

What is Machine Learning?



Artificial Intelligence

Machine Learning

Deep Learning

The subset of machine learning composed of algorithms that permit software to train itself to perform tasks, like speech and image recognition, by exposing multilayered neural networks to vast amounts of data.

A subset of AI that includes abstruse statistical techniques that enable machines to improve at tasks with experience. The category includes deep learning

Any technique that enables computers to mimic human intelligence, using logic, if-then rules, decision trees, and machine learning (including deep learning)

$$E * T = P$$

Experience

Task

Performance

Input Data:

- Housing prices
- Customer transactions
- Clickstream data
- Images

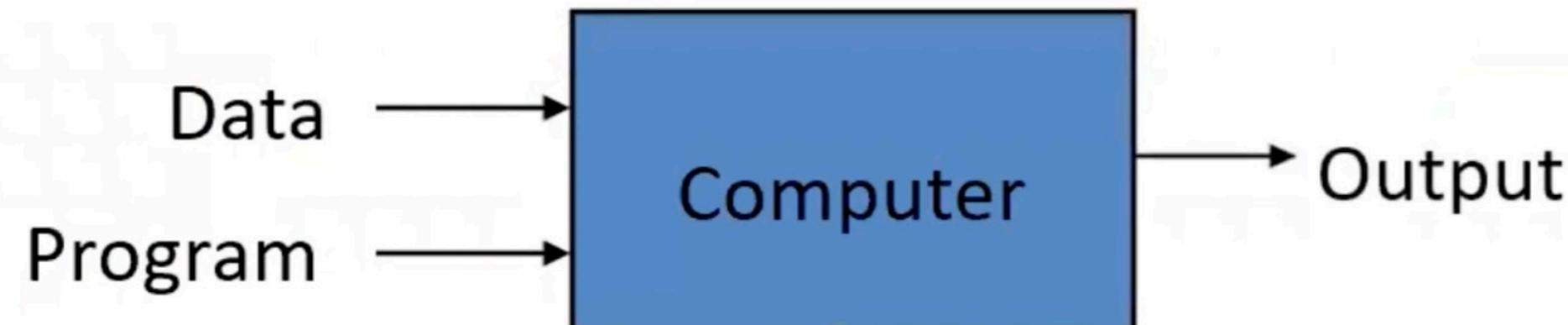
Task:

- Predict prices
- Segment customers
- Optimize user flows
- Categorize images

Performance:

- Accurate prices
- Coherent groupings
- KPI lifts
- Correctly sorted images

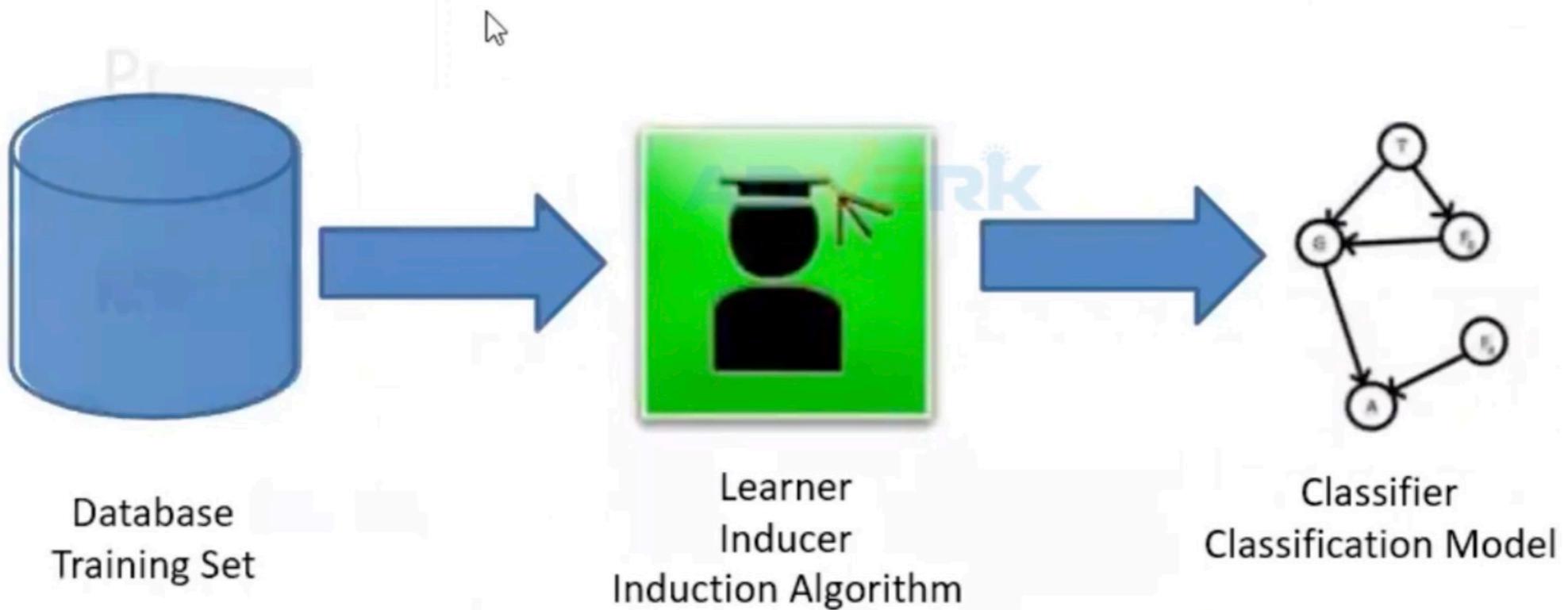
Traditional Programming



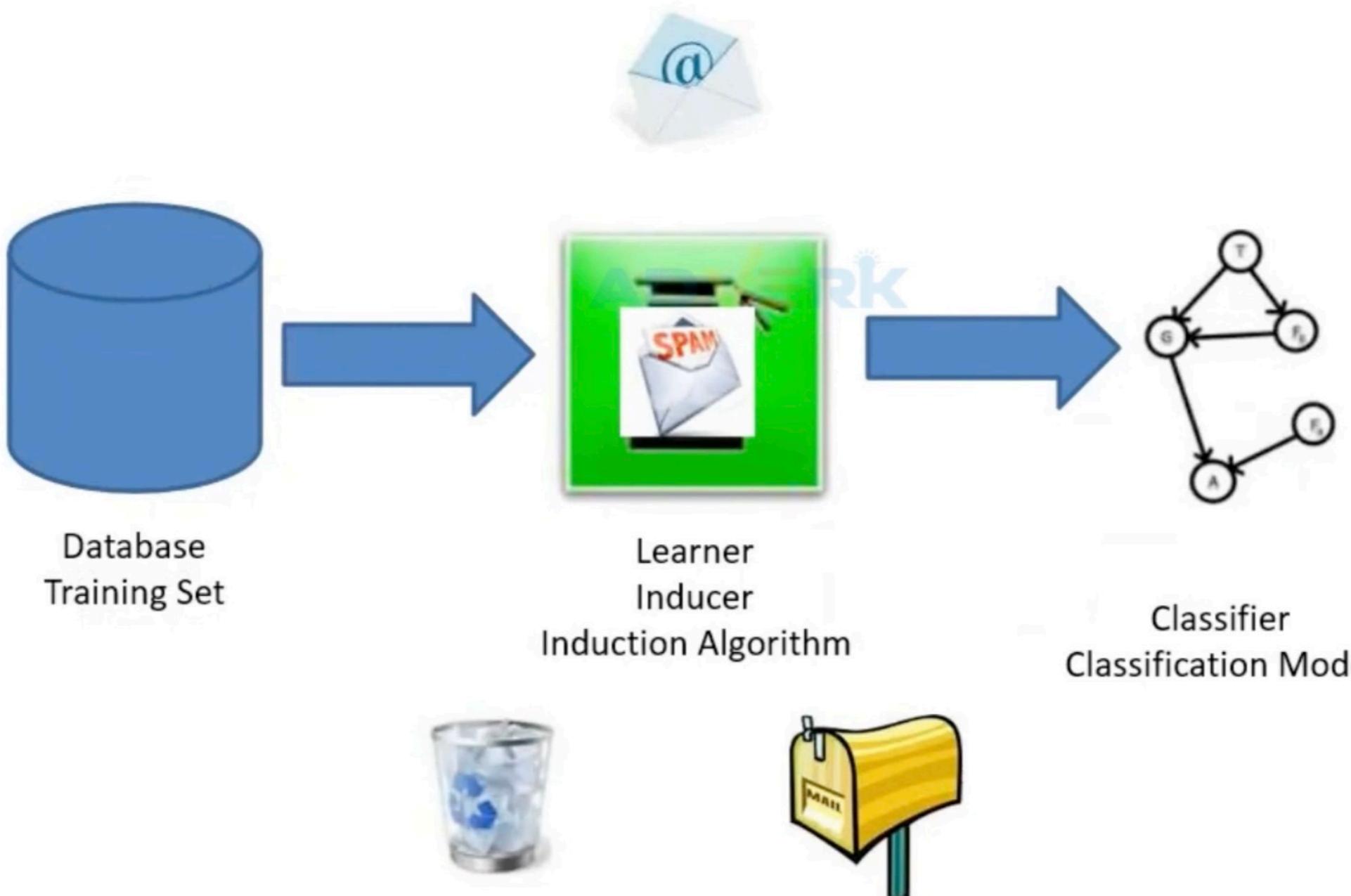
Machine Learning

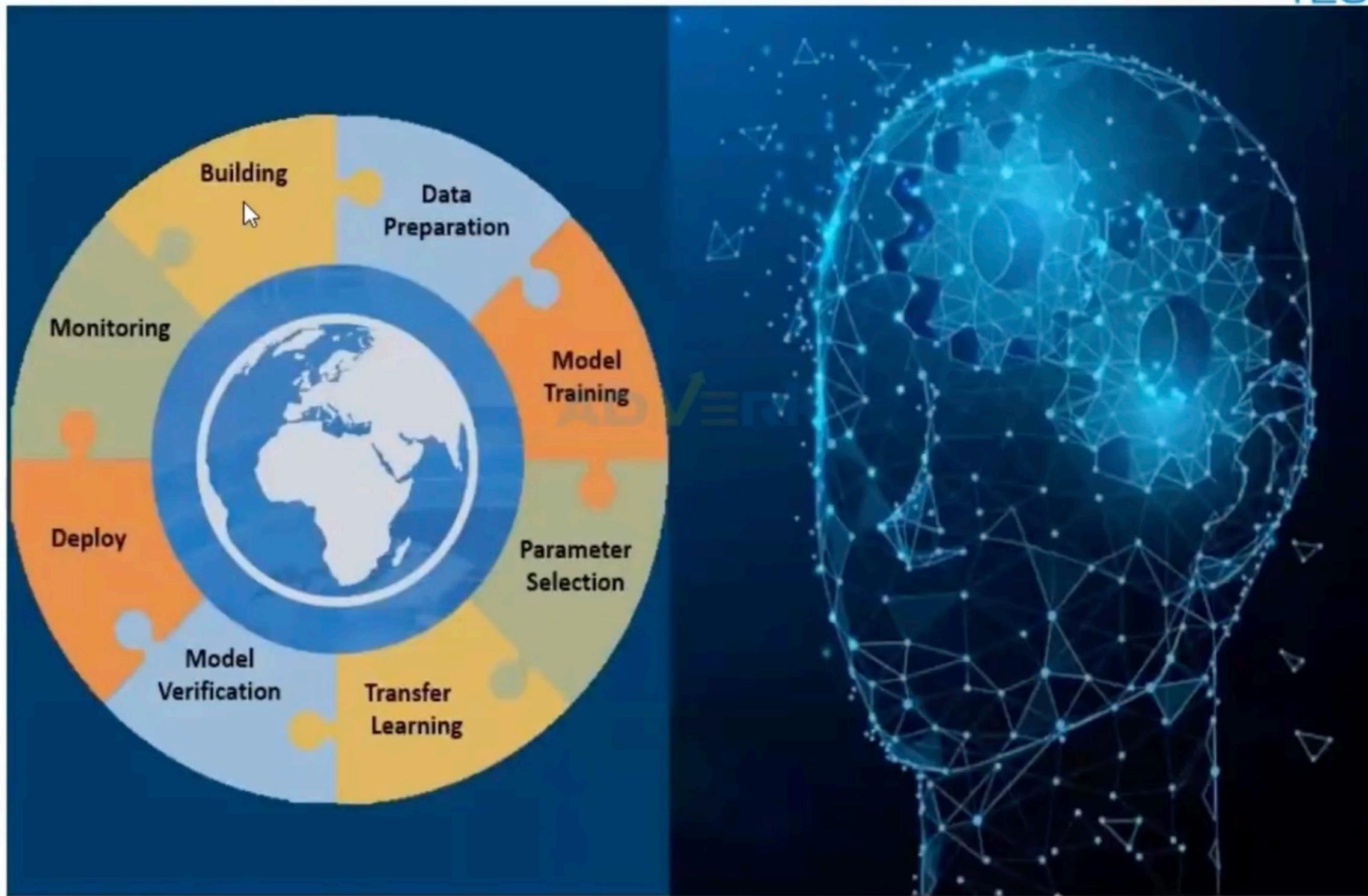


How Machine Learn



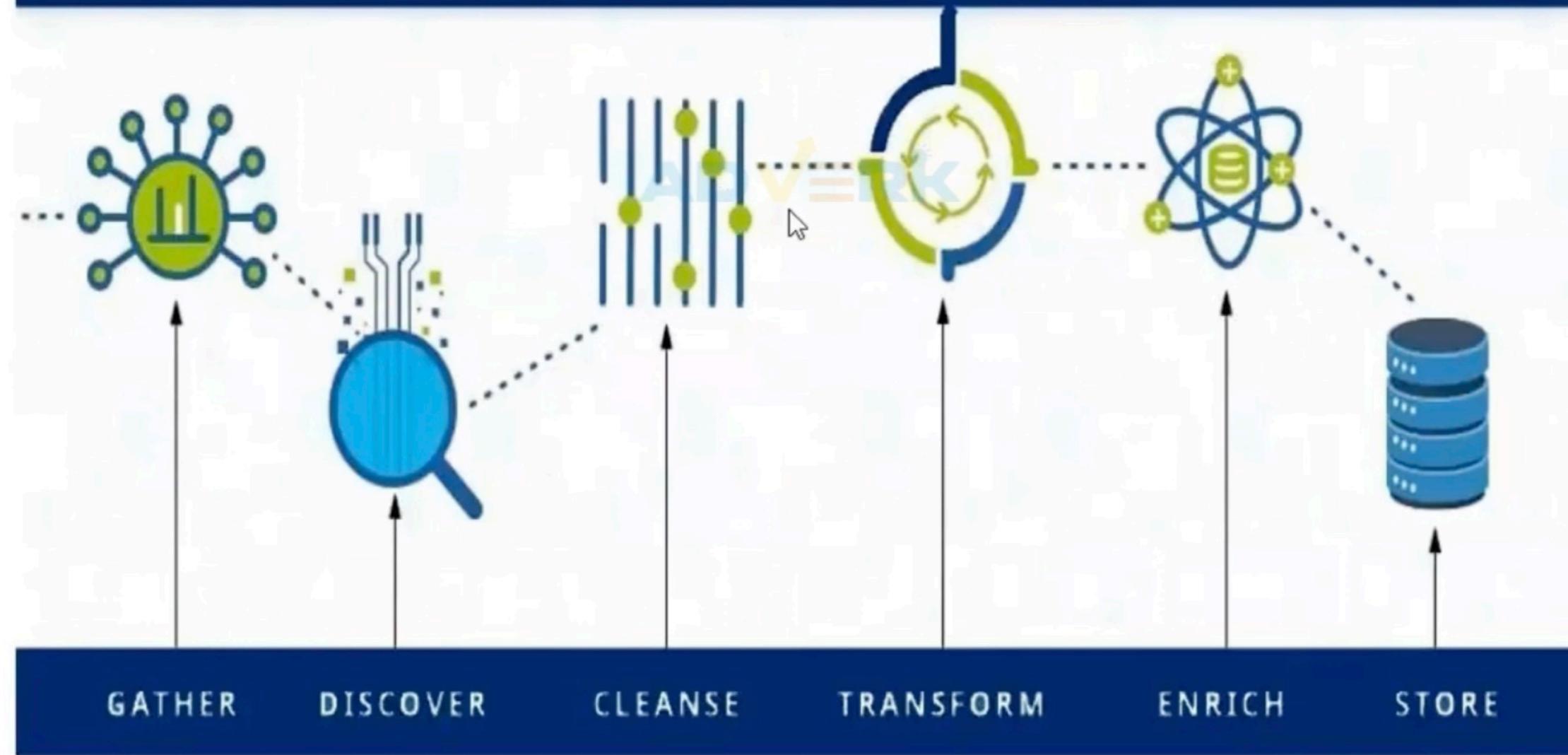
How Machine Learn







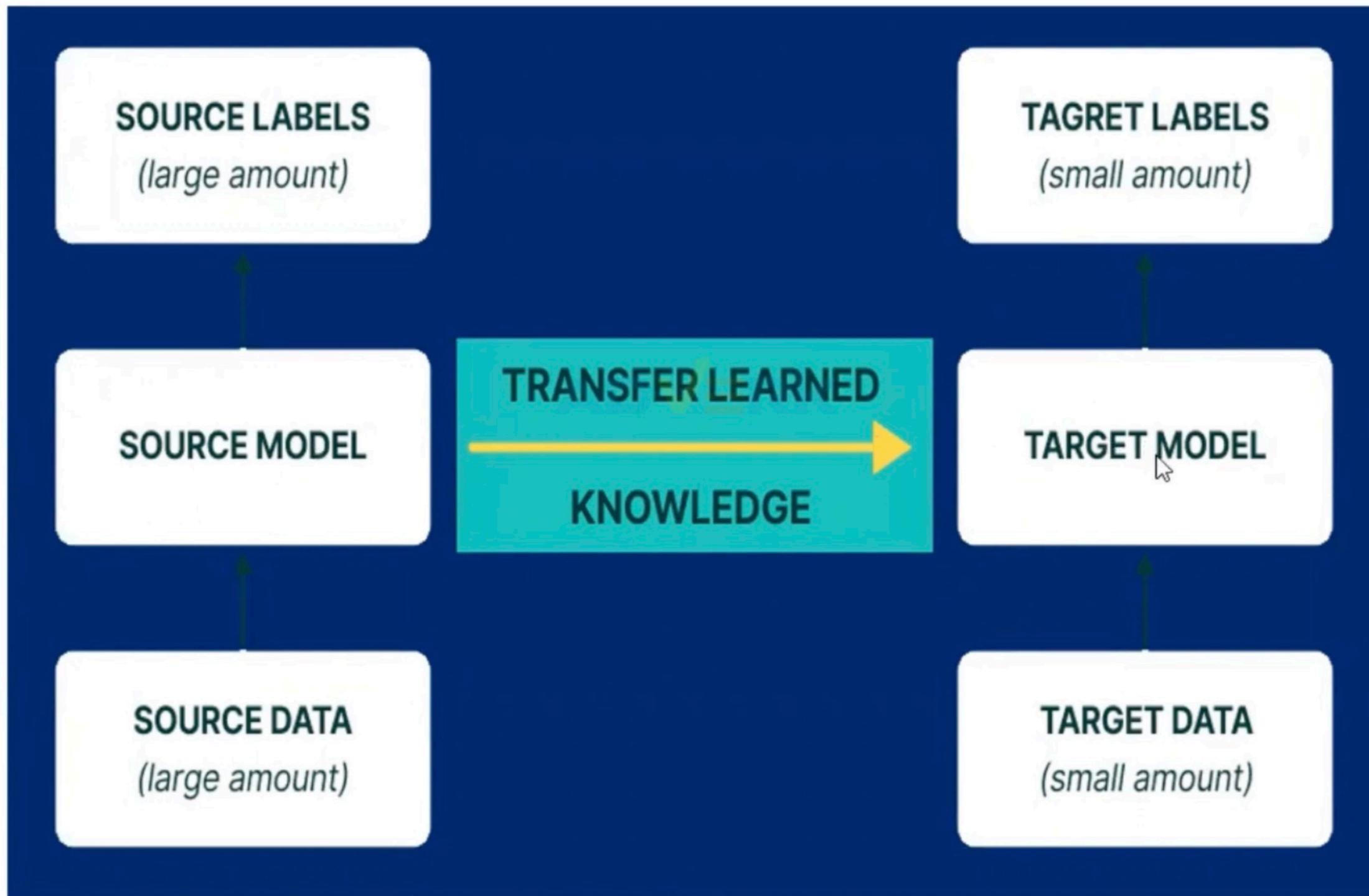
3rd Step: Data Preparation





4th Step: Paramarameter Selection





Machine learning Model Validation Testing

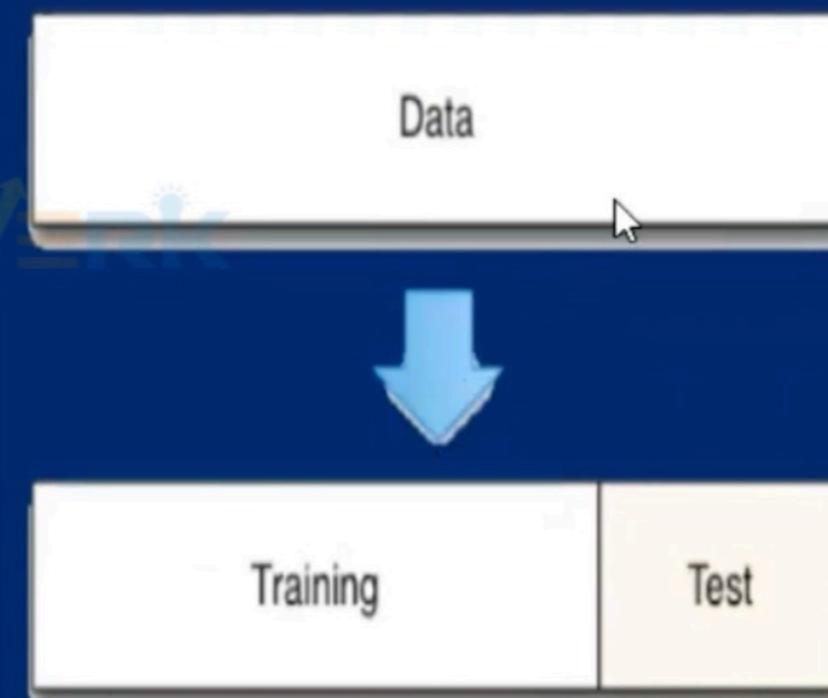


MACHINE LEARNING MODEL DEPLOYMENT

ADVERK

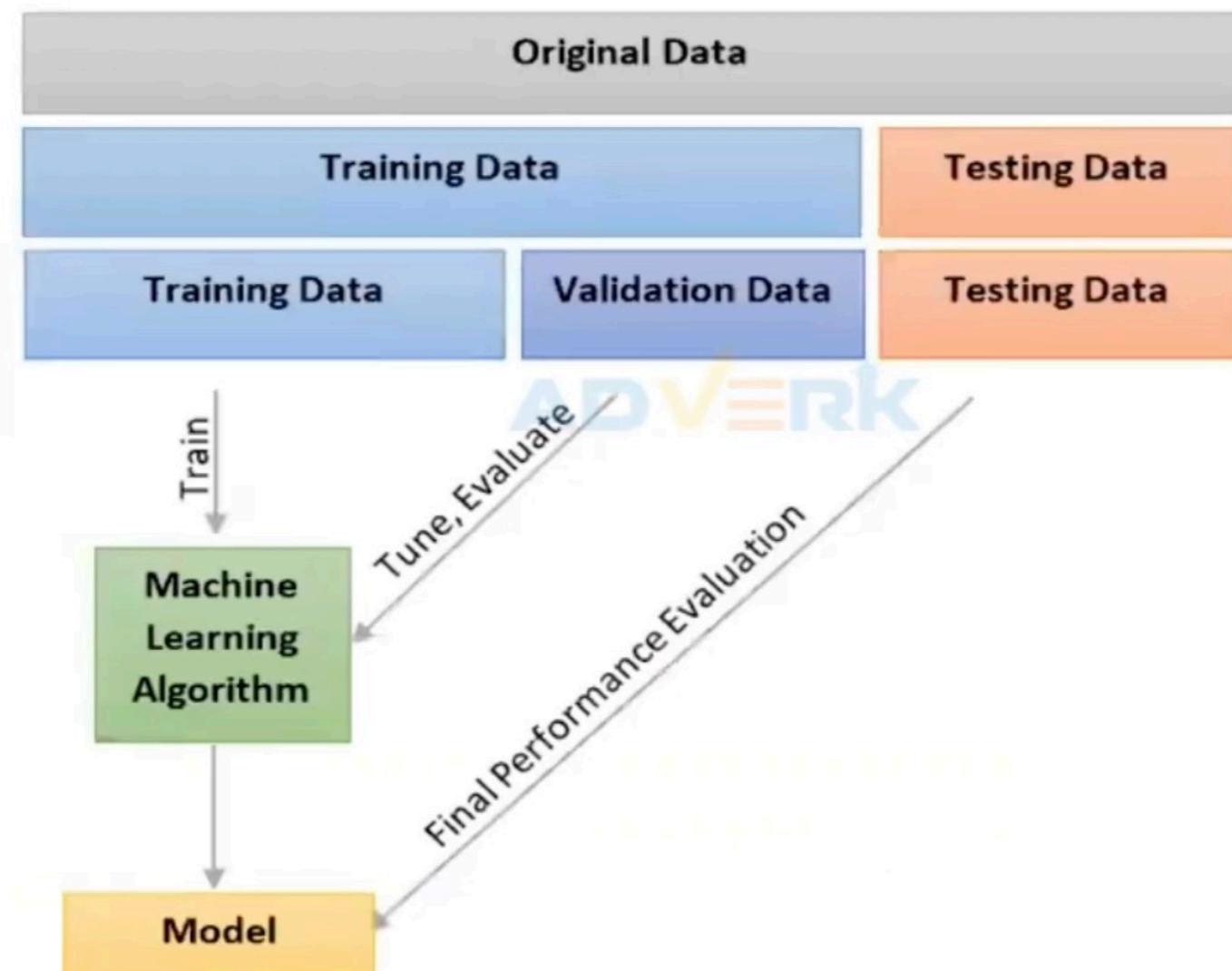


Training and Testing Data-Set In ML



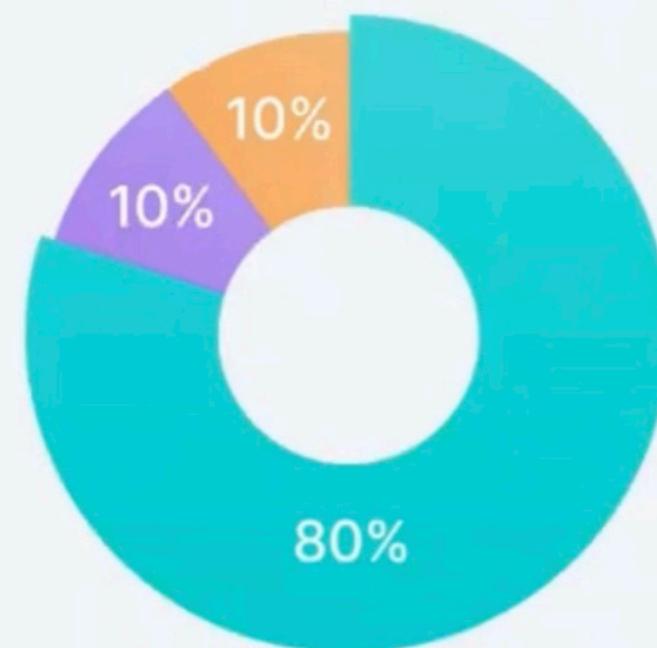
Splitting Data



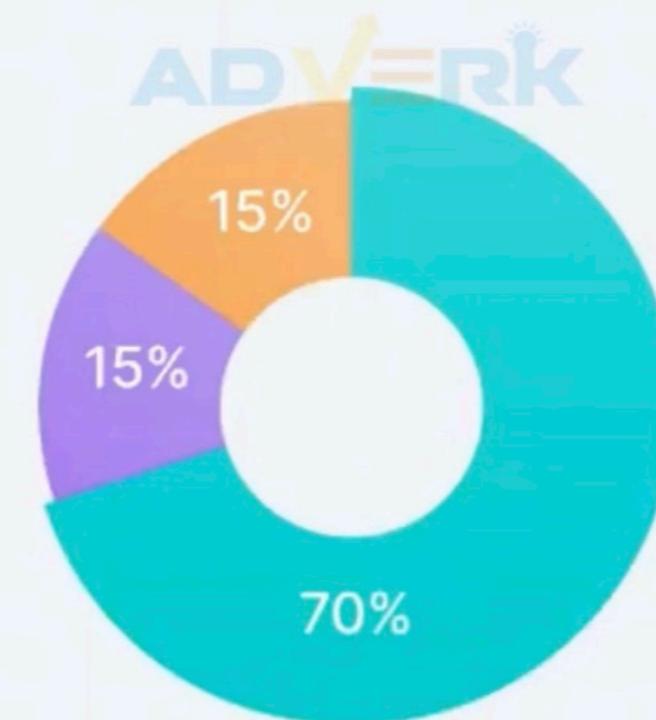


Data Training Needs

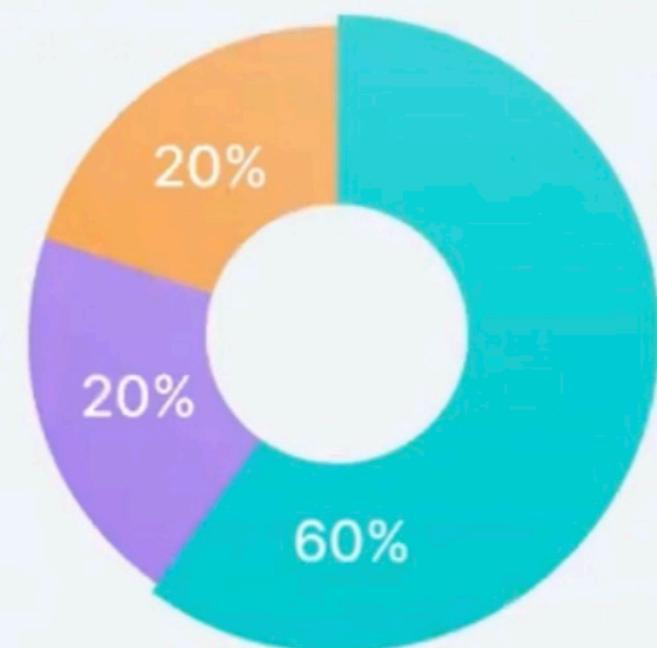
● Training data



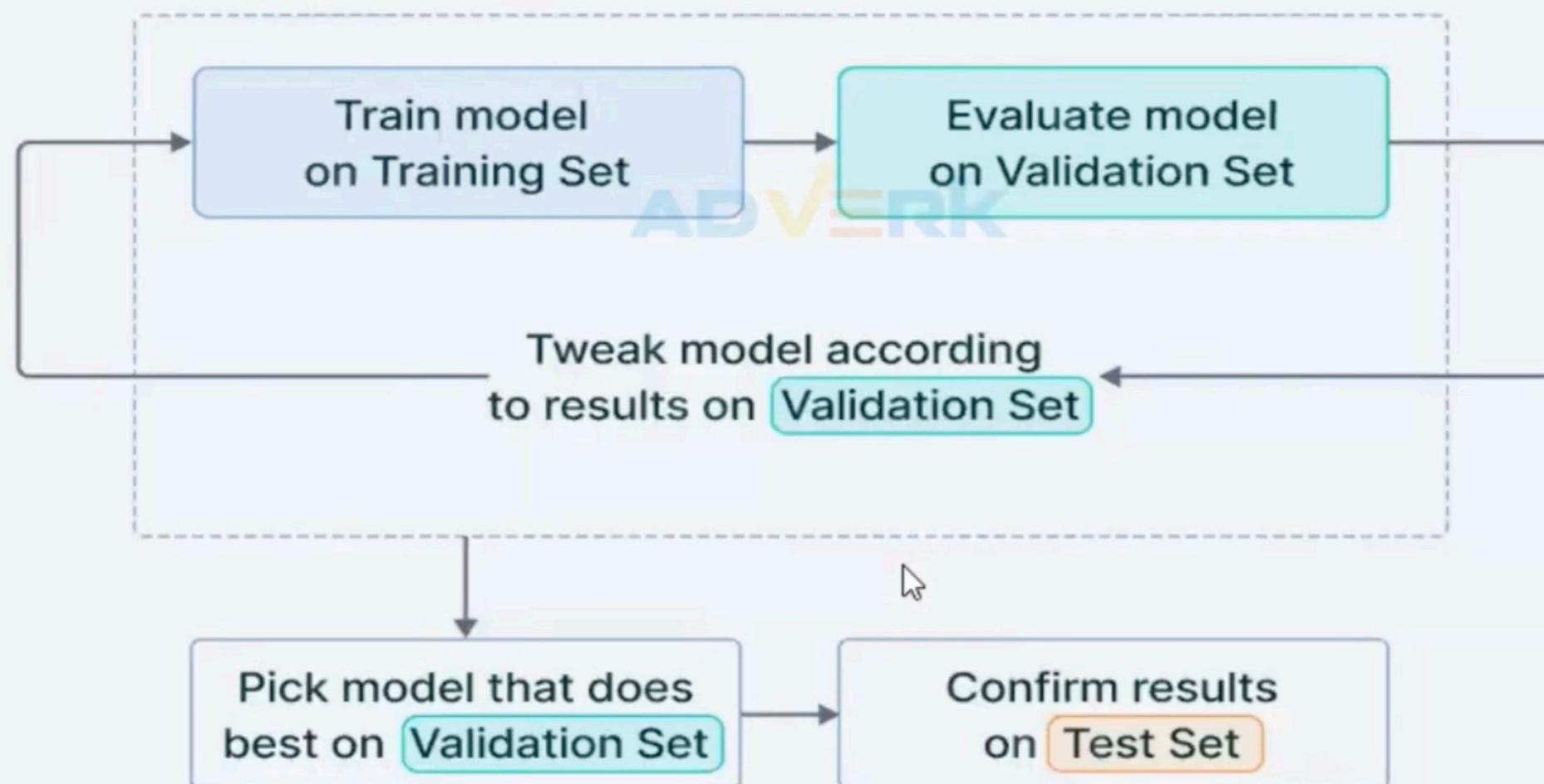
● Validation data



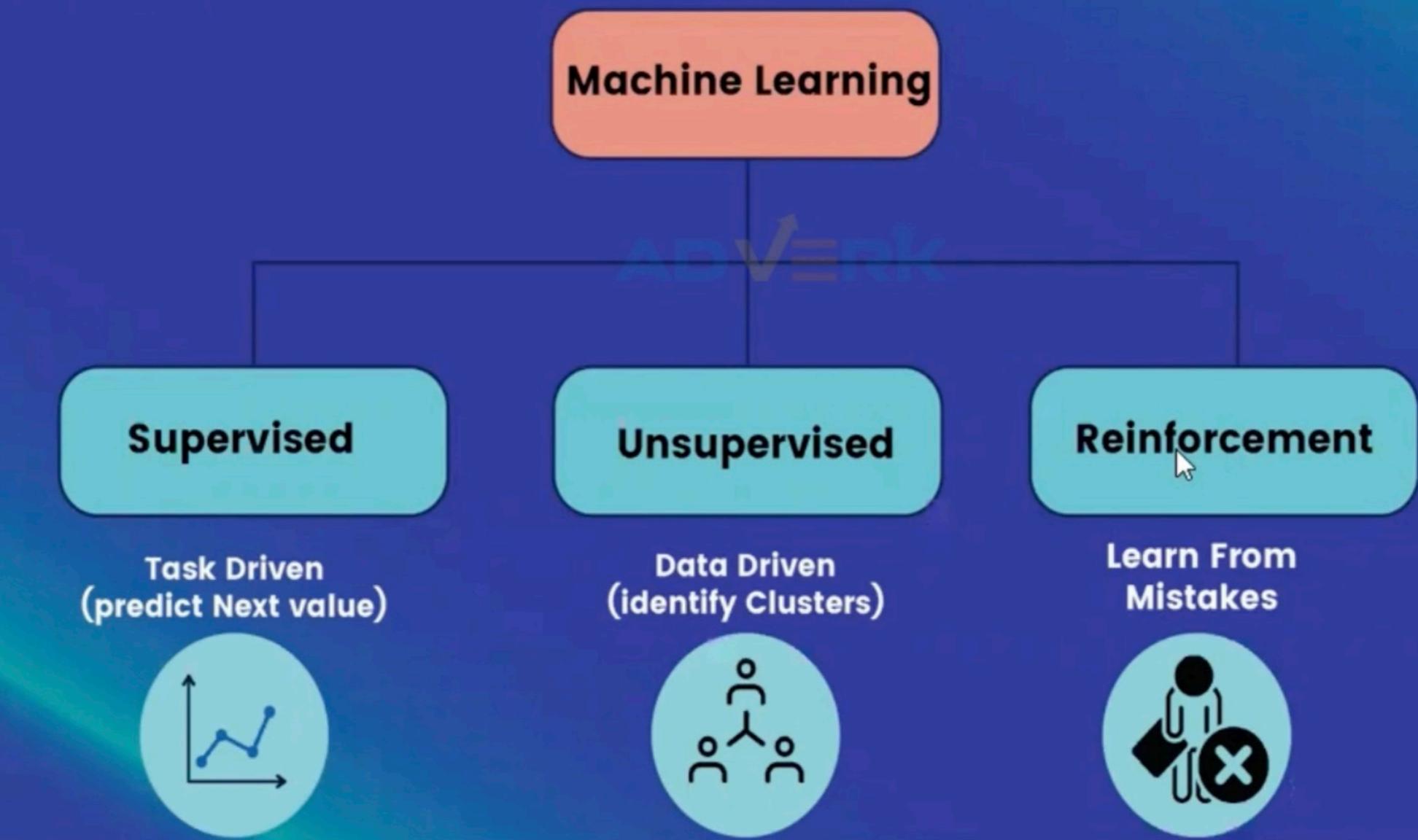
● Test data

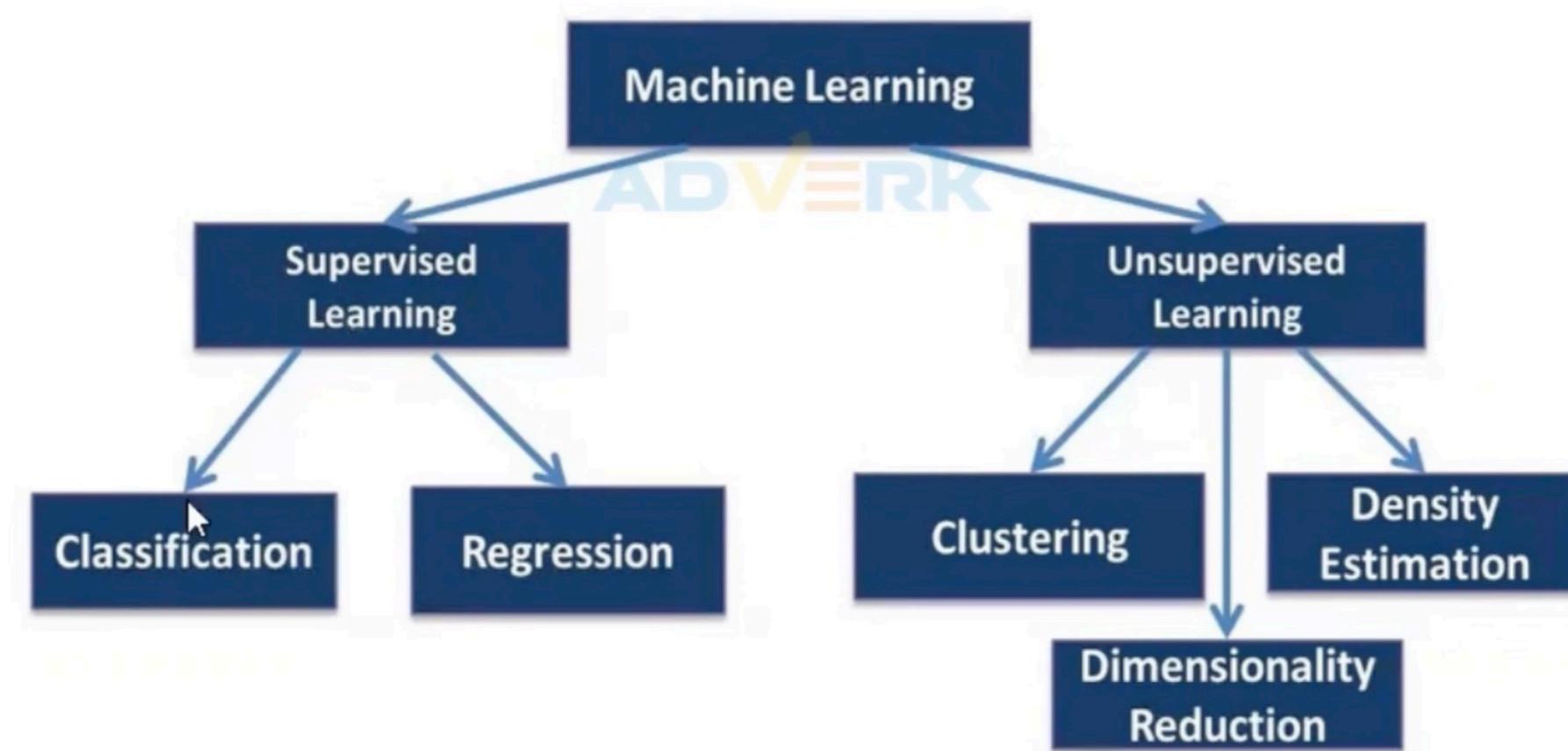


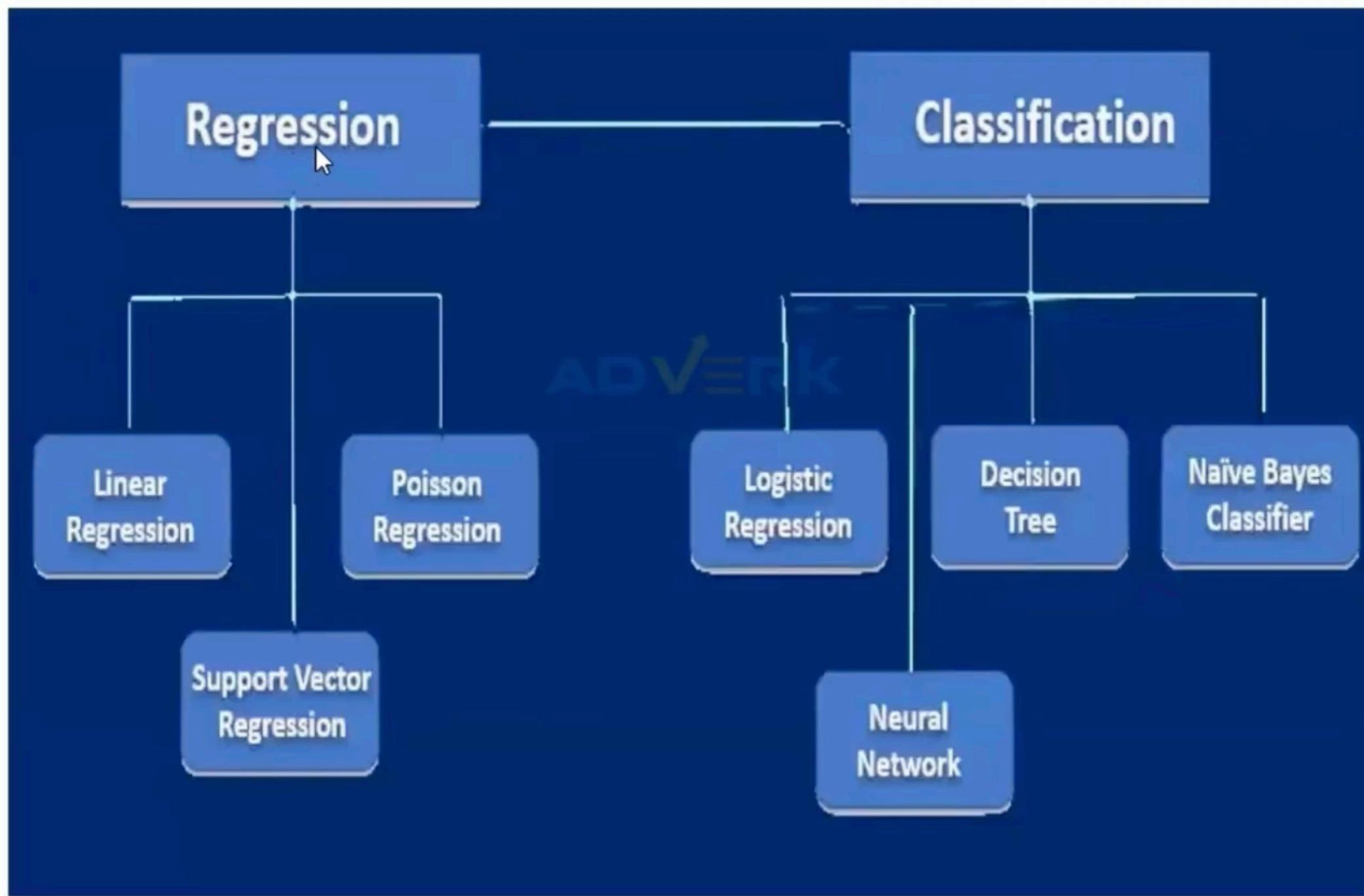
Training data/validation/test



Types of Machine Learning







Advantages & Disadvantages of Supervised Learning



ADVANTAGES

Since supervised learning work with the labelled dataset so we can have an exact idea about the classes of objects.

These algorithms are helpful in predicting the output on the basis of prior experience.



DISADVANTAGES

These algorithms are not able to solve complex tasks.

It may predict the wrong output if the test data is different from the training data.

It requires lots of computational time to train the algorithm.

Applications of Supervised Learning

Image Segmentation - Supervised Learning algorithms are used in image segmentation. In this process, image classification is performed on different image data with pre-defined labels.

Medical Diagnosis - Supervised algorithms are also used in the medical field for diagnosis purposes. It is done by using medical images and past labelled data with labels for disease conditions. With such a process, the machine can identify a disease for the new patients.

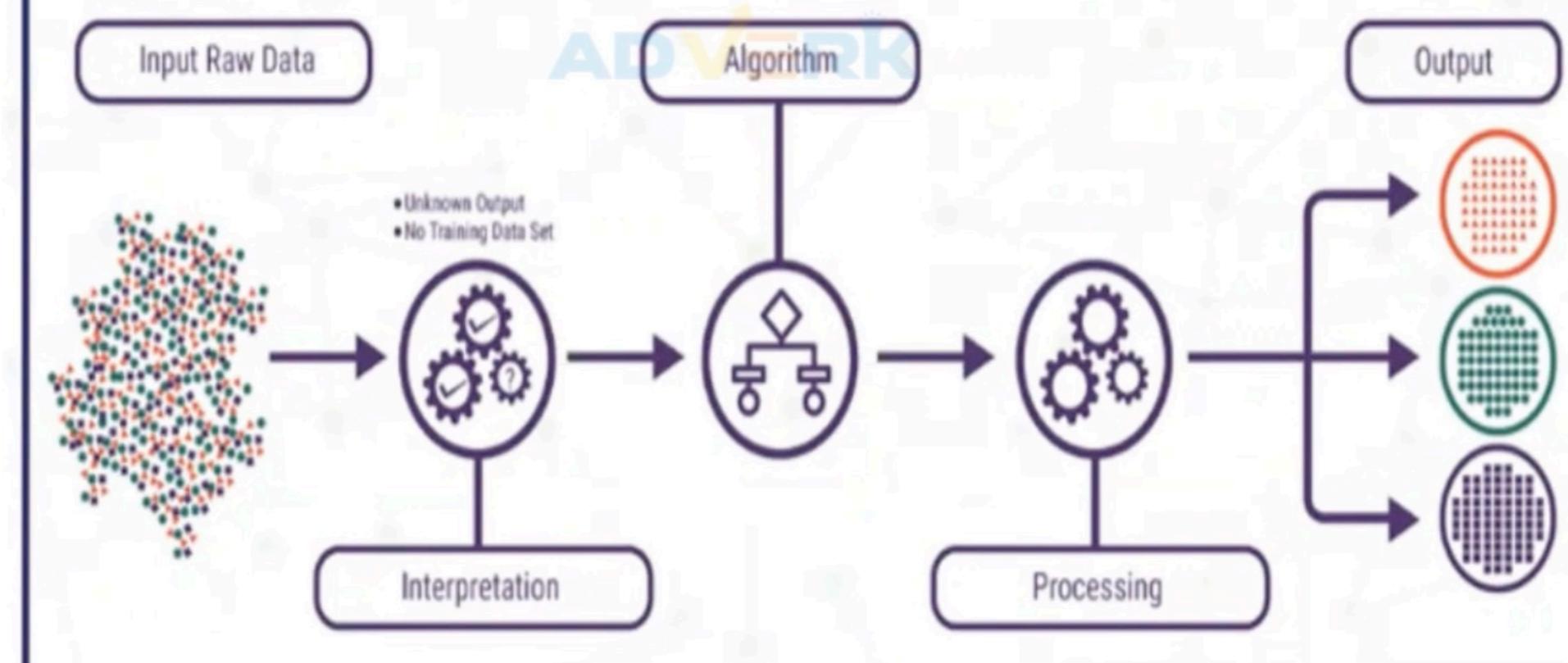
Fraud Detection - Supervised Learning classification algorithms are used for identifying fraud transactions, fraud customers, etc. It is done by using historic data to identify the patterns that can lead to possible fraud.

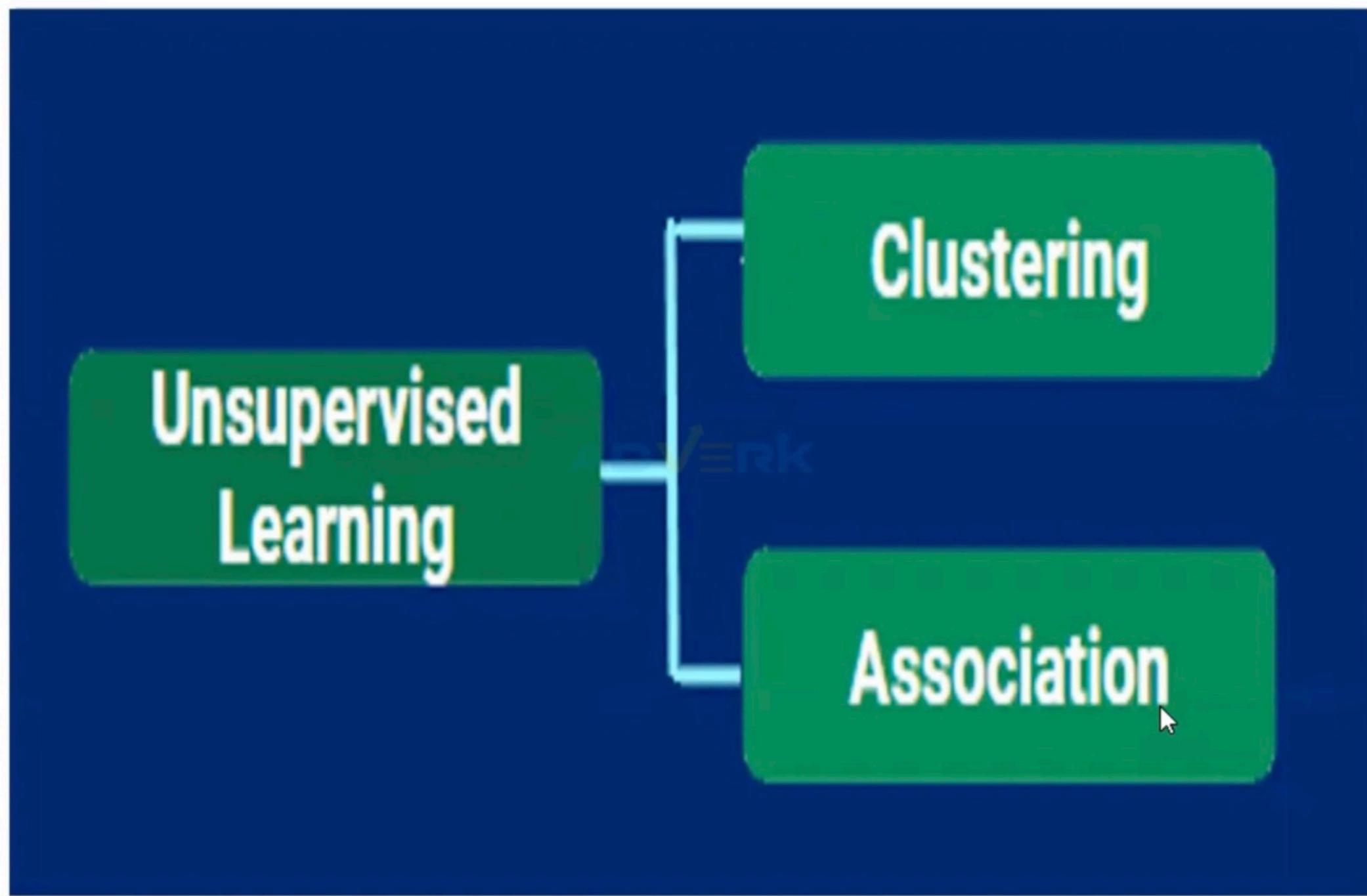
Spam detection - In spam detection & filtering, classification algorithms are used. These algorithms classify an email as spam or not spam. The spam emails are sent to the spam folder.

Speech Recognition - Supervised learning algorithms are also used in speech recognition. The algorithm is trained with voice data, and various identifications can be done using the same, such as voice-activated passwords, voice commands, etc.



UNSUPERVISED LEARNING





Advantages & Disadvantages of Unsupervised Learning

ADVANTAGES

These algorithms can be used for complicated tasks compared to the supervised ones because these algorithms work on the unlabeled dataset.

Unsupervised algorithms are preferable for various tasks as getting the unlabeled dataset is easier as compared to the labelled dataset.

DISADVANTAGES

The output of an unsupervised algorithm can be less accurate as the dataset is not labelled, and algorithms are not trained with the exact output in prior.

Working with Unsupervised learning is more difficult as it works with the unlabelled dataset that does not map with the output.

Applications of Unsupervised Learning

Network Analysis: Unsupervised learning is used for identifying plagiarism and copyright in document network analysis of text data for scholarly articles.

Recommendation Systems: Recommendation systems widely use unsupervised learning techniques for building recommendation applications for different web applications and e-commerce websites.

Anomaly Detection: Anomaly detection is a popular application of unsupervised learning, which can identify unusual data points within the dataset. It is used to discover fraudulent transactions.

Singular Value Decomposition: Singular Value Decomposition or SVD is used to extract particular information from the database. For example, extracting information of each user located at a particular location.



REINFORCEMENT LEARNING

environment

agent



ADVERK



TYPES OF REINFORCEMENT

POSITIVE

NEGATIVE

Advantages & Disadvantages of Reinforcement Learning

ADVANTAGES

It helps in solving complex real-world problems which are difficult to be solved by general techniques.

The learning model of RL is similar to the learning of human beings; hence most accurate results can be found.

DISADVANTAGES

RL algorithms are not preferred for simple problems.

RL algorithms require huge data and computations.

Too much reinforcement learning can lead to an overload of states which can weaken the results.

Applications of Reinforcement Learning

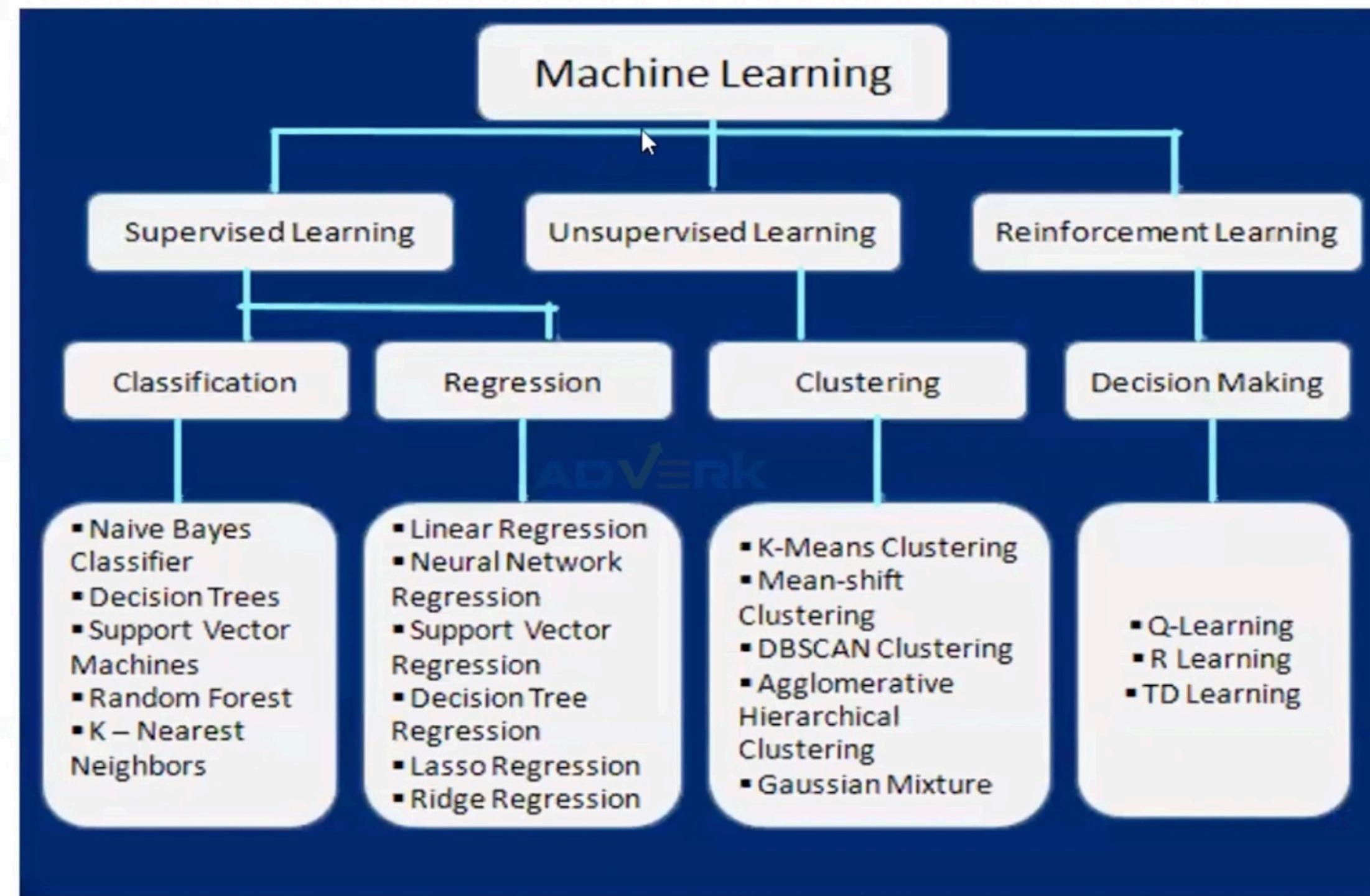
Video Games: RL algorithms are much popular in gaming applications. It is used to gain super-human performance. Some popular games that use RL algorithms are **AlphaGO** and **AlphaGO Zero**.

Resource Management: The "Resource Management with Deep Reinforcement Learning" paper showed that how to use RL in computer to automatically learn and schedule resources to wait for different jobs in order to minimize average job slowdown.

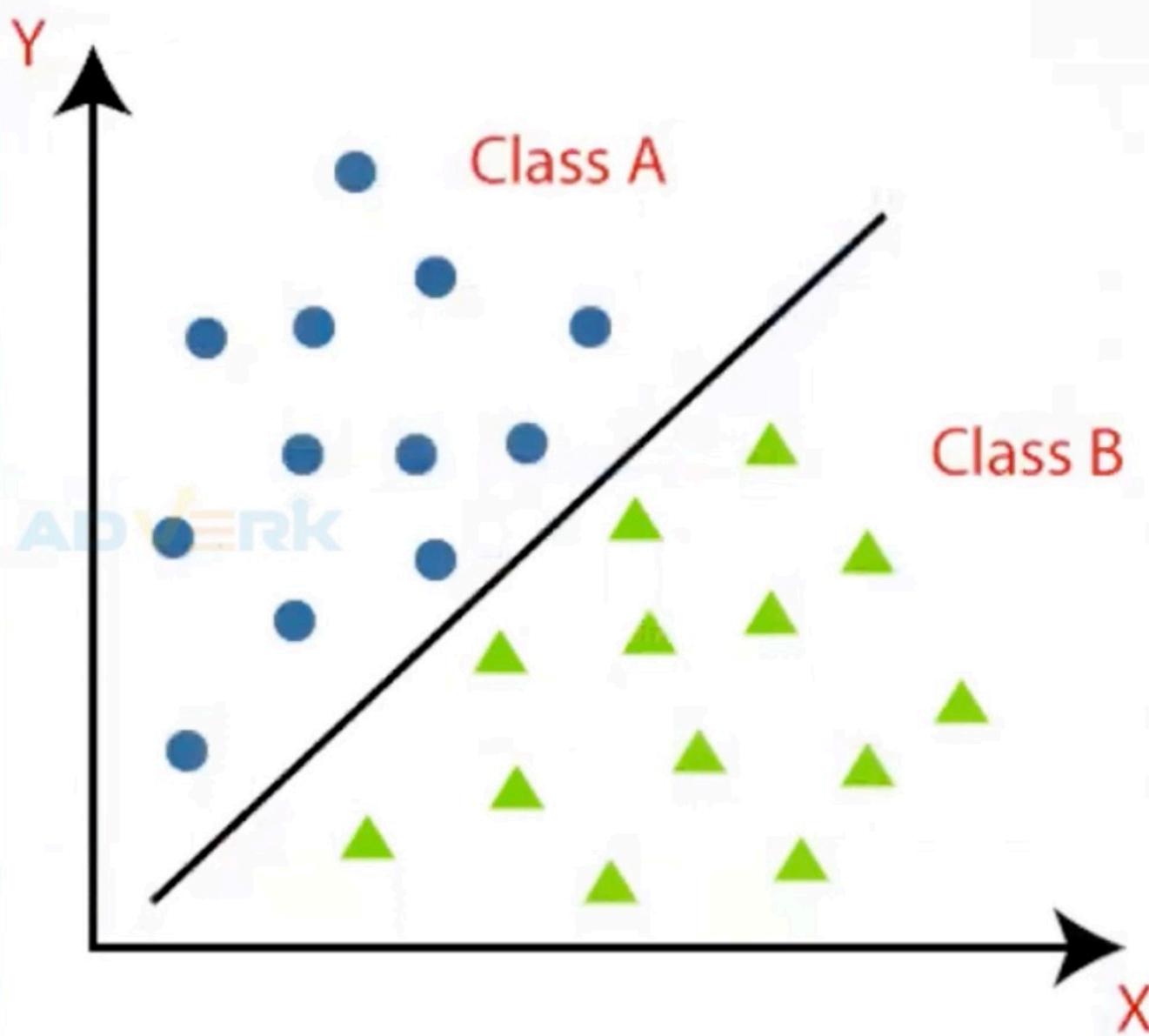
Robotics: RL is widely being used in Robotics applications. Robots are used in the industrial and manufacturing area, and these robots are made more powerful with reinforcement learning. There are different industries that have their vision of building intelligent robots using AI and Machine learning technology.

Text Mining: Text-mining, one of the great applications of NLP, is now being implemented with the help of Reinforcement Learning by Salesforce company.

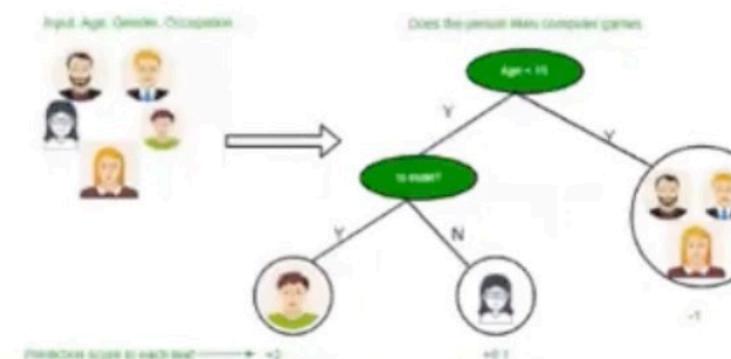
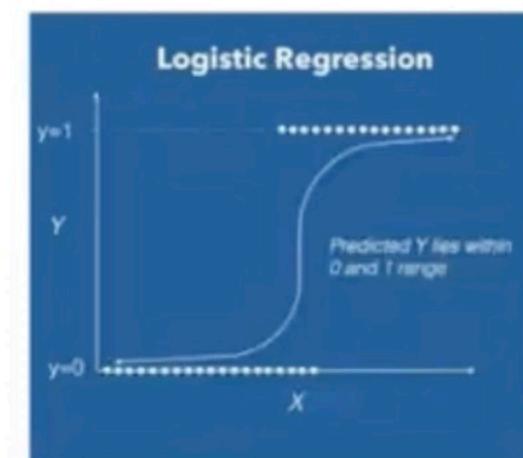
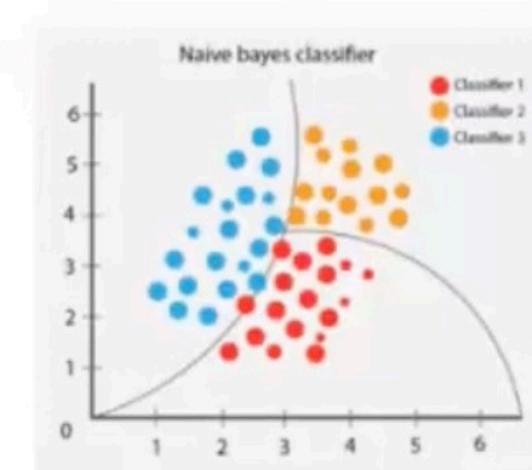




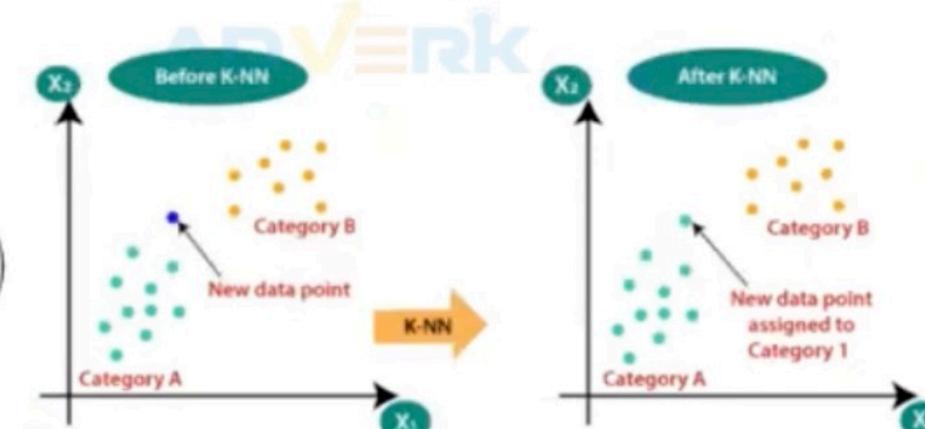
Classification



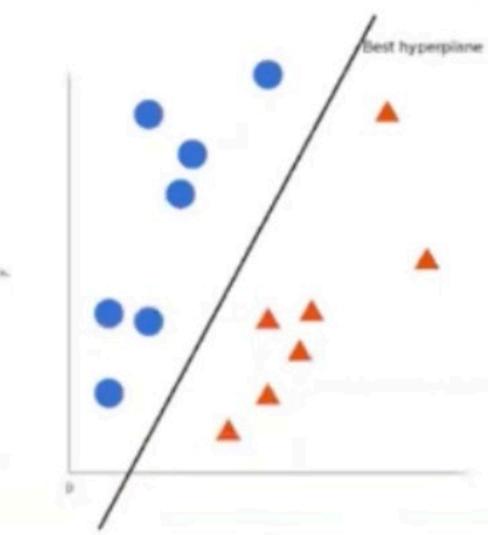
Classification Algorithms



Decision Tree

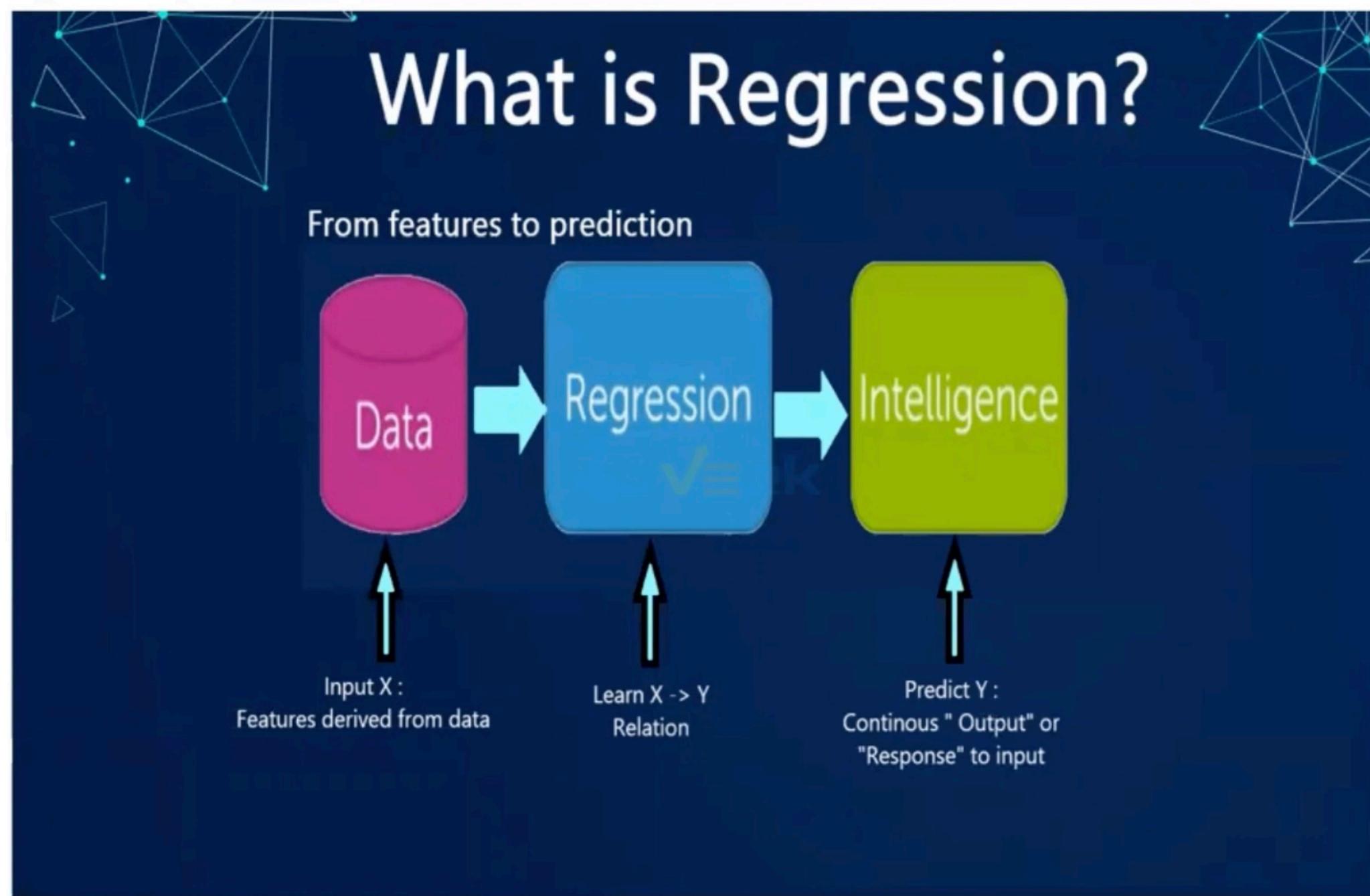


K-Nearest Neighbors

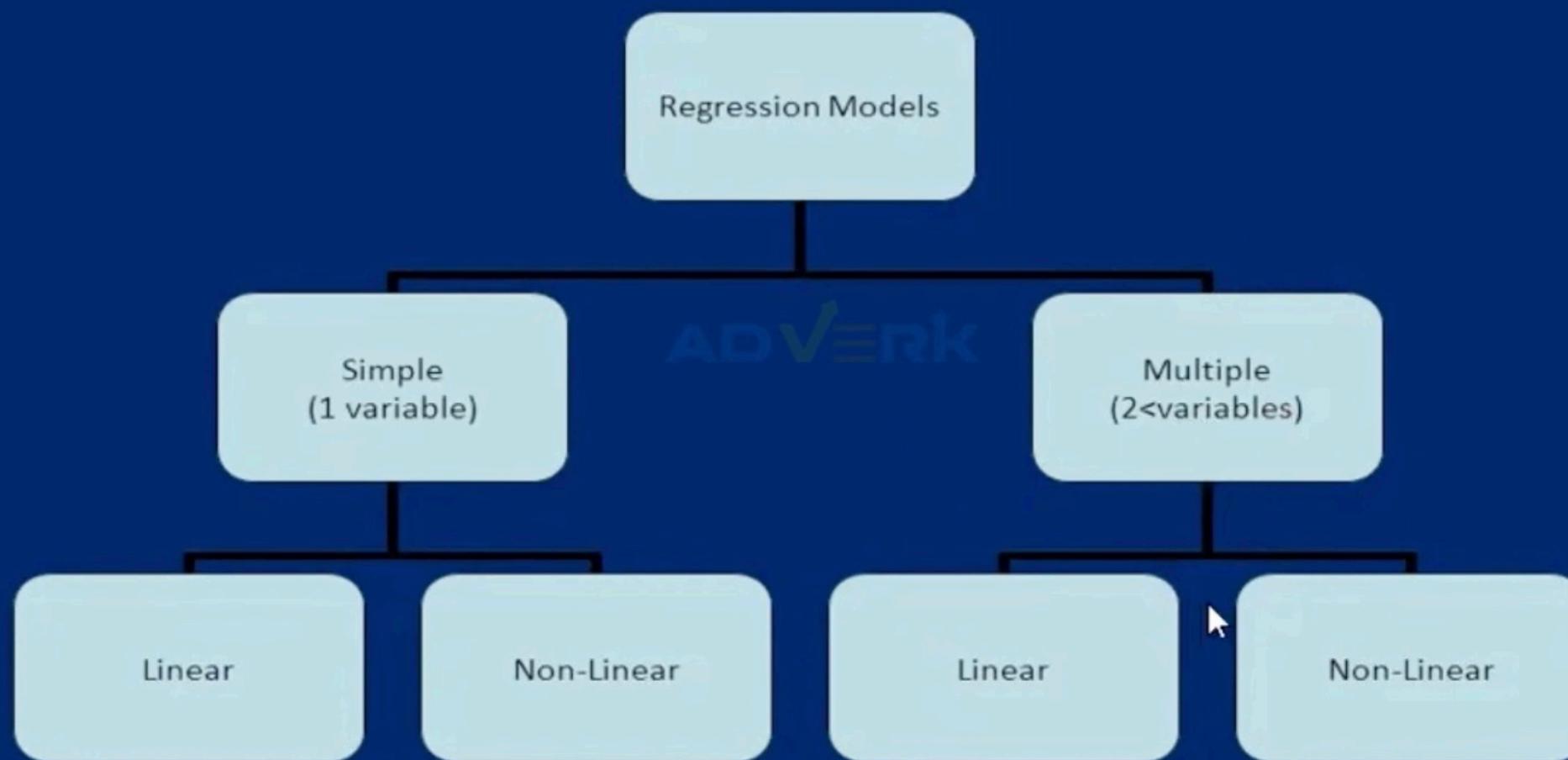


Support Vector Machines

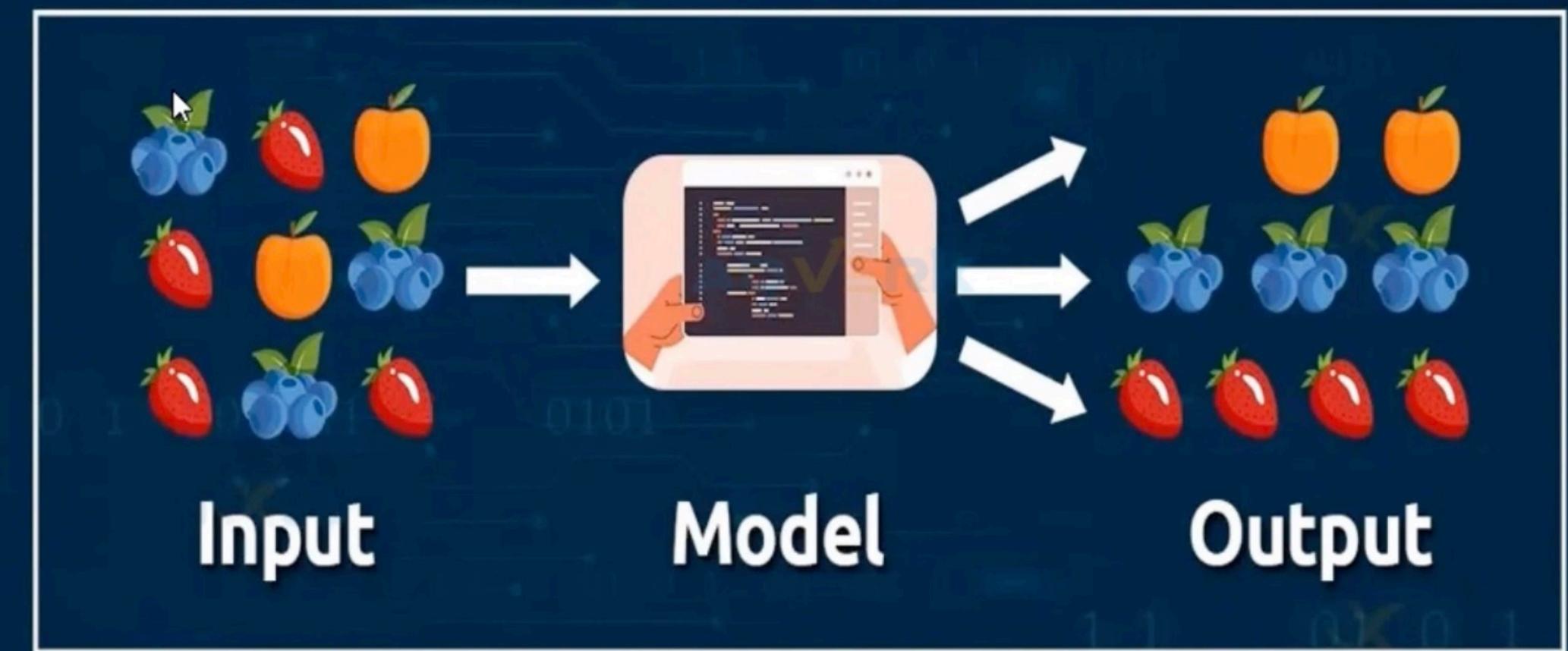
What is Regression?

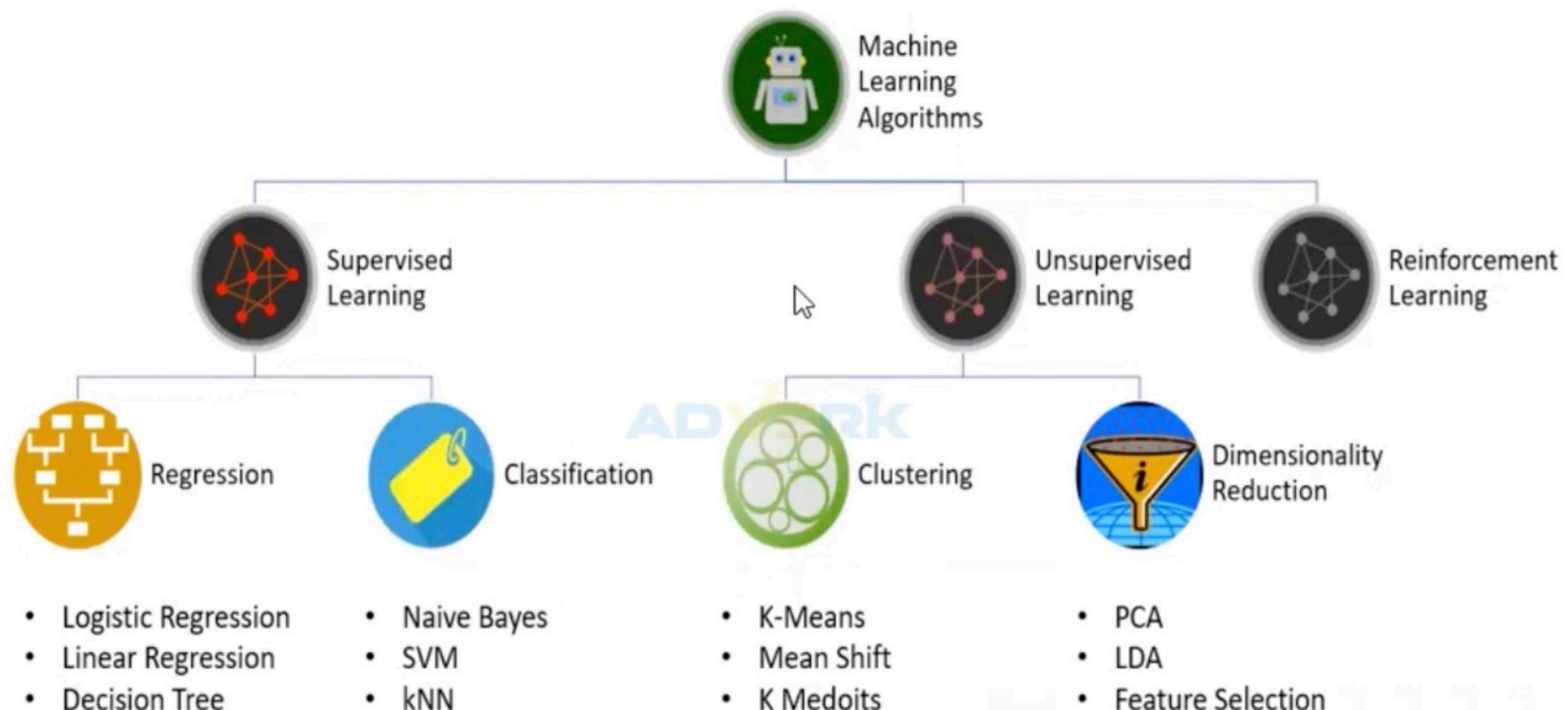


Regression

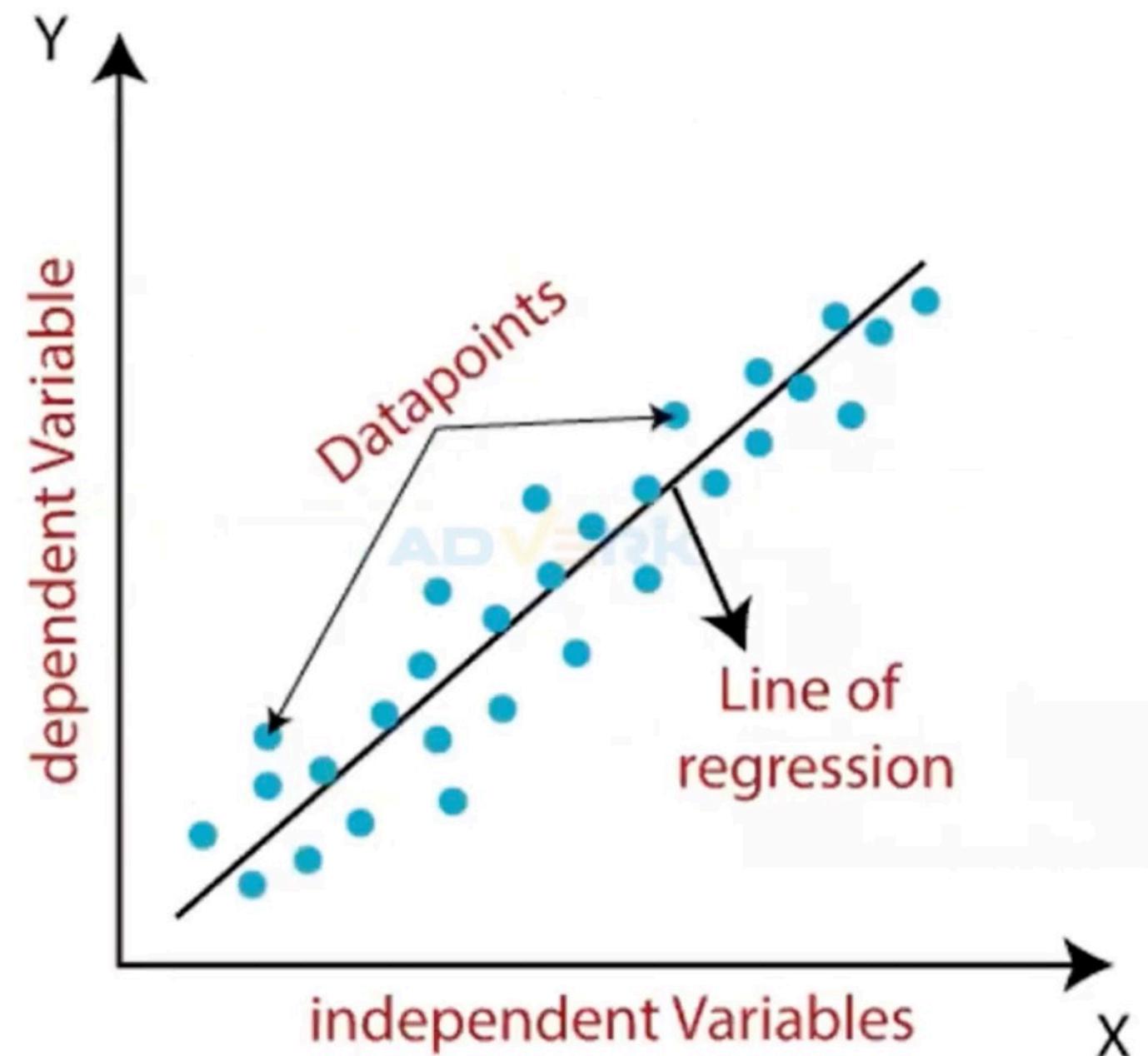


Clustering in Machine Learning

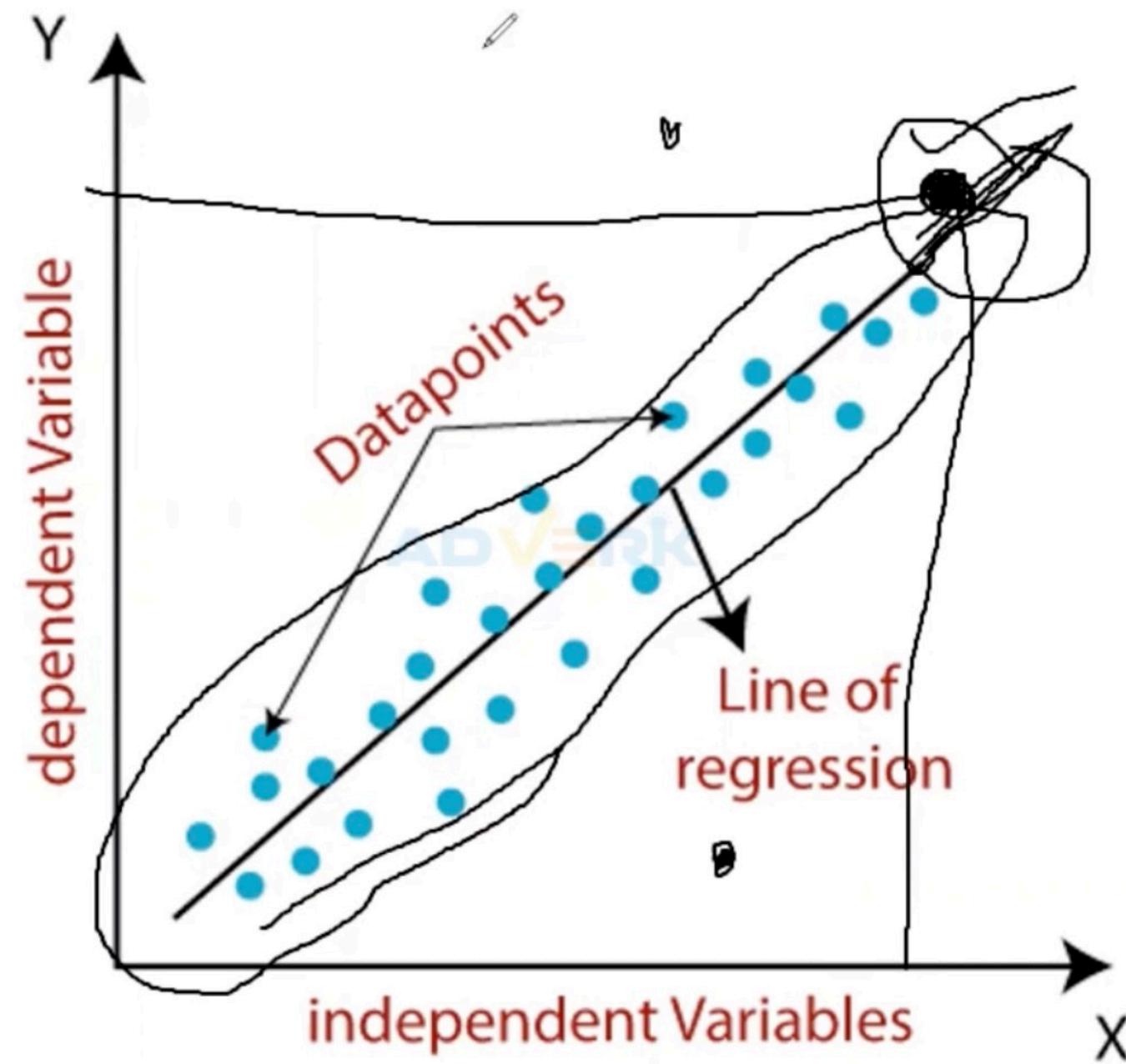




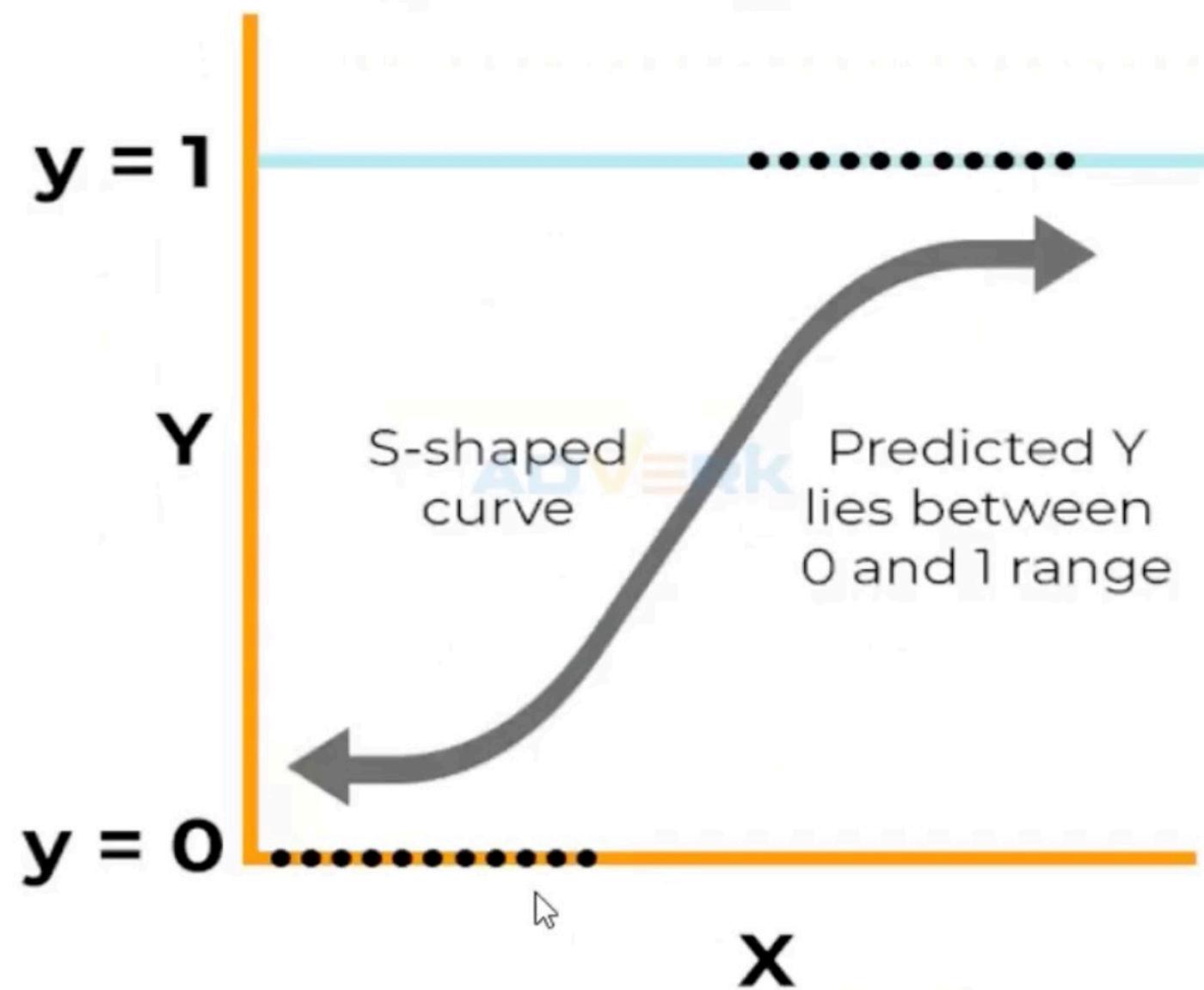
Linear Regression

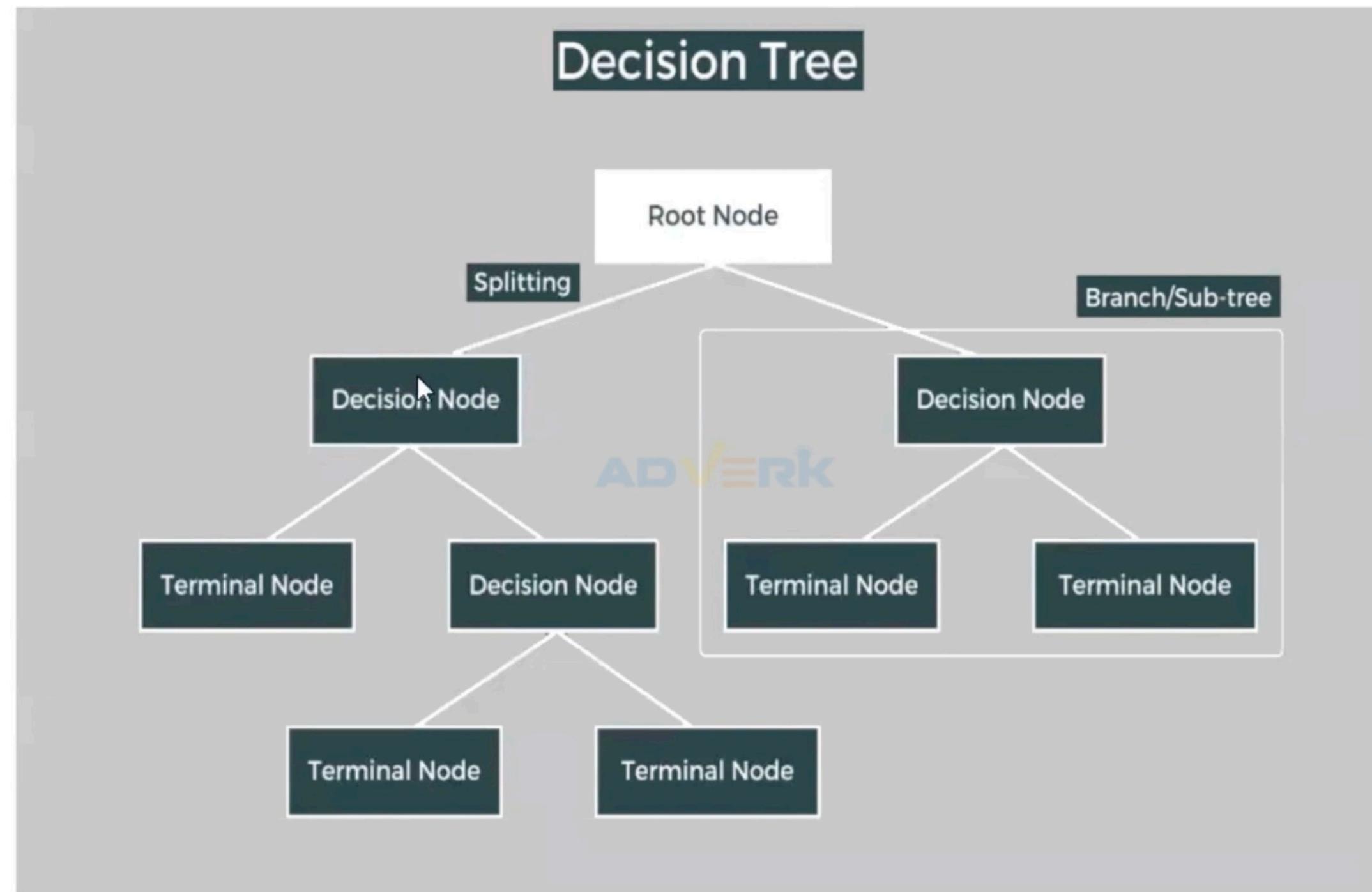


Linear Regression

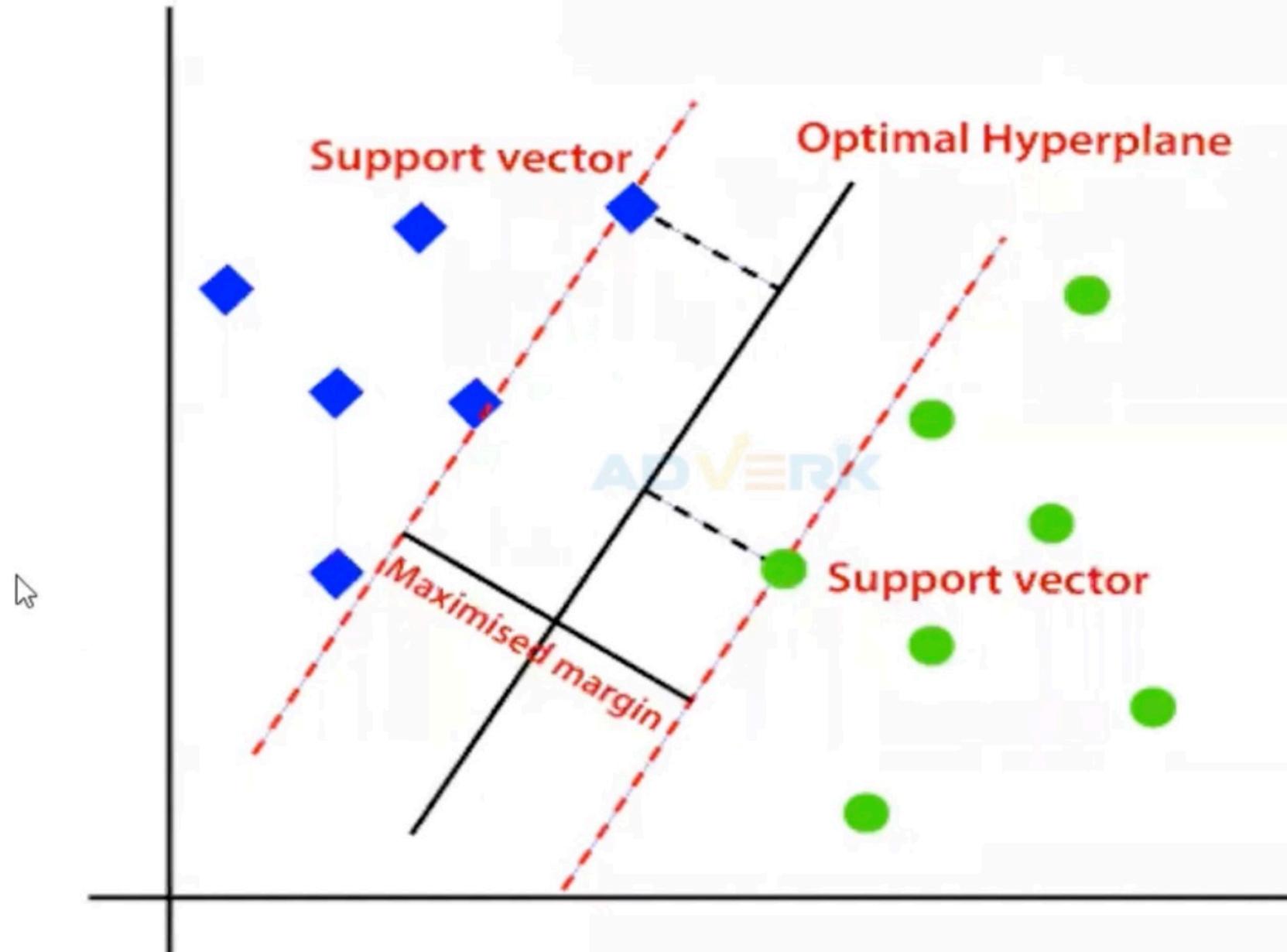


Logistic Regression

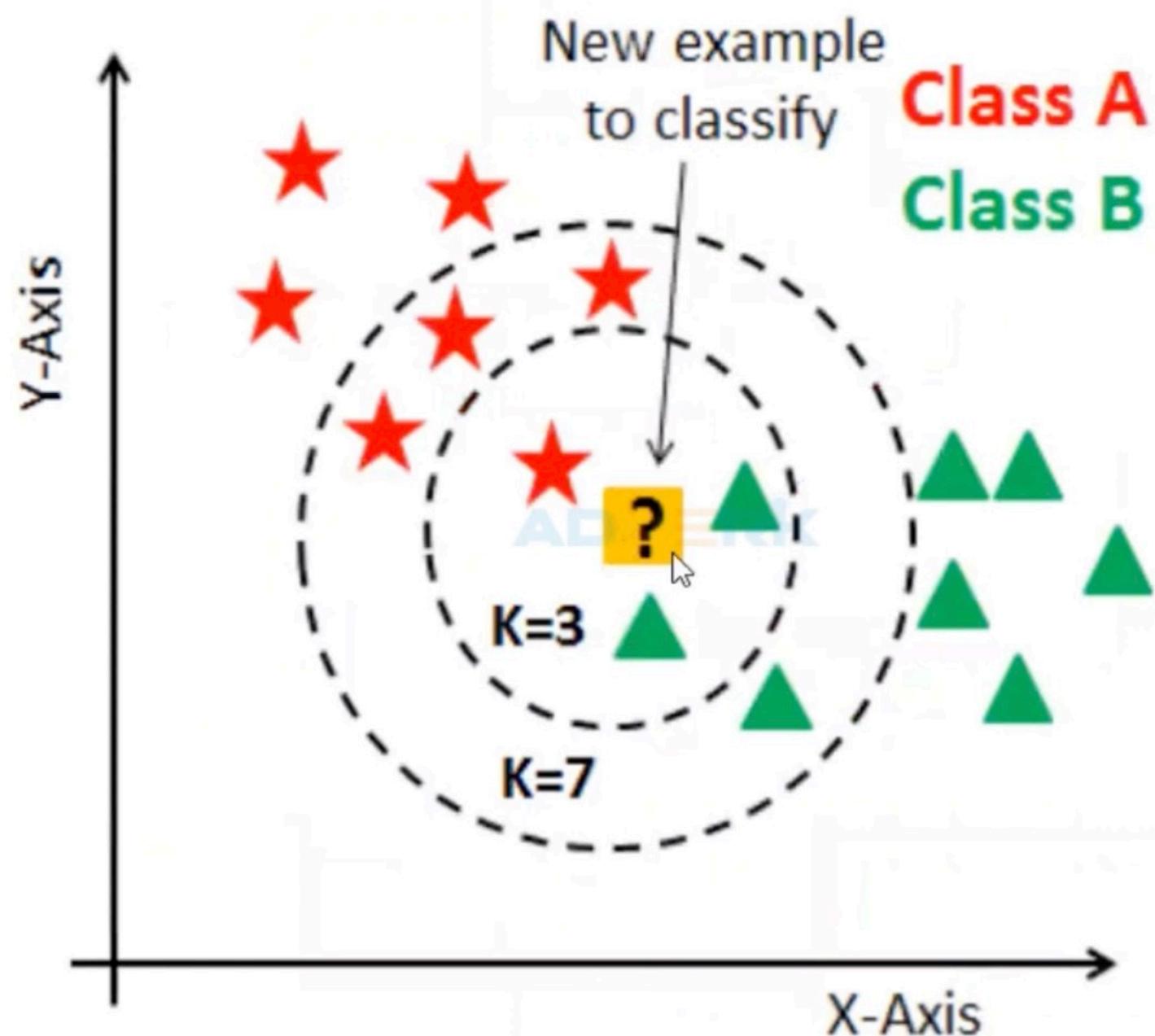




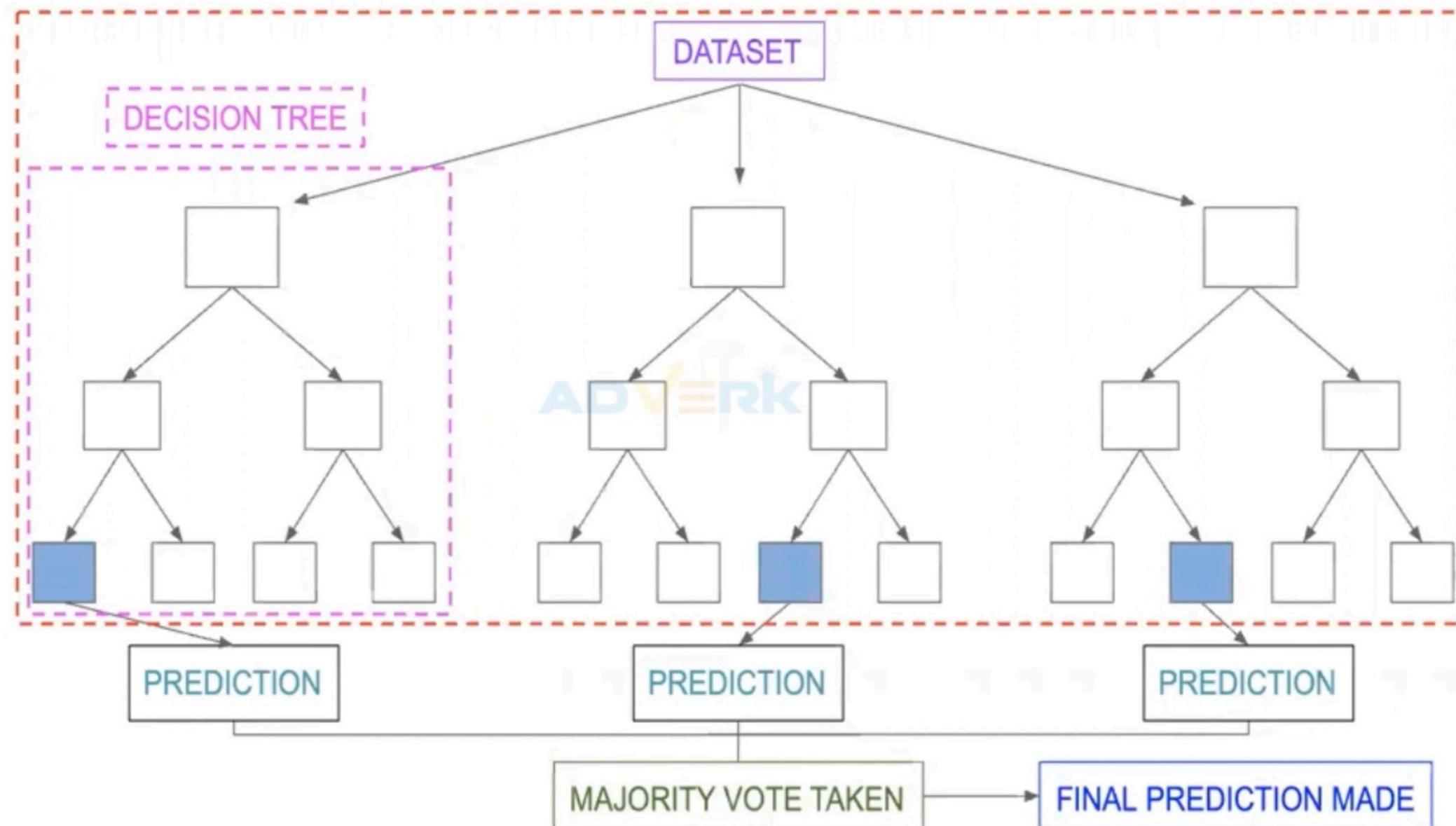
Support Vector Machine



K-Nearest Neighbors



Random Forest



Gradient Boosting

