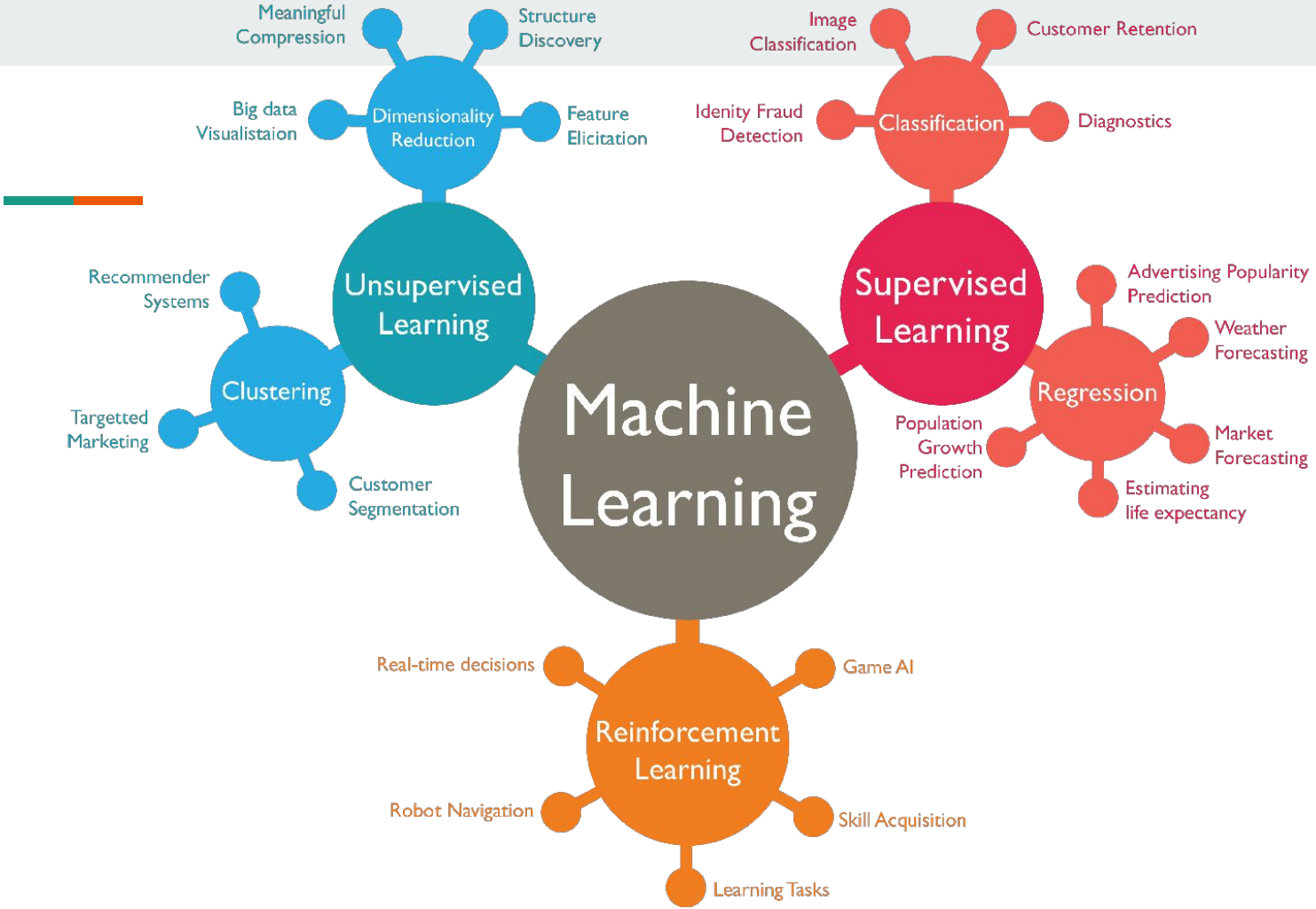
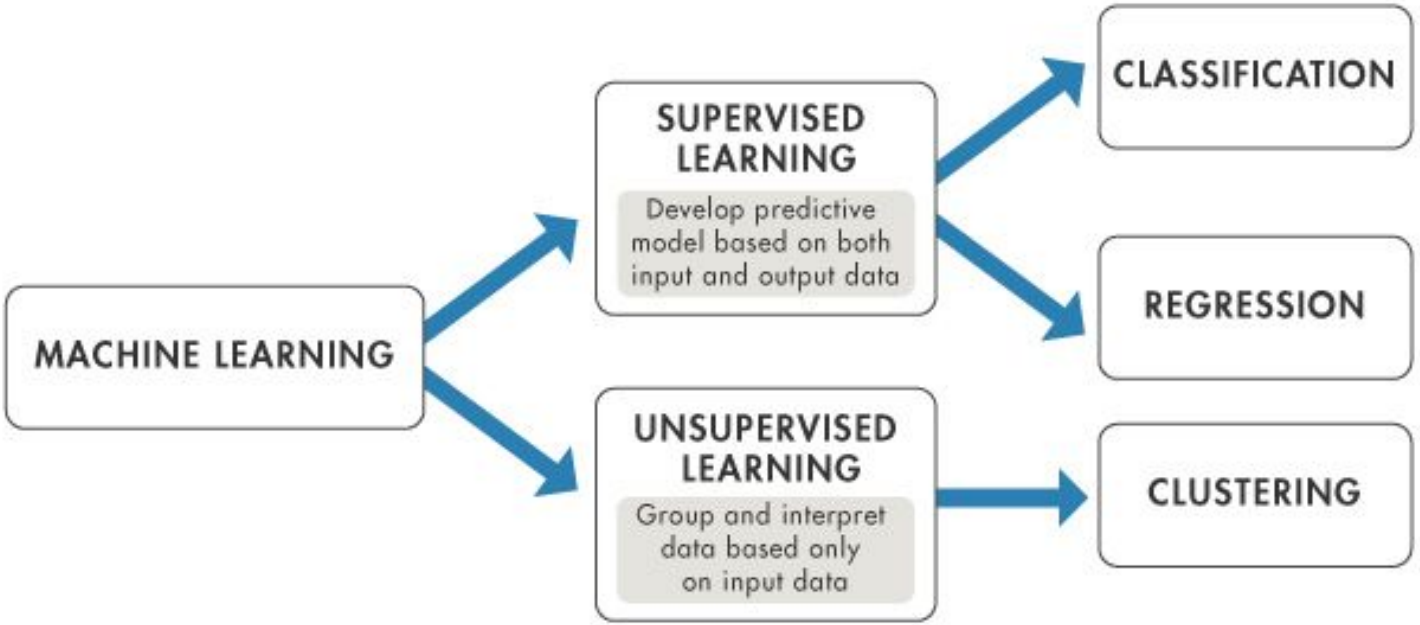
Aprendizaje Supervisado: KNN

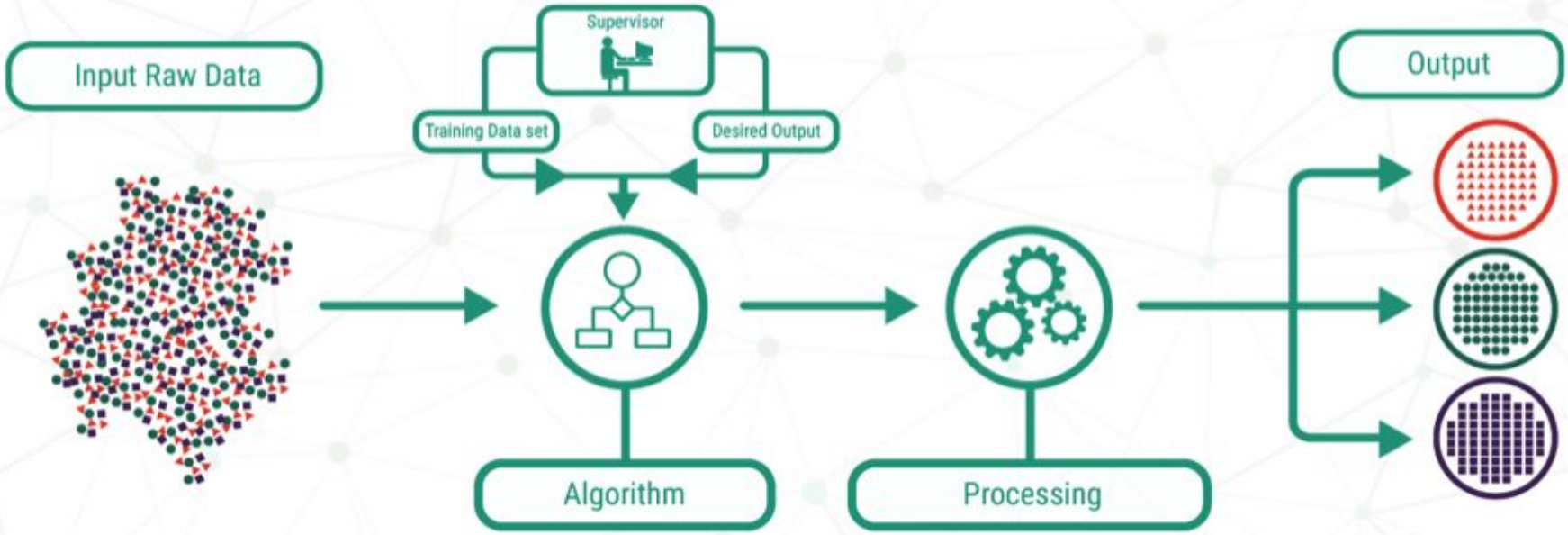
PhD.(c) Junior Fabian Arteaga


Machine Learning
Unsupervised Learning
Dimensionality Reduction
Meaningful Compression
Structure Discovery
Big data Visualistaion
Feature Elicitation
Clustering
Recommender Systems
Targetted Marketing
Customer Segmentation
Supervised Learning
Classification
Image Classification
Customer Retention
Idenity Fraud Detection
Diagnostics
Regression
Advertising Popularity Prediction
Weather Forecasting
Market Forecasting
Estimating life expectancy
Population Growth Prediction
Reinforcement Learning
Real-time decisions
Game AI
Robot Navigation
Skill Acquisition
Learning Tasks

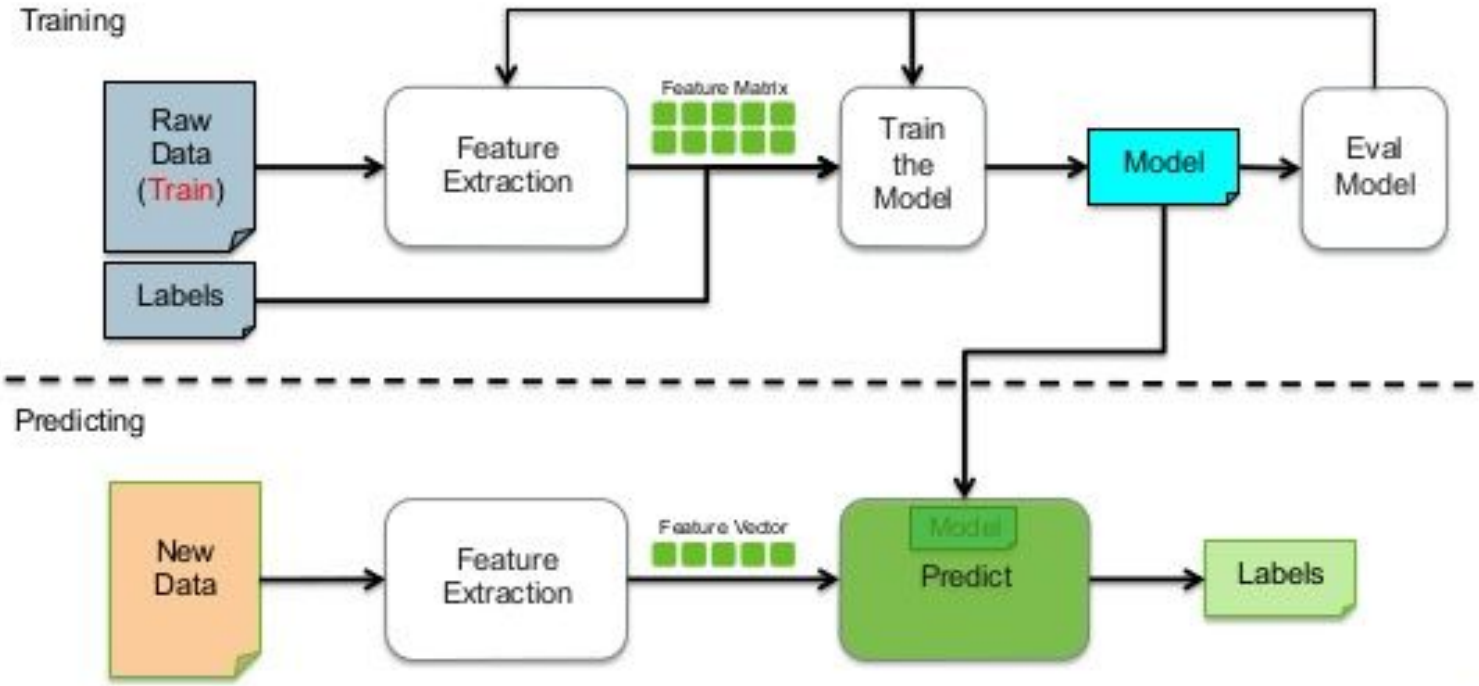
Machine Learning



SUPERVISED LEARNING



Supervised Learning Workflow



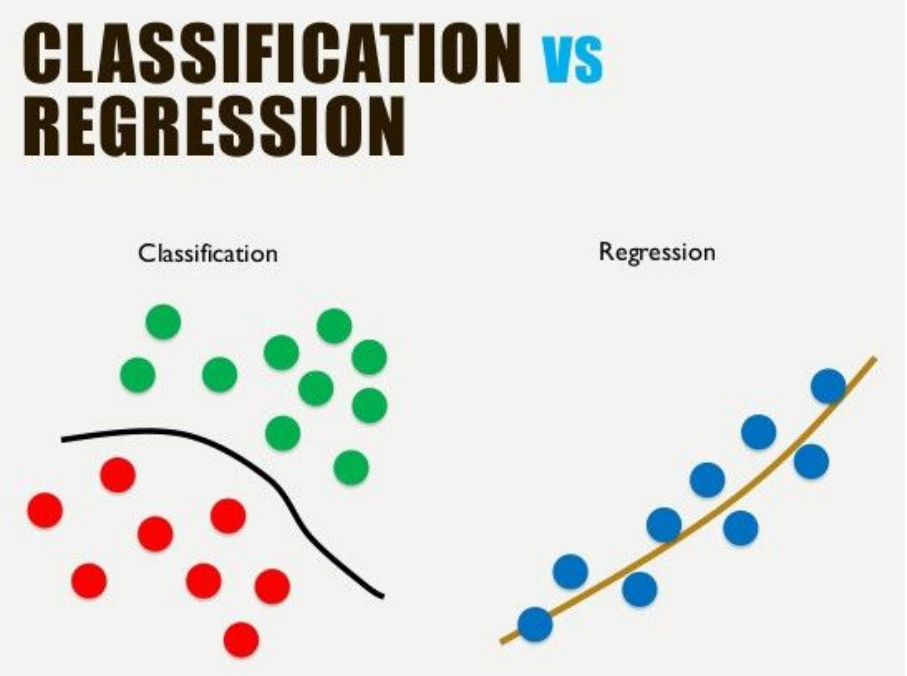
Técnicas de AS

1. **Clasificación**

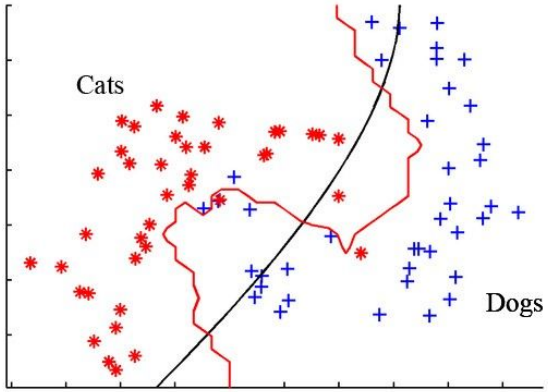
Output: Categoría

2. **Regresión**

Output: Valor Continuo



Clasificación



	Input $x \in \mathcal{X}$	Output $y \in \mathcal{Y}$
Spam filtering		Binary 
Character recognition		Multi-Class C

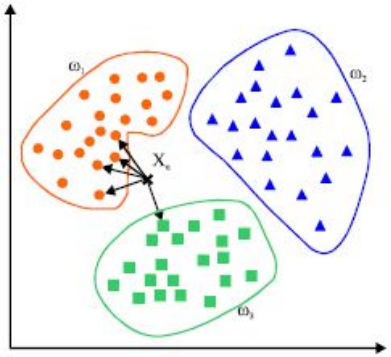
[thanks to Ben Taskar for slide!]

Algoritmos de Clasificación

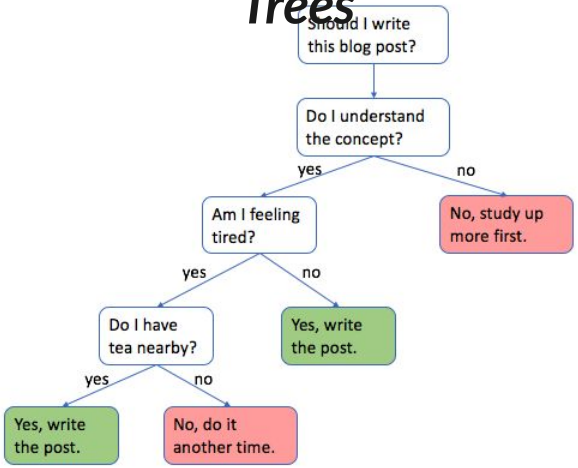
Naïve Bayes

$$P(A \mid B) = \frac{P(B \mid A)P(A)}{P(B)}$$

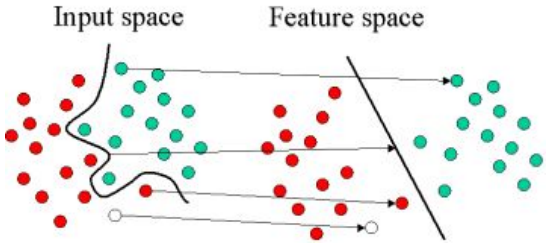

K-NN

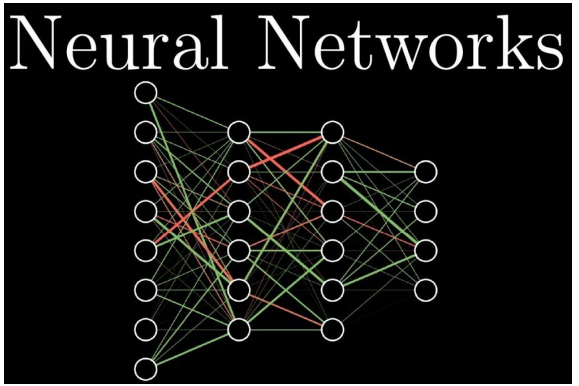


Decision Trees

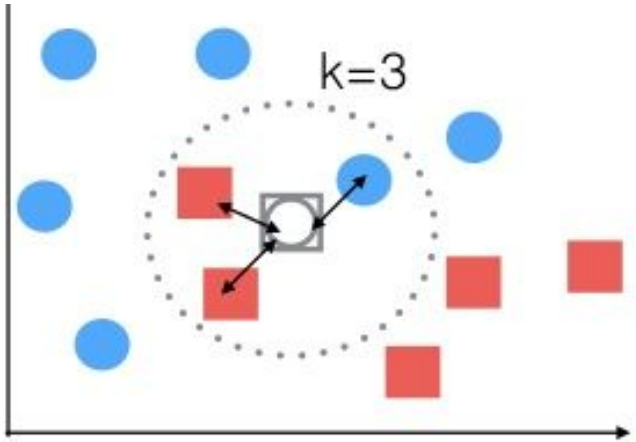


SVM





K-NN *(K- Nearest Neighbors)*



Algoritmo:

Entrada: Punto *Px* (Test), Dataset de puntos *(P1,P2,..,Pn)*

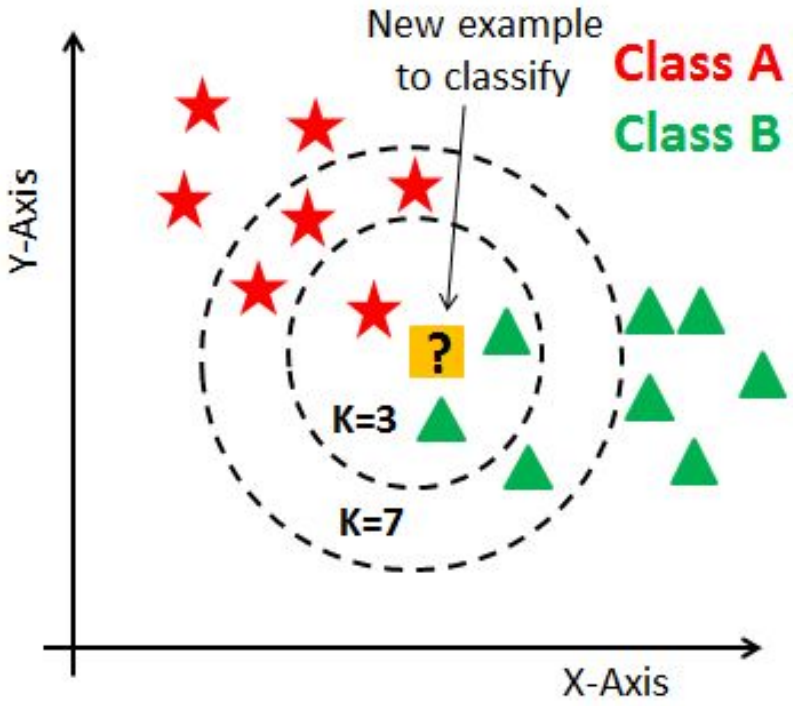
Salida: Clase a la que pertenece Punto *Px*

INICIO

1. Para cada punto ***(P1,P2,..,Pn)*** en el dataset:
    1.1. Calcular la **distancia** entre ***Px*** y el punto actual
2. Ordenar las distancias en orden creciente
3. Tomar ***K*** ítems con menor distancia a ***Px***
4. Encontrar la clase mayoritaria entre los ***K*** ítems

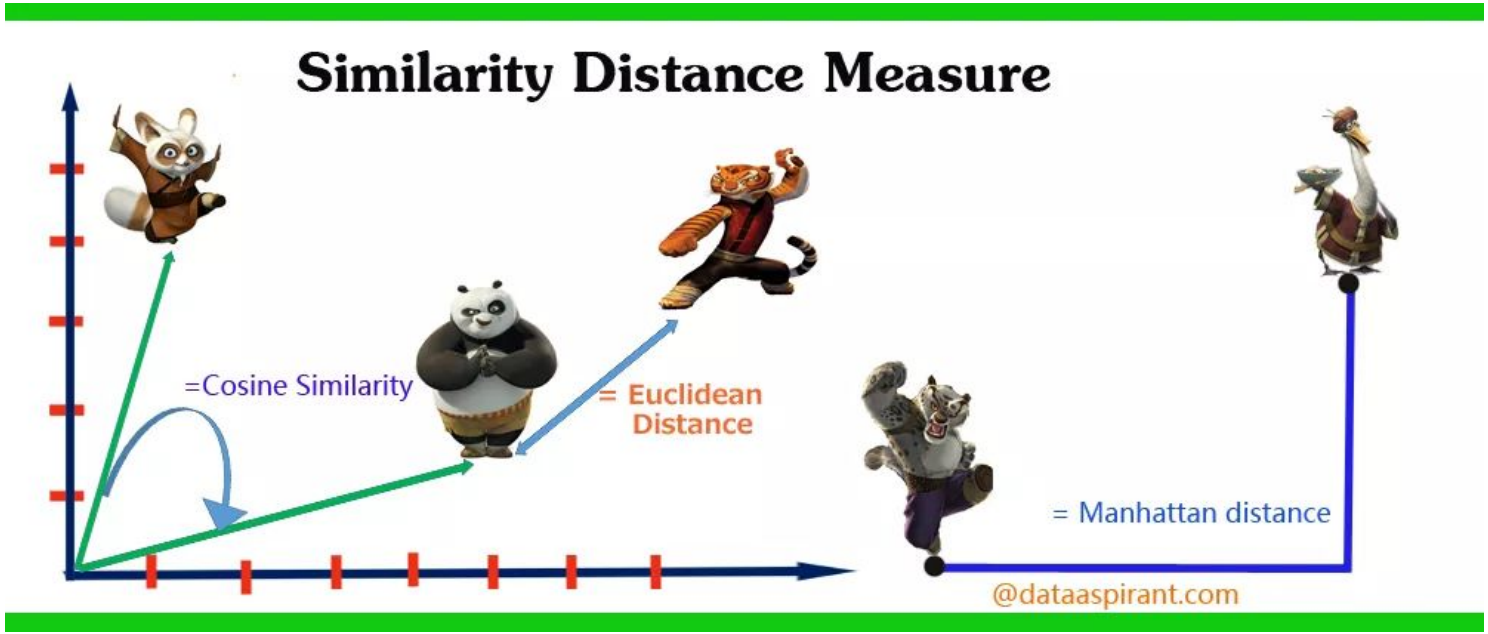
FIN

K-NN *(K- Nearest Neighbors)*



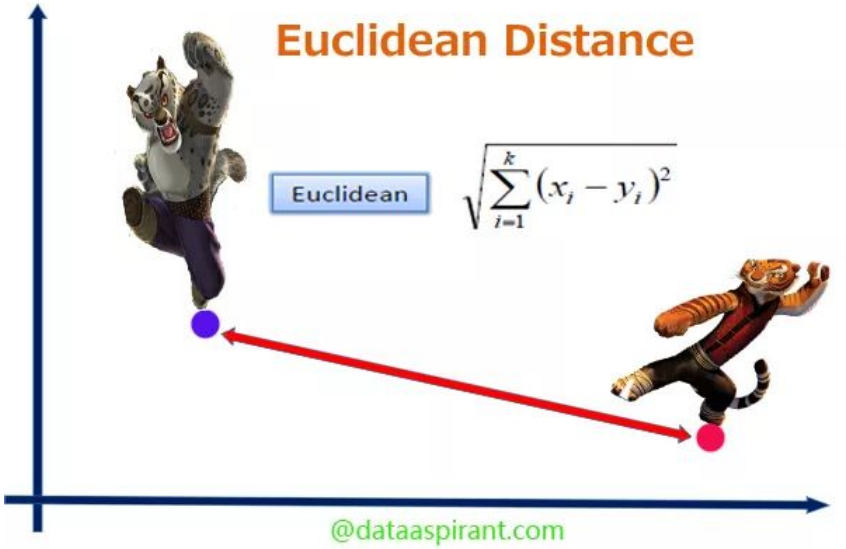
K-NN *(K- Nearest Neighbors)*

Distances



K-NN *(K- Nearest Neighbors)*

Distances



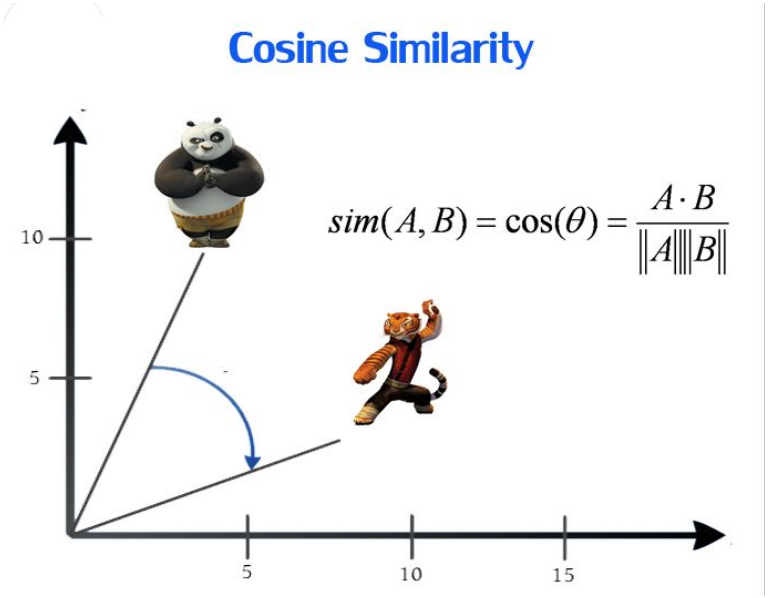


Table 2.1 **Movies with the number of kicks and number of kisses shown for each movie, along with our assessment of the movie type**

Movie title	# of kicks	# of kisses	Type of movie
California Man	3	104	Romance
He's Not Really into Dudes	2	100	Romance
Beautiful Woman	1	81	Romance
Kevin Longblade	101	10	Action
Robo Slayer 3000	99	5	Action
Amped II	98	2	Action
?	18	90	Unknown

K-NN *(K- Nearest Neighbors)*

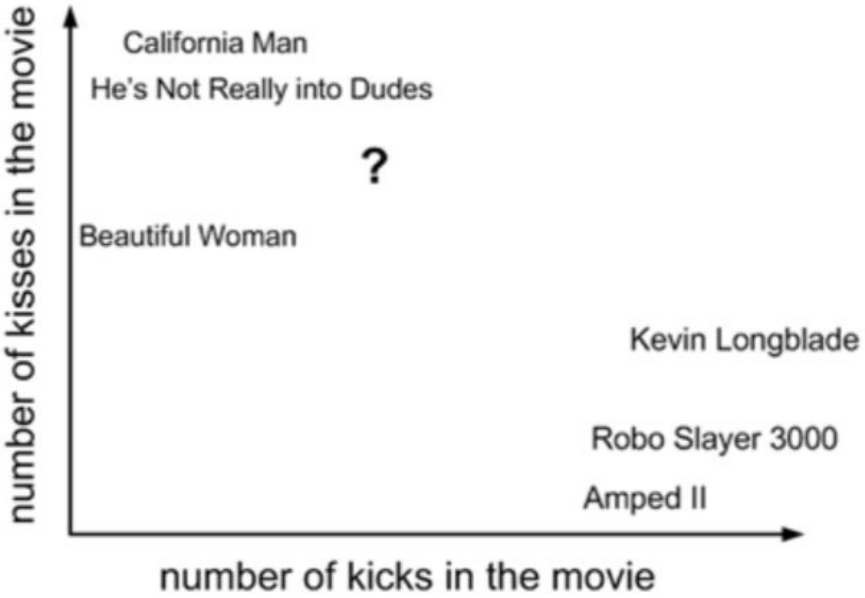


Figure 2.1 **Classifying movies by plotting the number of kicks and kisses in each movie**