Machine Learning - Algorithms

Raghu Prasad K S

Introduction

- Raghu Prasad – BE, MS
- Total of 29 years of experience
- 7 years as a lecturer in Engineering College
- 22 Years into IT
- Worked with companies like CISCO,CSC,ICICI,First Apex – NTT Data
- Currently into Corporate training and consultancy
- Worked with corporates and public sector
- Technologies – Java,Python,Data Sciences,Web technologies,Java Script technologies (MEAN stack),IOT,Test Automation – Selenium,JMeter

Course Outline

- Types of Machine Learning
- Machine Learning Algorithms
- Machine learning examples

Types of Machine Learning Algorithms

- **Broadly, there are 3 types of Machine Learning Algorithms**
- **1. Supervised Learning**
- **How it works:** This algorithm consist of a target / outcome variable (or dependent variable) which is to be predicted from a given set of predictors (independent variables). Using these set of variables, we generate a function that map inputs to desired outputs. The training process continues until the model achieves a desired level of accuracy on the training data.
- Examples of Supervised Learning: Regression, Decision Tree, Random Forest, KNN, Logistic Regression etc.

Types of Machine Learning Algorithms

- **2. Unsupervised Learning**
- **How it works:** In this algorithm, we do not have any target or outcome variable to predict / estimate. It is used for clustering population in different groups, which is widely used for segmenting customers in different groups for specific intervention.
- Examples of Unsupervised Learning: Apriori algorithm, K-means.

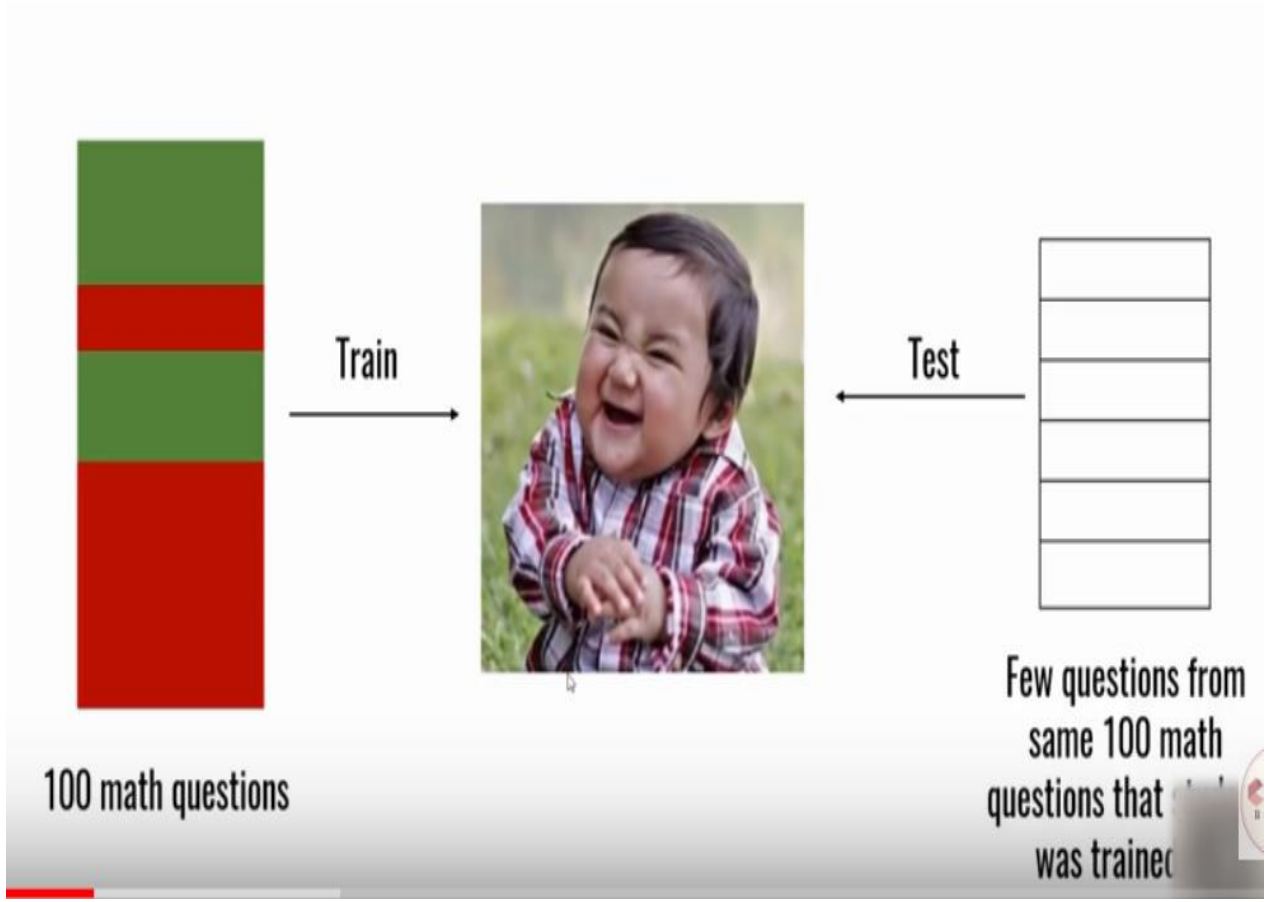
Types of Machine Learning Algorithms

- **3. Reinforcement Learning:**
- **How it works:** Using this algorithm, the machine is trained to make specific decisions. It works this way: the machine is exposed to an environment where it trains itself continually using trial and error. This machine learns from past experience and tries to capture the best possible knowledge to make accurate business decisions. Example of Reinforcement Learning: Markov Decision Process

Common ML Algorithms

- Linear Regression
- Logistic Regression
- Decision Tree
- SVM
- Naive Bayes
- kNN
- K-Means
- Random Forest
- Dimensionality Reduction Algorithms
- Gradient Boosting algorithms
  - GBM ,XGBoost,LightGBM,CatBoost
  - REFERENCE - https://www.analyticsvidhya.com/blog/2017/09/common-machine-learning-algorithms/

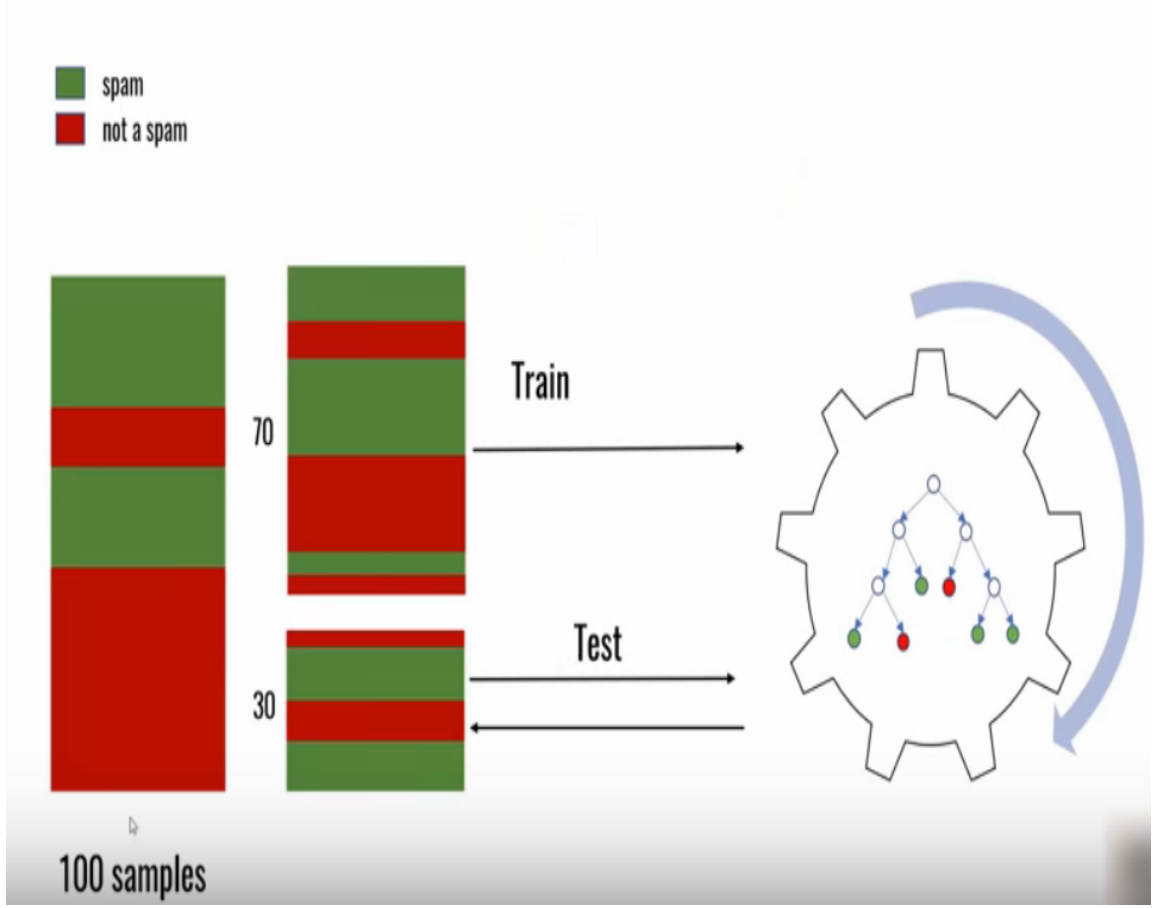
Cross Validation – Evaluating model performance



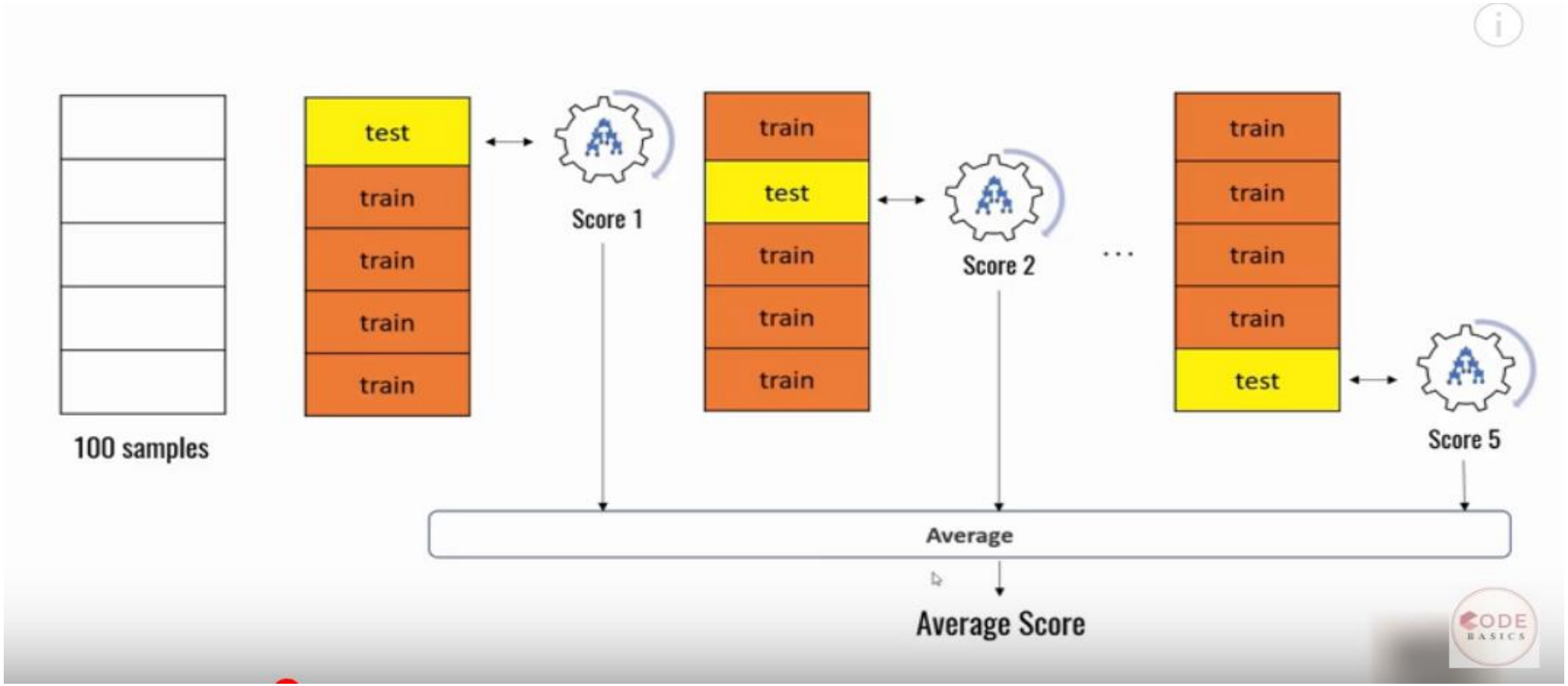
Cross Validation – Evaluating model performance

Option 2

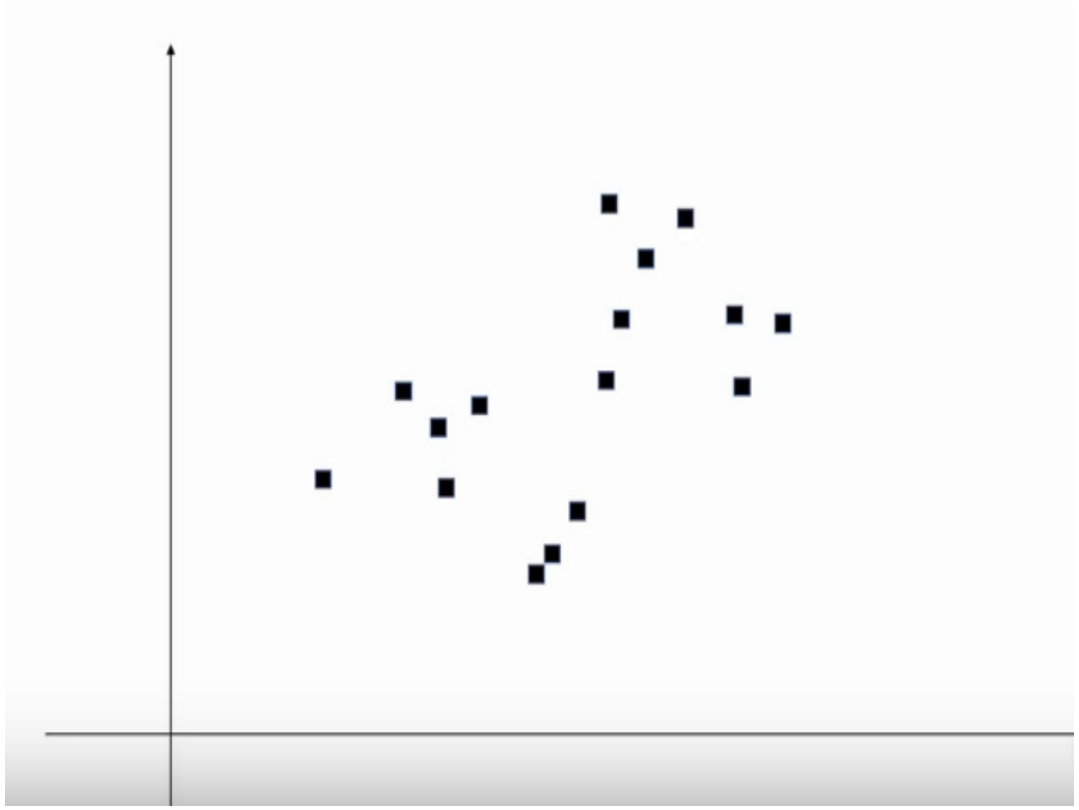
Split available dataset into training and test sets

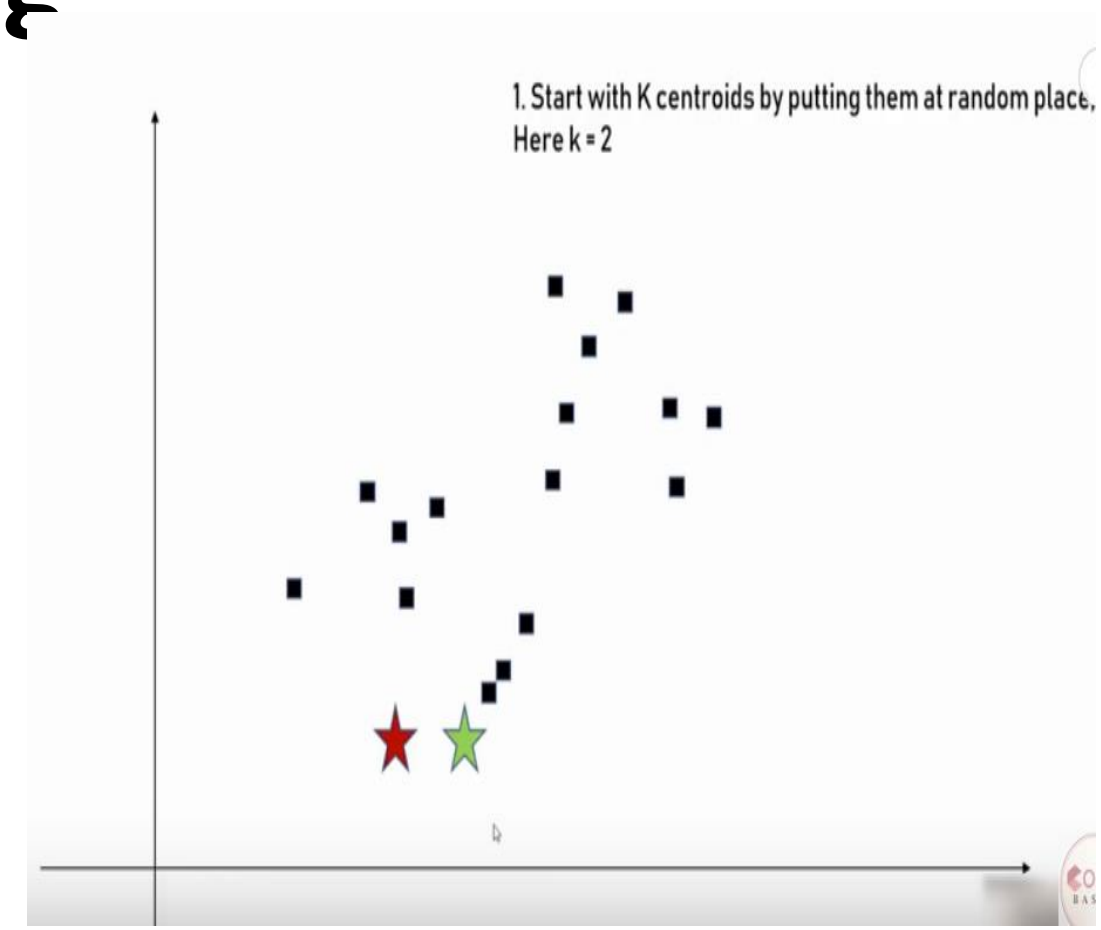


Cross Validation – Evaluating model performance – Option 3



K Means Clustering – Unsupervised learning





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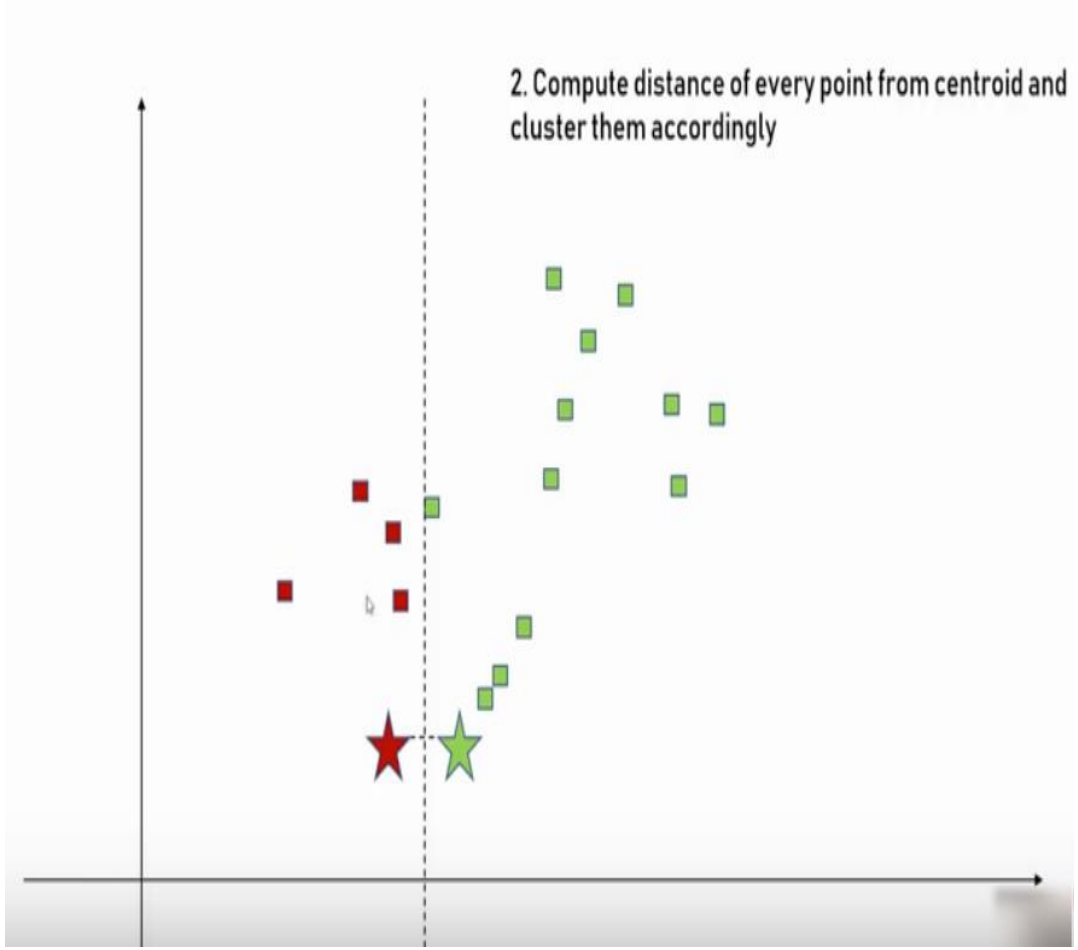

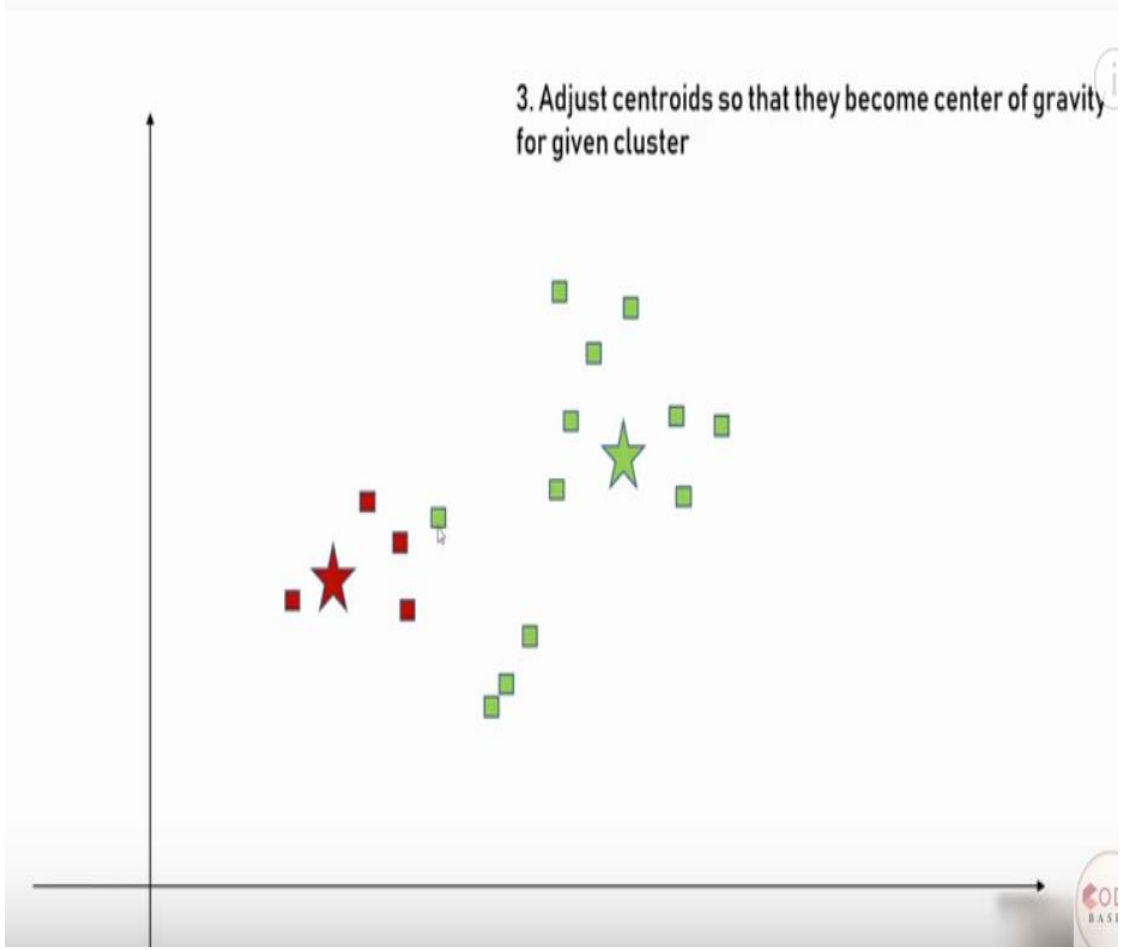

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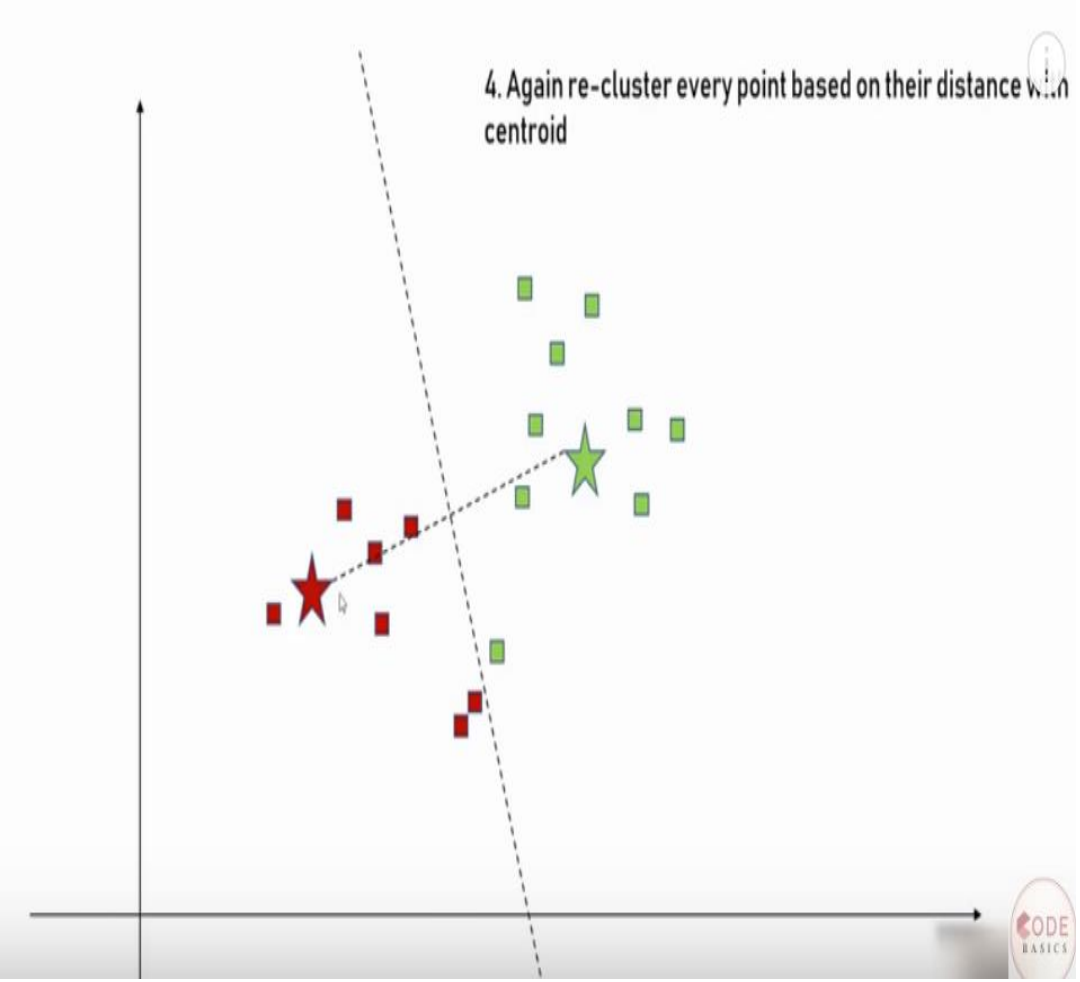
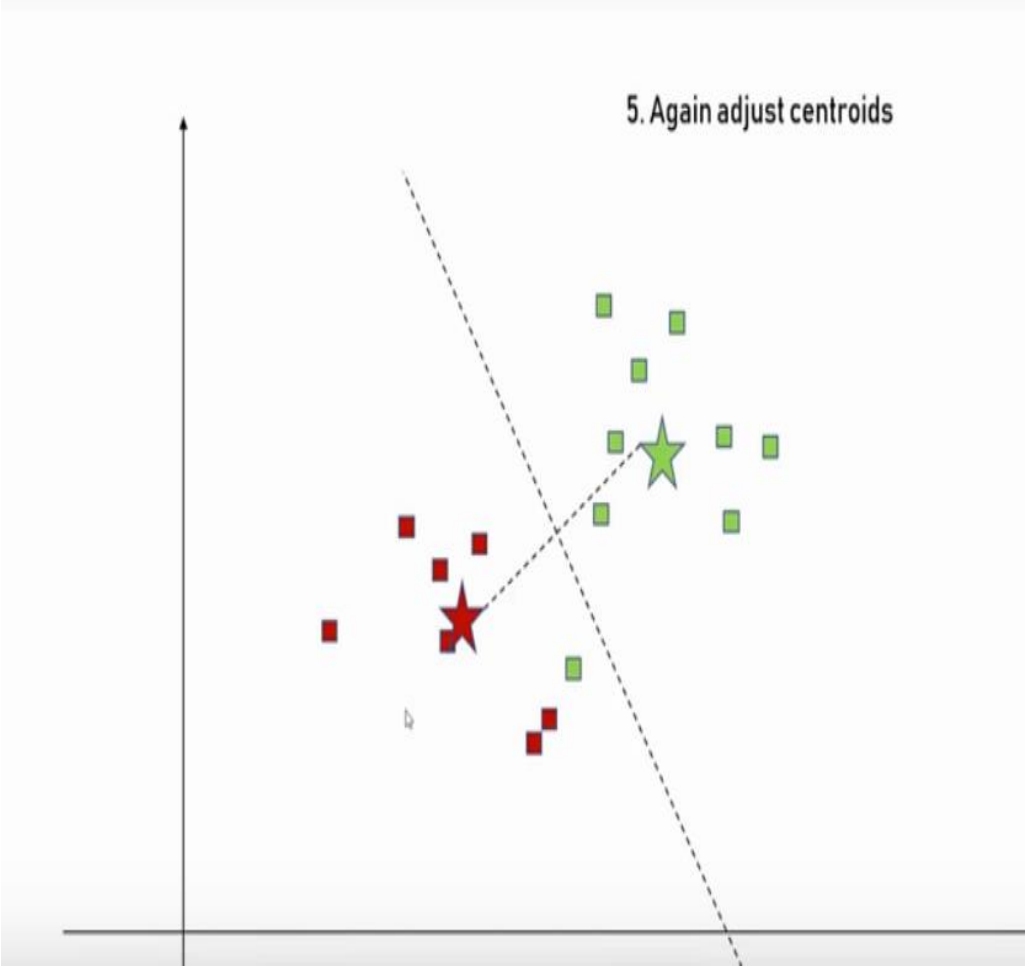
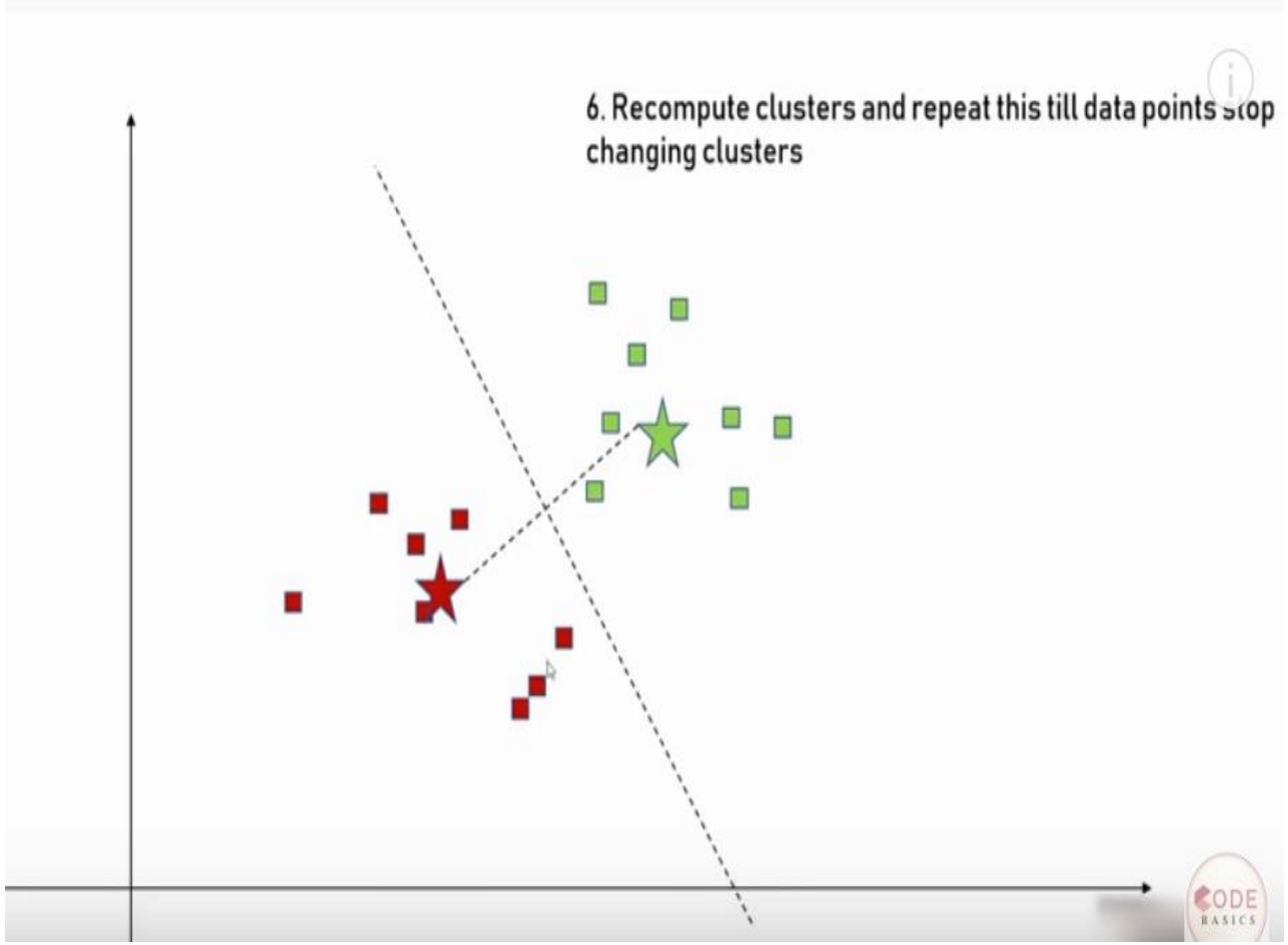
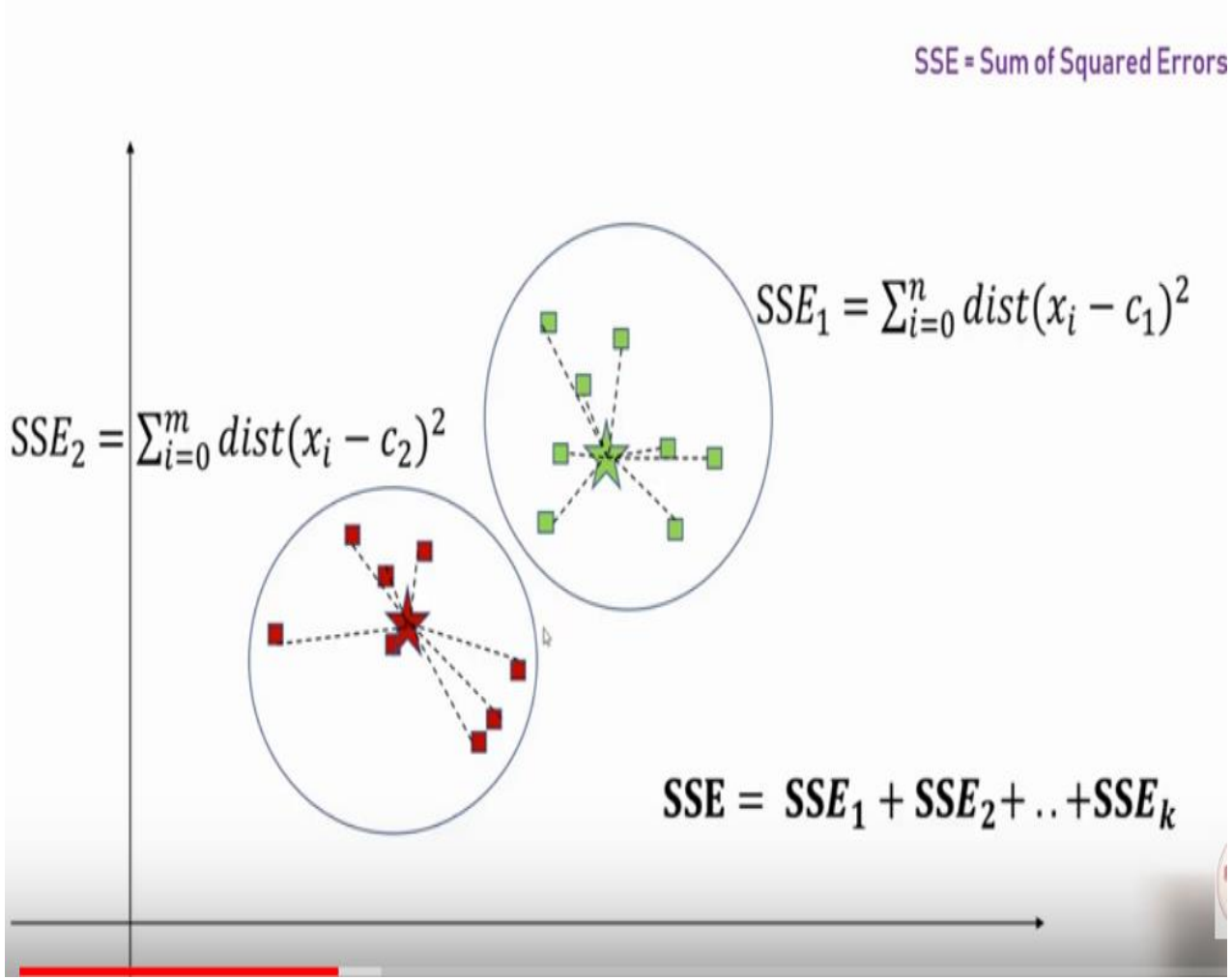


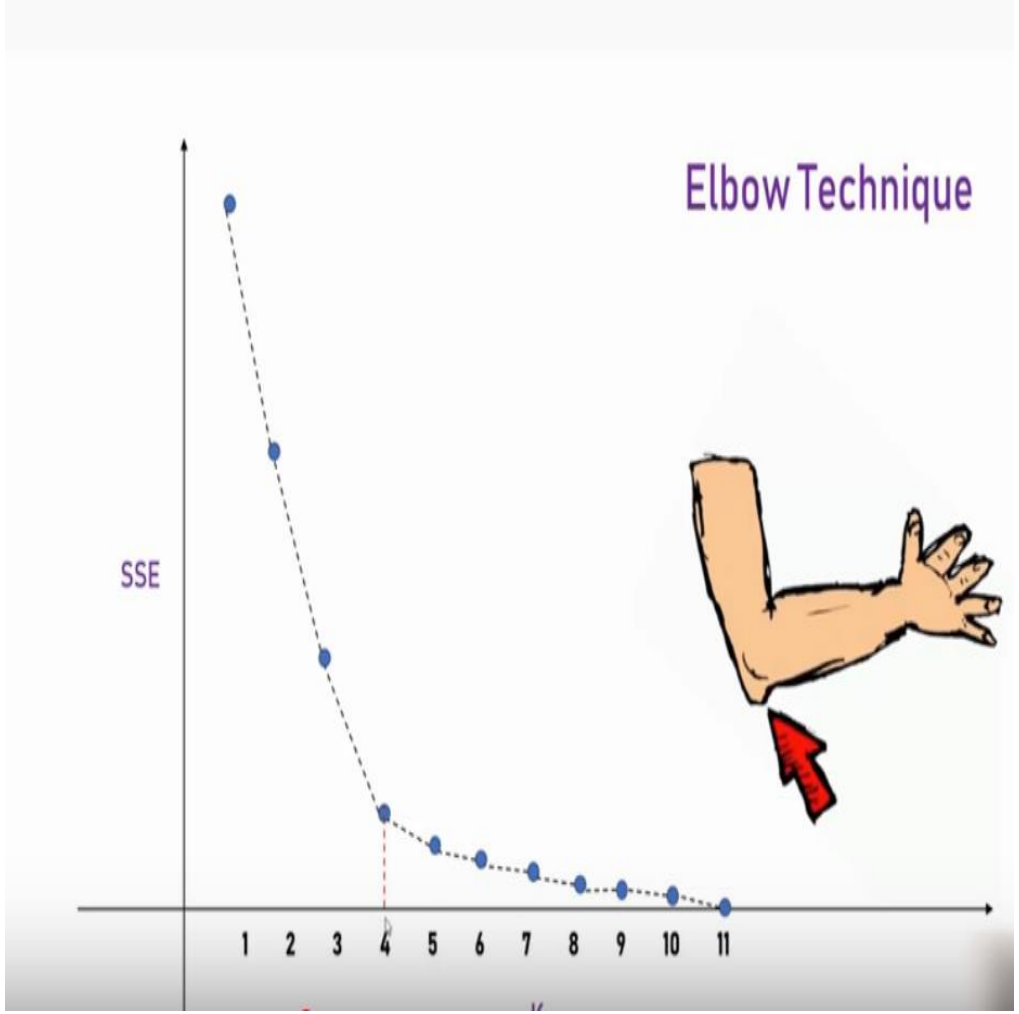


K Mean Clustering – Unsupervised learning

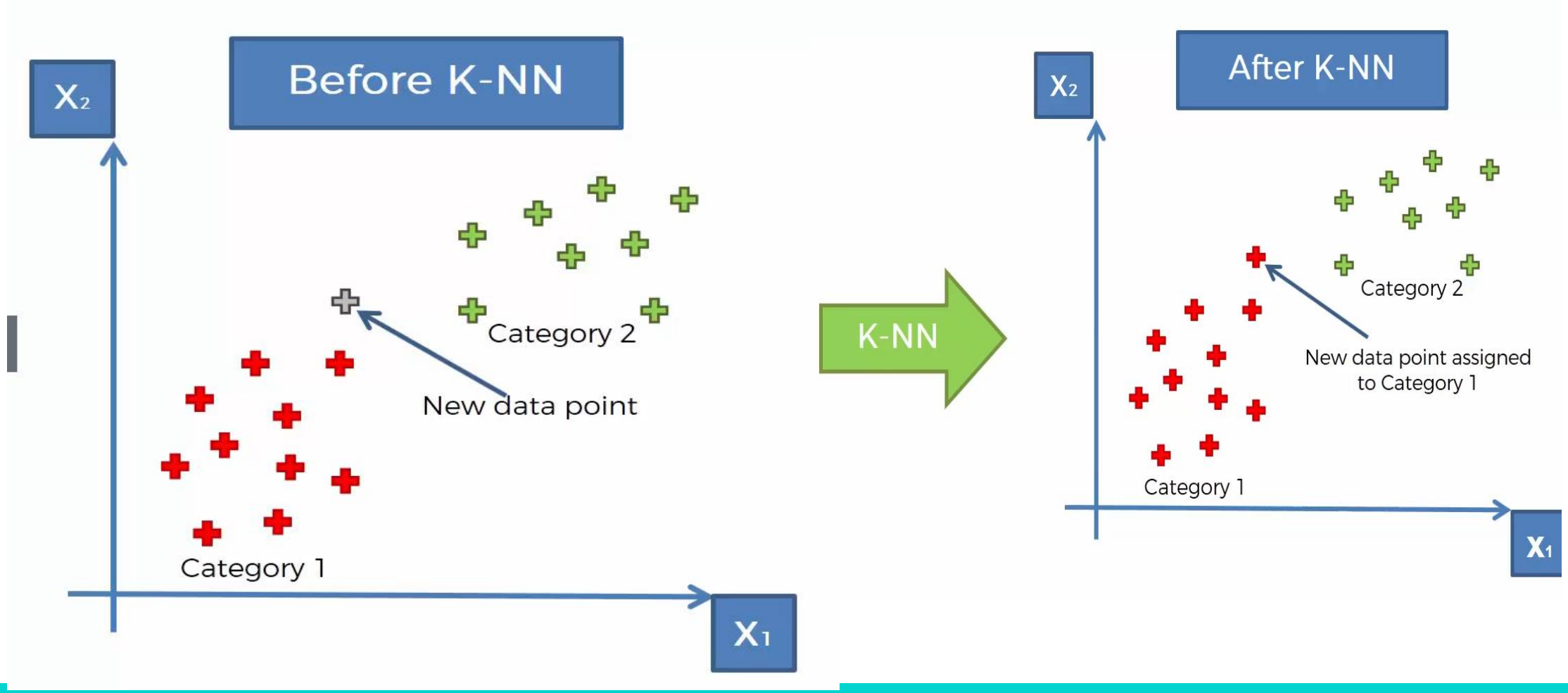


Elbow method to determine K





K Nearest Neighbour (KNN) - Classification



Working of KNN

STEP 1: Choose the number K of neighbors

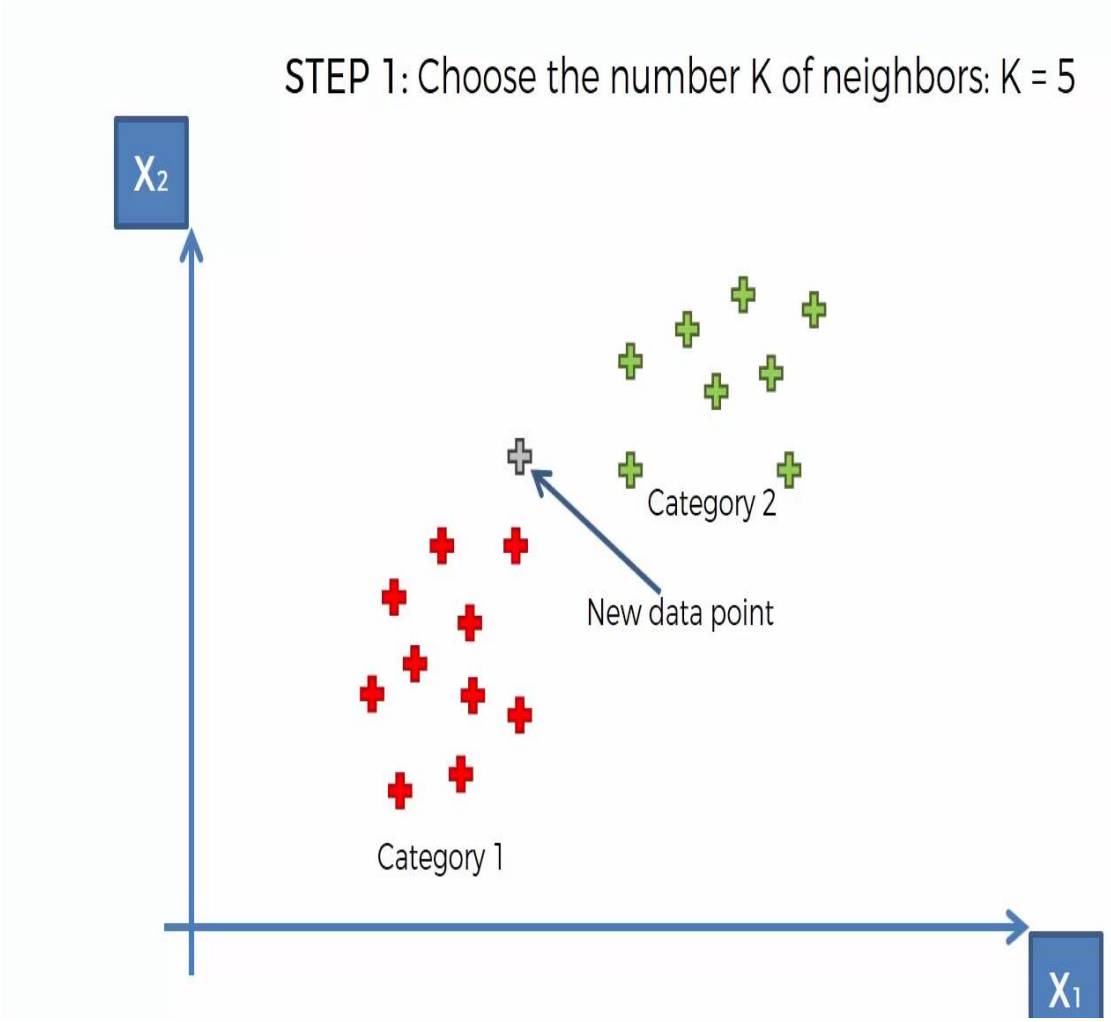
STEP 2: Take the K nearest neighbors of the new data point, according to the Euclidean distance

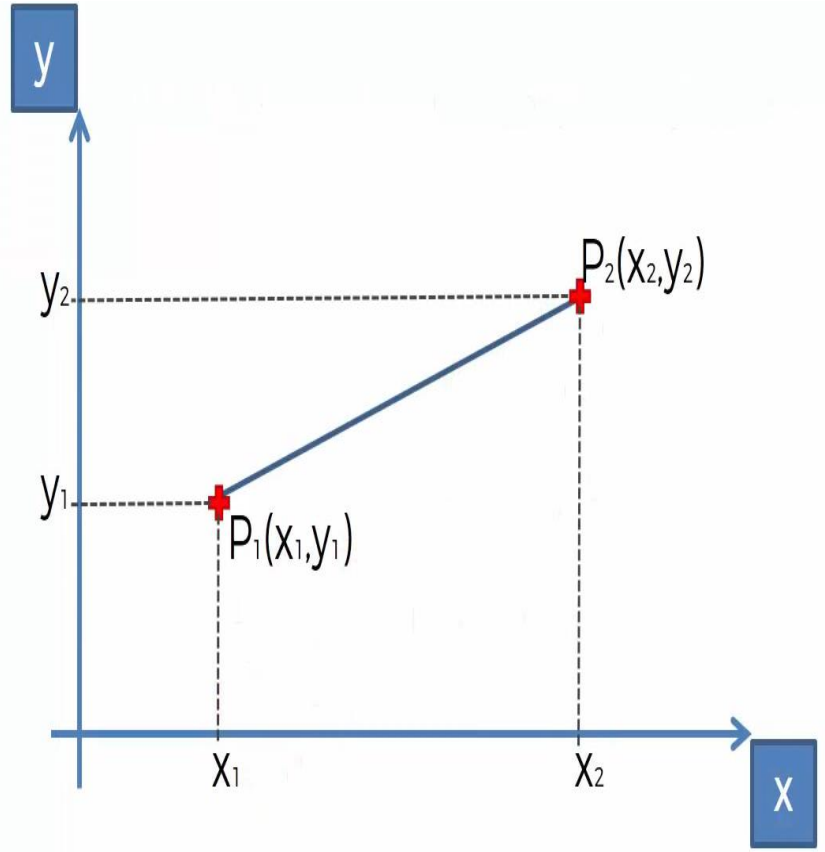
STEP 3: Among these K neighbors, count the number of data points in each category

STEP 4: Assign the new data point to the category where you counted the most neighbors

Your Model is Ready

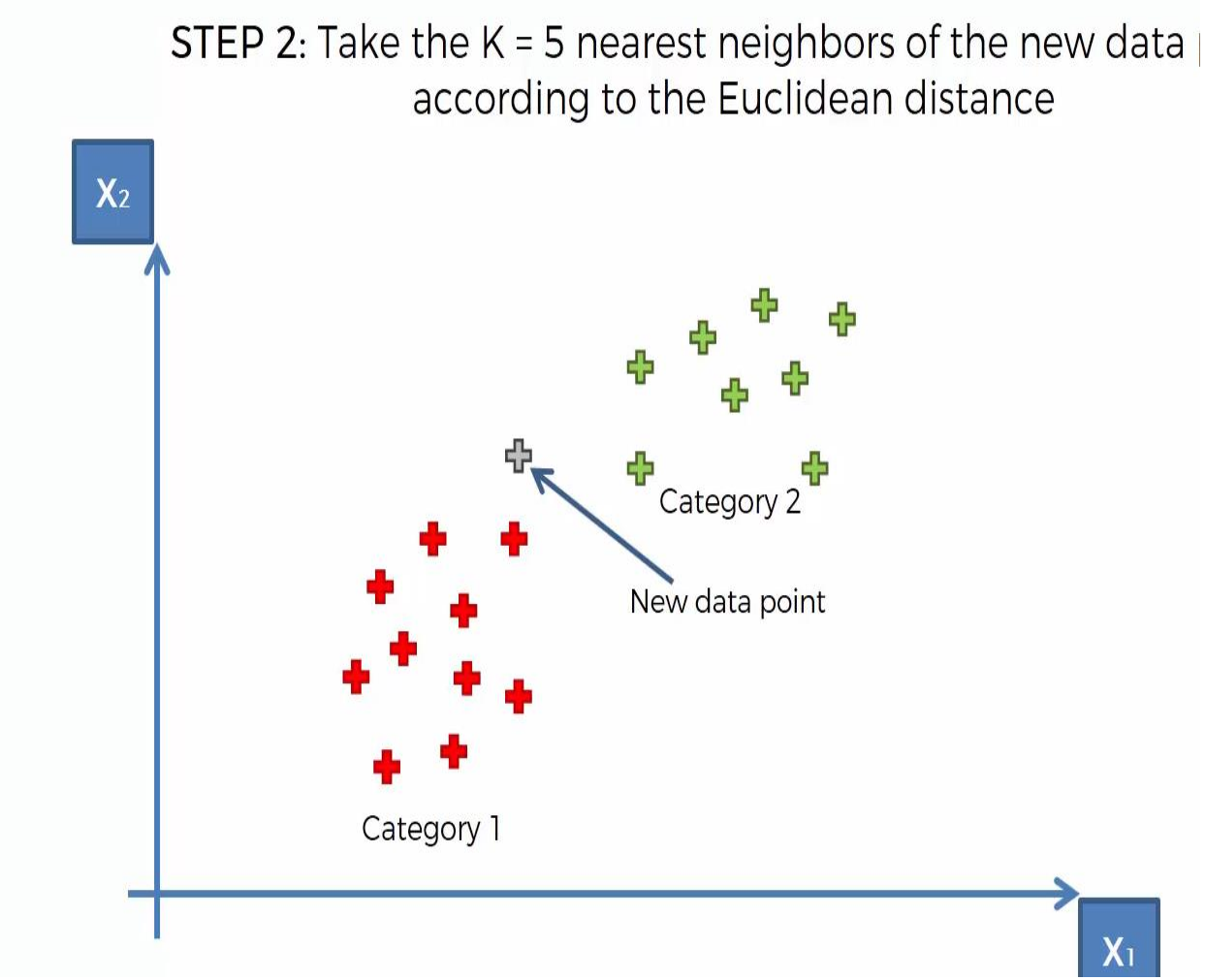
Working of KNN

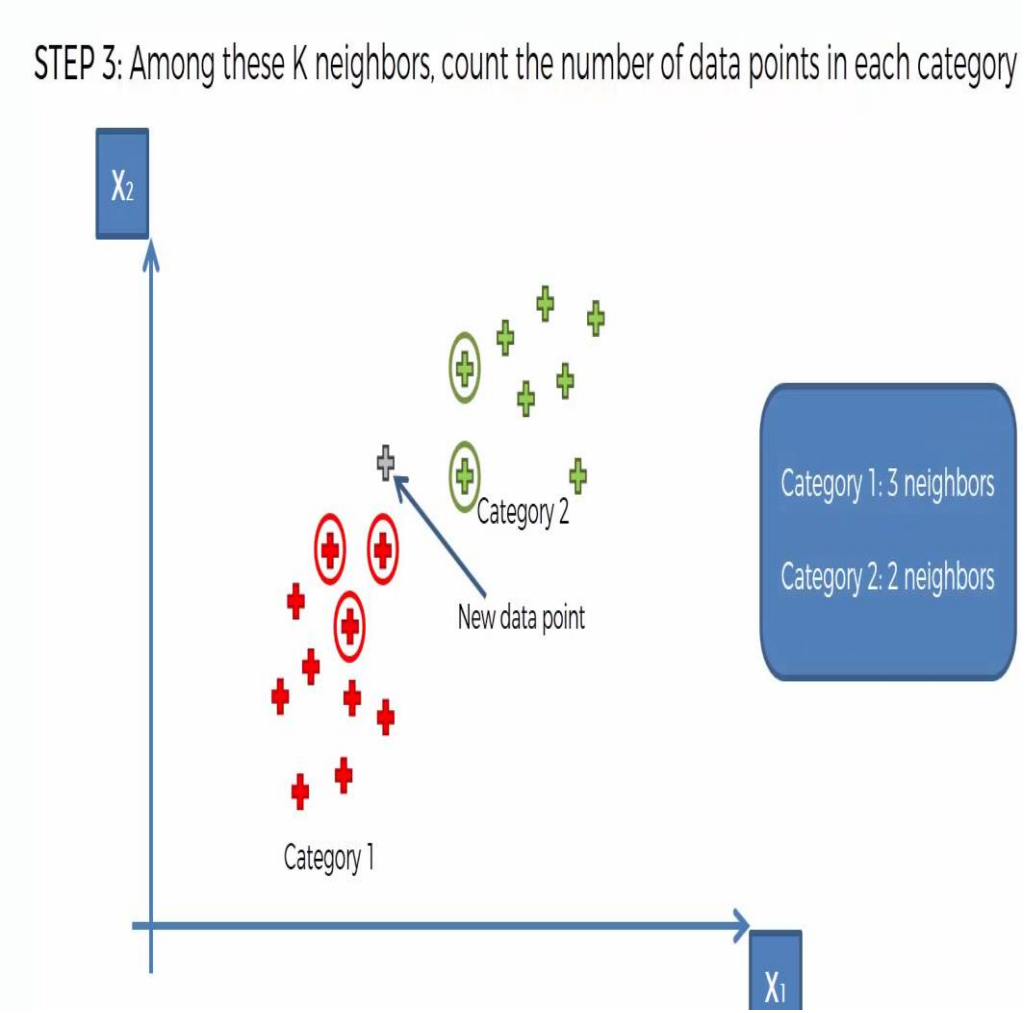




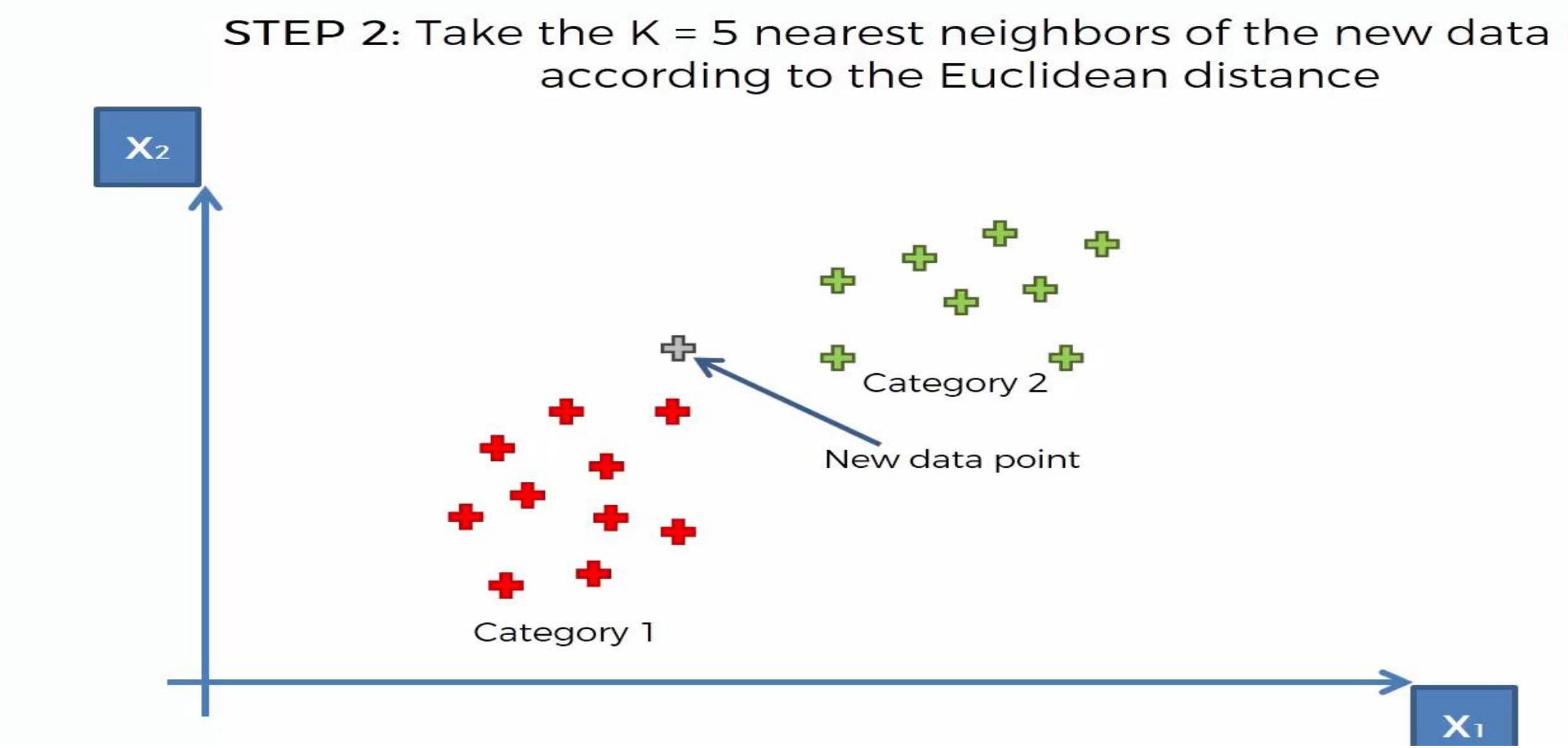
Euclidean Distance between P_1 and $P_2 = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Working of KNN





Working of KNN




Thank You