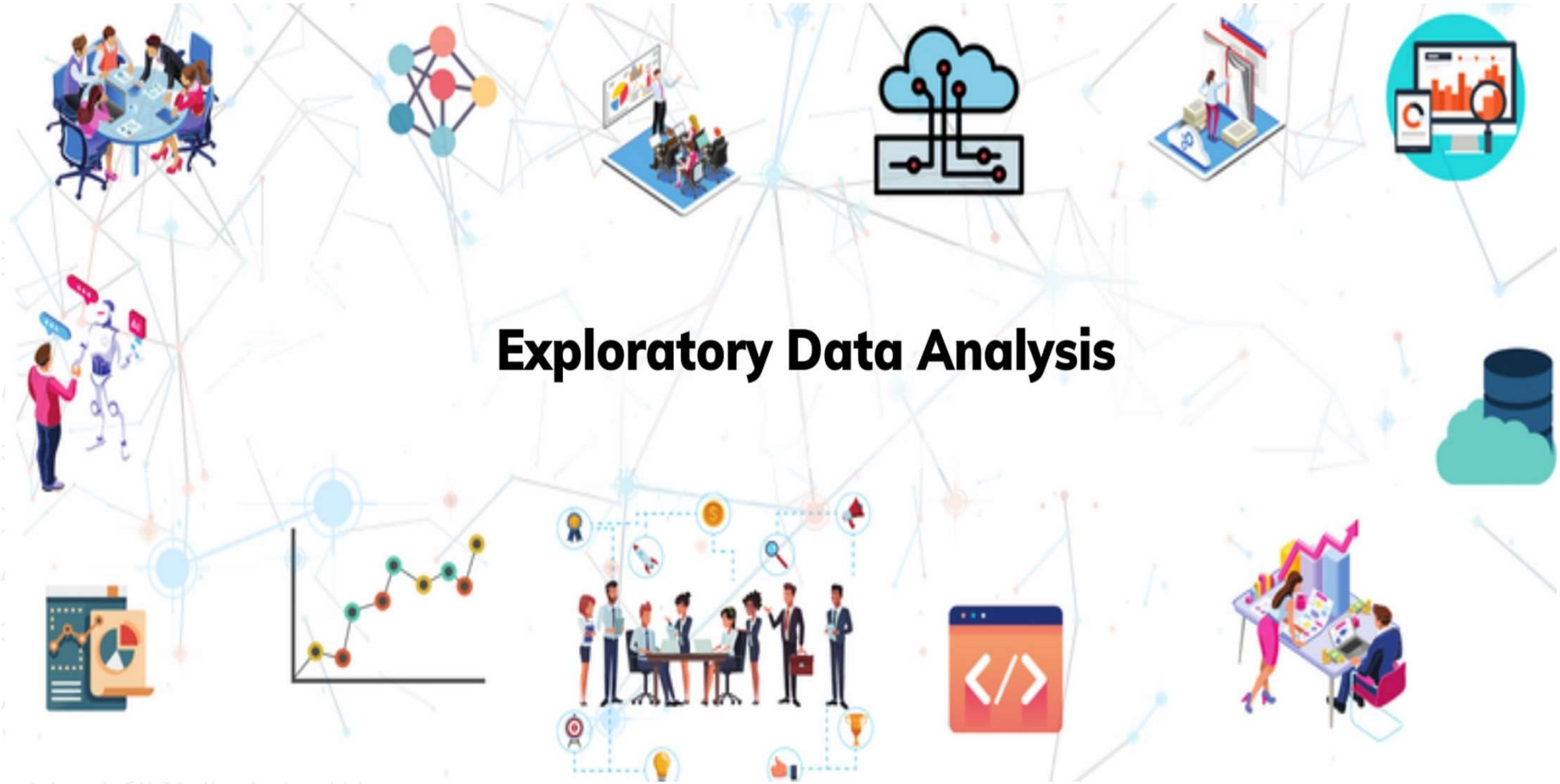
- Naive Bayes
- SVM- Support Vector Machine



Demo

Dataset

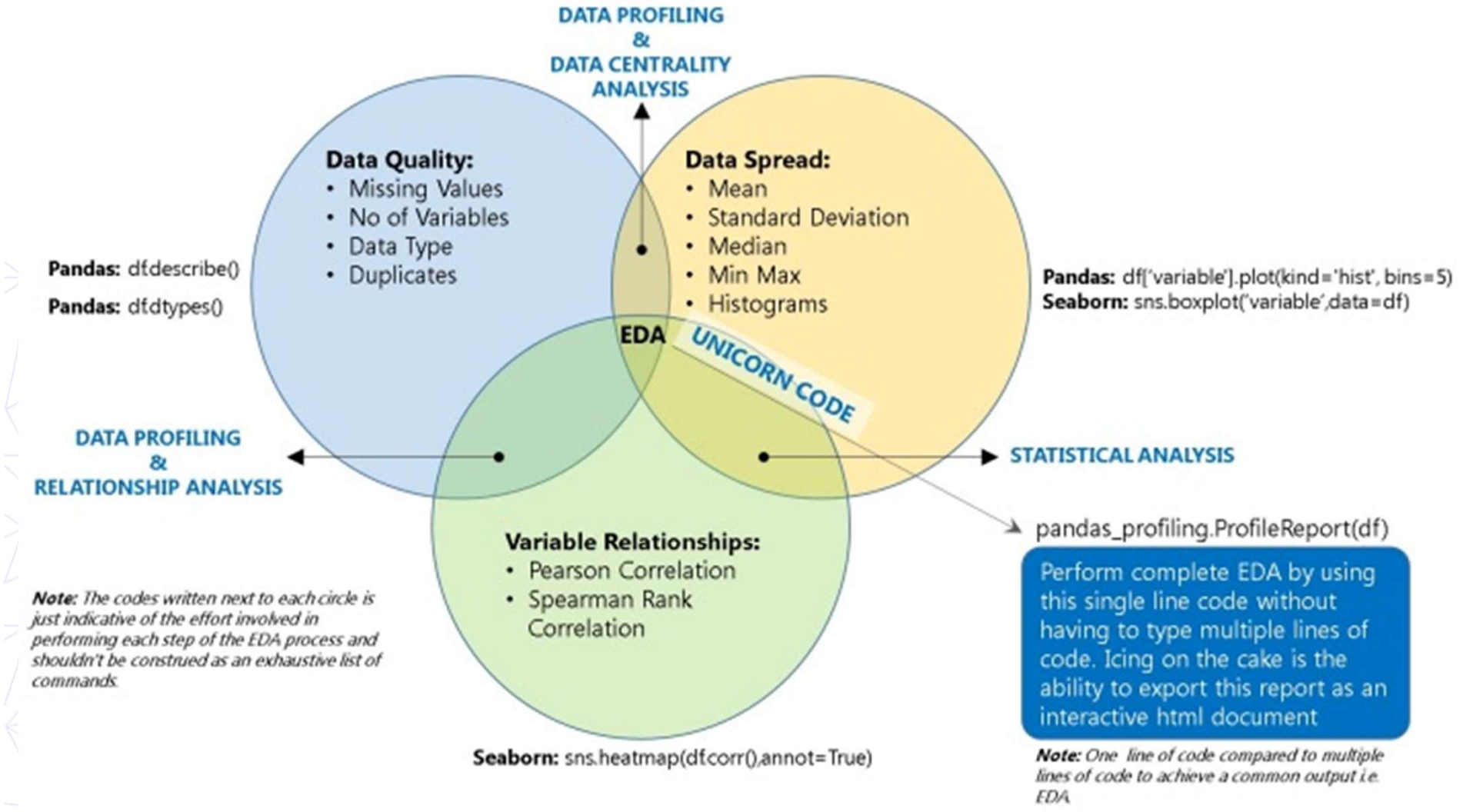
Why EDA



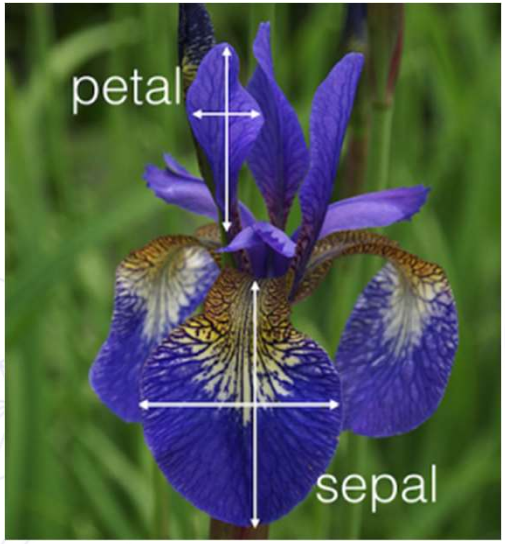
EDA

- Handle Missing value
- Removing duplicates
- Outlier Treatment
- Normalizing and Scaling(Numerical Variables)
- Encoding Categorical variables(Dummy Variables)
- Bivariate Analysis

EDA



IRIS Flower



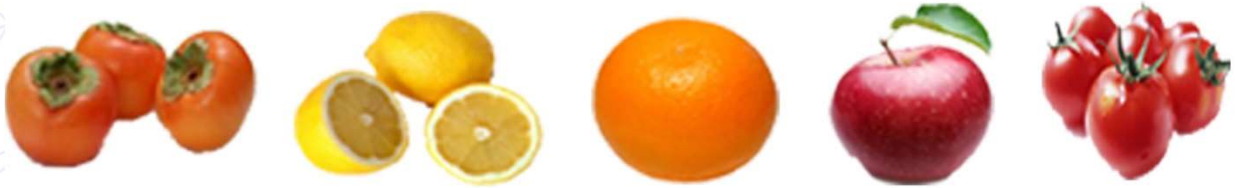
Iris Versicolor

Iris Setosa

Iris Virginica

	A	B	C	D	E
1	Sepal Length	Sepal Width	Petal Length	Petal Width	Class
2	5.1	3.5	1.4	0.2	Iris-setosa
3	4.9	3	1.4	0.2	Iris-setosa
4	4.7	3.2	1.3	0.2	Iris-setosa
5	4.6	3.1	1.5	0.2	Iris-setosa
6	5	3.6	1.4	0.2	Iris-setosa
7	5.4	3.9	1.7	0.4	Iris-setosa
8	4.6	3.4	1.4	0.3	Iris-setosa
9	5	3.4	1.5	0.2	Iris-setosa
10	4.4	2.9	1.4	0.2	Iris-setosa
11	4.9	3.1	1.5	0.1	Iris-setosa

Fruits Separation Machine



Apple or Orange Data Set

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

ML Library

Sklearn

Scikit-learn

- Simple & efficient tool for data mining & analysis.
- Built on Numpy, SciPy and Matplotlib.
- Used in
  - Classification
    - Identifying category of an object
    - Ex:
      - Spam or Not
      - Orange or Apple
      - Cat or Dog
  - Regression
    - Predicting an attribute associated with an object
    - Ex: Stock Prices Prediction

Usage of scikit-learn package

Clustering
Grouping of similar objects into sets

Model Selection
Comparing, Validating and choosing parameters & models

Dimensionality Reduction
Comparing, Validating and choosing parameters & models

Classification
Predicting an attribute associated with an object

Regression
Identifying category of an object

Regression
Identifying category of an object

Using Scikit-learn

Classification	Identifying which category an object belongs to Application: Spam detection
Regression	Predicting an attribute associated with an object Application: Stock prices prediction
Clustering	Automatic Grouping of similar objects into sets Application: Customer segmentation
Model Selection	Comparing, Validating and choosing & models Application: Improving model accuracy via parameter tuning
Dimensionality reduction	Reducing the number of random variables to consider **Application**: To increase mode efficiency
Pre-Processing	Feature extraction and normalization **Application**: Transforming input data such as text for use with machine algorithms

References

- https://www.mlstack.cafe/blog/k-means-clustering-interview-questions
- https://www.fullstack.cafe/?utm_source=github&utm_medium=sud

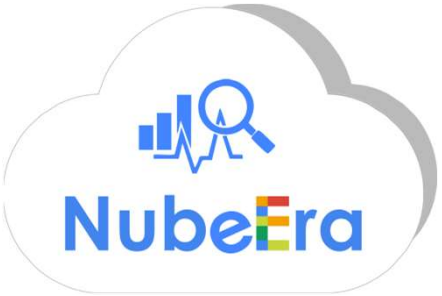
- https://www.youtube.com/c/NubeEra

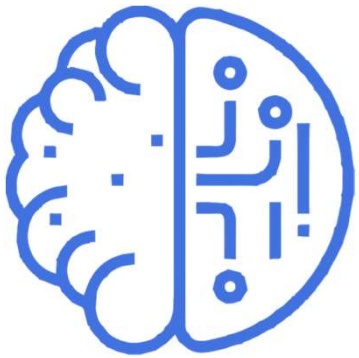
(for future reference we will upload here upcoming technology)

???

The Important thing is not to stop

Questioning





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