Contemporary Data Processing Technology (CCOD)

Lab 9 (October 27, 2016)

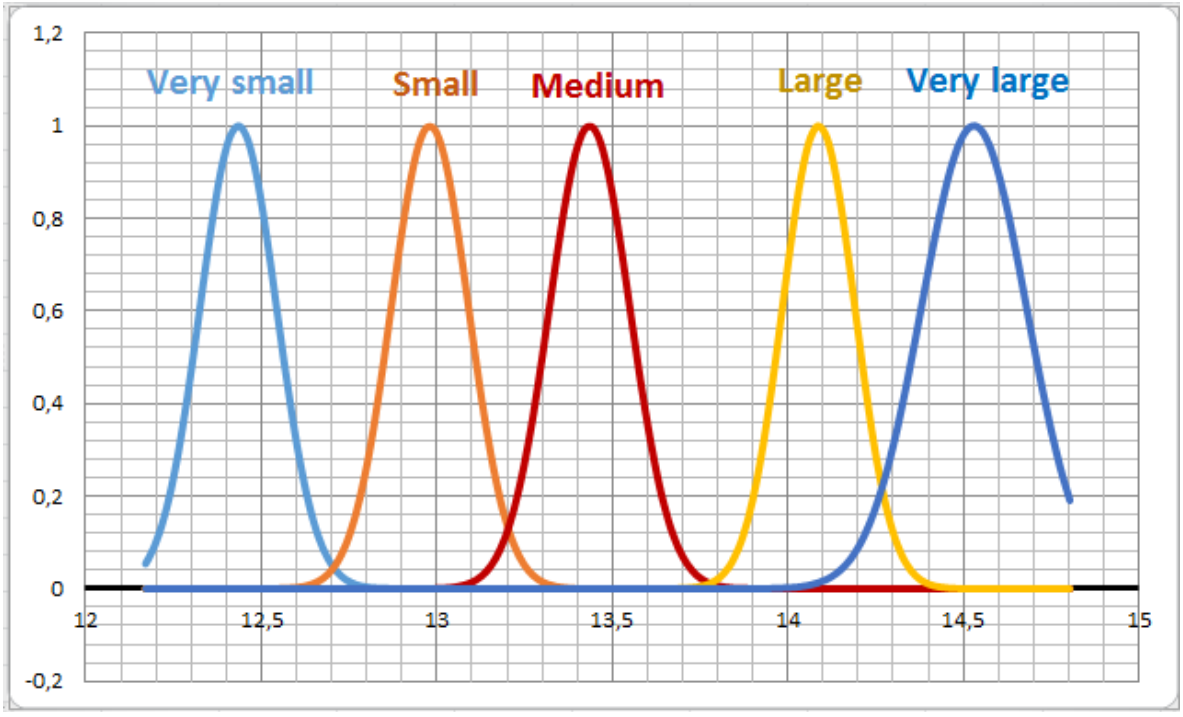
Savchuk Artem, AS-36

Initial data:

class	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
	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
	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
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
	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
	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
3	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
	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

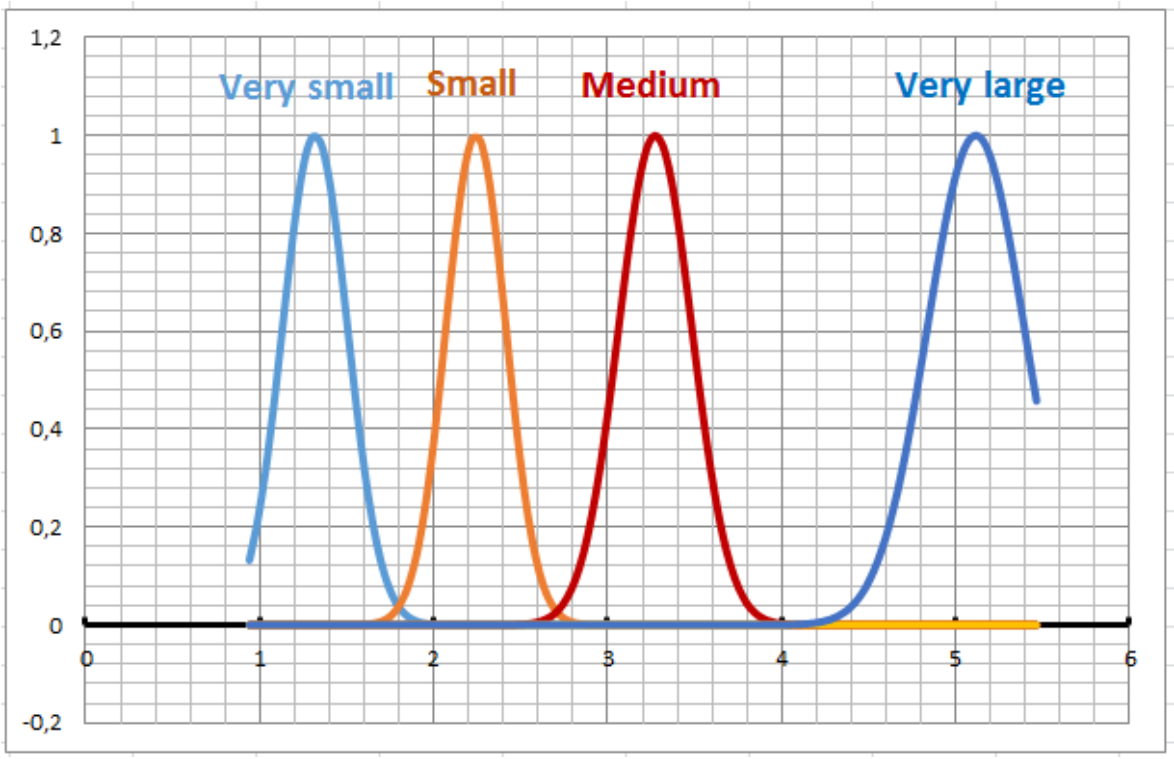
Membership functions for attribute x1(Alcohol):

	very small	small	medium	large	very large
average	12,43	12,98	13,435	14,0875	14,53
std	0,024	0,024	0,0263	0,0213	0,045



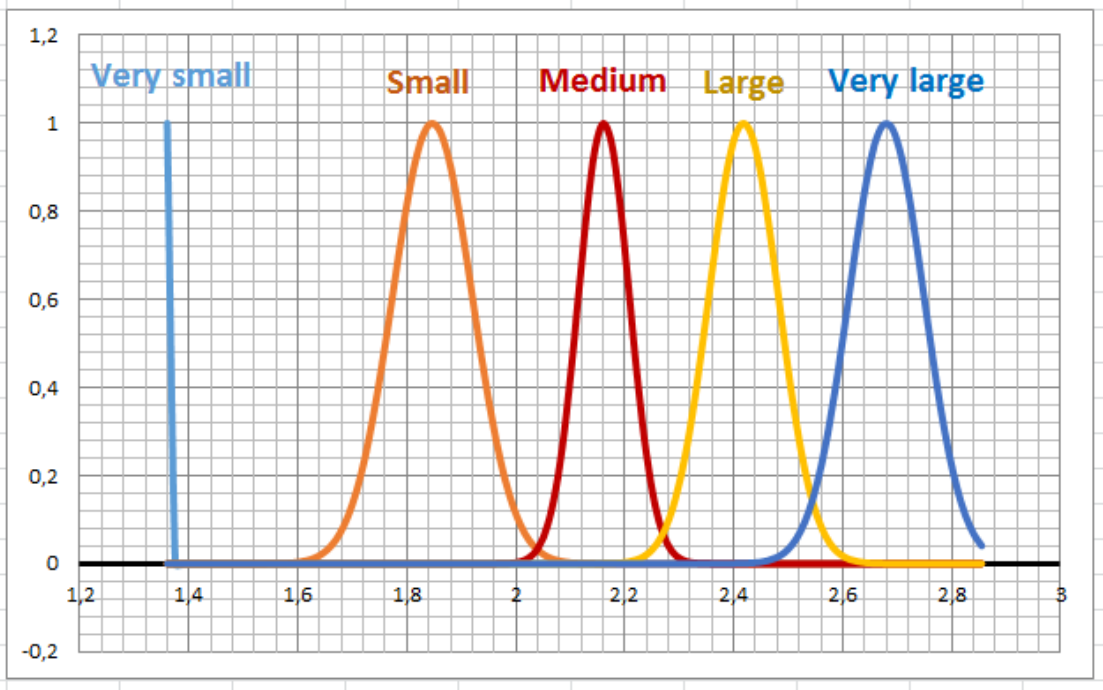
Membership functions for attribute x2 (Malic acid):

	very small	small	medium	large	very large
average	1,31	2,24	3,275	0	5,115
std	0,07	0,06	0,08	0	0,16



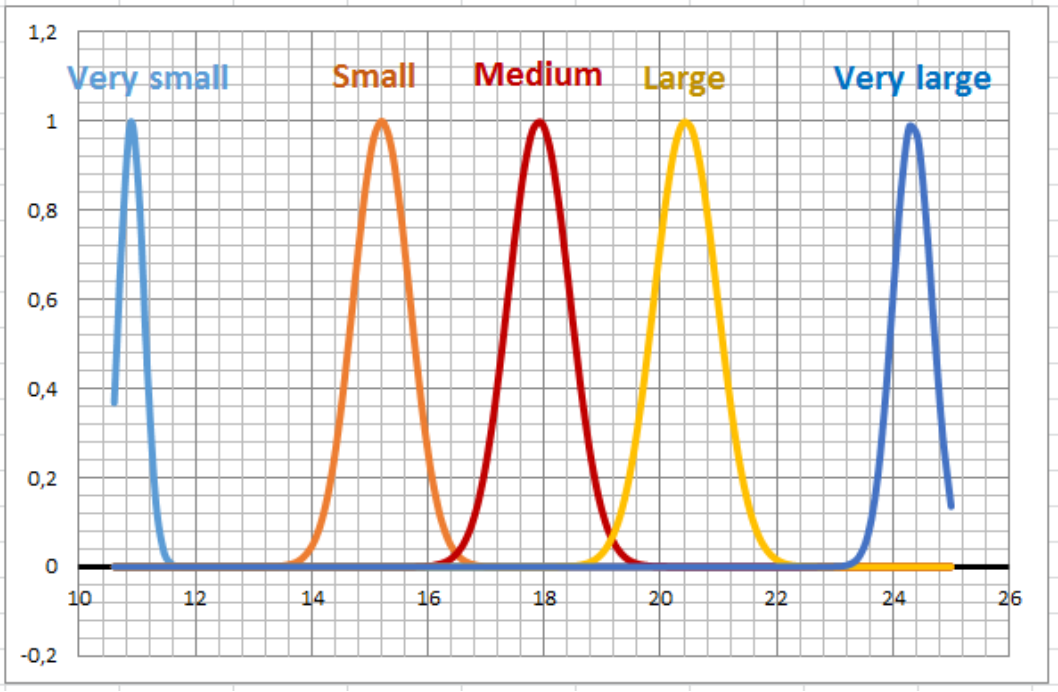
Membership functions for attribute x3 (Ash):

	very small	small	medium	large	very large
average	1,36	1,845	2,16	2,41	2,68
std	0	0,01	0,004	0,008	0,01



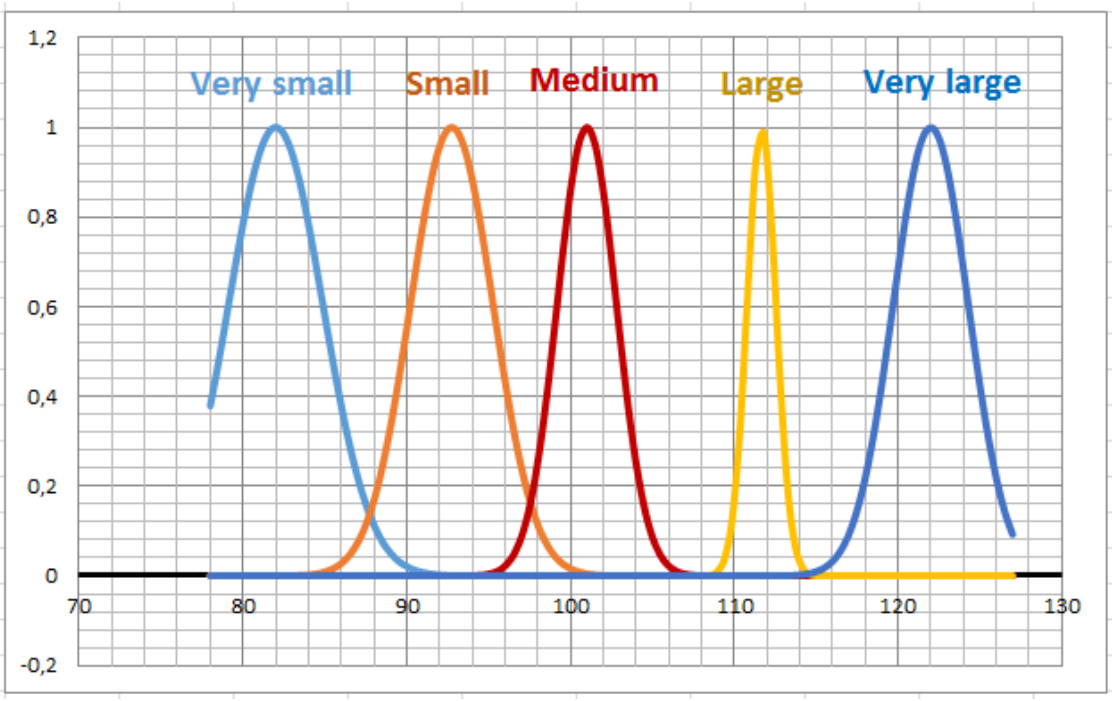
Membership functions for attribute x4 (Alcalinity of ash):

	very small	small	medium	large	very large
average	10,9	15,2	17,9	20,43	24,34
std	0,09	0,468	0,567	0,589	0,23



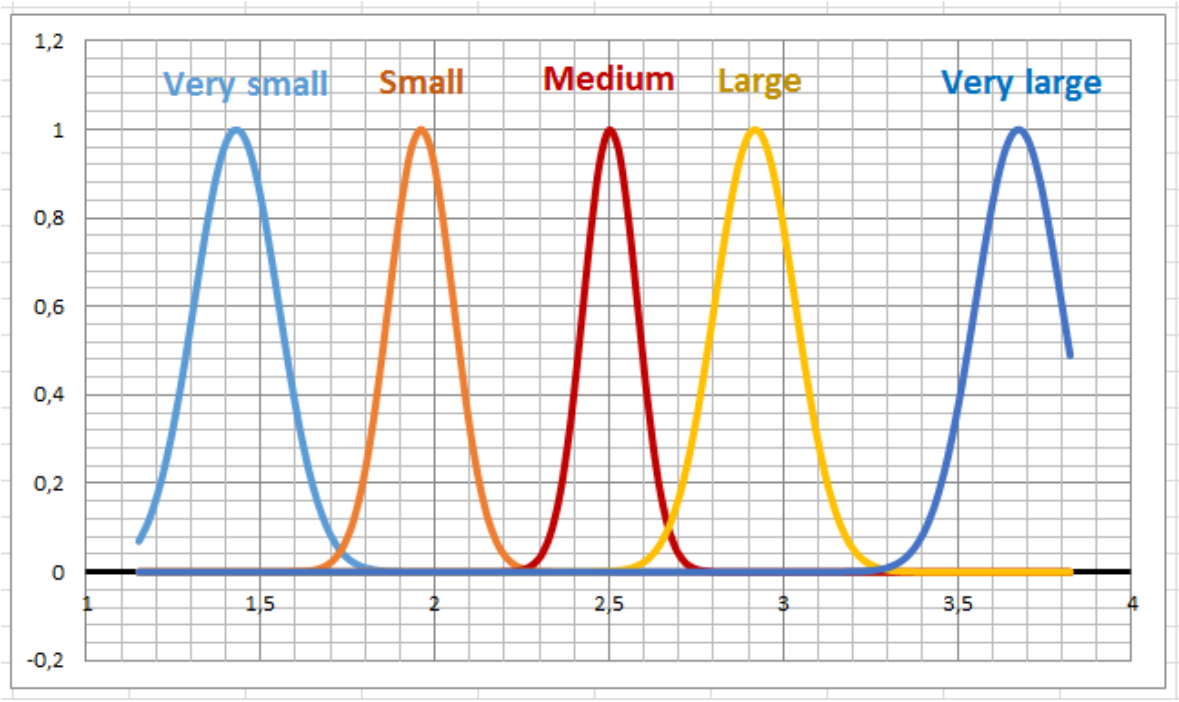
Membership functions for attribute x5 (Magnesim):

	very small	small	medium	large	very large
average	82	92,75	101	111,67	122
std	16,5	12,687	6,54	1,56	10,5



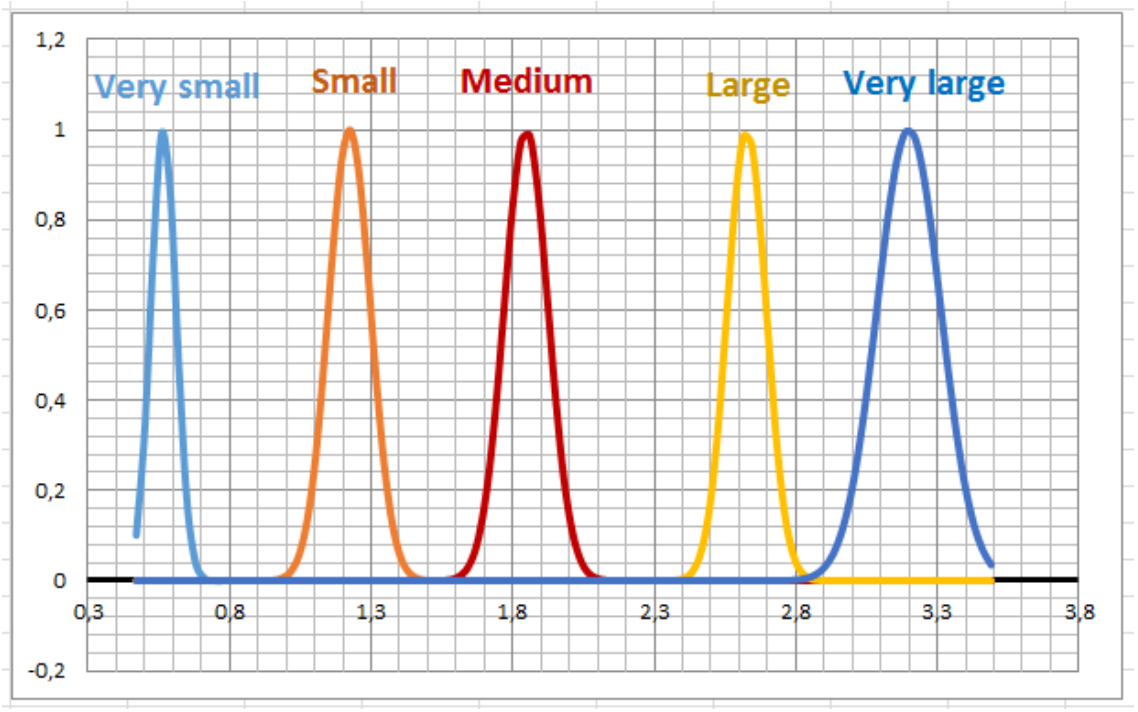
Membership functions for attribute x6 (Total phenols):

	very small	small	medium	large	very large
average	1,43	1,96	2,5	2,918	3,675
std	0,03	0,017	0,012	0,026	0,03



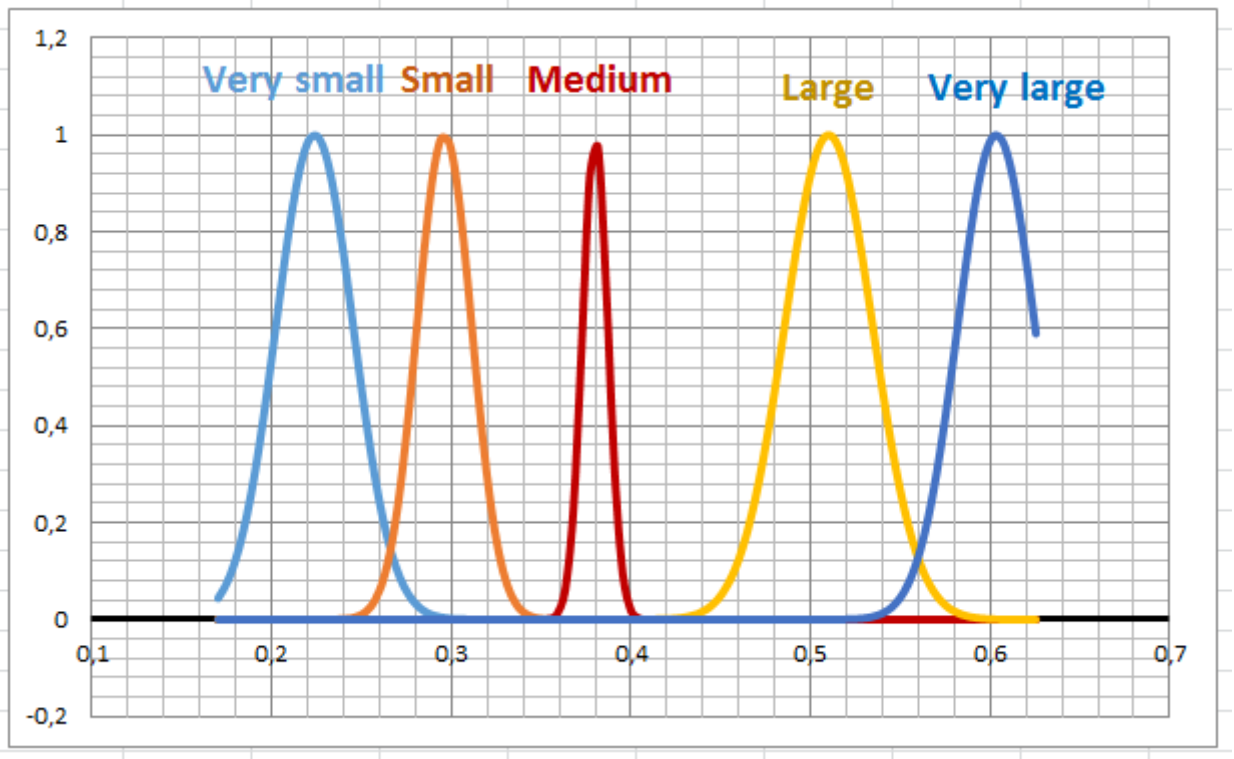
Membership functions for attribute x7 (Flavanoids):

	very small	small	medium	large	very large
average	0,056	1,22	1,8467	2,626	3,1987
std	0,0039	0,011	0,012	0,0094	0,0253



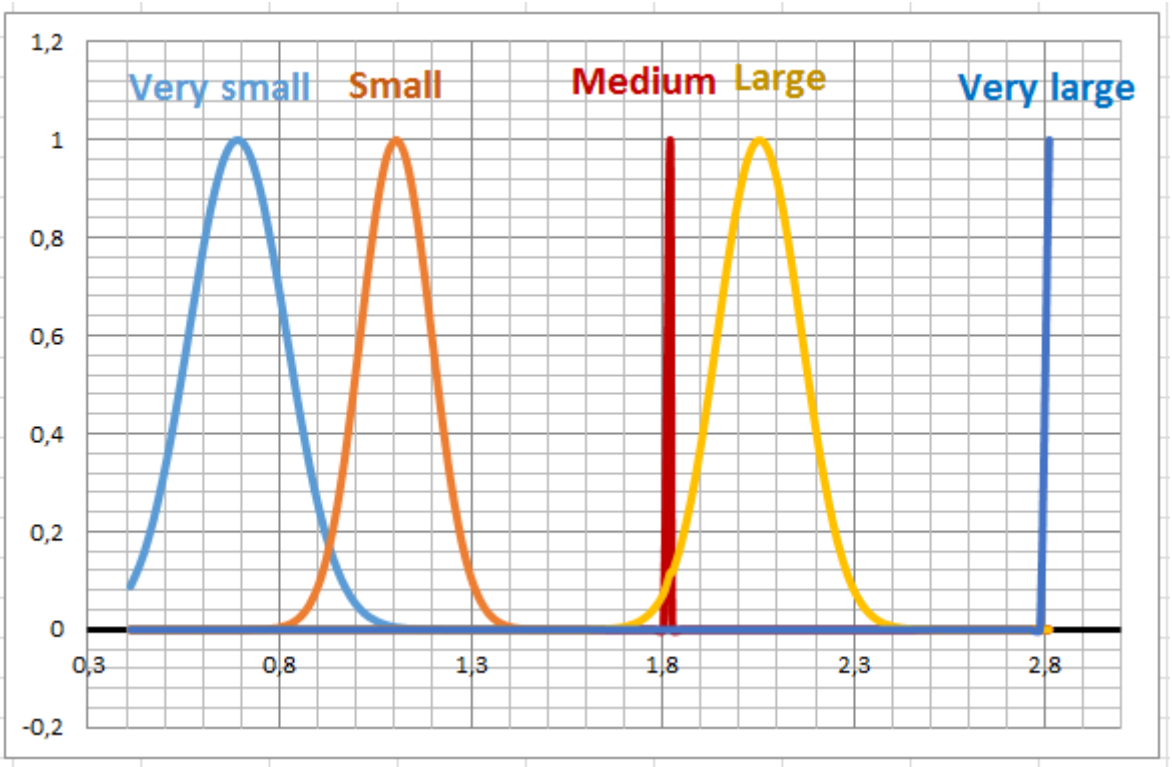
Membership functions for attribute x8 (Nonflavanoid phenols):

	very small	small	medium	large	very large
average	0,223	0,296	0,38	0,51	0,6
std	0,0009	0,00046	0,0001	0,0012	0,00092



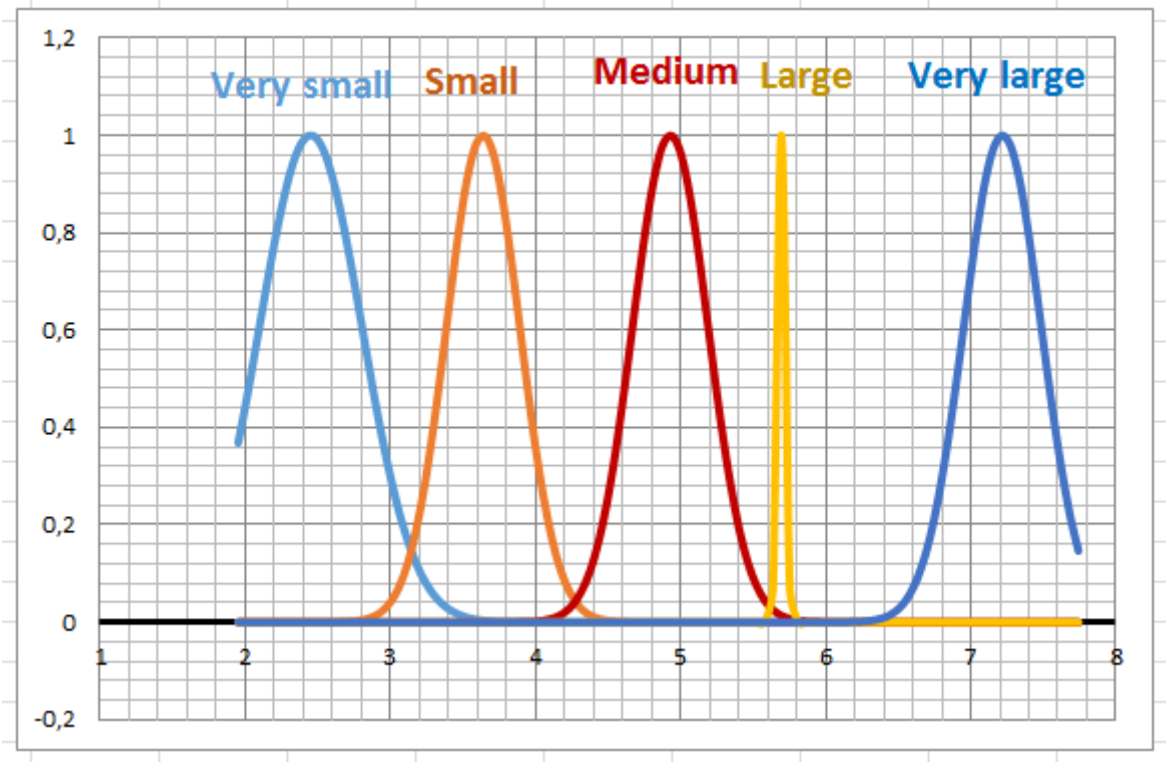
Membership functions for attribute x9 (Proanthocyanins):

	very small	small	medium	large	very large
average	0,69	1,103	1,82	2,053	2,81
std	0,032	0,017	0	0,024	0



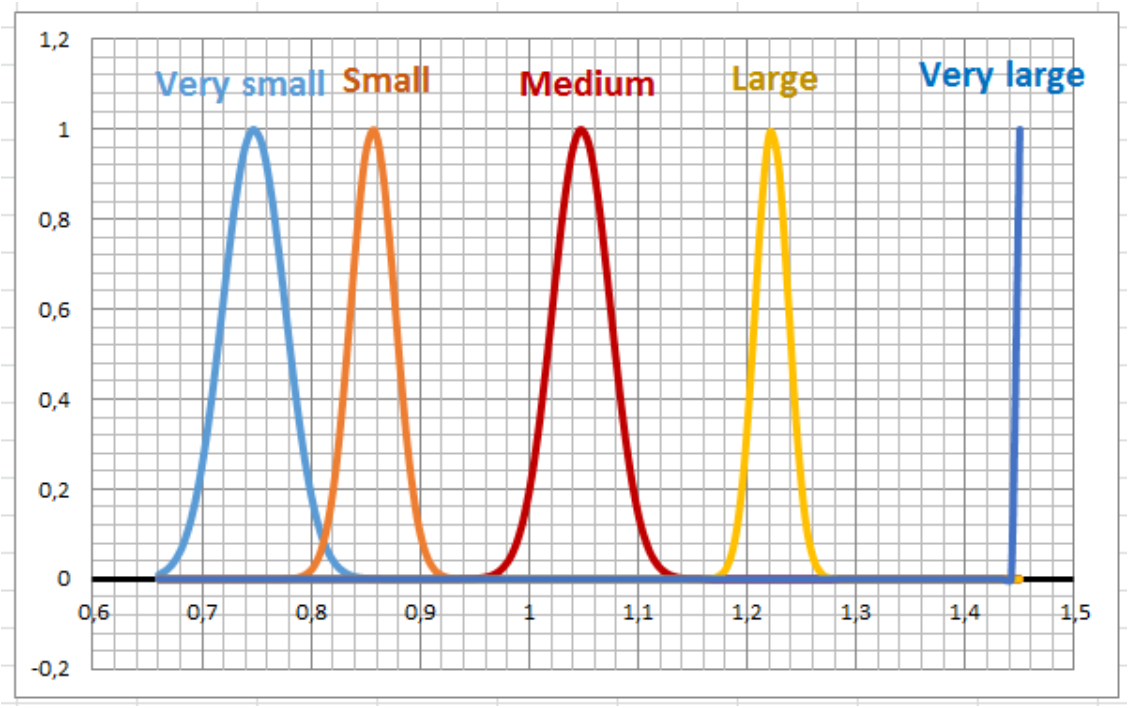
Membership functions for attribute x10 (Color intensity):

	very small	small	medium	large	very large
average	2,45	3,638	4,928	5,694	0,7217
std	0,25	0,127	0,136	0,0012	0,14



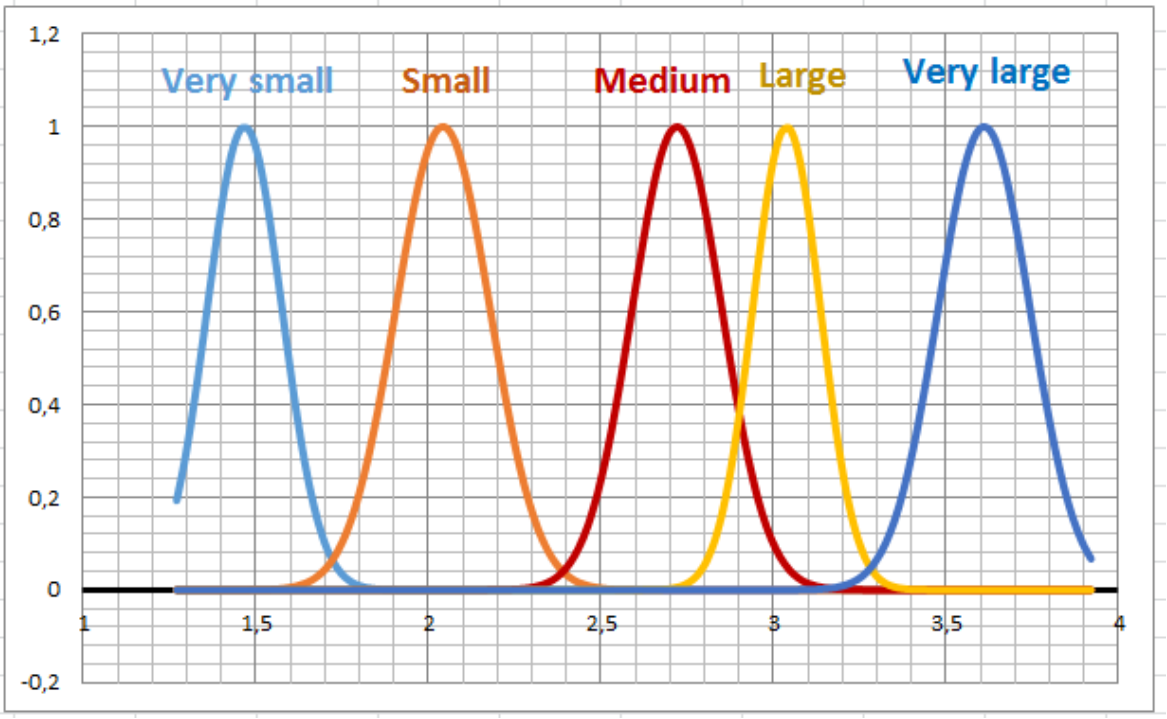
Membership functions for attribute x11 (Hue):

	very small	small	medium	large	very large
average	0,0747	0,856	1,0478	1,2225	1,45
std	0,0016	0,0008	0,0014	0,00046	0



Membership functions for attribute x12 (OD280/OD315 of diluted wines):

	very small	small	medium	large	very large
average	1,467	2,041	2,72	3,0375	3,61
std	0,023	0,0374	0,0338	0,019	0,0355



Membership functions for attribute x13 (Proline):

	very small	small	medium	large	very large
average	468,67	661,5	0	1078	1378,75
std	3670,89	3003,91	0	2916	7554,69

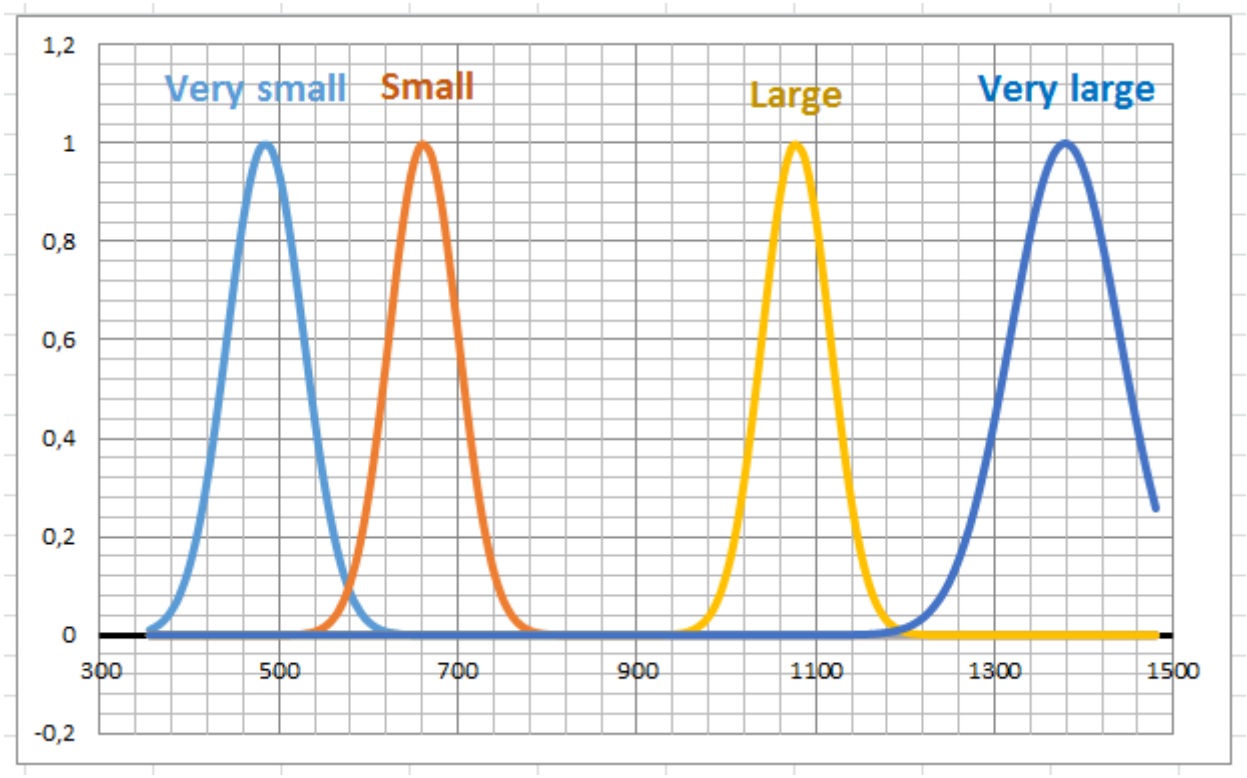


Table of rules:

#	If X1	AND X2	AND X3	AND X4	AND X5	AND X6	AND X7	AND X8	AND X9	AND X10	AND X11	AND X12	AND X13	Then
1	large	small	large	very small	small	large	very large	small	large	very large	large	medium	very large	A
2	very large	small	large	medium	medium	medium	large	very small	large	medium	large	large	large	A
3	very small	very small	medium	very large	very small	small	medium	small	large	medium	large	very small	small	B
4	medium	very small	small	medium	medium	medium	small	large	very small	small	large	small	small	B
5	small	medium	large	large	small	small	very small	medium	small	very large	small	medium	very small	C
6	very small	small	very large	very large	large	very small	very small	large	very small	medium	small	small	small	C
7	very large	large	small	small	very large	very large	small	large	very large	large	medium	very large	medium	Other

Verification data:

class	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
	14,12	1,48	2,32	16,8	95	2,2	2,43	0,26	1,57	5	1,17	2,82	1280
	13,75	1,73	2,41	16	89	2,6	2,76	0,29	1,81	5,6	1,15	2,9	1320
	14,75	1,73	2,39	11,4	91	3,1	3,69	0,43	2,81	5,4	1,25	2,73	1150
	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
	12,29	1,61	2,21	20,4	103	1,1	1,02	0,37	1,46	3,05	0,906	1,82	870
	13,86	1,51	2,67	25	86	2,95	2,86	0,21	1,87	3,38	1,36	3,16	410
	13,49	1,66	2,24	24	87	1,88	1,84	0,27	1,03	3,74	0,98	2,78	472
	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
	13,36	2,56	2,35	20	89	1,4	0,5	0,37	0,64	5,6	0,7	2,47	780
	13,52	3,17	2,72	23,5	97	1,55	0,52	0,5	0,55	4,35	0,89	2,06	520
	13,62	4,95	2,35	20	92	2	0,8	0,47	1,02	4,4	0,91	2,05	550
	12,25	3,88	2,2	18,5	112	1,38	0,78	0,29	1,14	8,21	0,65	2	855

Validation:

No.	Family A	Family B	Family C	Evaluation
#1	A	B	C	Good
#2	A	C	C	Not Good
#3	A	A	C	Not Good
#4	A	B	C	Good
#5	A	Other	C	Not Good
Success rate	100%	40,00%	100%	40%