Kmeans and Kmeans++: Comparison and deployment

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Abstract

Machine learning is without a doubt revolutionizing our world. Each day new discoveries are being made and there are a lot of techniques and algorithms. Usually, ML techniques are divided into **supervised learning** & **unsupervised learning**. Unsupervised learning techniques do not require labeling and are useful to train and group batches of data for further analysis and decision taking. In this document I describe the implementation of the KMeans algorithm, and the deployment of an example of such algorithm.

Keywords: AI, Clustering, ML, Unsupervised learning, Web, Cloud, unit testing.

Kmeans and Kmeans++: Comparison and deployment

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KMeans & Kmeans++

KMeans Clustering and its variant

K Means clustering is an **unsupervised learning technique** to group samples of data without requiring labeling. It takes a cluster of data points and attempts to cluster them by computing centroids, and from those centroids, it creates.

Implementation & deployment¹

The code was implemented in C#, using 2 classes: Row and cluster. The github folders contain more information about their contents, including useful texts.

Annex: Results from running the KMEans classic and KMeans++

ID		sepal_length	sepal_width	petal_length	petal_width	Label
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	7	4.6	3.4	1.4	0.3	2
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	9	4.4	2.9	1.4	0.2	2

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16	5.7	4.4	1.5	0.4	2
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22	5.1	3.7	1.5	0.4	2
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24	5.1	3.3	1.7	0.5	2
25	4.8	3.4	1.9	0.2	2
26	5	3	1.6	0.2	2
27	5	3.4	1.6	0.4	2
28	5.2	3.5	1.5	0.2	2
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31	4.8	3.1	1.6	0.2	2
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56	5.7	2.8	4.5	1.3	0
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61	5	2	3.5	1	0
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63	6	2.2	4	1	0
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66	6.7	3.1	4.4	1.4	0
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115	5.8	2.8	5.1	2.4	0
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126	7.2	3.2	6	1.8	1

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	149	6.2	3.4	5.4	2.3	1		
	150	5.9	3	5.1	1.8	0		
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7	1	5.1	3.5	1.4	0.3	2
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3	2	5	3	1.6	0.2	2
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	3	4.8	3.1	1.6	0.2	2
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3	3	5.2	4.1	1.5	0.1	2
3	3	5.5	4.2	1.4	0.2	2
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	3	4.9	3.1	1.5	0.1	2
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	3	5	3.2	1.2	0.2	2
6						
	3	5.5	3.5	1.3	0.2	2
7						
	3	4.9	3.1	1.5	0.1	2
8						
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9	4	5.1	3.4	1.5	0.2	2
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3		_	2.5	1.6	0.6	2
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4	4	5.1	3.8	1.9	0.4	2
5	·	3.1	3.0	1.9	0.1	2
	4	4.8	3	1.4	0.3	2
6						
	4	5.1	3.8	1.6	0.2	2
7						
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8						
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0	5	7	3.2	4.7	1.4	1
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	5	6.4	3.2	4.5	1.5	0
2						
	5	6.9	3.1	4.9	1.5	1
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	5	5.7	2.8	4.5	1.3	0
6						
	5	6.3	3.3	4.7	1.6	0
7	5	4.9	2.4	3.3	1	0
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	5	6.6	2.9	4.6	1.3	0
9						
	6	5.2	2.7	3.9	1.4	0
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	6	5	2	3.5	1	0
1	6	5.9	3	4.2	1.5	0
2	O	5.7	5	1.2	1	U

	6	6	2.2	4	1	0
3						
	6	6.1	2.9	4.7	1.4	0
4						
	6	5.6	2.9	3.6	1.3	0
5						
	6	6.7	3.1	4.4	1.4	0
6						
	6	5.6	3	4.5	1.5	0
7						
	6	5.8	2.7	4.1	1	0
8						
	6	6.2	2.2	4.5	1.5	0
9	7	5.6	2.5	2.0	1.1	0
0	7	5.6	2.5	3.9	1.1	0
U	7	5.9	3.2	4.8	1.8	0
1	,	3.)	3.2	4.0	1.0	U
1	7	6.1	2.8	4	1.3	0
2	•			-		Č
	7	6.3	2.5	4.9	1.5	0
3						

	7	6.1	2.8	4.7	1.2	0
4						
	7	6.4	2.9	4.3	1.3	0
5						
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7						
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8						
	7	6	2.9	4.5	1.5	0
9						
0	8	5.7	2.6	3.5	1	0
0	8	5 5	2.4	2.9	1.1	0
1	0	5.5	2.4	3.8	1.1	0
1	8	5.5	2.4	3.7	1	0
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_	8	5.8	2.7	3.9	1.2	0
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	8	6	2.7	5.1	1.6	0
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	8	5.4	3	4.5	1.5	0
5						
	8	6	3.4	4.5	1.6	0
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7	8	6.7	3.1	4.7	1.5	0
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	9	5.5	2.6	4.4	1.2	0
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2	9	6.1	3	4.6	1.4	0
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3						
	9	5	2.3	3.3	1	0
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5						

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7						
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8						
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00						
	1	6.3	3.3	6	2.5	1
01						
	1	5.8	2.7	5.1	1.9	0
02				- O		
0.2	1	7.1	3	5.9	2.1	1
03	1	6.2	2.0	5.6	1.0	1
0.4	1	6.3	2.9	5.6	1.8	1
04	1	6.5	2	5.8	2.2	1
05	1	6.5	3	3.8	2.2	1
03	1	7.6	3	6.6	2.1	1
06	1	7.0	3	0.0	2.1	1
00						

	1	4.9	2.5	4.5	1.7	0
07						
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08						
	1	6.7	2.5	5.8	1.8	1
09						
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11						
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10	1	0.8	3	5.5	2.1	1
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14						
	1	5.8	2.8	5.1	2.4	0
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17						

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25						
	1	7.2	3.2	6	1.8	1
26			• 0			0
25	1	6.2	2.8	4.8	1.8	0
27	1	<i>c</i> 1	2	4.0	1.0	0
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28						

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29						
	1	7.2	3	5.8	1.6	1
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31						
	1	7.9	3.8	6.4	2	1
32						
	1	6.4	2.8	5.6	2.2	1
33			• 0	~ .		0
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	1	6	3	4.8	1.8	0
39						

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	1	6.7	3.1	5.6	2.4	1
41						
	1	6.9	3.1	5.1	2.3	1
42						
	1	5.8	2.7	5.1	1.9	0
43						
	1	6.8	3.2	5.9	2.3	1
44						
	1	6.7	3.3	5.7	2.5	1
45						
	1	6.7	3	5.2	2.3	1
46						
	1	6.3	2.5	5	1.9	0
47						
	1	6.5	3	5.2	2	1
48						
	1	6.2	3.4	5.4	2.3	1
49						
	1	5.9	3	5.1	1.8	0
50						