

Artificial Intelligence

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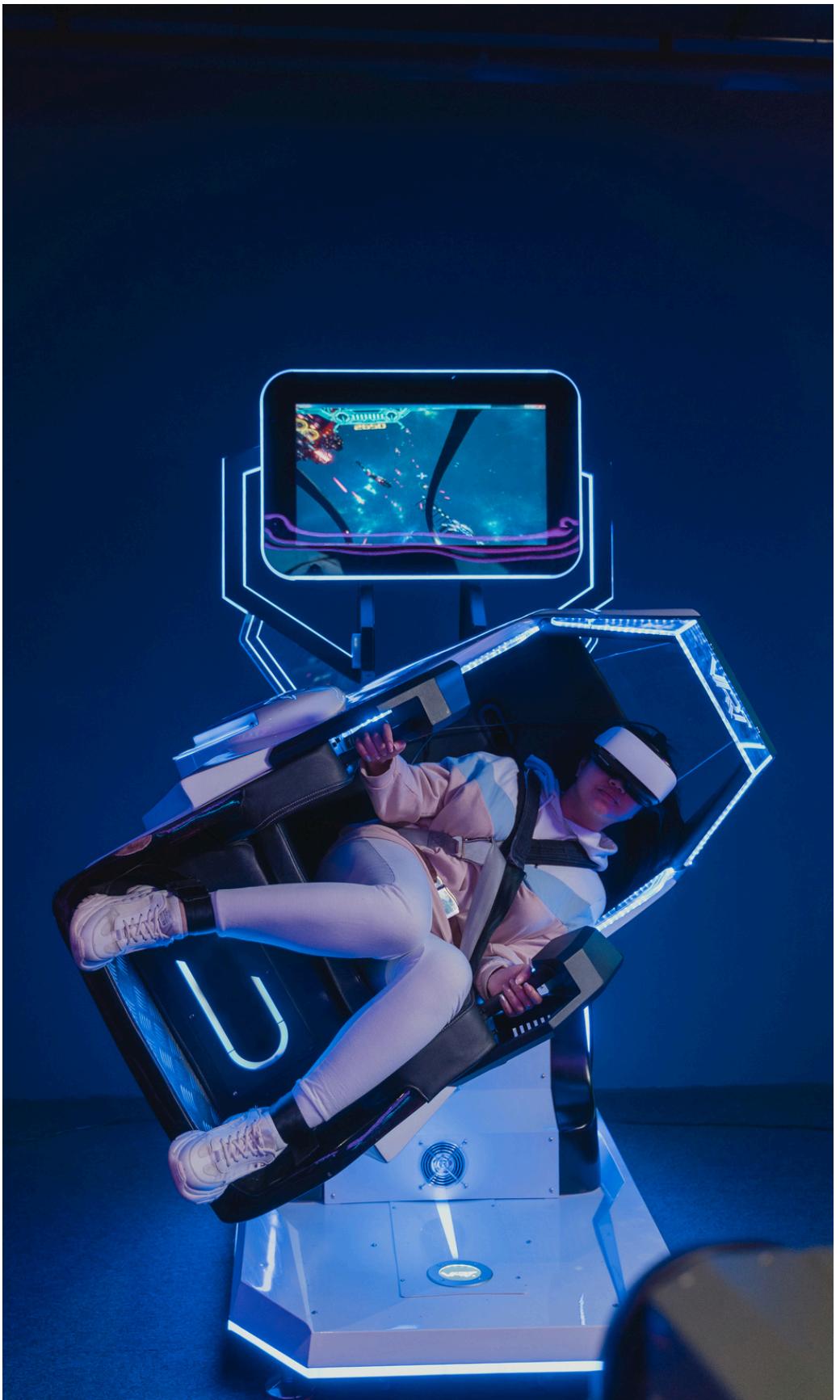
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What is KNN Algorithm?

KNN - K Nearest Neighbors, is one of the simplest Supervised Machine Learning algorithm mostly used for

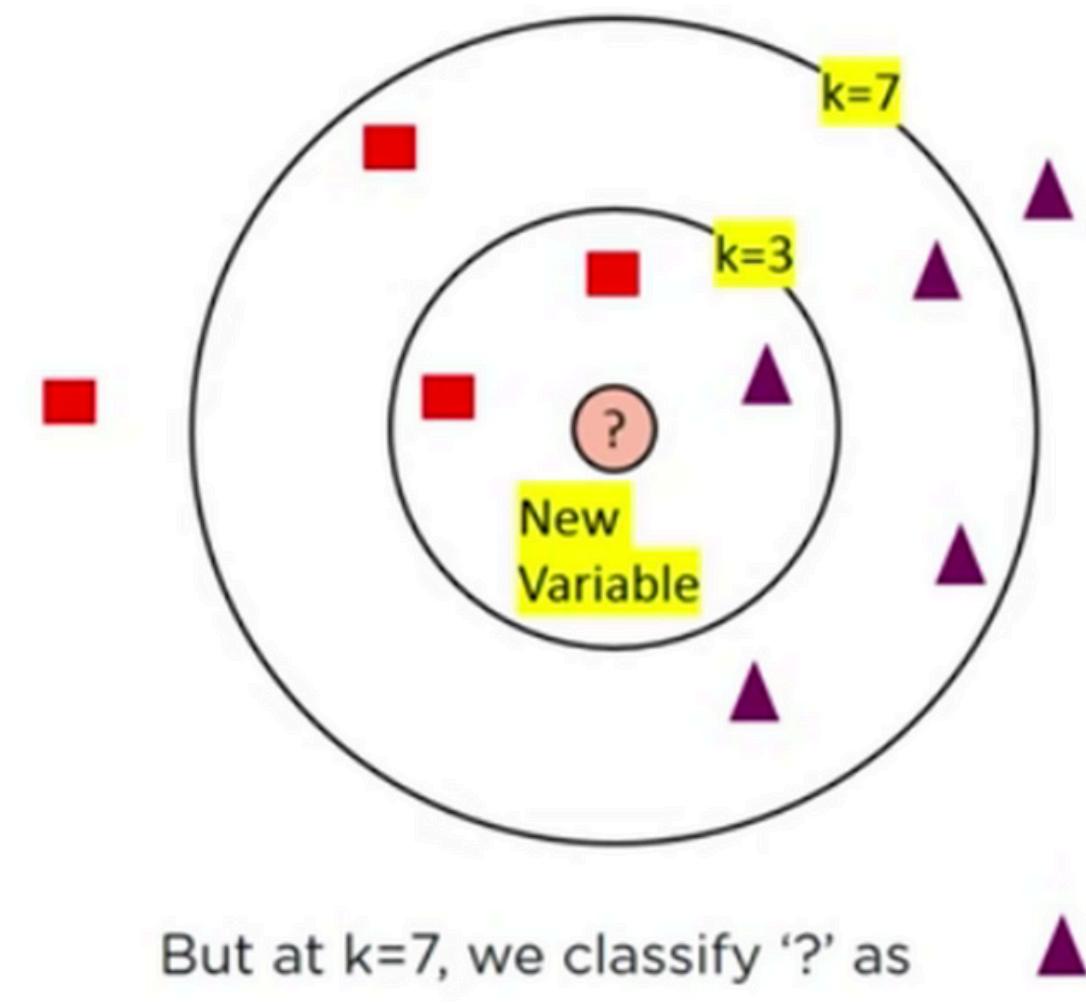
Classification



It classifies a data point based on how its neighbors are classified

How Do We Choose ‘K’ ?

KNN Algorithm is based on feature similarity: Choosing the right value of k is a process called parameter tuning, and is important for better accuracy





How Do We Choose ‘K’ ?

The class of unknown data point was ■ at k=3 but changed at k=7, so which k should we choose?

How Do We Choose ‘K’ ?

To choose a value of k:

- Sqrt(n), where n is the total number of data points
- Odd value of K is selected to avoid confusion between two classes of data

How dose KNN Algorithm Work?



Consider a dataset having two variables: height (cm) & weight (kg) and each point is classified as Normal or Underweight

Weight(x2)	Height(y2)	Class
51	167	Underweight
62	182	Normal
69	176	Normal
64	173	Normal
65	172	Normal
56	174	Underweight
58	169	Normal
57	173	Normal
55	170	Normal





How does KNN Algorithm Work?



On the basis of the given data we have to classify the below set as Normal or Underweight using KNN

57 kg	170 cm	?
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Assuming, we
don't know how
to calculate BMI!

Euclidean Distance and Classification

Where $(x_1, y_1) = (57, 170)$ whose class we have to classify

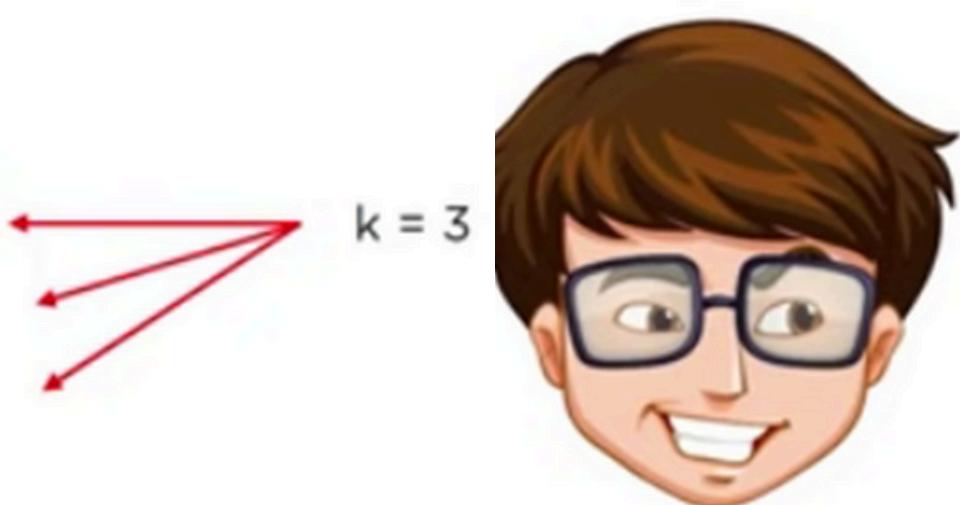
Weight(x2)	Height(y2)	Class	Euclidean Distance
51	167	Underweight	6.7
62	182	Normal	13
69	176	Normal	13.4
64	173	Normal	7.6
65	172	Normal	8.2
56	174	Underweight	4.1
58	169	Normal	1.4
57	173	Normal	3
55	170	Normal	2



Now, lets calculate the nearest neighbor at k=3

Weight(x2)	Height(y2)	Class	Euclidean Distance
51	167	Underweight	6.7
62	182	Normal	13
69	176	Normal	13.4
64	173	Normal	7.6
65	172	Normal	8.2
56	174	Underweight	4.1
58	169	Normal	1.4
57	173	Normal	3
55	170	Normal	2

57 kg	170 cm	?
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k = 3

Class	Euclidean Distance
Underweight	6.7
Normal	13
Normal	13.4
Normal	7.6
Normal	8.2
Underweight	4.1
Normal	1.4
Normal	3
Normal	2

k = 3

So, majority neighbors are pointing towards 'Normal'

Hence, as per KNN algorithm the class of (57, 170) should be 'Normal'

Required modules from python for importing KNN

Import the required Scikit-learn libraries as shown:

“

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import confusion_matrix
from sklearn.metrics import f1_score
from sklearn.metrics import accuracy_score
```

”

Thank You !

