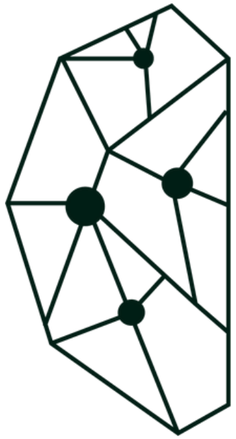

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SUPERVISED LEARNING

Regression & Classification

LET'S DISCOVER THE SUPERVISED LEARNING WORLD TOGETHER!

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MEET YOUR WORKSHOPER

Eya Laouini

- IT Student @ISET Nabeul
- AI Intern @L-mobile Tunisia
- AI Instructor @GoMyCode

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GOAL

UNDERSTAND THE SUPERVISED LEARNING

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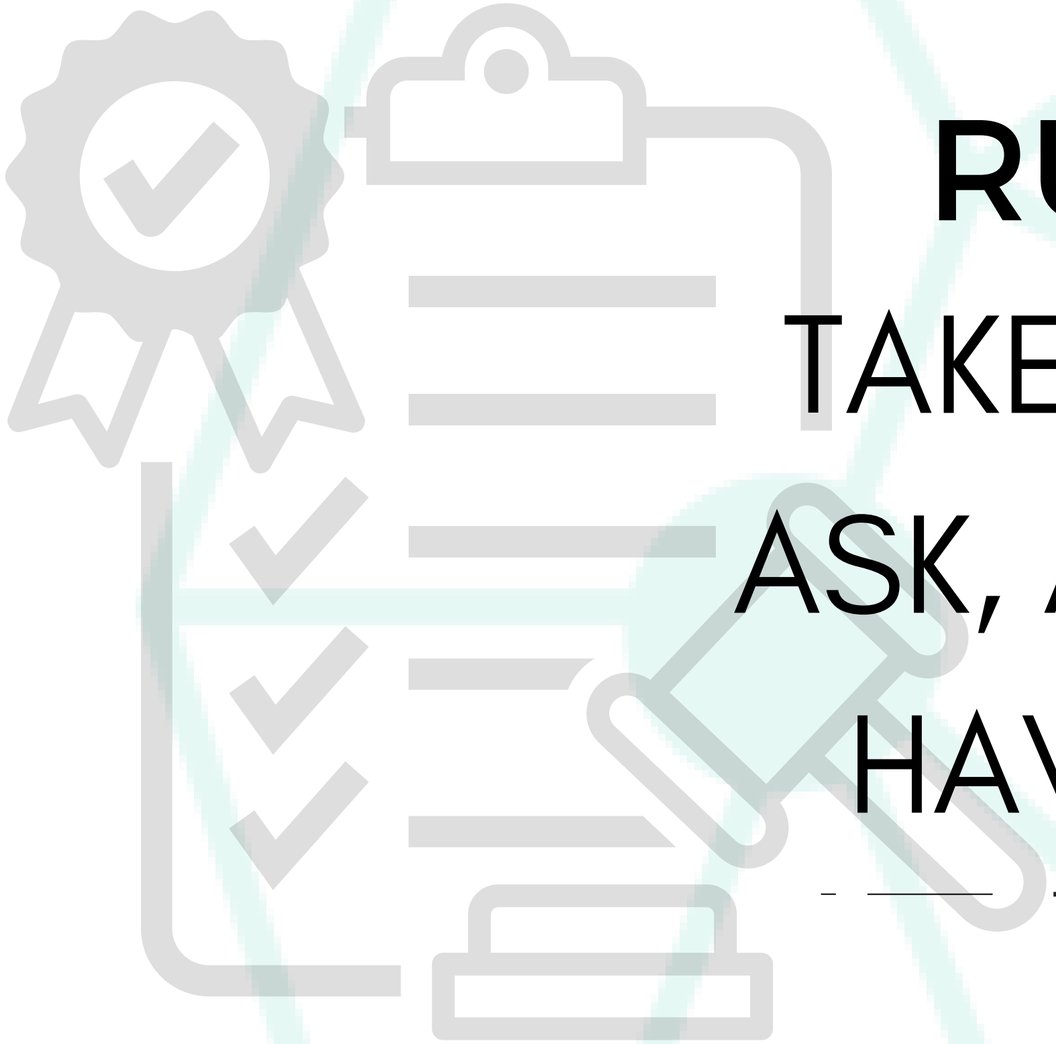

RULES

TAKE NOTES

ASK, ASK, ASK

HAVE FUN

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LES'T START OUR JOURNEY!

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WHAT DO YOU KNOW ABOUT SUPERVISED LEARNING?

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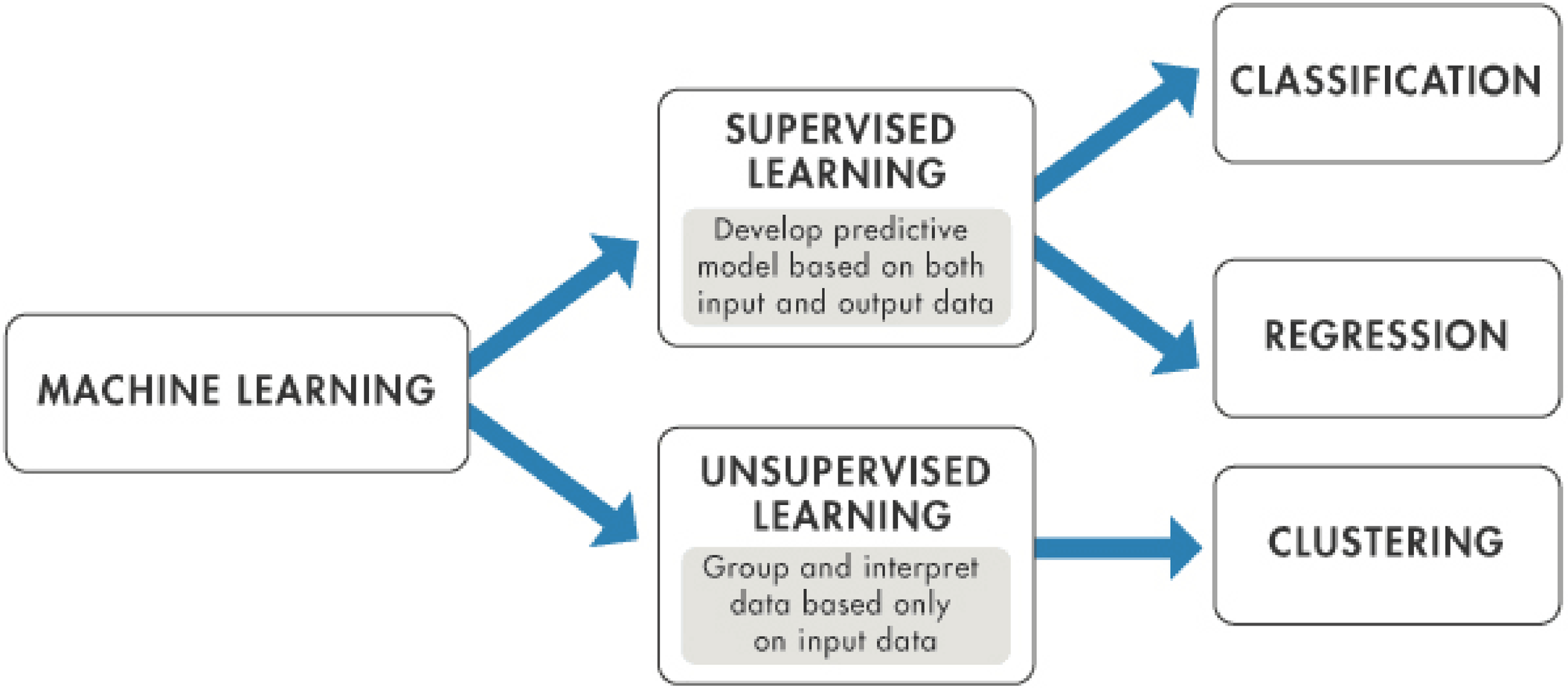
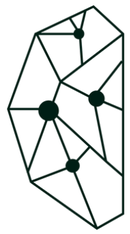
MACHINE LEARNING





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SUPERVISED LEARNING

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

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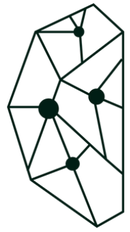
SUPERVISED LEARNING

The data used in supervised learning is **labeled** — meaning that it contains examples of both inputs **(called features)** and correct outputs **(labels)**.



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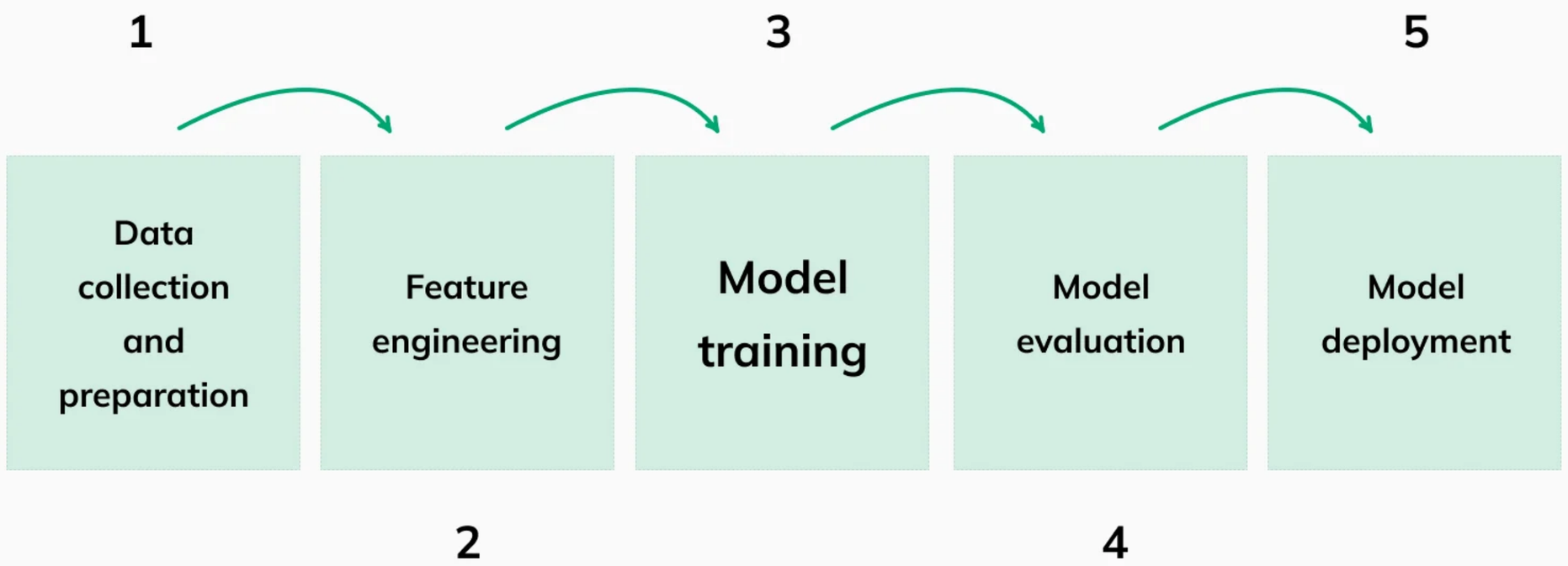
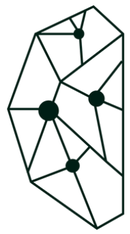
SUPERVISED LEARNING

The **algorithms** analyze a large dataset of these **training pairs** to infer what a desired output value would be when asked to **predict new data**.

ML WORKFLOW

Machine learning workflow





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SUPERVISED LEARNING

Features

Label

date	lat	long	temp	humidity	cloud_coverage	wind_direction	atmp_pressure	rainfall
2021-09-09	49.71N	82.16W	74	20	3	N	18.6	.01
2021-09-09	32.71N	117.16W	82	42	6	SW	29.94	.23

Example

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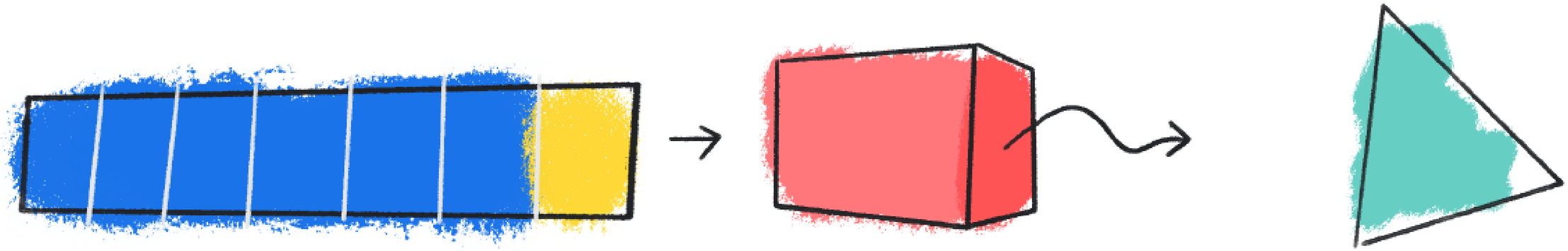
SUPERVISED LEARNING



Labeled Example

Model

Prediction

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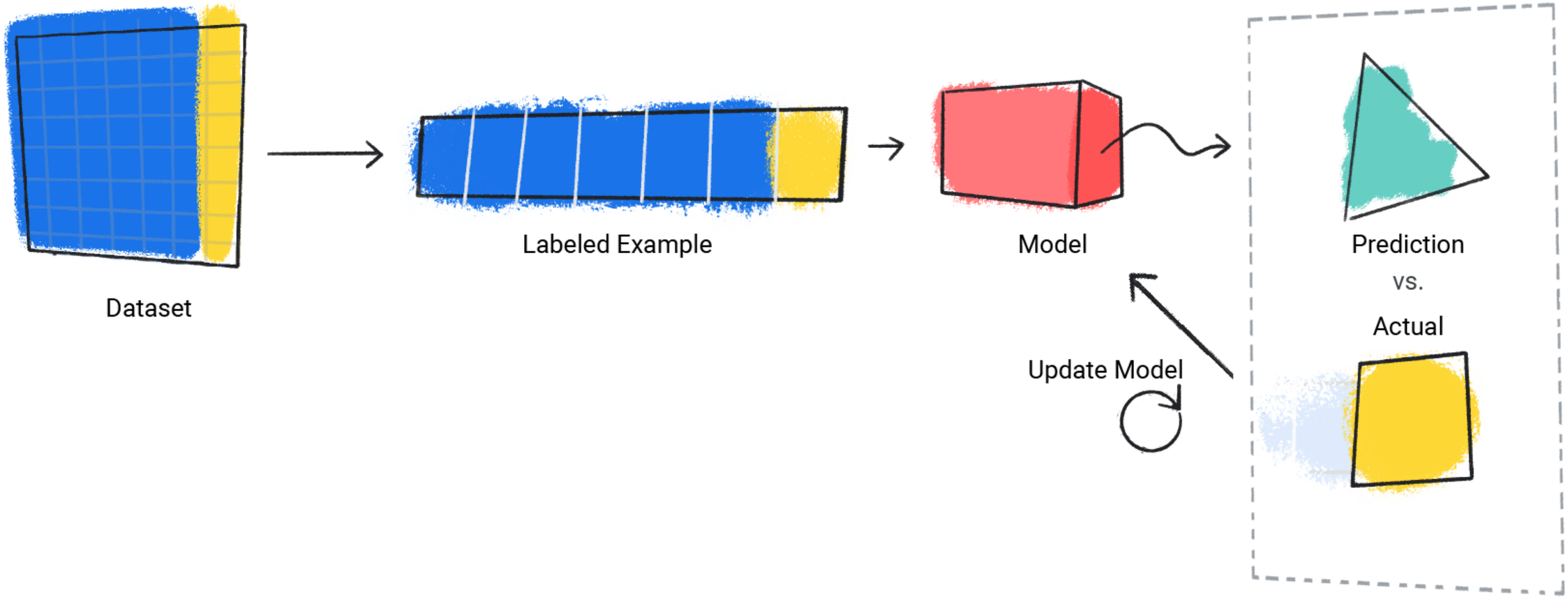

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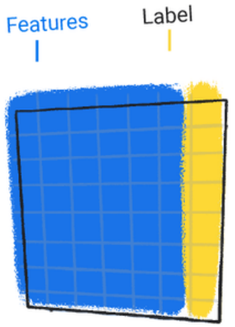
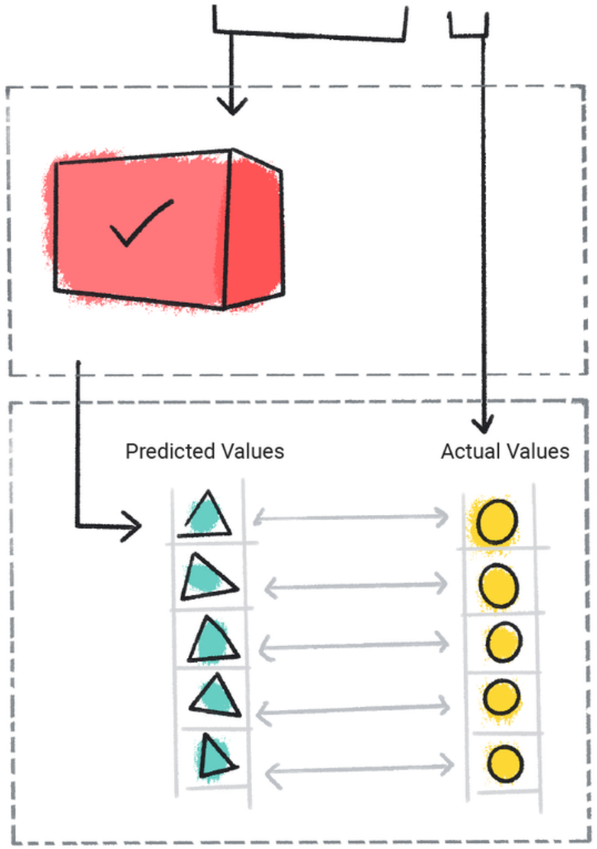


1

Use a **trained ML Model** to predict a value from a given dataset with labeled examples.



2

Compare **Predicted Values** with **Actual Values**.

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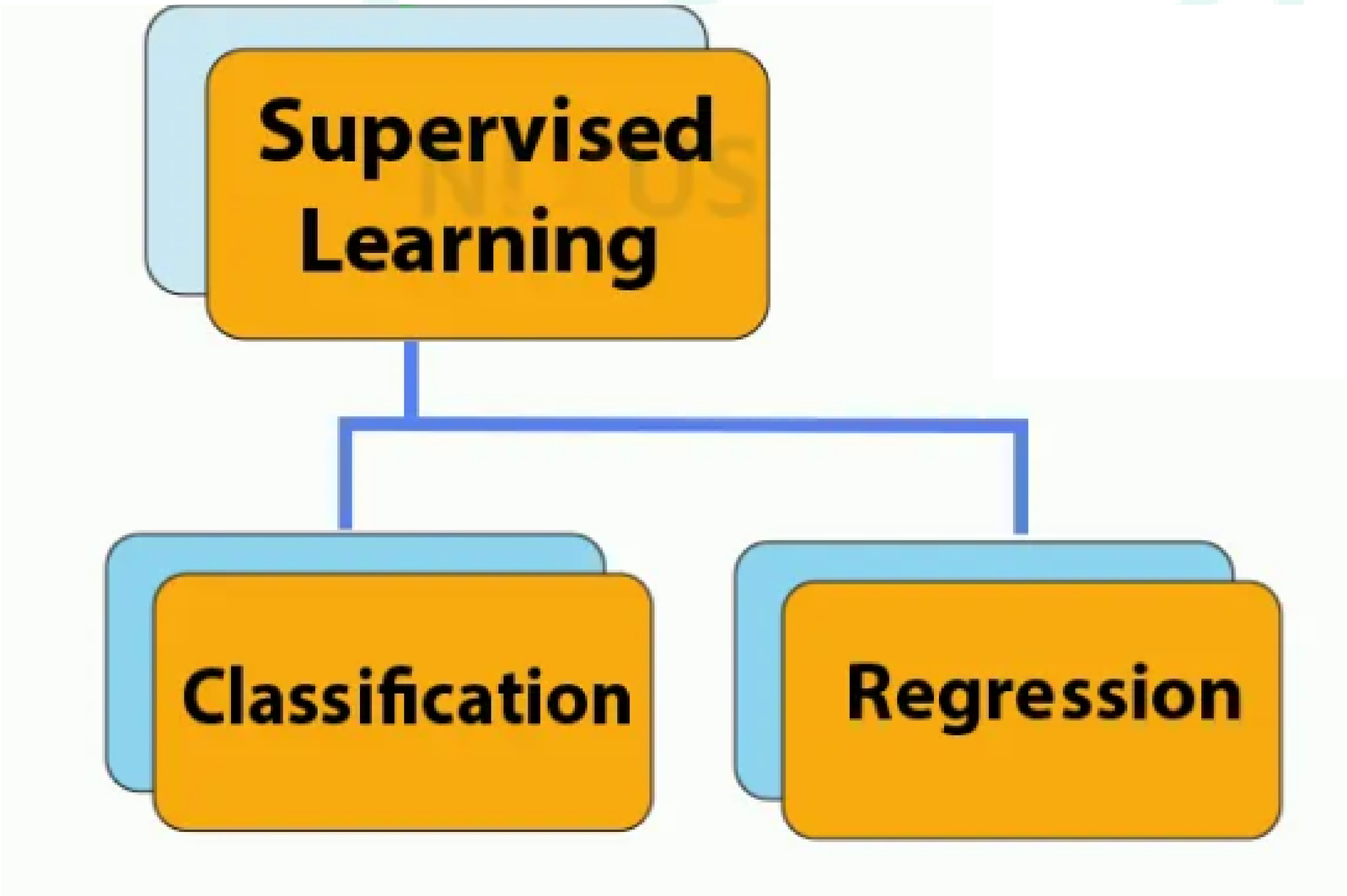

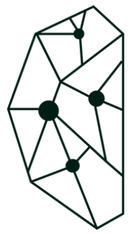

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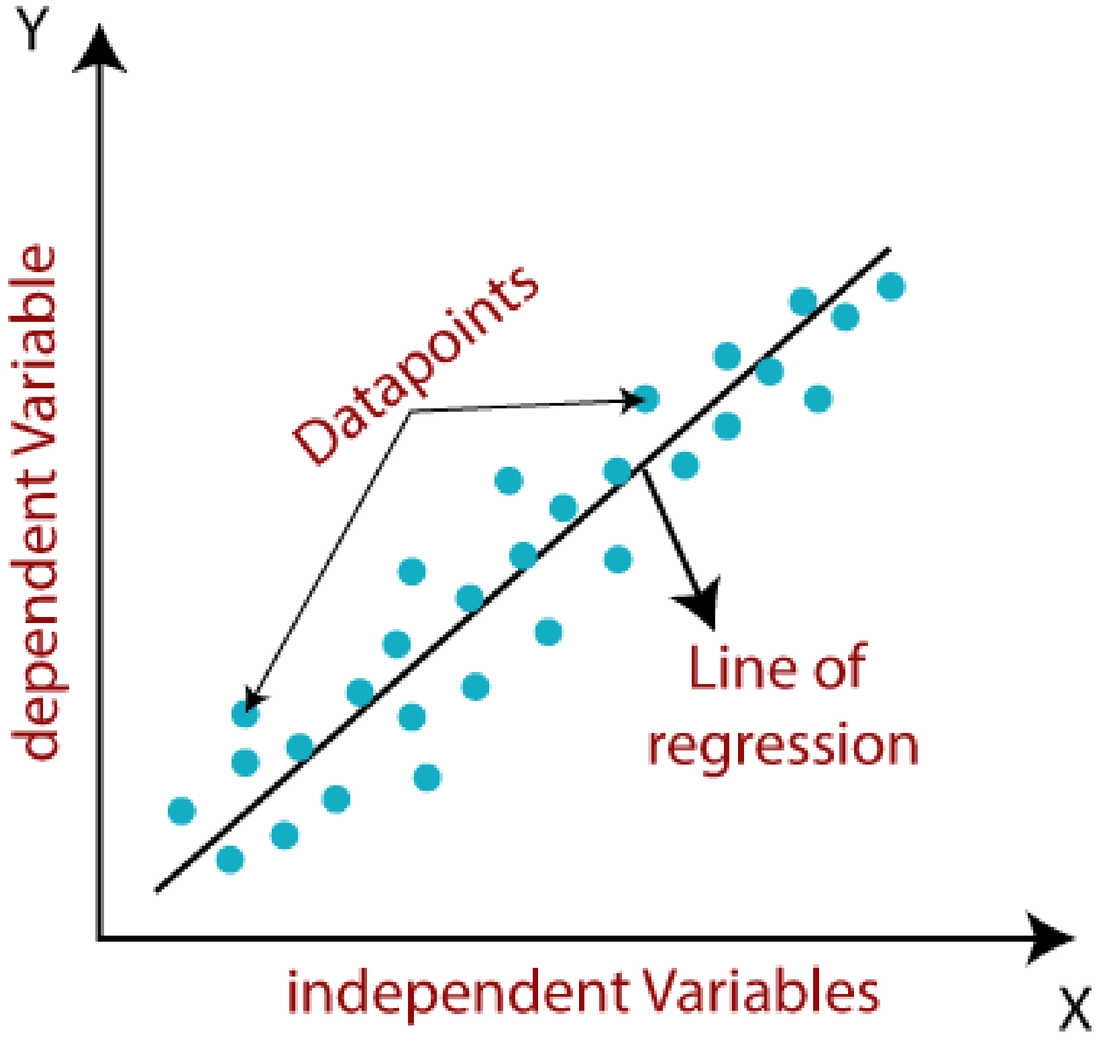
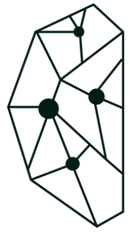
REGRESSION

Regression algorithms are used to predict a real or **continuous value**, where the algorithm detects a relationship between two or more variables.

REGRESSION


Y
dependent Variable
Datapoints
Line of
regression
independent Variables
X



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CLASSIFICATION

Classification algorithms are used to **group data** by predicting a **categorical label** or output variable based on the input data. Classification is used when output variables are categorical, meaning there are two or more **classes**.

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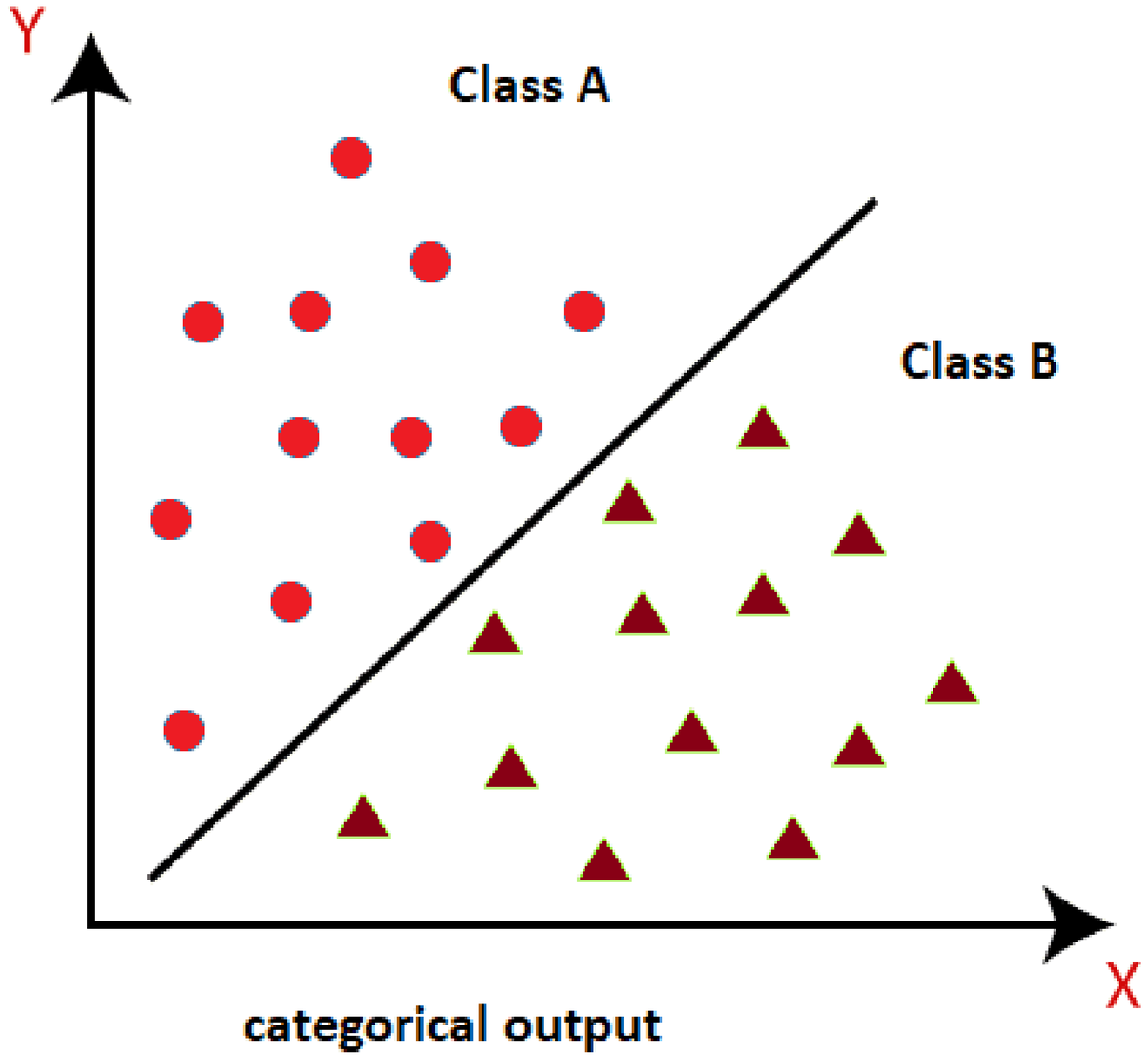
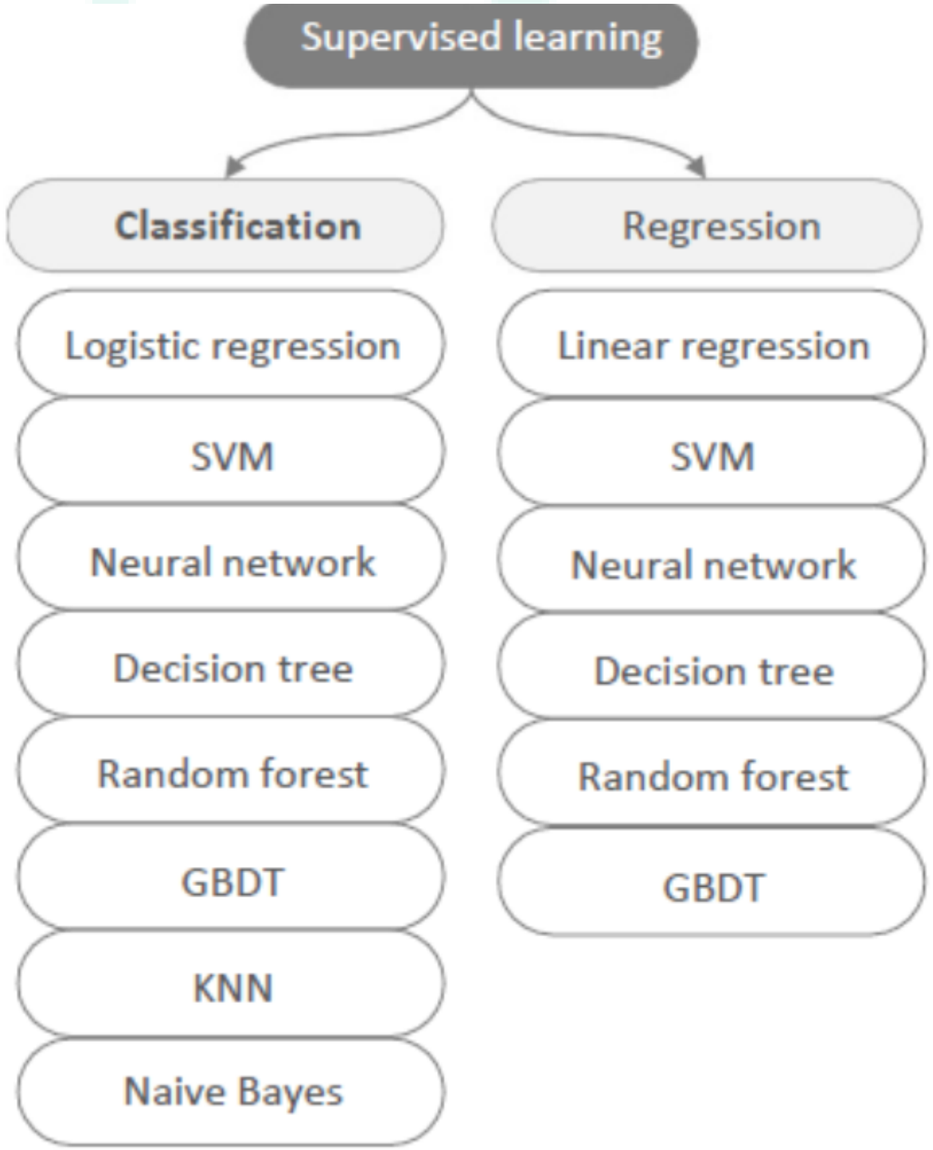
CLASSIFICATION



SUPERVISED ALGOS



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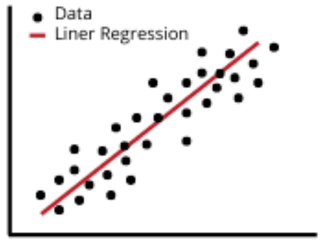
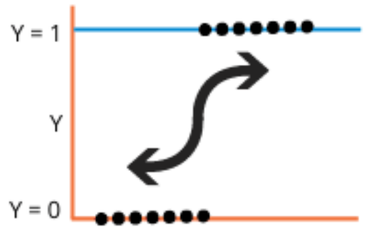
SUPERVISED ALGOS

Linear Regression

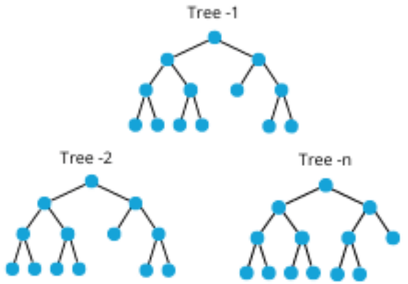


Logistic Regression

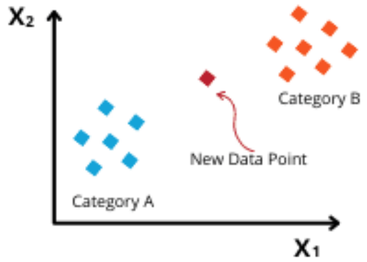


Decision Trees

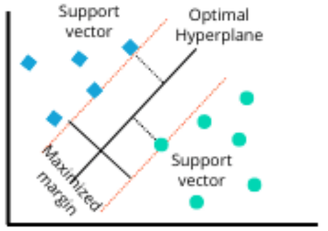
Random Forest

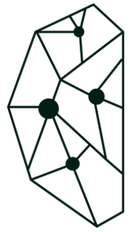


K-Nearest Neighbor



Support Vector Machine





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LINEAR REGRESSION

A simple algorithm that models a linear relationship between inputs and a continuous numerical output variable.

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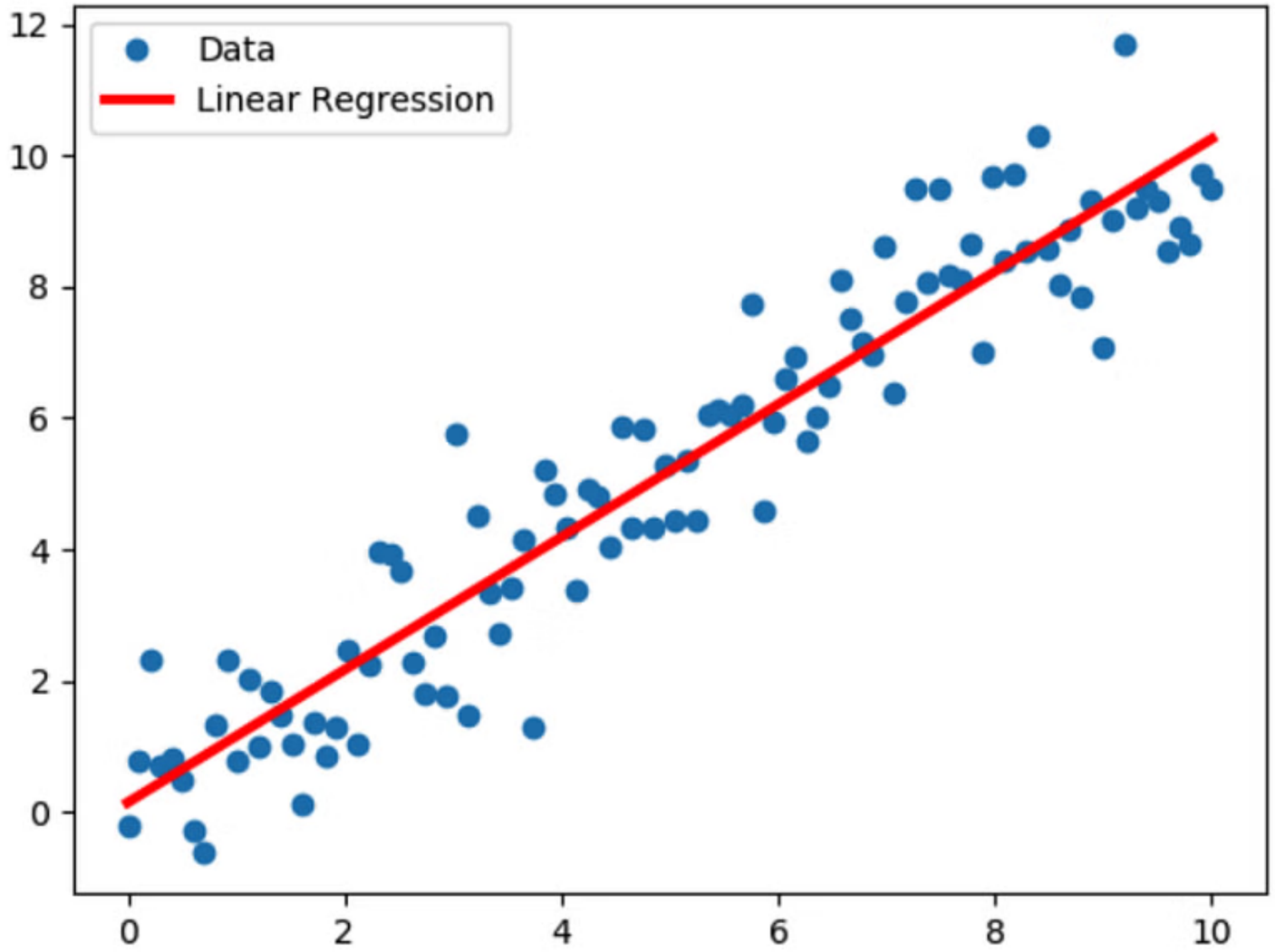
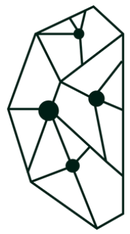
LINEAR REGRESSION





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LOGISTIC REGRESSION

Logistic Regression is a special case of Linear Regression where the target variable (y) is discrete/categorical such as 1 or 0, True or False, Yes or No, Default or No Default.

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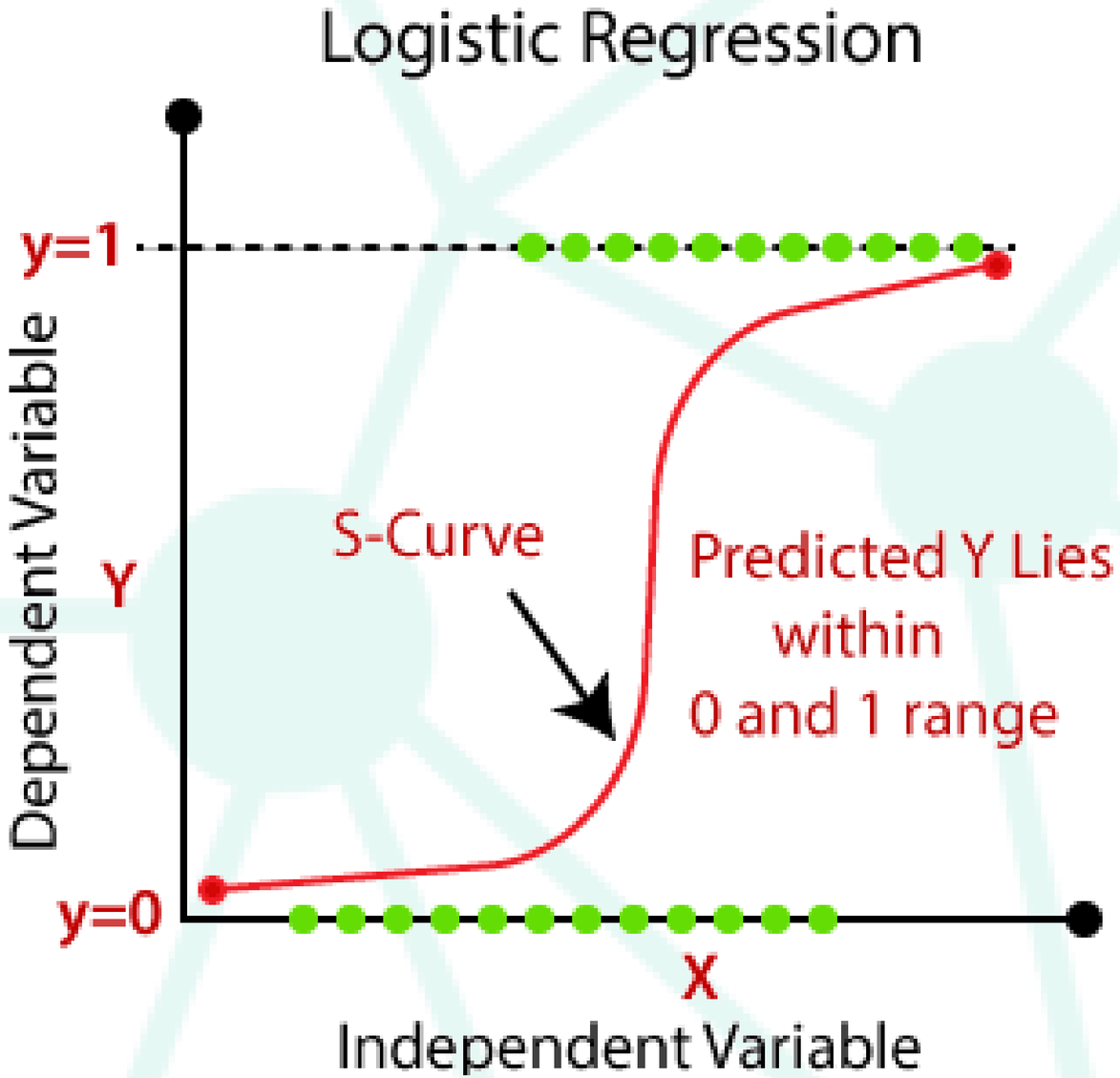
LOGISTIC REGRESSION



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SUPPORT VECTOR MACHINES

Support Vector Machines (SVMs) are a set of supervised learning methods used for classification, regression, and outliers detection. The basic principle behind SVM is to find the best boundary (or hyperplane) that separates data points of different classes. This boundary is chosen to maximize the margin, which is the distance between the hyperplane and the nearest data points from each class, known as support vectors.

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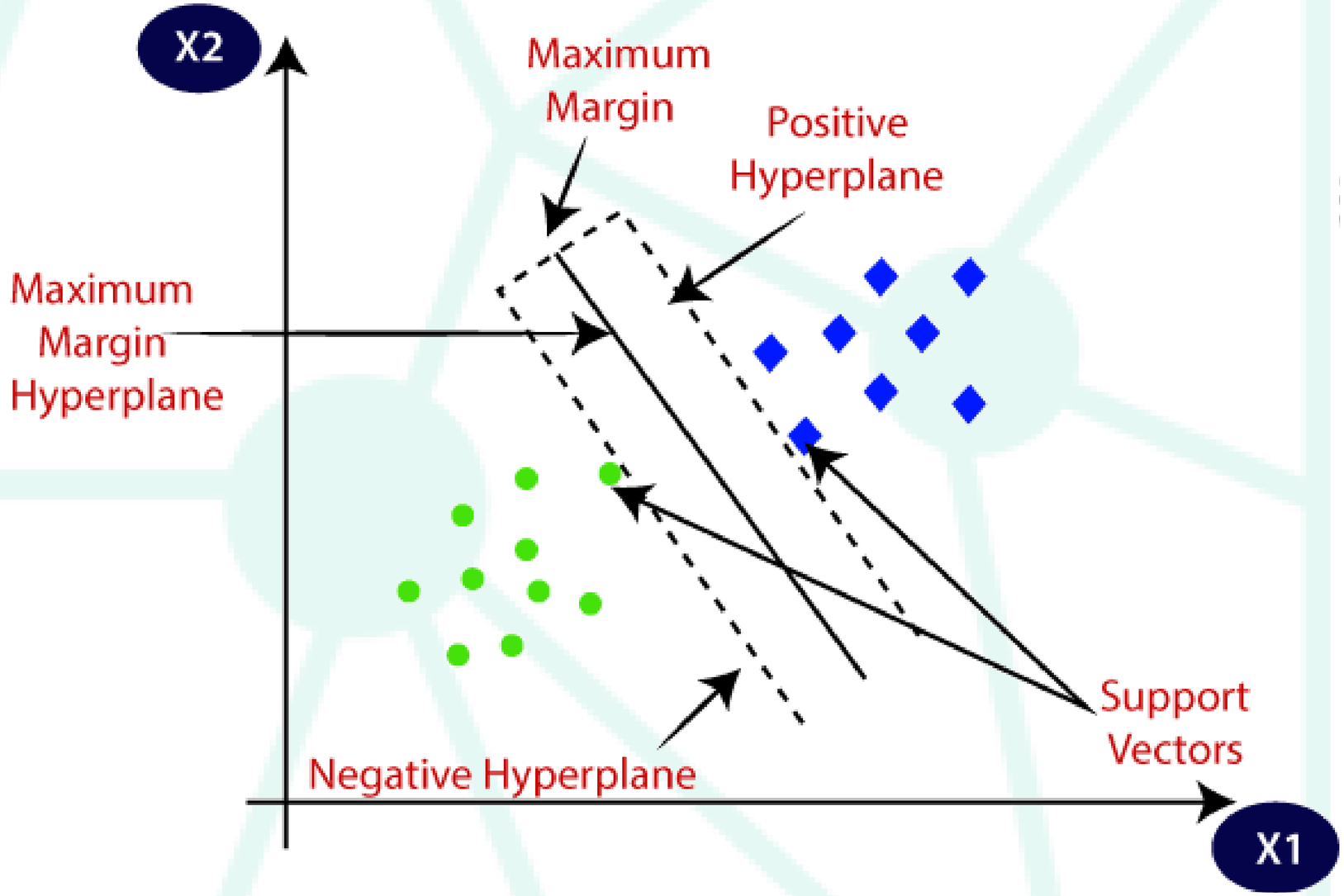
SUPPORT VECTOR MACHINES



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DECISION TREE

Decision Tree algorithms are a type of probability tree-like structural model that continuously separates data to categorize or make predictions depending on the results of the previous set of questions. The model analyzes the data and responds to the questions to assist you in making more informed choices.

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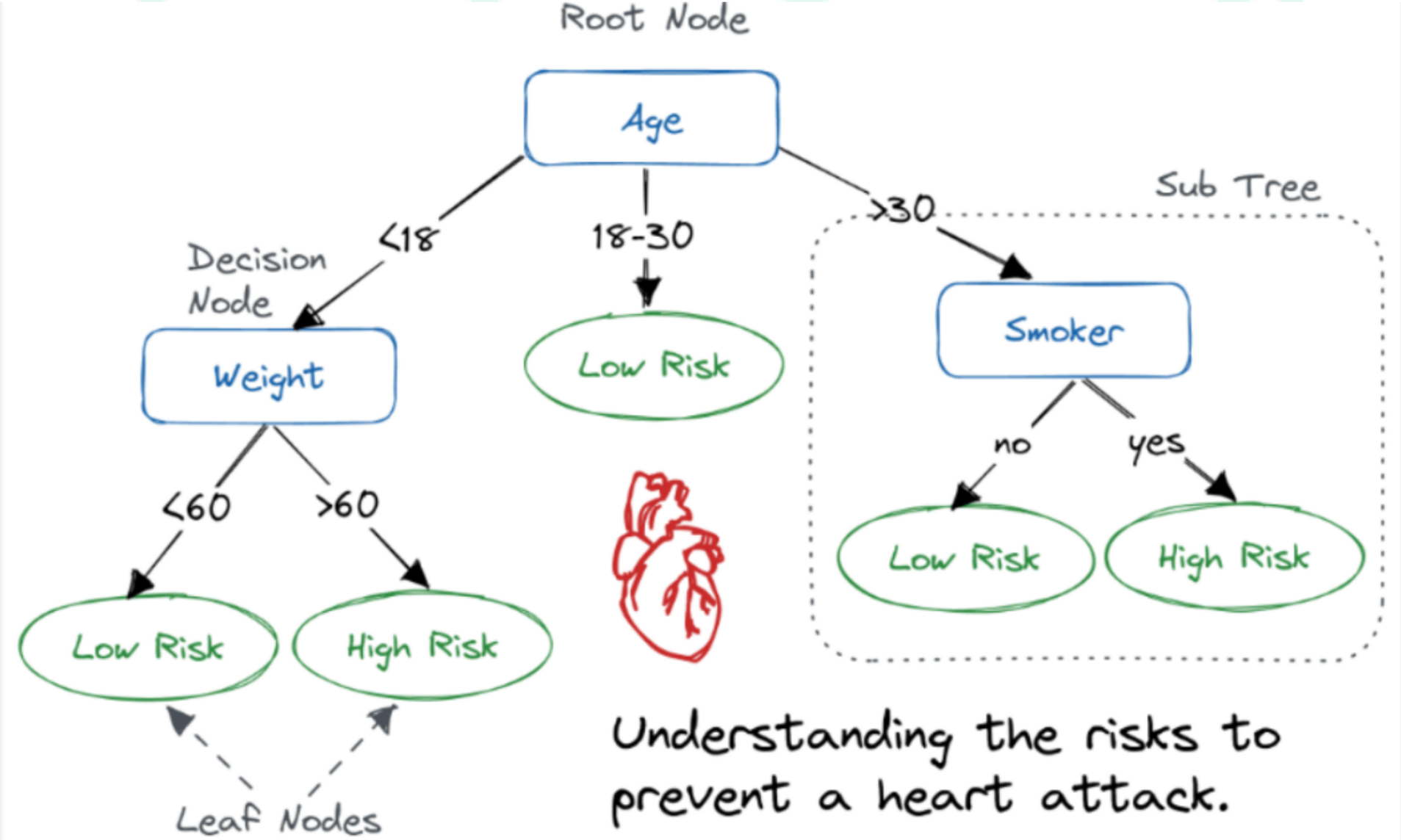
DECISION TREE



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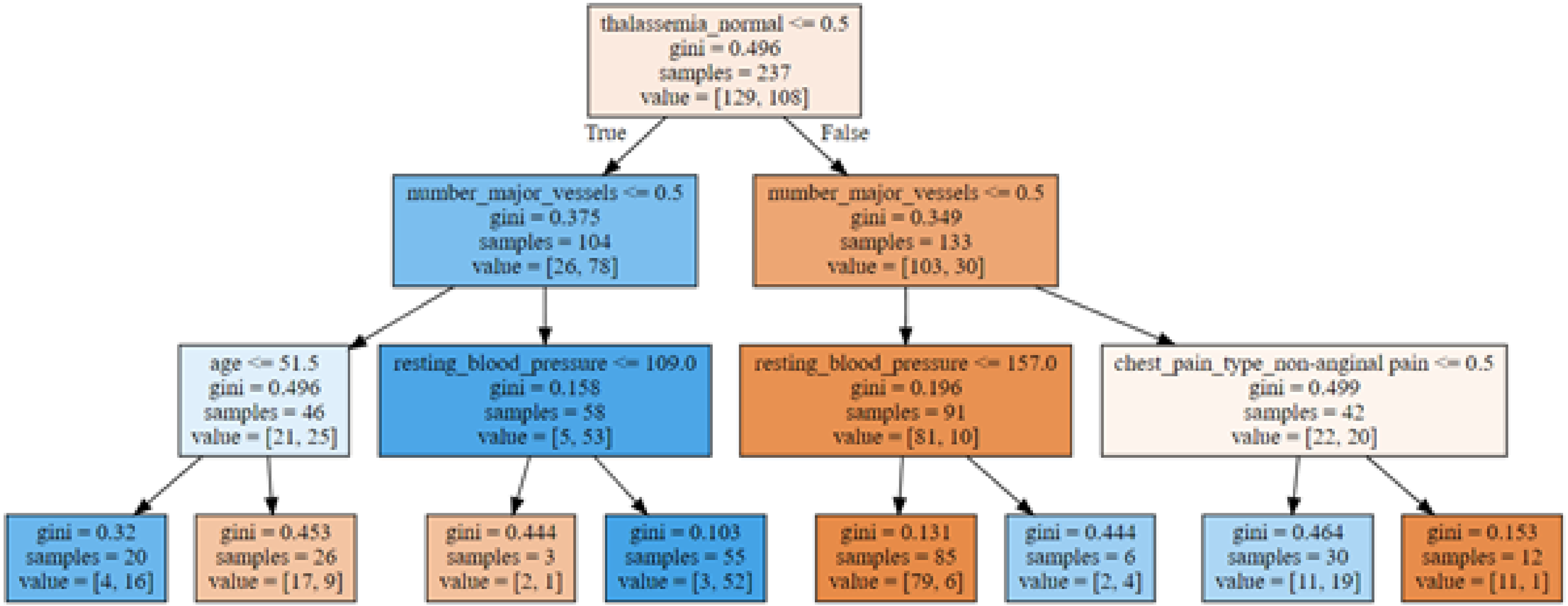
DECISION TREE



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RANDOM FOREST

Random Forest is another example of an algorithm that is built on trees, just like Decision Trees. In contrast to Decision Tree, which only consists of a single tree, Random Forest employs a number of Decision Trees to make judgments, creating what is essentially a forest of trees.

It does this by combining a number of different models in order to produce predictions, and it may be used for both classification and regression.

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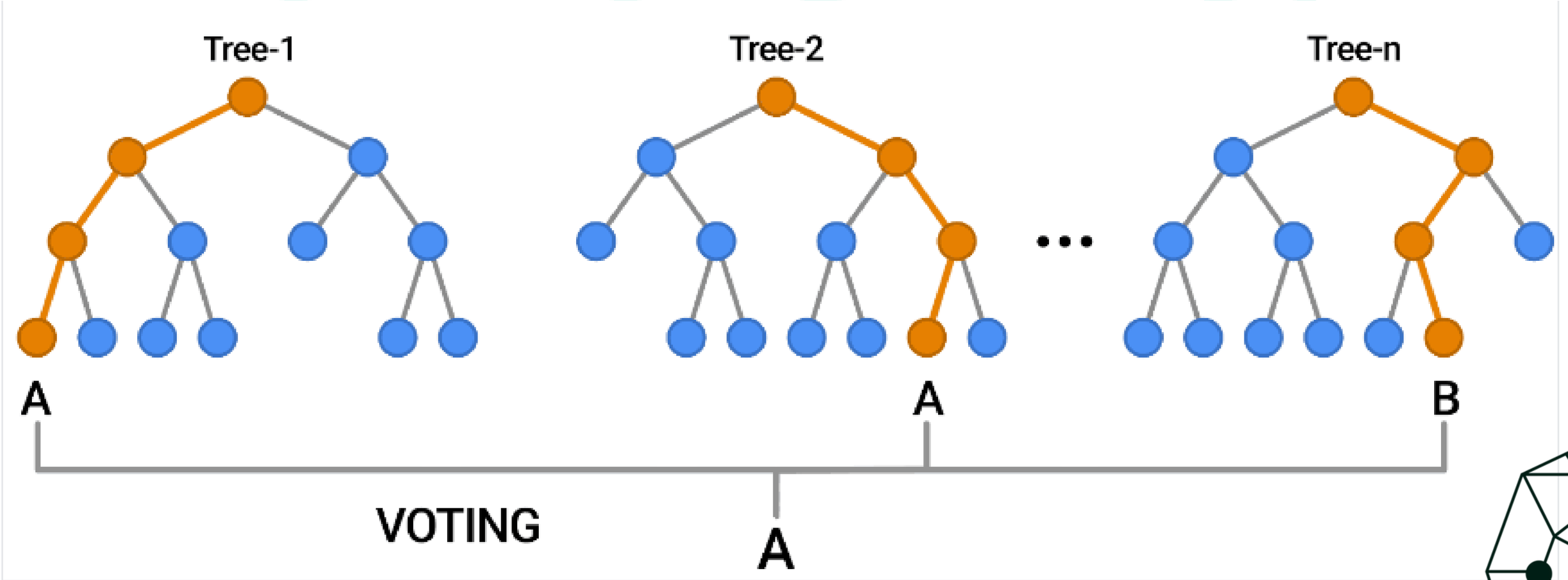
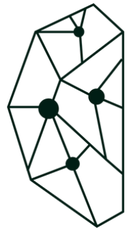
RANDOM FOREST





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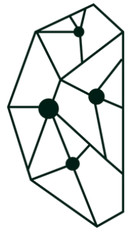
LET'S PRACTICE



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GITHUB LINK

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LET'S TEST OUR KNOWLEDGE!

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QUIZ

Question 1: What is supervised learning?

A) A type of learning where the model tries to predict the output from the input data without any labeled examples.
B) A type of learning where the model is trained on labeled data to predict the output for new inputs.
C) A type of learning where the model organizes the input data into clusters without labeled examples.
D) A type of learning where the model only uses text data for training.

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QUIZ

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D) A type of learning where the model only uses text data for training.

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QUIZ

Question 2: What is a label in a supervised learning dataset?

A) A unique identifier for each data point.

B) The feature that is used to divide the dataset into training and testing sets.

C) The variable that is being predicted by the model.

D) The algorithm that is used to train the model.

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QUIZ

Question 2: What is a label in a supervised learning dataset?

A) A unique identifier for each data point.

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QUIZ

Question 3: In the context of supervised learning, what is regression used for?

A) To predict categorical outcomes.
B) To predict numerical continuous outcomes.
C) To classify images into different categories.
D) To cluster data into different groups.

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QUIZ

Question 3: In the context of supervised learning, what is regression used for?

A) To predict categorical outcomes.

B) To predict numerical continuous outcomes.

C) To classify images into different categories.

D) To cluster data into different groups.

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QUIZ

Question 4: Which of the following is a regression algorithm?

A) K-Means Clustering

B) Decision Tree

C) Naive Bayes Classifier

D) Linear Regression

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QUIZ

Question 4: Which of the following are regression algorithms?

A) K-Means Clustering

B) Decision Tree

C) Naive Bayes Classifier

D) Linear Regression

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QUIZ

Question 5: What is classification in supervised learning?

A) Predicting the exact numerical value for new data points.

B) Predicting the category or class to which new data points belong.

C) Dividing data into clusters that contain similar characteristics.

D) Estimating the probability of an event occurring.

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QUIZ

Question 5: What is classification in supervised learning?

A) Predicting the exact numerical value for new data points.

B) Predicting the category or class to which new data points belong.

C) Dividing data into clusters that contain similar characteristics.

D) Estimating the probability of an event occurring.

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QUIZ

Question 6: Which of the following are classification algorithms?

A) Logistic Regression

B) Decision Tree

C) Linear Regression

D) Random Forest

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QUIZ

Question 6: Which of the following are classification algorithms?

A) Logistic Regression

B) Decision Trees

C) Linear Regression

D) Random Forest

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THANK YOU
FOR YOUR ATTENTION!

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CONTACT ME!

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