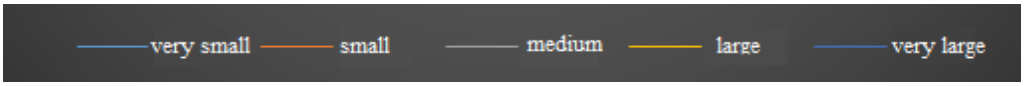
Lab 9 (October 27, 2016)

Fedorov Danil, AS-36

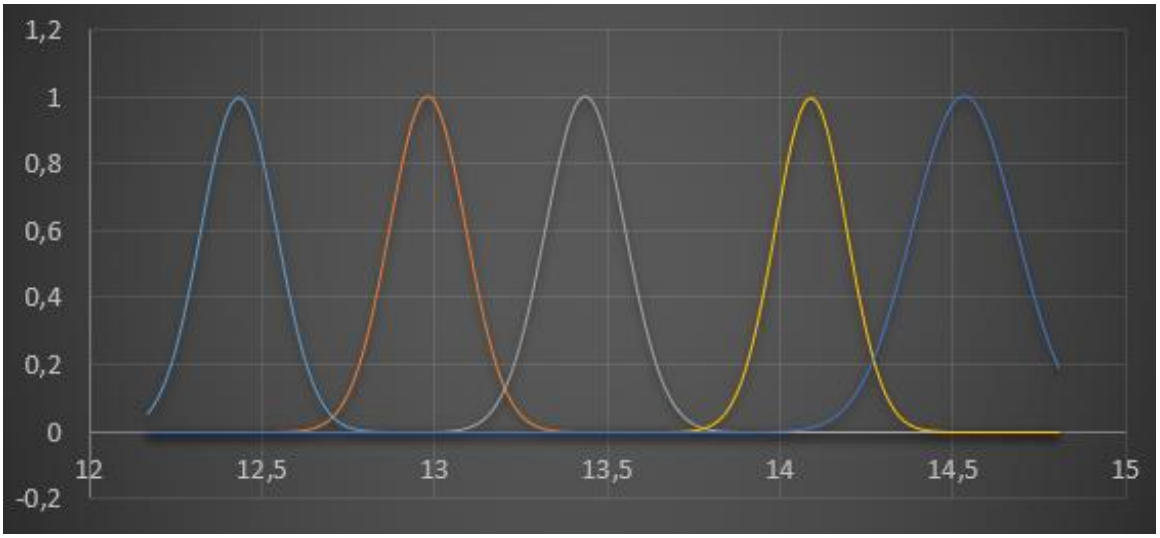
Classification Wine with 5 membership very small, small, medium, large, and very large, with 7 rules

Initial data:

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13
	14,23	1,71	2,43	15,6	127	2,8	3,06	0,28	2,29	5,64	1,04	3,92	1065
	13,2	1,78	2,14	11,2	100	2,65	2,76	0,26	1,28	4,38	1,05	3,4	1050
	13,16	2,36	2,67	18,6	101	2,8	3,24	0,3	2,81	5,68	1,03	3,17	1185
	14,37	1,95	2,5	16,8	113	3,85	3,49	0,24	2,18	7,8	0,86	3,45	1480
type 1	13,24	2,59	2,87	21	118	2,8	2,69	0,39	1,82	4,32	1,04	2,93	735
	14,2	1,76	2,45	15,2	112	3,27	3,39	0,34	1,97	6,75	1,05	2,85	1450
	14,39	1,87	2,45	14,6	96	2,5	2,52	0,3	1,98	5,25	1,02	3,58	1290
	14,06	2,15	2,61	17,6	121	2,6	2,51	0,31	1,25	5,05	1,06	3,58	1295
	14,83	1,64	2,17	14	97	2,8	2,98	0,29	1,98	5,2	1,08	2,85	1045
	13,86	1,35	2,27	16	98	2,98	3,15	0,22	1,85	7,22	1,01	3,55	1045
	12,37	0,94	1,36	10,6	88	1,98	0,57	0,28	0,42	1,95	1,05	1,82	520
	12,33	1,1	2,28	16	101	2,05	1,09	0,63	0,41	3,27	1,25	1,67	680
	12,64	1,36	2,02	16,8	100	2,02	1,41	0,53	0,62	5,75	0,98	1,59	450
	13,67	1,25	1,92	18	94	2,1	1,79	0,32	0,73	3,8	1,23	2,46	630
	12,37	1,13	2,16	19	87	3,5	3,1	0,19	1,87	4,45	1,22	2,87	420
type 2	12,17	1,45	2,53	19	104	1,89	1,75	0,45	1,03	2,95	1,45	2,23	355
	12,37	1,21	2,56	18,1	98	2,42	2,65	0,37	2,08	4,6	1,19	2,3	678
	13,11	1,01	1,7	15	78	2,98	3,18	0,26	2,28	5,3	1,12	3,18	502
	12,37	1,17	1,92	19,6	78	2,11	2	0,27	1,04	4,68	1,12	3,48	510
	13,34	0,94	2,36	17	110	2,53	1,3	0,55	0,42	3,17	1,02	1,93	750
	12,86	1,35	2,32	18	122	1,51	1,25	0,21	0,94	4,1	0,76	1,29	630
	12,88	2,99	2,4	20	104	1,3	1,22	0,24	0,83	5,4	0,74	1,42	530
	12,81	2,31	2,4	24	98	1,15	1,09	0,27	0,83	5,7	0,66	1,36	560
	12,7	3,55	2,36	21,5	106	1,7	1,2	0,17	0,84	5	0,78	1,29	600
	12,51	1,24	2,25	17,5	85	2	0,58	0,6	1,25	5,45	0,75	1,51	650
type 3	12,6	2,46	2,2	18,5	94	1,62	0,66	0,63	0,94	7,1	0,73	1,58	695
	12,25	4,72	2,54	21	89	1,38	0,47	0,53	0,8	3,85	0,75	1,27	720
	12,53	5,51	2,64	25	96	1,79	0,6	0,63	1,1	5	0,82	1,69	515
	13,49	3,59	2,19	19,5	88	1,62	0,48	0,58	0,88	5,7	0,81	1,82	580
	12,84	2,96	2,61	24	101	2,32	0,6	0,53	0,81	4,92	0,89	2,15	590

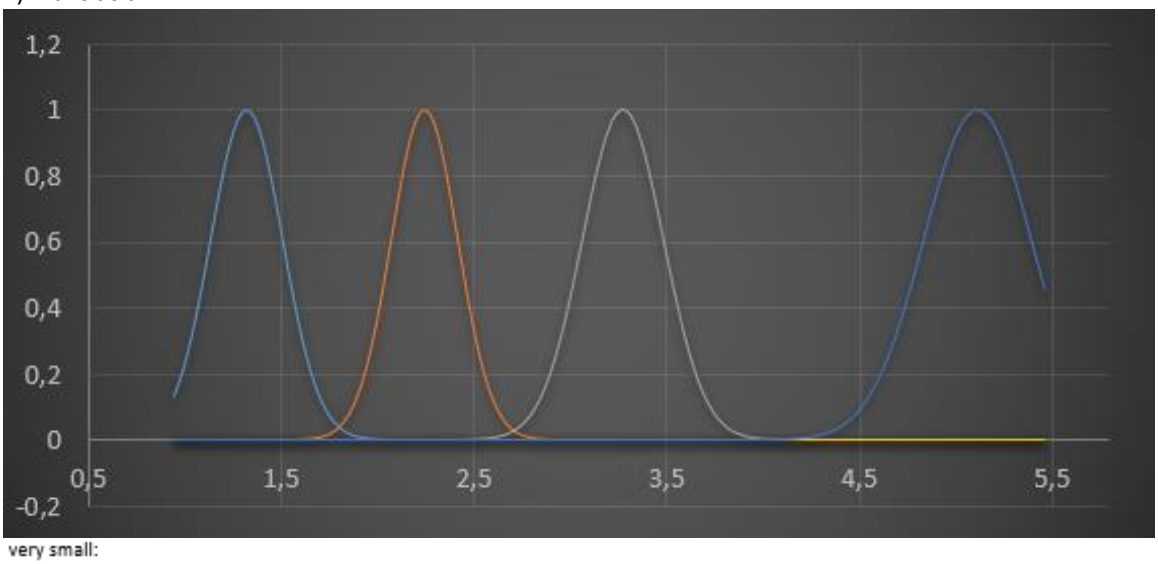


1) Alcohol



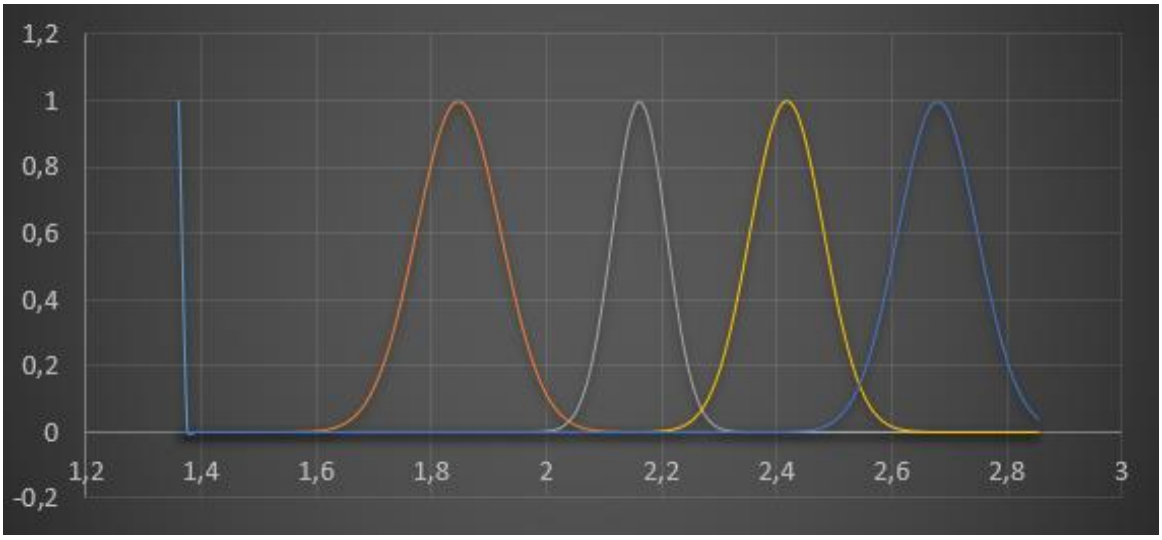
very small:
avg:12.43416666666667
std: 0.02387430555555556
small:
avg:12.98
std: 0.024371428571428492
medium:
avg:13.435
std: 0.026324999999999984
large:
avg:14.0875
std: 0.021368750000000047
very large:
avg:14.53
std: 0.04506666666666671

2) Malic acid



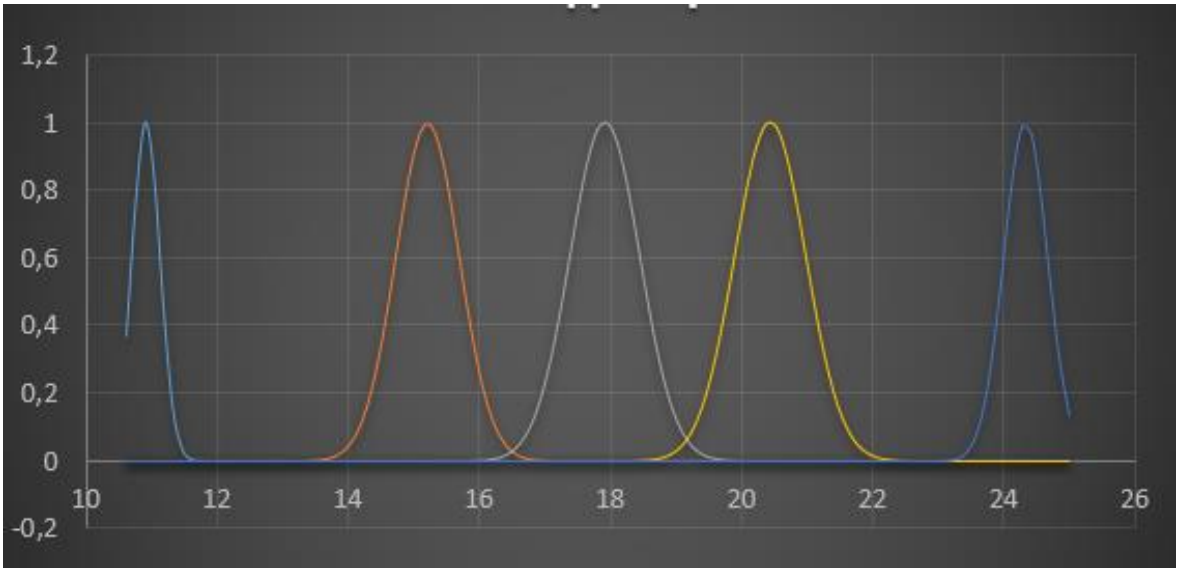
very small:
avg:1.3170588235294114
std: 0.0703031141868512
small:
avg:2.2414285714285715
std: 0.059897959183673445
medium:
avg:3.2725
std: 0.08881874999999992
large:
avg:0
std: 0
very large:
avg:5.115
std: 0.15602500000000002

3) Ash



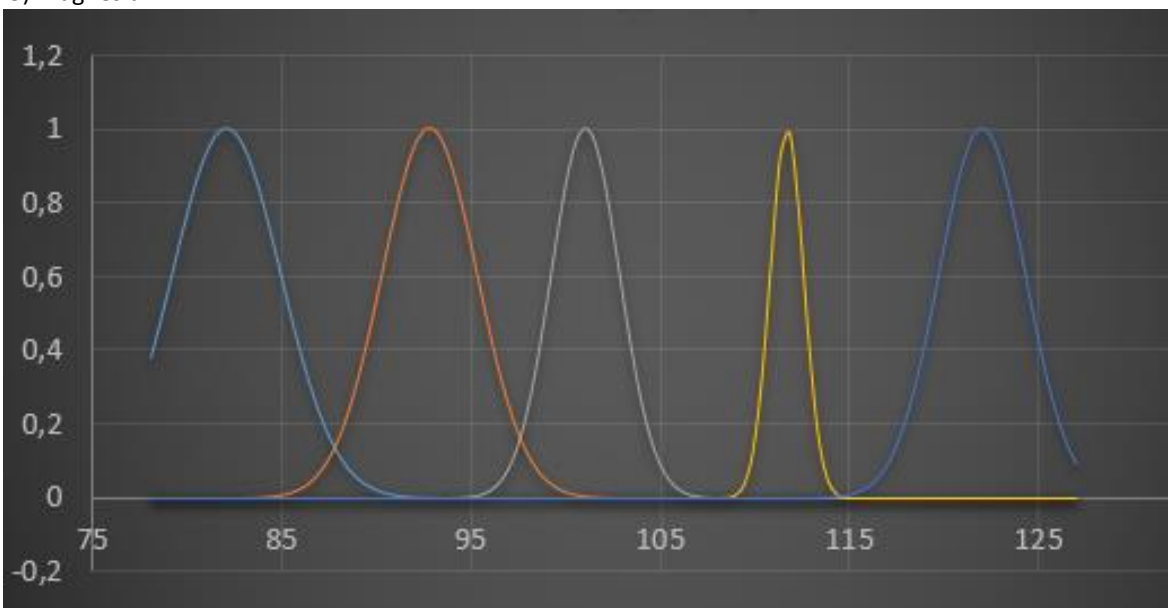
very small:
avg:1.36
std: 0
small:
avg:1.8466666666666667
std: 0.010755555555555553
medium:
avg:2.1614285714285715
std: 0.0043836734693877555
large:
avg:2.4178571428571427
std: 0.008173979591836742
very large:
avg:2.6799999999999997
std: 0.009520000000000013

4) Alcalinity of ash



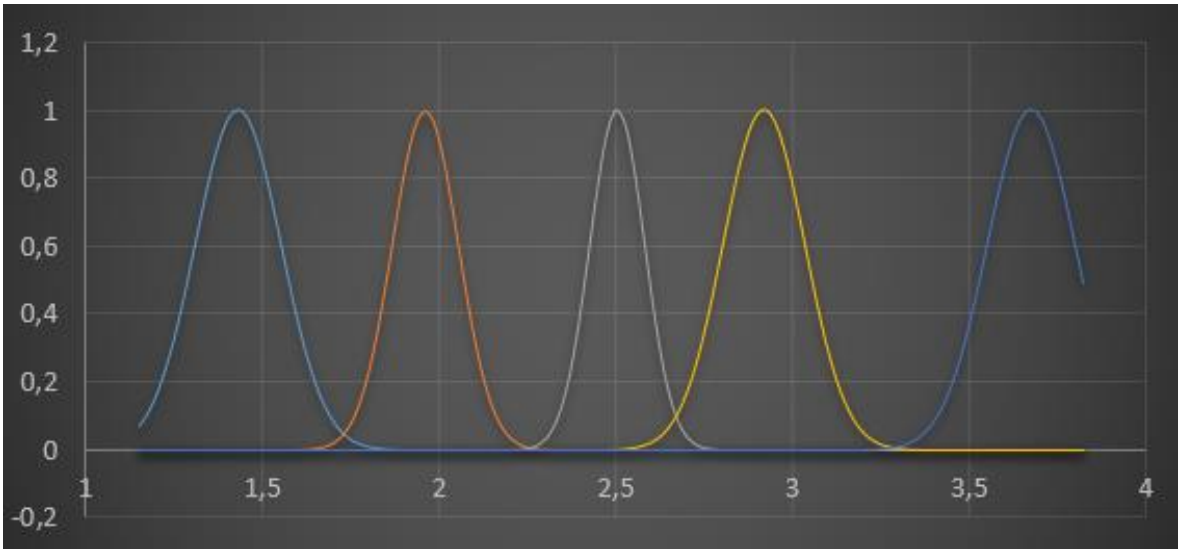
very small:
avg:10.899999999999999
std: 0.08999999999999989
small:
avg:15.2
std: 0.4685714285714286
medium:
avg:17.908333333333335
std: 0.5674305555555555
large:
avg:20.433333333333337
std: 0.5888888888888886
very large:
avg:24.333333333333336
std: 0.22222222222222224

5) Magnesium



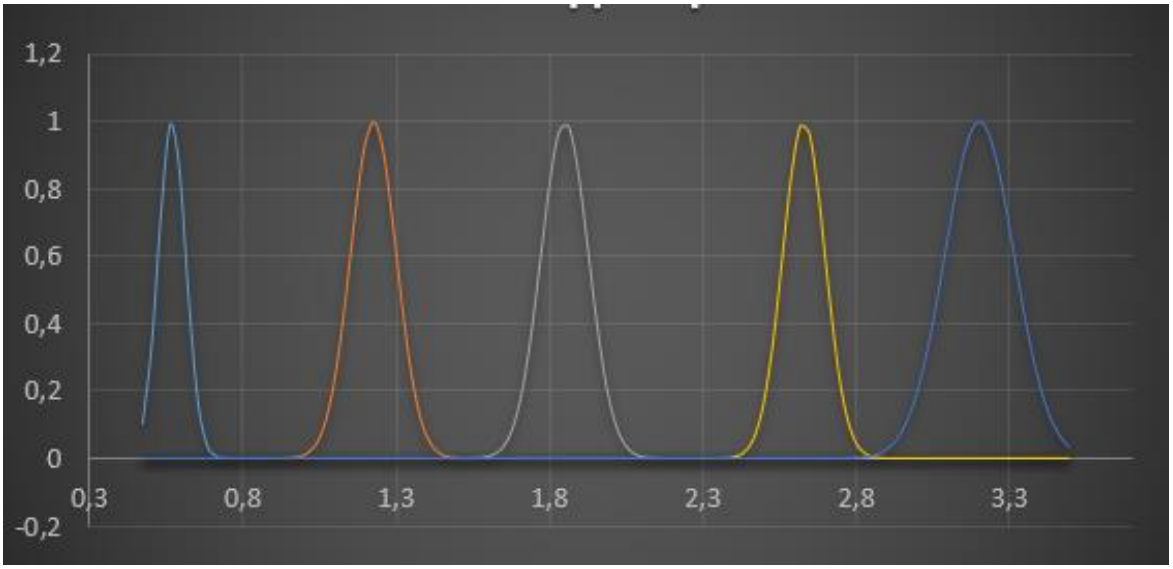
very small:
avg:82
std: 16.5
small:
avg:92.75
std: 12.6875
medium:
avg:101
std: 6.545454545454547
large:
avg:111.66666666666666
std: 1.5555555555555556
very large:
avg:122
std: 10.5

6) Total phenols



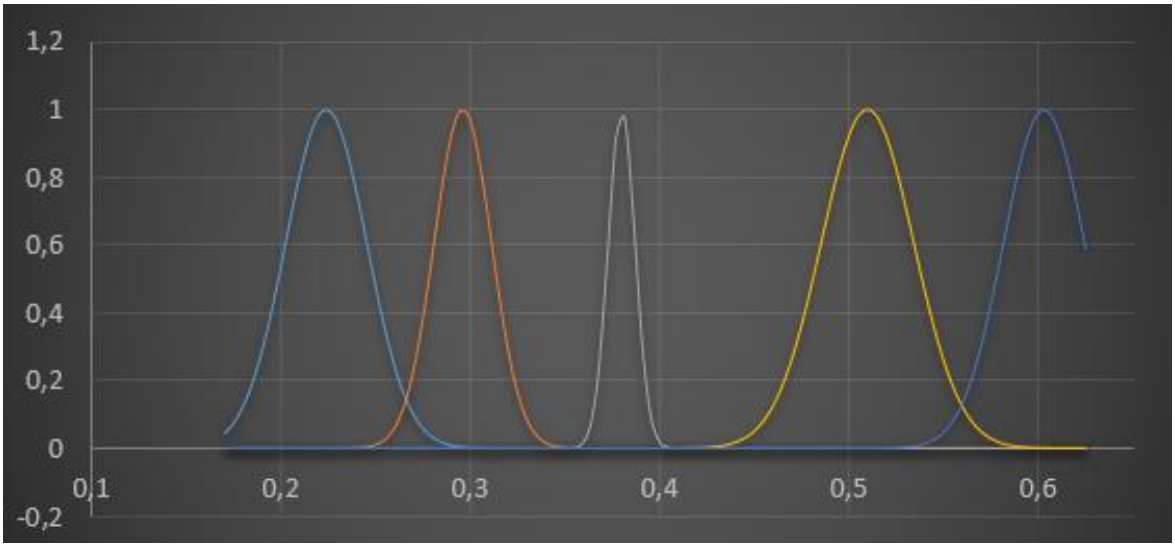
very small:
avg:1.43
std: 0.02940000000000002
small:
avg:1.96
std: 0.017466666666666665
medium:
avg:2.5033333333333334
std: 0.01202222222222223
large:
avg:2.9185714285714286
std: 0.026755102040816353
very large:
avg:3.675
std: 0.030625000000000013

7) Flavanoids



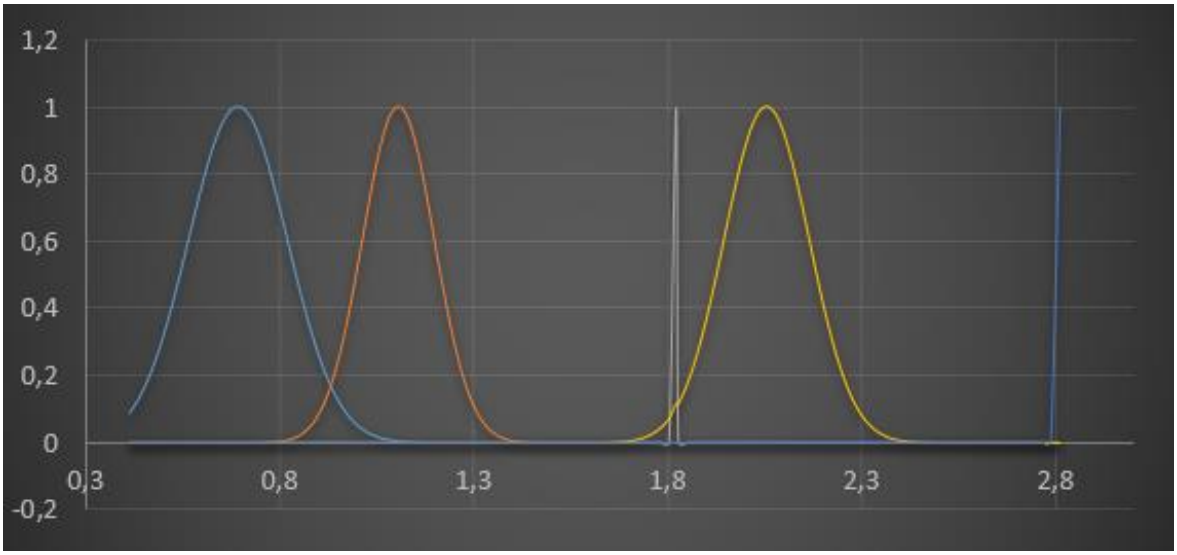
very small:
avg:0.5657142857142857
std: 0.00399591836734694
small:
avg:1.222857142857143
std: 0.011077551020408156
medium:
avg:1.8466666666666667
std: 0.012022222222222222
large:
avg:2.6260000000000003
std: 0.009463999999999997
very large:
avg:3.1987500000000004
std: 0.02533593750000002

8) Nonflavanoid phenols



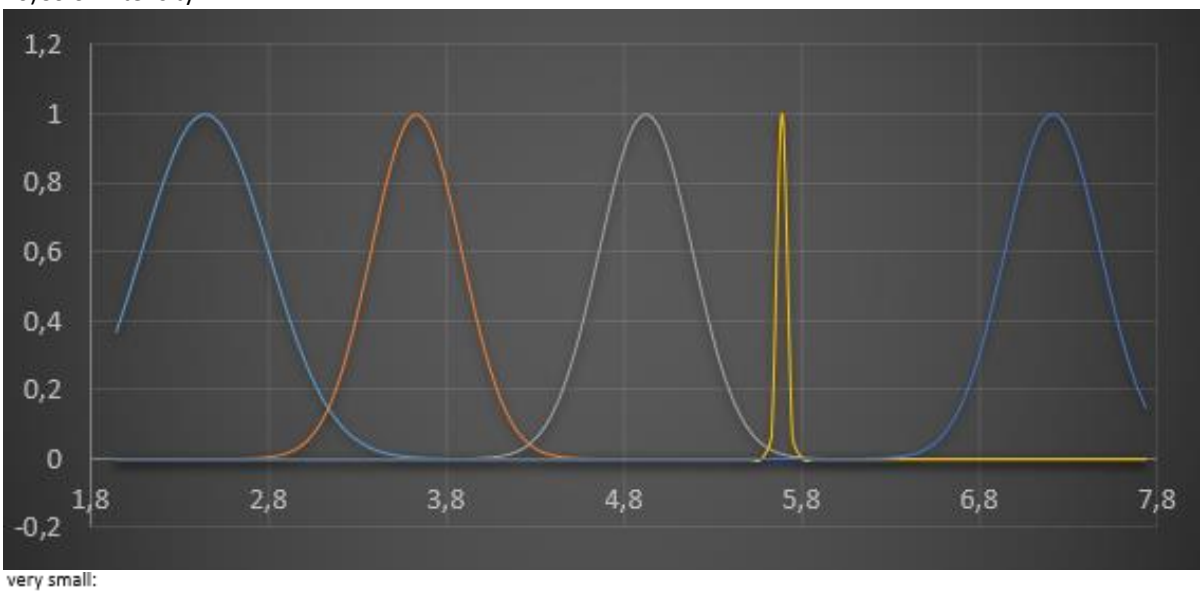
very small:
avg:0.22374999999999998
std: 0.0009234375
small:
avg:0.29600000000000004
std: 0.0004639999999999999
medium:
avg:0.38
std: 0.00010000000000000018
large:
avg:0.51
std: 0.0012000000000000008
very large:
avg:0.6033333333333333
std: 0.0009222222222222221

9) Proanthocyanins



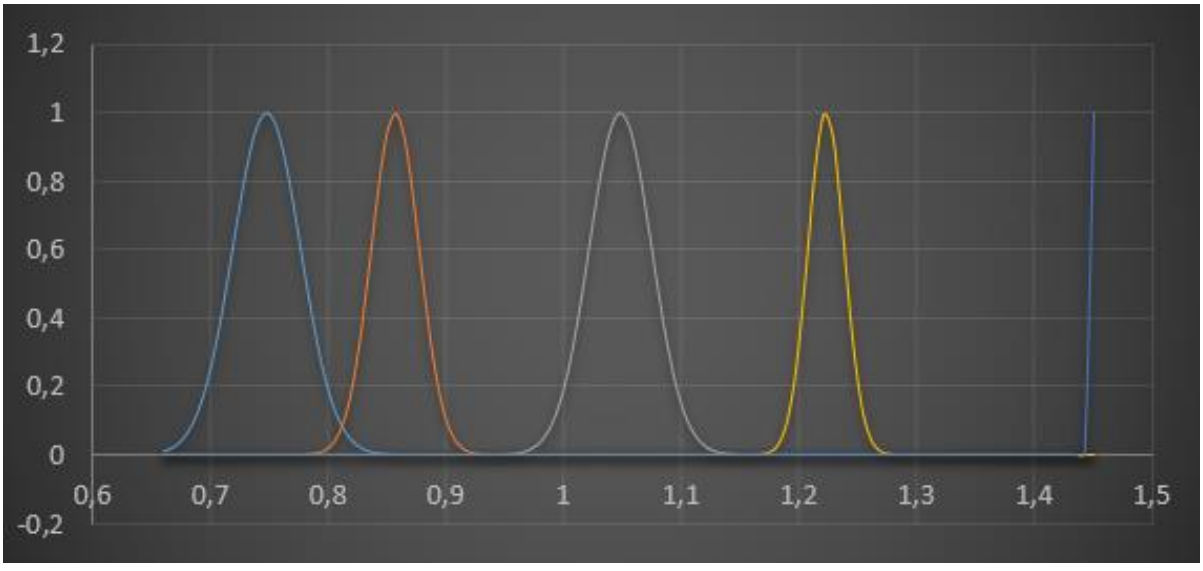
very small:
avg:0.69
std: 0.03227272727272728
small:
avg:1.10375
std: 0.0171234375
medium:
avg:1.82
std: 0
large:
avg:2.0533333333333332
std: 0.02408888888888888
very large:
avg:2.81
std: 0

10)Color intensity



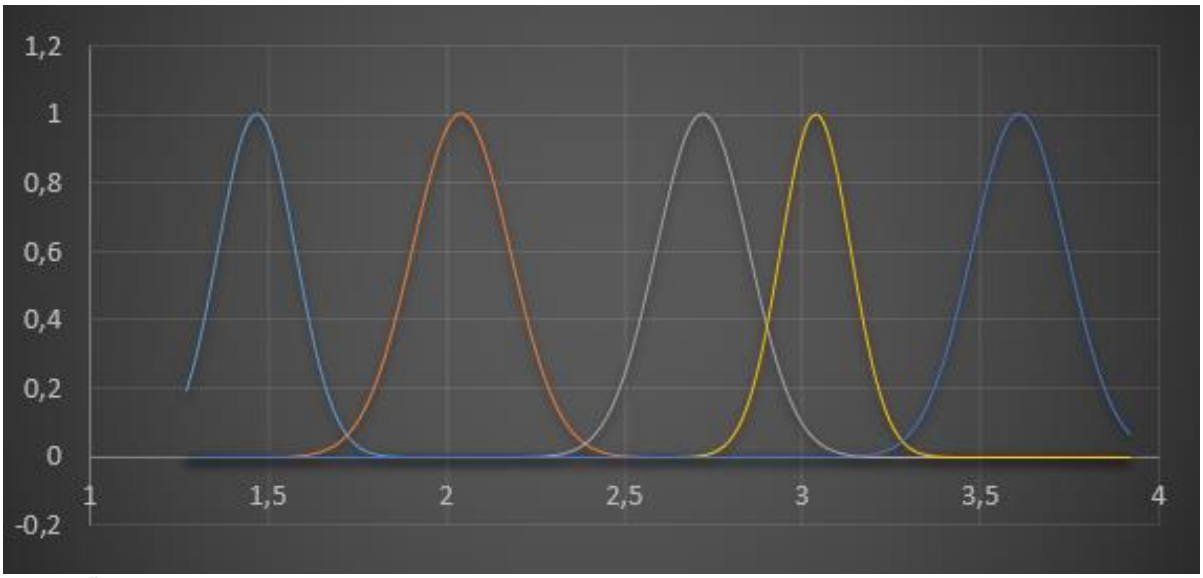
very small:
avg:2.45
std: 0.2500000000000001
small:
avg:3.638
std: 0.12781599999999993
medium:
avg:4.928571428571429
std: 0.13601224489795918
large:
avg:5.694000000000001
std: 0.0012640000000000095
very large:
avg:7.2175
std: 0.14291874999999996

11)Hue



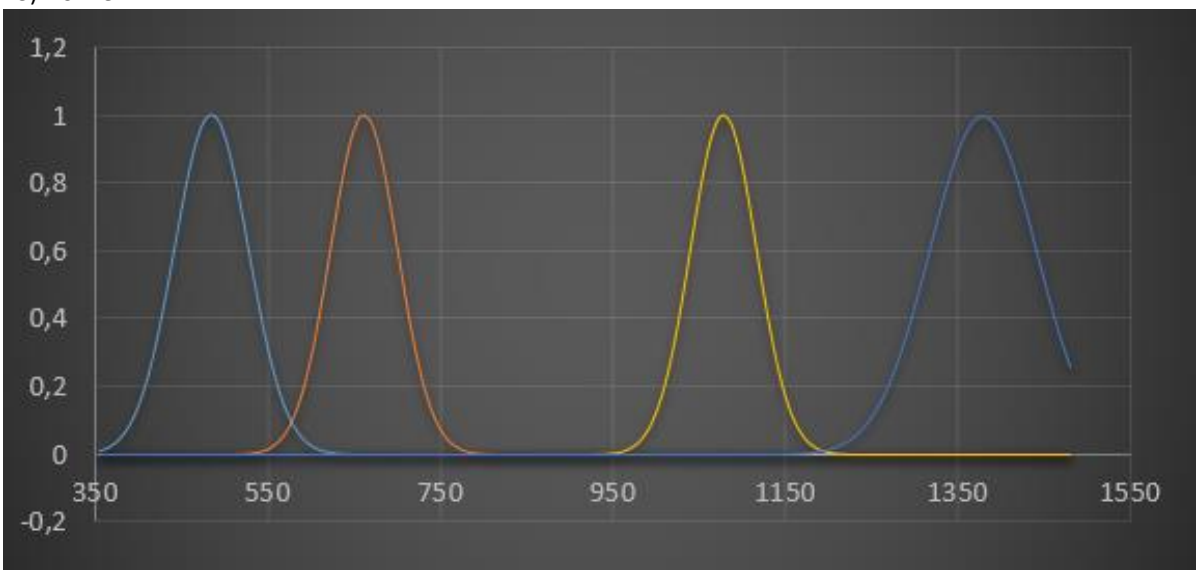
very small:
avg:0.7475
std: 0.0016437500000000005
small:
avg:0.8566666666666667
std: 0.0008222222222222238
medium:
avg:1.0478571428571428
std: 0.0014025510204081658
large:
avg:1.2225000000000001
std: 0.0004687500000000085
very large:
avg:1.45
std: 0

12)OD280/OD315 of diluted wines



very small:
avg:1.4669999999999999
std: 0.023580999999999998
small:
avg:2.0416666666666665
std: 0.0374472222222222
medium:
avg:2.72
std: 0.033800000000000024
large:
avg:3.0374999999999996
std: 0.01936874999999999
very large:
avg:3.6100000000000003
std: 0.03552499999999999

13)Proline



very small:
avg:484.66666666666663
std: 3670.8888888888887
small:
avg:661.5
std: 3003.9166666666665
medium:
avg:0
std: 0
large:
avg:1078
std: 2916.0000000000005
very large:
avg:1378.75
std: 7554.6875

My rules:

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13
type 1	large	very slow	large	medium	medium	large	very large	small	large	very large	large	large	large
	large	very slow	large	medium	small	medium	large	very small	large	very large	large	large	large
type2	medium	very small	medium	medium	very small	medium	small	small	very small	medium	large	very small	very small
	medium	very small	medium	very large	medium	medium	small	small	large	small	medium	very small	very small
type3	very small	medium	medium	very large	small	very small	very small	large	very small	very large	very small	small	small
	very small	very large	medium	very large	large	small	very small	small	small	medium	small	small	very small
other	medium	large	small	very small	very large	large	small	medium	medium	very large	very large	small	medium

Validate data:

TYPE	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13
1	14,1	2,16	2,3	18	105	2,95	3,32	0,22	2,38	5,75	1,25	3,17	1510
1	14,12	1,48	2,32	16,8	95	2,2	2,43	0,26	1,57	5	1,17	2,82	1280
1	13,75	1,73	2,41	16	89	2,6	2,76	0,29	1,81	5,6	1,15	2,9	1320
1	14,75	1,73	2,39	11,4	91	3,1	3,69	0,43	2,81	5,4	1,25	2,73	1150
1	14,38	1,87	2,38	12	102	3,3	3,64	0,29	2,96	7,5	1,2	3	1547
2	12,21	1,19	1,75	16,8	151	1,85	1,28	0,14	2,5	2,85	1,28	3,07	718
2	12,29	1,61	2,21	20,4	103	1,1	1,02	0,37	1,46	3,05	0,906	1,82	870
2	13,86	1,51	2,67	25	86	2,95	2,86	0,21	1,87	3,38	1,36	3,16	410
2	13,49	1,66	2,24	24	87	1,88	1,84	0,27	1,03	3,74	0,98	2,78	472
2	12,99	1,67	2,6	30	139	3,3	2,89	0,21	1,96	3,35	1,31	3,5	985
3	12,93	2,81	2,7	21	96	1,54	0,5	0,53	0,75	4,6	0,77	2,31	600
3	13,36	2,56	2,35	20	89	1,4	0,5	0,37	0,64	5,6	0,7	2,47	780
3	13,52	3,17	2,72	23,5	97	1,55	0,52	0,5	0,55	4,35	0,89	2,06	520
3	13,62	4,95	2,35	20	92	2	0,8	0,47	1,02	4,4	0,91	2,05	550
3	12,25	3,88	2,2	18,5	112	1,38	0,78	0,29	1,14	8,21	0,65	2	855

Checking my rules , success rate