

Second task of Neural Network

Input : Two features of Noise signal (max, rms)

Number of datapoint: 2100

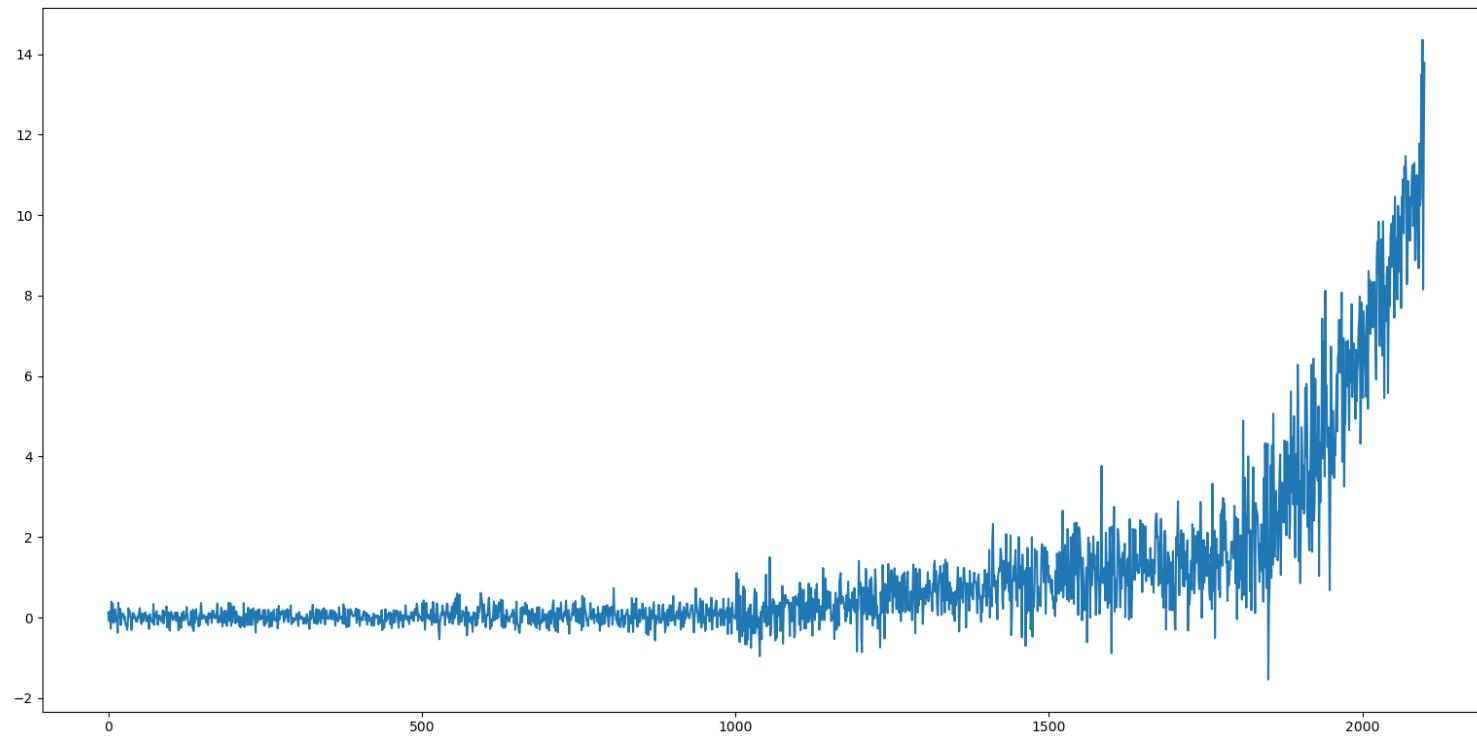
Number of Segmentation: 420 (for each 5 datapoint)

output: 3 classes (1,2,3)

method Supervised learning (SL) : **MLP Classifier**

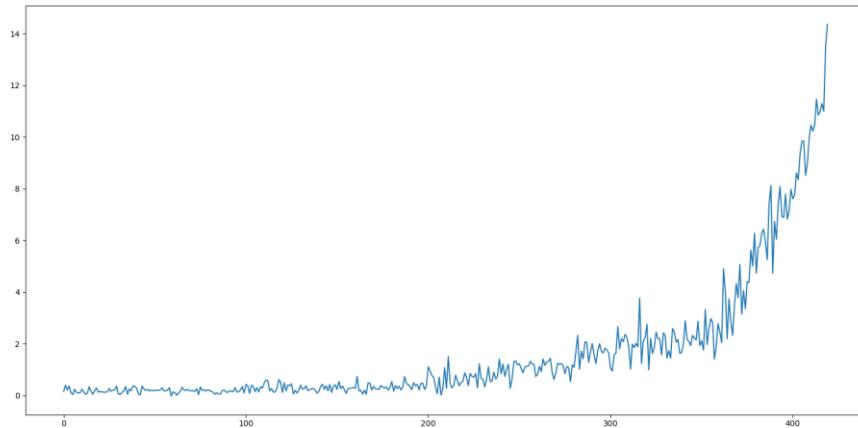
method Unsupervised learning : **K-Means Clustering**

Signal With Noise

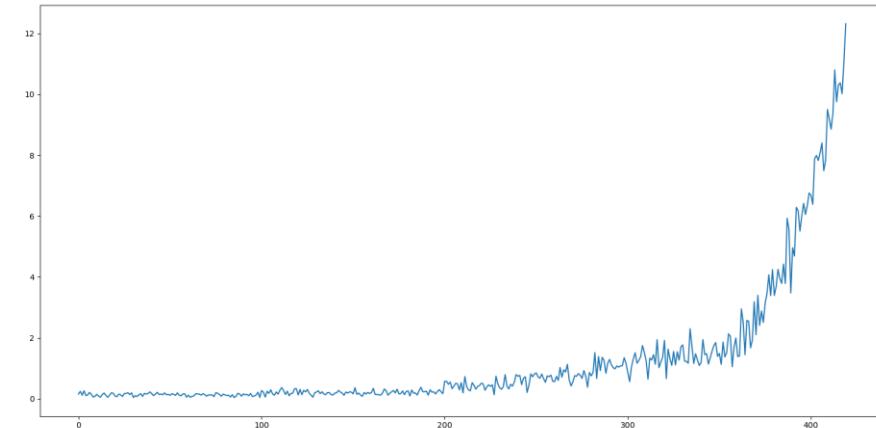


Two features of Noise signal

Max



RMS



Shuffle Data for justice in training and testing

Original input
max RMS

	0	1	2
0	0	0.154716	0.159553
1	1	0.395399	0.243513
2	2	0.208204	0.119442
3	3	0.369567	0.264073
4	4	0.102667	0.107927
5	5	0.030588	0.125567
6	6	0.234596	0.211018
7	7	0.115857	0.150071
8	8	0.0904512	0.0602943
9	9	0.105196	0.0813899
10	10	0.23802	0.147852
11	11	0.130977	0.0892714
12	12	0.04125	0.0518134
13	13	0.0873754	0.142399
14	14	0.337311	0.191007
15	15	0.158477	0.108977
16	16	0.0499266	0.0492427
17	17	0.181834	0.120532
18	18	0.278518	0.200066

Shuffle input
max RMS

	0	1	2
0	13	0.08737...	0.142399
1	24	0.151337	0.07569...
2	307	2.07633	1.38147
3	243	0.99952	0.672175
4	37	0.174015	0.156564
5	230	0.632322	0.364954
6	362	4.8953	2.95276
7	226	0.8417	0.46114
8	48	0.20662	0.134156
9	170	0.349148	0.183849
10	58	0.298752	0.166979
11	265	1.28332	0.953186
12	268	0.875315	0.61676
13	180	0.535157	0.261105
14	260	0.80779	0.563838
15	316	3.7676	1.9408
16	182	0.381024	0.29018
17	169	0.203809	0.118611
18	95	0.129606	0.07238...

Shuffle Data for justice in training and testing

Original output

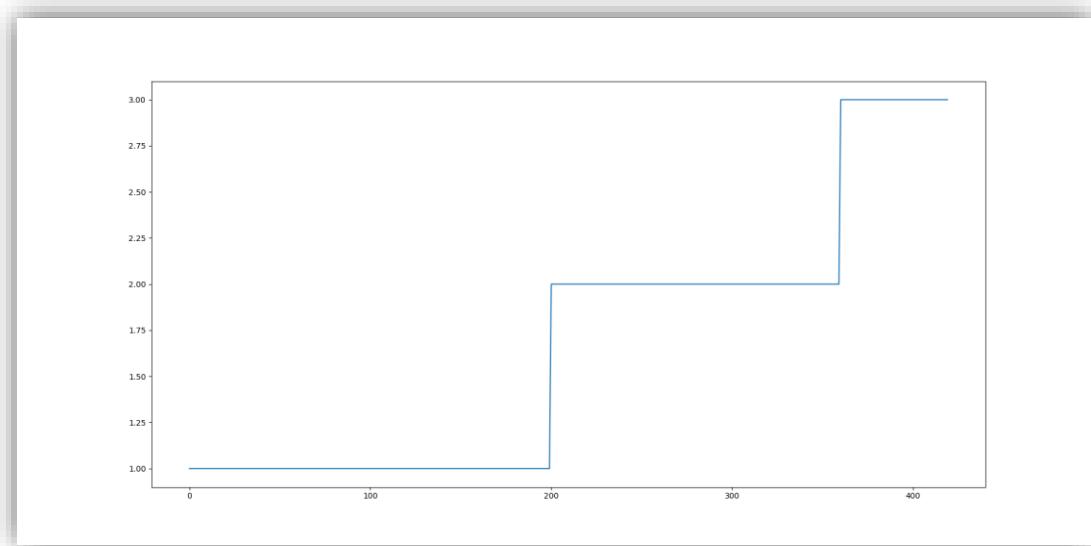
	0	1
0	0	1
1	1	1
2	2	1
3	3	1
4	4	1
5	5	1
6	6	1
7	7	1
8	8	1
9	9	1
10	10	1
11	11	1
12	12	1
13	13	1
14	14	1
15	15	1
16	16	1
17	17	1
18	18	1

Shuffle output

	0	1
0	13	1
1	24	1
2	307	2
3	243	2
4	37	1
5	230	2
6	362	3
7	226	2
8	48	1
9	170	1
10	58	1
11	265	2
12	268	2
13	180	1
14	260	2
15	316	2
16	182	1
17	169	1
18	95	1

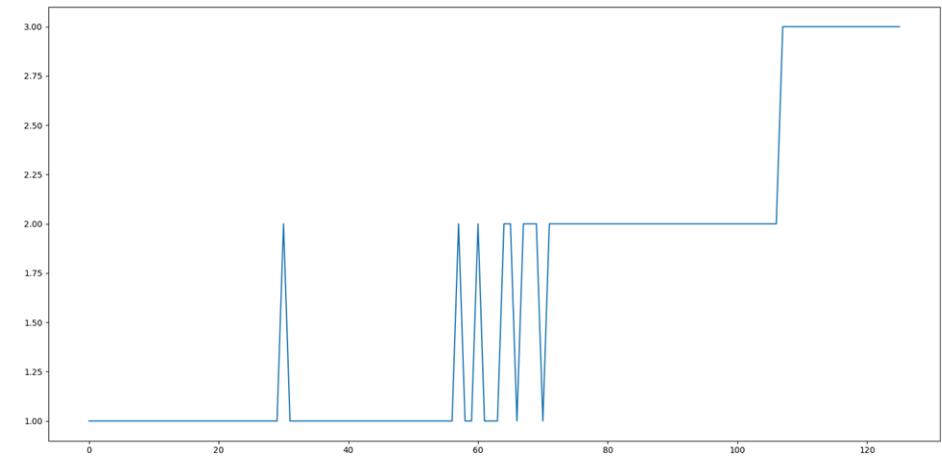
Output Plot

Test : 30% Segments

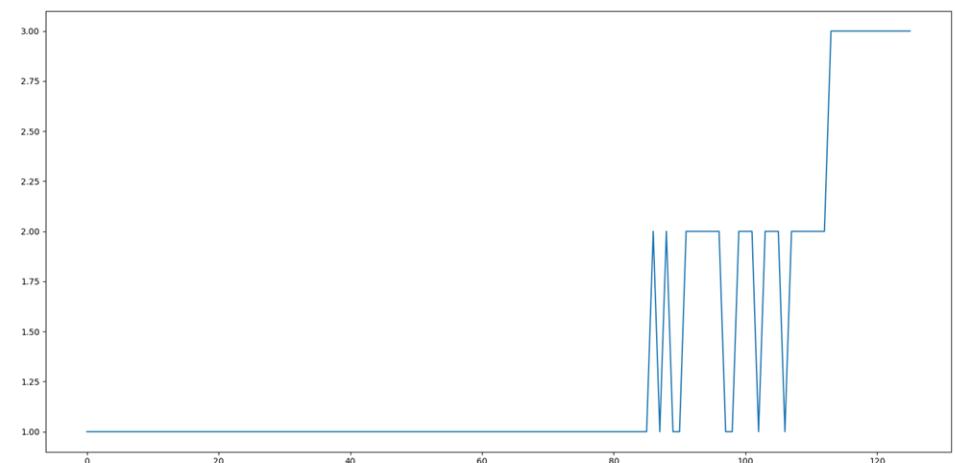


true output

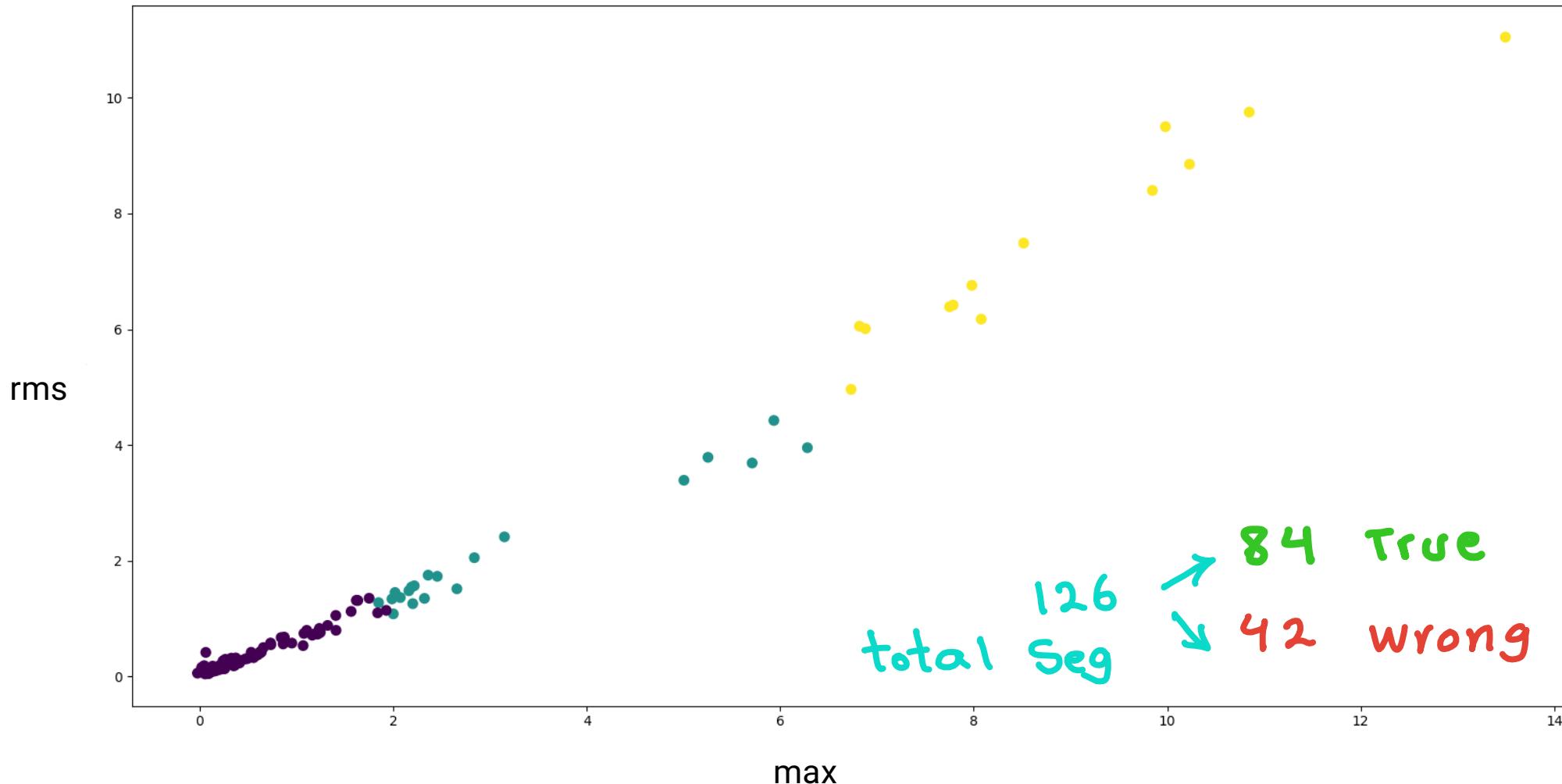
Supervised learning output



UnSupervised learning output

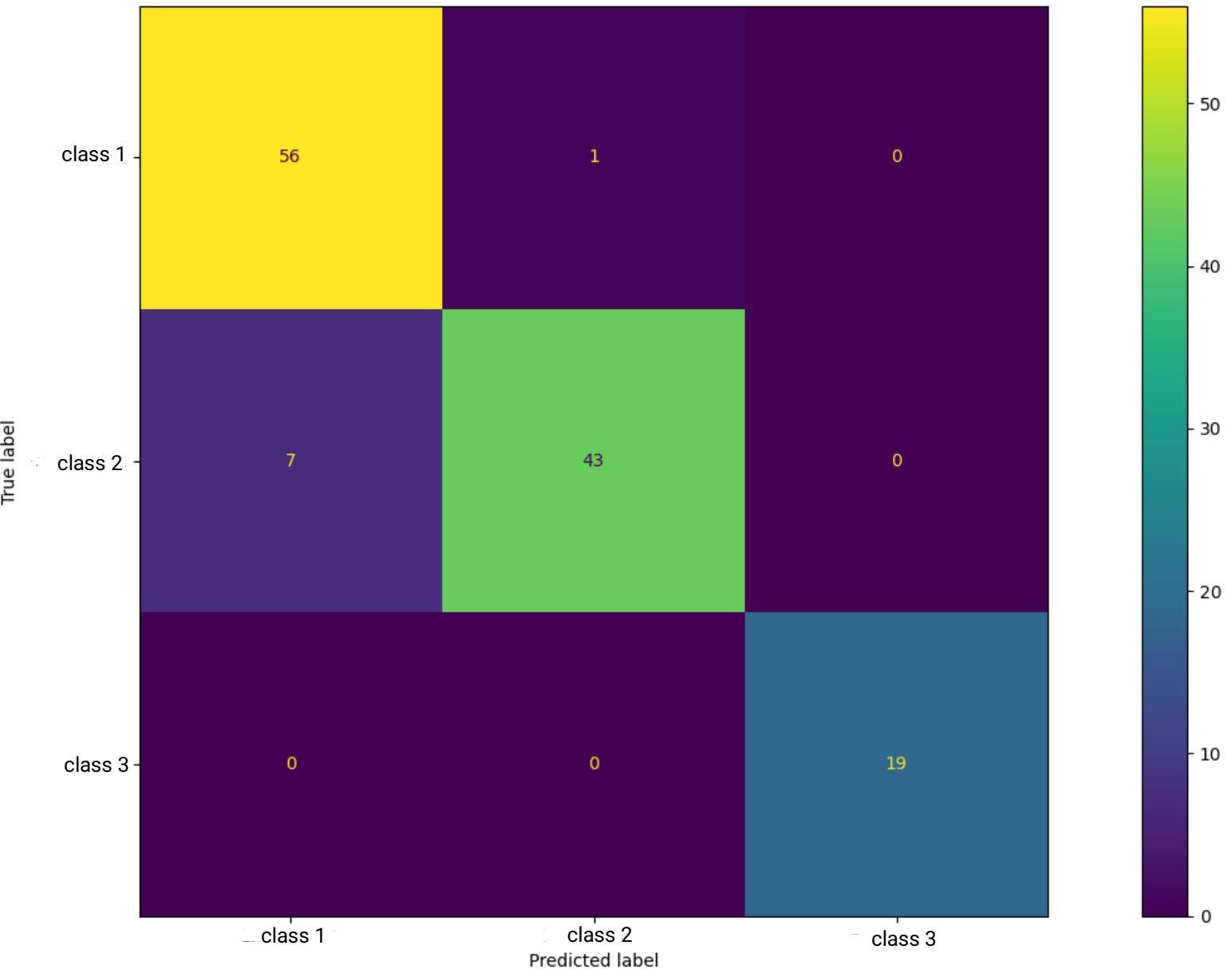


Unsupervised learning → k-means

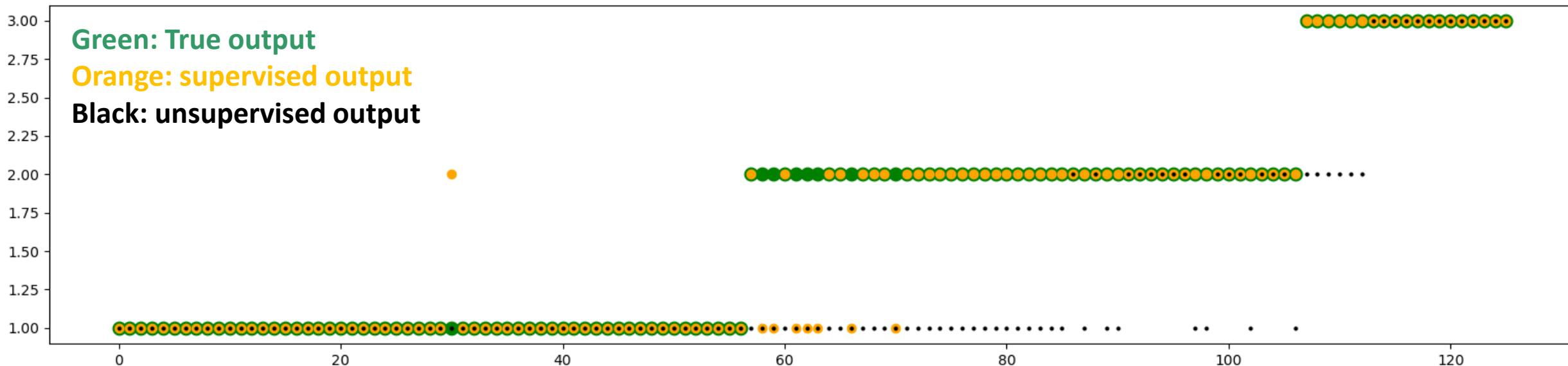


Supervised learning (SL)

Total = $56 + 43 + 19 + 1 + 7$
126 $\underbrace{118}_{\text{True}}$ $\underbrace{8}_{\text{wrong}}$



Supervised learning **VS** Unsupervised learning



supervised output accuracy_score: 93%

unsupervised output accuracy_score : 66%

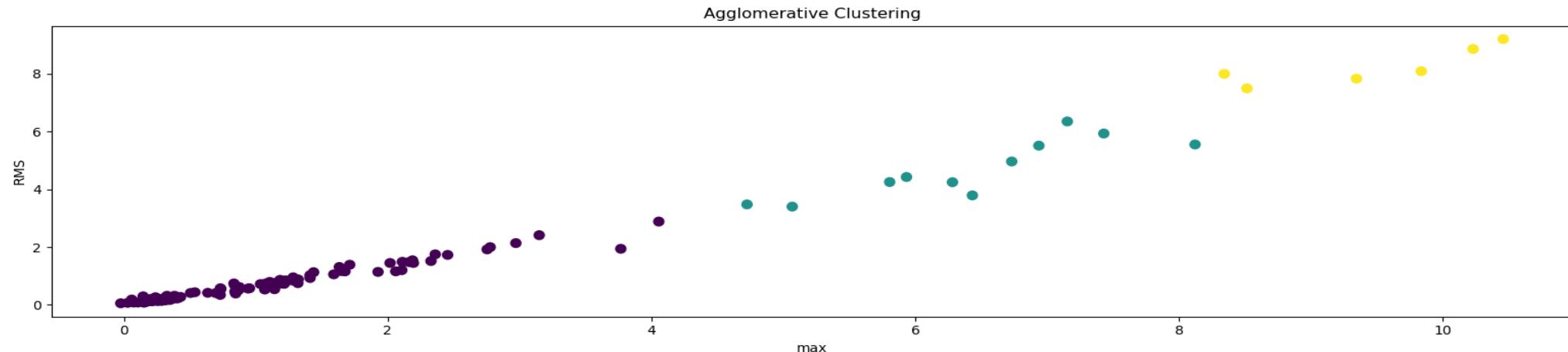
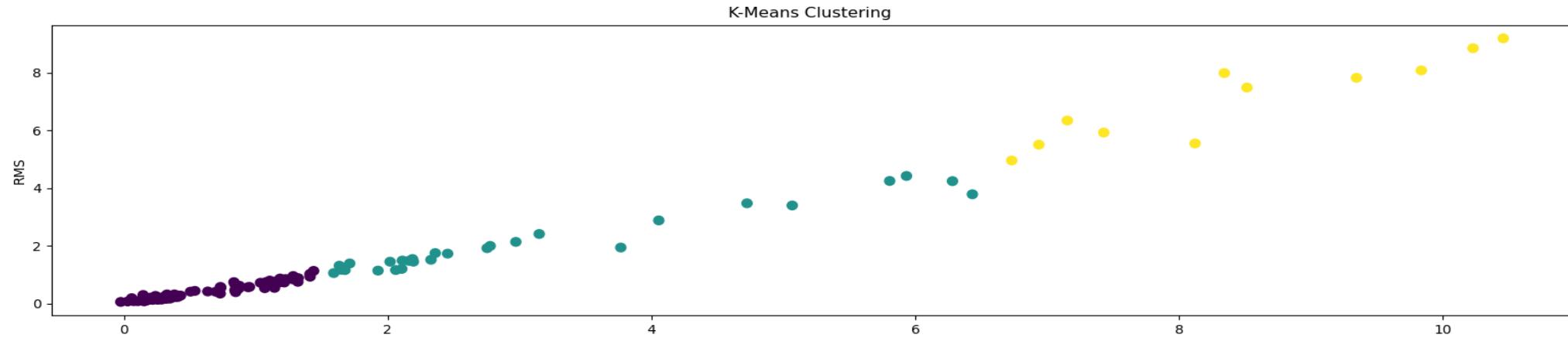
Another example

compare two different clustering

supervised (MLP Classifier) output accuracy_score: %96

Unsupervised (k-means Clustering) output accuracy_score: %61

Unsupervised (Agglomerative Clustering) output accuracy_score: %42



End