

Contemporary Data Processing Technology (CCOD)

Lab 8 (October 27, 2016)

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Initial data:

Type	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
1	14,23	1,71	2,43	15,6	127	2,8	3,06	0,28	2,29	5,64	1,04	3,92	1065
1	13,2	1,78	2,14	11,2	100	2,65	2,76	0,26	1,28	4,38	1,05	3,4	1050
1	13,16	2,36	2,67	18,6	101	2,8	3,24	0,3	2,81	5,68	1,03	3,17	1185
1	14,37	1,95	2,5	16,8	113	3,85	3,49	0,24	2,18	7,8	0,86	3,45	1480
1	13,24	2,59	2,87	21	118	2,8	2,69	0,39	1,82	4,32	1,04	2,93	735
1	14,2	1,76	2,45	15,2	112	3,27	3,39	0,34	1,97	6,75	1,05	2,85	1450
1	14,39	1,87	2,45	14,6	96	2,5	2,52	0,3	1,98	5,25	1,02	3,58	1290
1	14,06	2,15	2,61	17,6	121	2,6	2,51	0,31	1,25	5,05	1,06	3,58	1295
1	14,83	1,64	2,17	14	97	2,8	2,98	0,29	1,98	5,2	1,08	2,85	1045
1	13,86	1,35	2,27	16	98	2,98	3,15	0,22	1,85	7,22	1,01	3,55	1045
2	12,37	0,94	1,36	10,6	88	1,98	0,57	0,28	0,42	1,95	1,05	1,82	520
2	12,33	1,1	2,28	16	101	2,05	1,09	0,63	0,41	3,27	1,25	1,67	680
2	12,64	1,36	2,02	16,8	100	2,02	1,41	0,53	0,62	5,75	0,98	1,59	450
2	13,67	1,25	1,92	18	94	2,1	1,79	0,32	0,73	3,8	1,23	2,46	630
2	12,37	1,13	2,16	19	87	3,5	3,1	0,19	1,87	4,45	1,22	2,87	420
2	12,17	1,45	2,53	19	104	1,89	1,75	0,45	1,03	2,95	1,45	2,23	355
2	12,37	1,21	2,56	18,1	98	2,42	2,65	0,37	2,08	4,6	1,19	2,3	678
2	13,11	1,01	1,7	15	78	2,98	3,18	0,26	2,28	5,3	1,12	3,18	502
2	12,37	1,17	1,92	19,6	78	2,11	2	0,27	1,04	4,68	1,12	3,48	510
2	13,34	0,94	2,36	17	110	2,53	1,3	0,55	0,42	3,17	1,02	1,93	750
3	12,86	1,35	2,32	18	122	1,51	1,25	0,21	0,94	4,1	0,76	1,29	630
3	12,88	2,99	2,4	20	104	1,3	1,22	0,24	0,83	5,4	0,74	1,42	530
3	12,81	2,31	2,4	24	98	1,15	1,09	0,27	0,83	5,7	0,66	1,36	560
3	12,7	3,55	2,36	21,5	106	1,7	1,2	0,17	0,84	5	0,78	1,29	600
3	12,51	1,24	2,25	17,5	85	2	0,58	0,6	1,25	5,45	0,75	1,51	650
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
3	12,25	4,72	2,54	21	89	1,38	0,47	0,53	0,8	3,85	0,75	1,27	720
3	12,53	5,51	2,64	25	96	1,79	0,6	0,63	1,1	5	0,82	1,69	515
3	13,49	3,59	2,19	19,5	88	1,62	0,48	0,58	0,88	5,7	0,81	1,82	580
3	12,84	2,96	2,61	24	101	2,32	0,6	0,53	0,81	4,92	0,89	2,15	590

Membership Functions:

1) Alcohol

MS 1:

very small:

avg:12.434166666666667

std: 0.023874305555555556

small:

avg:12.98

std: 0.024371428571428492

medium:

avg:13.435

std: 0.026324999999999984

large:

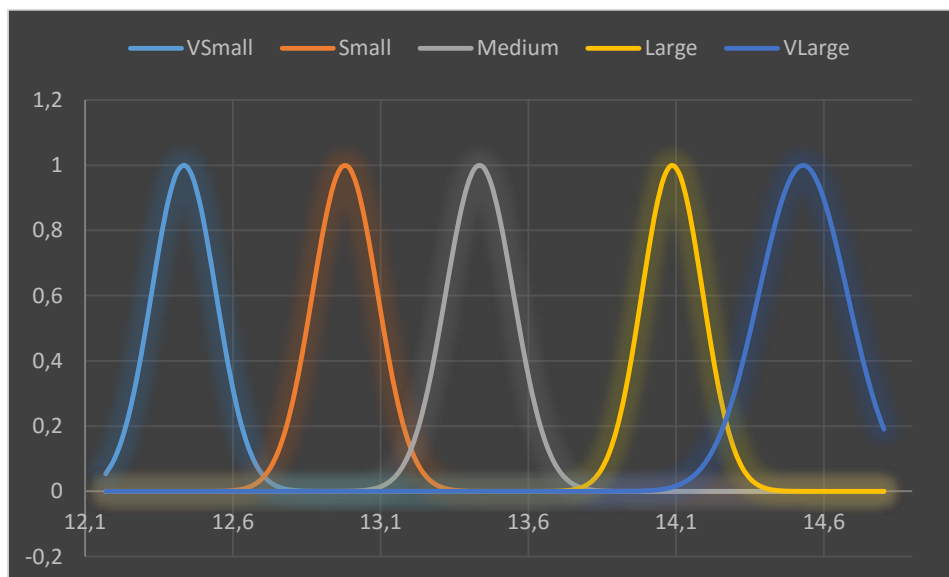
avg:14.0875

std: 0.021368750000000047

very large:

avg:14.53

std: 0.045066666666666671



2) Malic acid

MS 2:

very small:

avg:1.3170588235294114

std: 0.0703031141868512

small:

avg:2.2414285714285715

std: 0.059897959183673445

medium:

avg:3.2725

std: 0.08881874999999992

large:

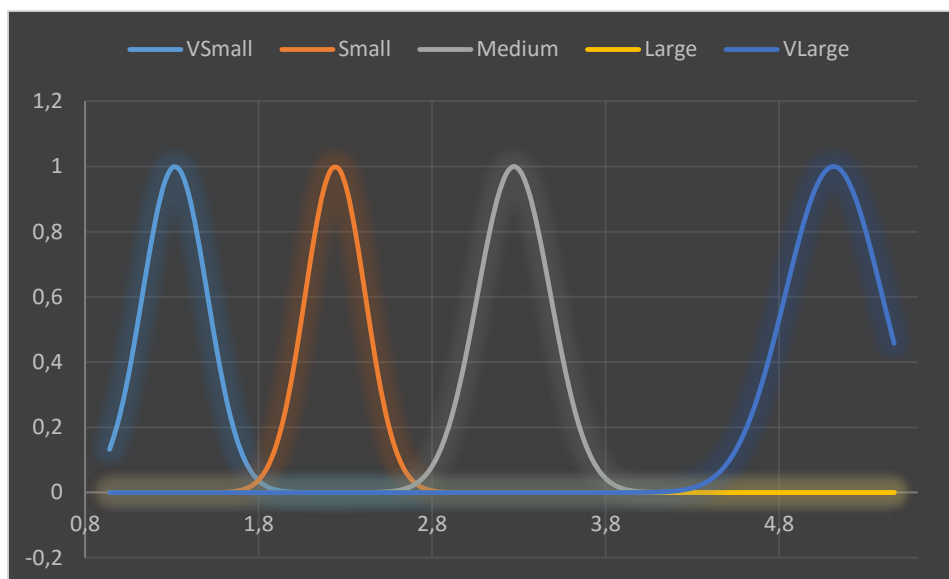
avg:0

std: 0

very large:

avg:5.115

std: 0.15602500000000002



3) Ash

MS 3:

very small:

avg:1.36

std: 0

small:

avg:1.8466666666666667

std: 0.010755555555555553

medium:

avg:2.1614285714285715

std: 0.0043836734693877555

large:

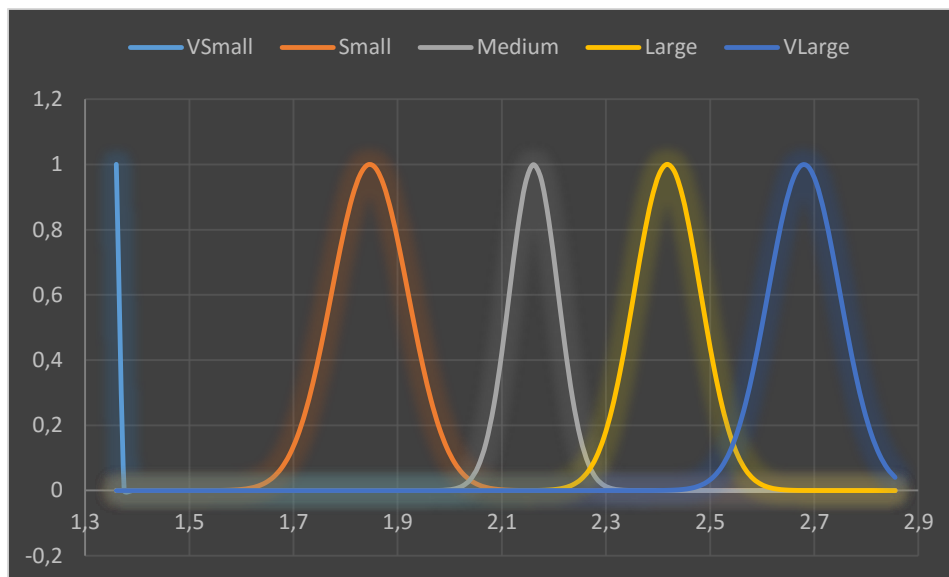
avg:2.4178571428571427

std: 0.008173979591836742

very large:

avg:2.6799999999999997

std: 0.009520000000000013



4) Alcalinity of ash

MS 4:

very small:

avg:10.899999999999999

std: 0.08999999999999989

small:

avg:15.2

std: 0.4685714285714286

medium:

avg:17.908333333333335

std: 0.5674305555555555

large:

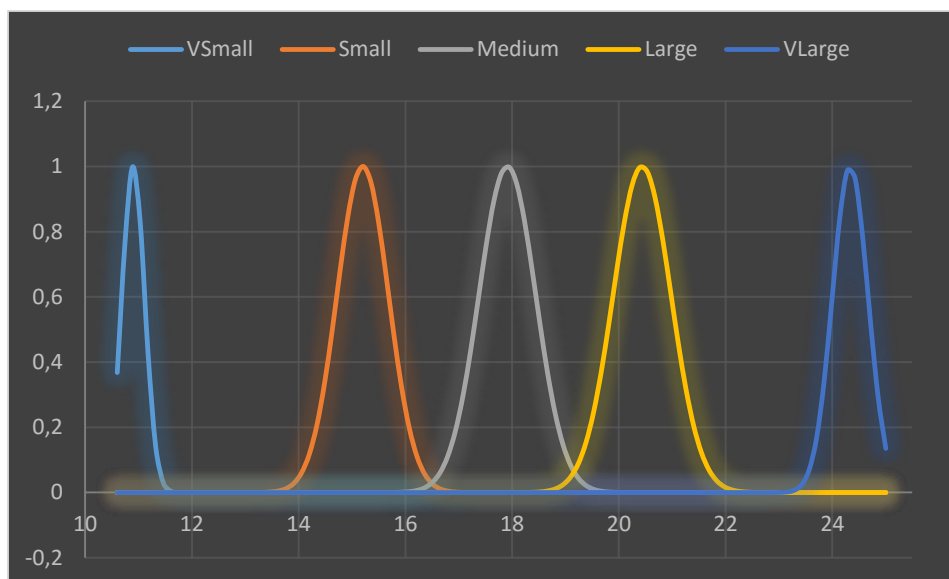
avg:20.433333333333337

std: 0.5888888888888886

very large:

avg:24.333333333333336

std: 0.22222222222222224



5) Magnesium

MS 5:

very small:

avg:82

std: 16.5

small:

avg:92.75

std: 12.6875

medium:

avg:101

std: 6.545454545454547

large:

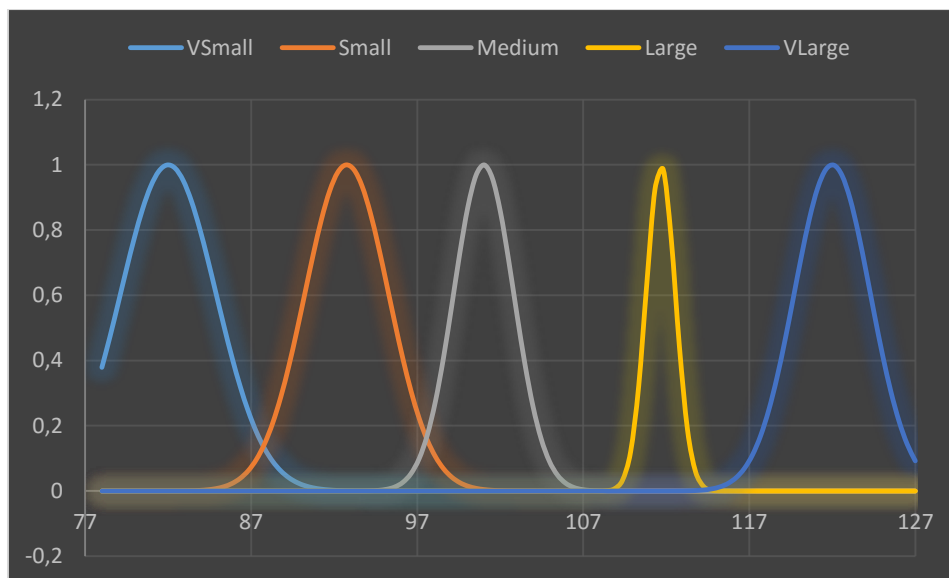
avg:111.66666666666666

std: 1.5555555555555556

very large:

avg:122

std: 10.5



6) Total phenols

MS 6:

very small:

avg:1.43

std: 0.029400000000000002

small:

avg:1.96

std: 0.017466666666666665

medium:

avg:2.5033333333333334

std: 0.012022222222222223

large:

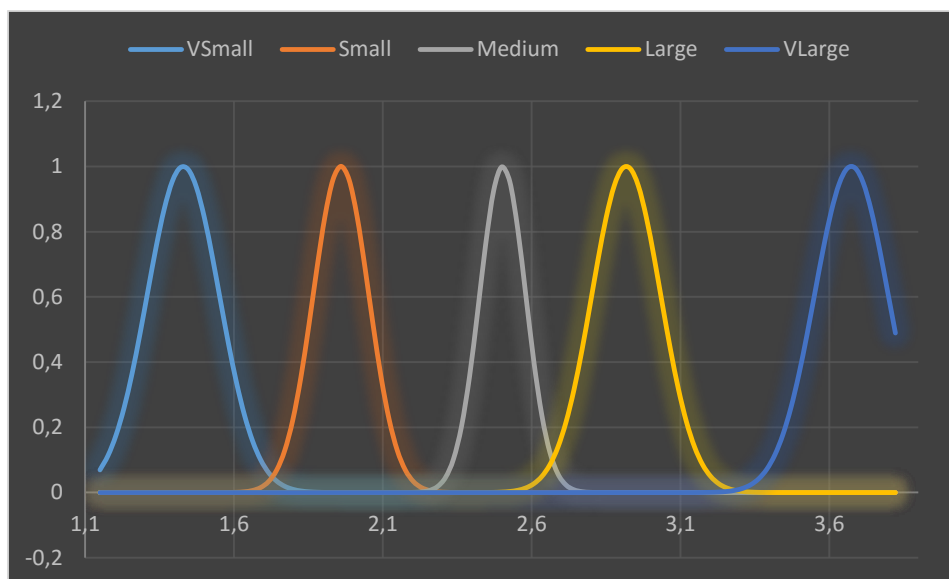
avg:2.9185714285714286

std: 0.026755102040816353

very large:

avg:3.675

std: 0.0306250000000000013



7) Flavanoids

MS 7:

very small:

avg:0.5657142857142857

std: 0.00399591836734694

small:

avg:1.222857142857143

std: 0.011077551020408156

medium:

avg:1.8466666666666667

std: 0.012022222222222222

large:

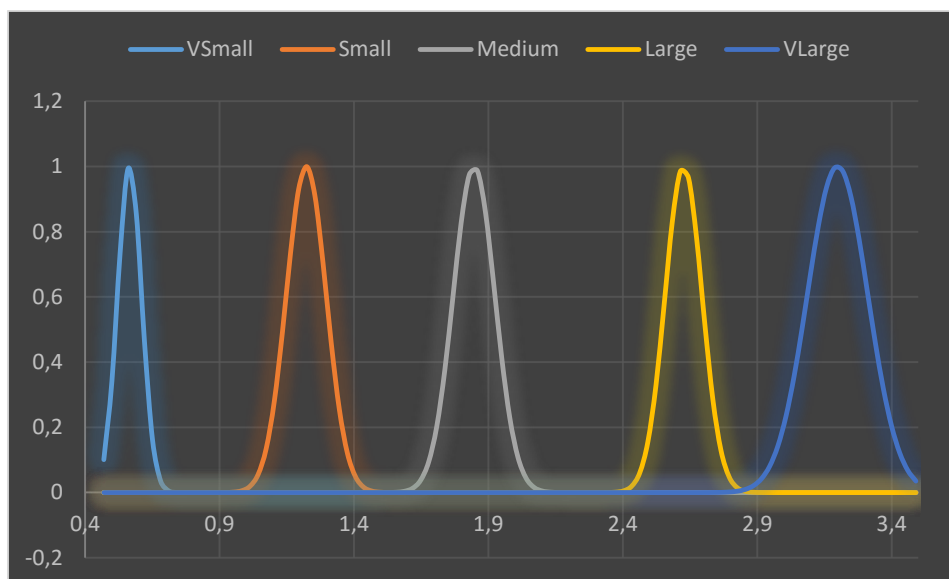
avg:2.6260000000000003

std: 0.009463999999999997

very large:

avg:3.1987500000000004

std: 0.02533593750000002



8) Nonflavanoid phenols

MS 8:

very small:

avg:0.22374999999999998

std: 0.0009234375

small:

avg:0.29600000000000004

std: 0.0004639999999999999

medium:

avg:0.38

std: 0.000100000000000000018

large:

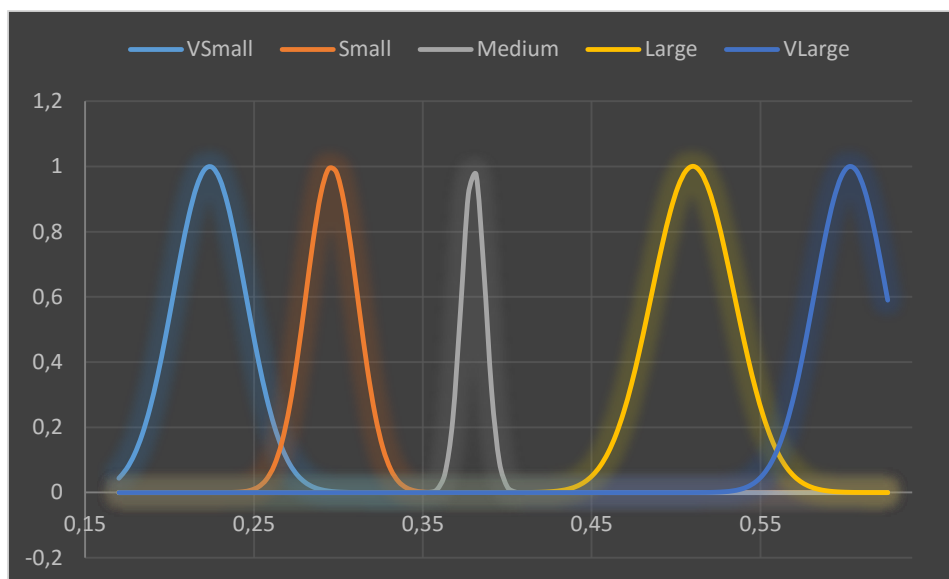
avg:0.51

std: 0.00120000000000000008

very large:

avg:0.6033333333333333

std: 0.0009222222222222221



9) Proanthocyanins

MS 9:

very small:

avg:0.69

std: 0.03227272727272728

small:

avg:1.10375

std: 0.0171234375

medium:

avg:1.82

std: 0

large:

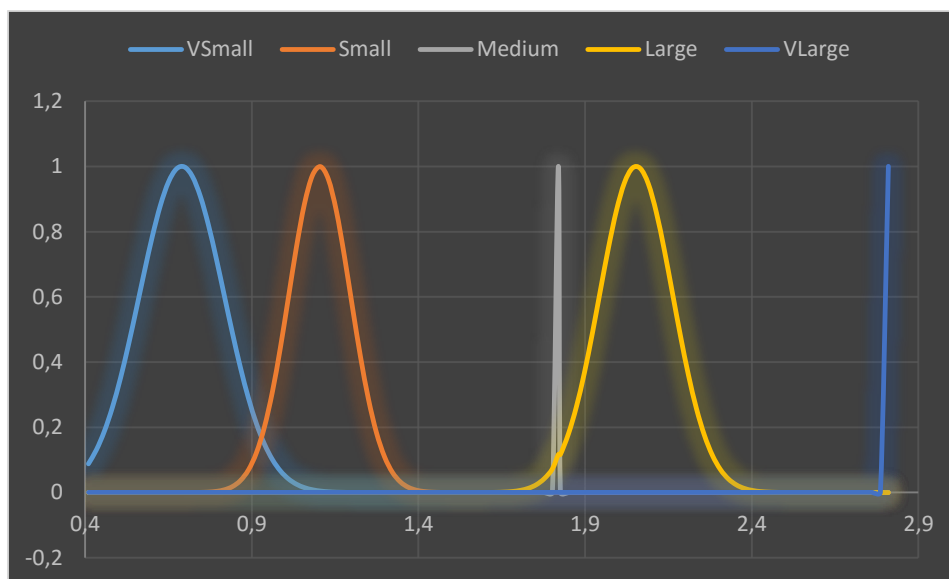
avg:2.0533333333333332

std: 0.024088888888888888

very large:

avg:2.81

std: 0



10)Color intensity

MS 10:

very small:

avg:2.45

std: 0.25000000000000001

small:

avg:3.638

std: 0.12781599999999993

medium:

avg:4.928571428571429

std: 0.13601224489795918

large:

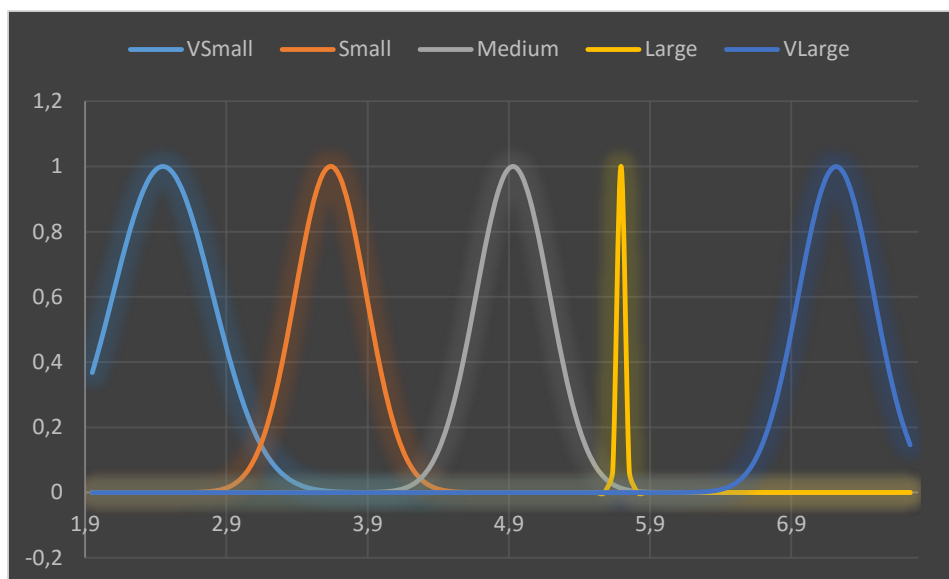
avg:5.6940000000000001

std: 0.0012640000000000095

very large:

avg:7.2175

std: 0.14291874999999996



11)Hue

MS 11:

very small:

avg:0.7475

std: 0.0016437500000000005

small:

avg:0.8566666666666667

std: 0.00082222222222222238

medium:

avg:1.0478571428571428

std: 0.0014025510204081658

large:

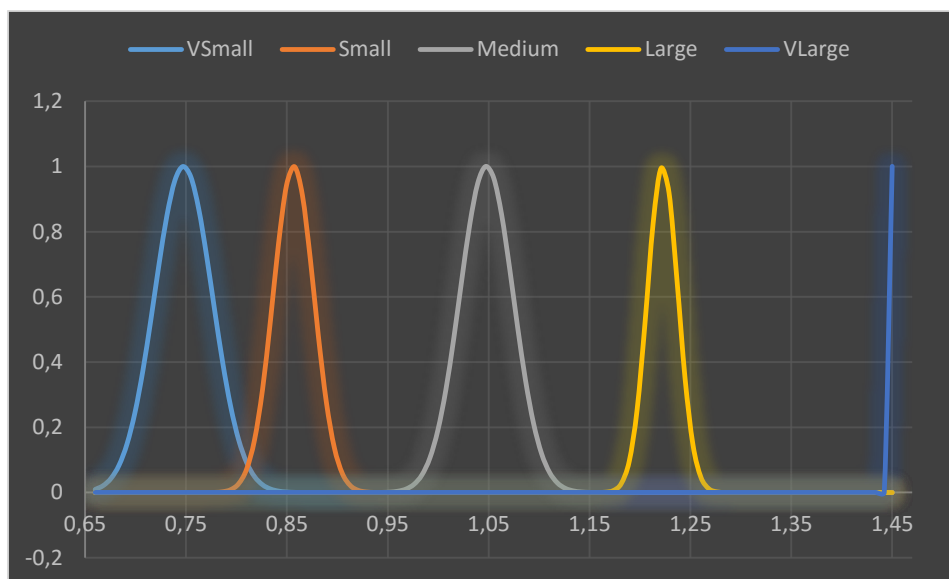
avg:1.2225000000000001

std: 0.00046875000000000085

very large:

avg:1.45

std: 0



12)OD280/OD315 of diluted wines

MS 12:

very small:

avg:1.4669999999999999

std: 0.023580999999999998

small:

avg:2.0416666666666665

std: 0.03744722222222222

medium:

avg:2.72

std: 0.0338000000000000024

large:

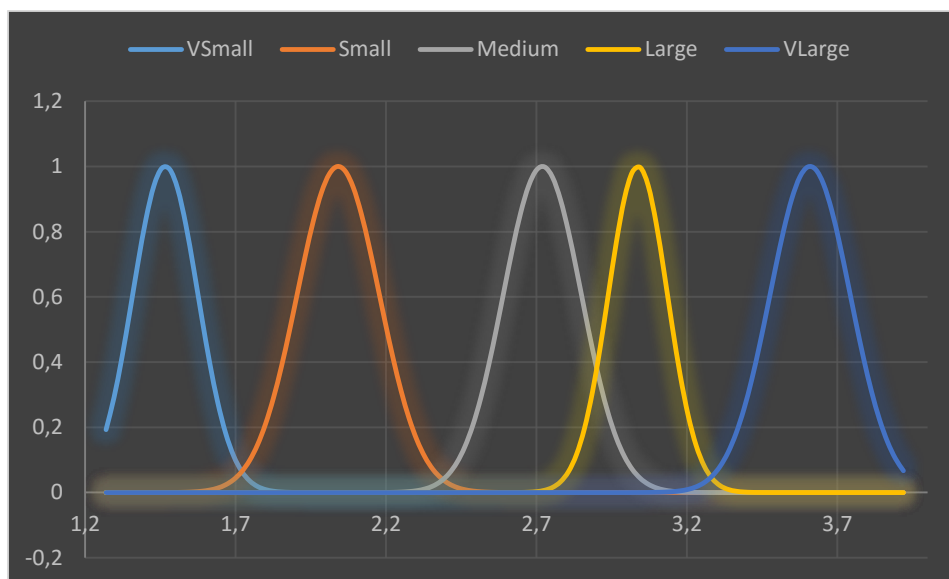
avg:3.0374999999999996

std: 0.019368749999999999

very large:

avg:3.6100000000000003

std: 0.035524999999999999



13)Proline

MS 13:

very small:

avg:484.6666666666663

std: 3670.888888888887

small:

avg:661.5

std: 3003.916666666665

medium:

avg:0

std: 0

large:

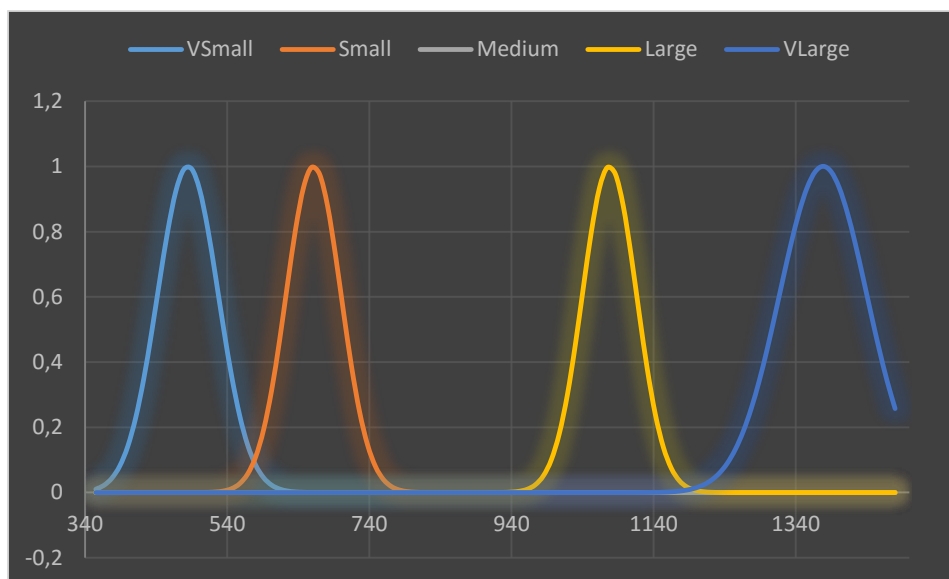
avg:1078

std: 2916.0000000000005

very large:

avg:1378.75

std: 7554.6875



Rules:

Rule 1: If x1=large; x2=small; x3=large; x4=vsmall; x5=small; x6=large; x7=large; x8=small; x9=large; x10=vlarge; x11=large; x12=medium; x13=vlarge, then type 1.

Rule 2: If x1= vlarge; x2= small; x3= large; x4= medium; x5= medium; x6= large; x7= large; x8= vsmall; x9= large; x10= medium; x11= large; x12= large; x13= large, then type 1.

Rule 3: If x1=vsmall; x2=vsmall; x3=small; x4=medium; x5=medium; x6=small; x7=medium; x8=small; x9=vsmall; x10=small; x11=medium; x12=vsmall; x13=vsmall, then type 2.

Rule 4: If x1=medium; x2=vsmall; x3=vlarge; x4=vlarge; x5=medium; x6=small; x7=medium; x8=small; x9=large; x10=medium; x11=medium; x12=small; x13=small, then type 2.

Rule 5: If x1=small; x2=medium; x3=large; x4=medium; x5=small; x6=vsmall; x7=vsmall; x8=large; x9=small; x10=medium; x11=small; x12=medium; x13=vsmall, then type 3.

Rule 6: If x1=medium; x2=medium; x3=large; x4=vlarge; x5=large; x6=small; x7=vsmall; x8=medium; x9=small; x10=vlarge; x11=small; x12=small; x13=small, then type 3.

Rule 7: If x1=medium; x2=large; x3=small; x4=vsmall; x5=vlarge; x6=large; x7=small; x8=medium; x9=medium; x10=vlarge; x11=vlarge; x12=small; x13=medium, then other.

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

Evaluate rules:

Data №:	Type 1	Type 2	Type 3	Result:
№ 1	1	2	3	Good
№ 2	1	2	3	Good
№ 3	1	2	3	Good
№ 4	1	2	3	Good
№ 5	1	1	3	Not good
Success Rate:	100%	80%	100%	80%