B Appendix: Data

In this appendix, we present several example data files to serve as fodder for the neural network algorithms and programs discussed in this text.

B.1 Iris Data

This classic data of Anderson and Fisher (1936) pertains to a four-input, three-class classification problem. The first four columns of the table indicate petal and sepal widths and lengths of various iris flowers, and the fifth column indicates the appropriate class (Setosa, Versicolor, and Virginia).

50	33	14	2	1	49	36	14	1	1	60	29	45	15	2
67	31	56	24	3	44	32	13	2	1	50	36	14	2	1
69	31	51	23	3	58	26	40	12	2	58	27	51	19	3
46	36	10	2	1	63	27	49	18	3	54	34	15	4	1
65	30	52	20	3	50	23	33	10	2	64	31	55	18	3
58	27	51	19	3	51	38	16	2	1	49	24	33	10	2
57	28	45	13	2	50	30	16	2	1	55	42	14	2	1
63	33	47	16	2	64	28	56	21	3	60	22	50	15	3
49	25	45	17	3	51	38	19	4	1	52	27	39	14	2
70	32	47	14	2	49	30	14	2	1	44	29	14	2	1
48	31	16	2	1	58	27	41	10	2	58	27	39	12	2
63	25	50	19	3	59	30	42	15	2	69	32	57	23	3
56	28	49	20	3	57	29	42	13	2	50	35	16	6	1
67	25	58	18	3	52	41	15	1	1	77	28	67	20	3
63	23	44	13	2	60	30	48	18	3	55	26	44	12	2
63	25	49	15	2	56	27	42	13	2	48	30	14	3	1
51	25	30	11	2	49	31	15	2	1	48	34	19	2	1
69	31	54	21	3	54	39	17	4	1	61	26	56	14	3
72	36	61	25	3	60	34	45	16	2	58	40	12	2	1
56	29	36	13	2	50	20	35	10	2	62	28	48	18	3
68	30	55	21	3	47	32	13	2	1	56	30	45	15	2
48	30	14	1	1	62	29	43	13	2	46	32	14	2	1
57	38	17	3	1	51	34	15	2	1	57	44	15	4	1
66	30	44	14	2	60	22	40	10	2	63	34	56	24	3
51	37	15	4	1	49	31	15	1	1	72	30	58	16	3
67	30	50	17	2	44	37	15	2	1	71	30	49	21	3

64	28	56	22	3	61	28	47	12	2	63	29	56	18	3
63	28	51	15	3	57	28	41	13	2	57	30	42	12	2
62	22	45	15	2	54	39	13	4	1	77	26	69	23	3
61	30	46	14	2	65	32	51	20	3	66	29	46	13	2
56	25	39	11	2	69	31	49	15	2	50	34	15	2	1
68	32	59	23	3	55	25	40	13	2	55	24	37	10	2
62	34	54	23	3	45	23	13	3	1	46	31	15	2	1
67	33	57	25	3	51	38	15	3	1	74	28	61	19	3
55	35	13	2	1	68	28	48	14	2	50	35	13	3	1
64	32	45	15	2	52	35	15	2	1	73	29	63	18	3
59	30	51	18	3	63	33	60	25	3	67	31	47	15	2
64	32	53	23	3	65	28	46	15	2	56	30	41	13	2
54	30	45	15	2	46	34	14	3	1	64	29	43	13	2
67	33	57	21	3	59	32	48	18	2	65	30	58	22	3
44	30	13	2	1	60	27	51	16	2	51	35	14	3	1
47	32	16	2	1	65	30	55	18	3	61	29	47	14	2
72	32	60	18	3	51	33	17	5	1	64	27	53	19	3
61	30	49	18	3	77	38	67	22	3	48	34	16	2	1
50	32	12	2	1	76	30	66	21	3	57	25	50	20	3
43	30	11	1	1	67	30	52	23	3	55	23	40	13	2
67	31	44	14	2	61	28	40	13	2	54	34	17	2	1
51	35	14	2	1	55	24	38	11	2	58	28	51	24	3
50	34	16	4	1	52	34	14	2	1	53	37	15	2	1
57	26	35	10	2	79	38	64	20	3	77	30	61	23	3

B.2 Classification of Myoelectric Signals

The following data are extracted from a problem in discriminating between electrical signals observed at the human skin surface. The first four columns correspond to input dimensions, and the last column indicates the class to which the signal belongs.

0.138	−0.168	−0.289	0.193	1	−0.030	0.003	−0.050	0.028	0
0.255	−0.029	0.134	−0.163	1	−0.001	0.019	0.016	0.023	0
0.044	0.003	0.048	−0.017	0	−0.009	0.008	−0.008	0.018	0

0.023	−0.004	−0.026	0.027	0	−0.031	0.002	−0.021	0.029	0
0.020	−0.034	0.030	−0.033	0	−0.018	0.056	−0.034	−0.012	0
0.003	0.006	0.006	0.032	0	0.023	−0.044	−0.045	0.020	0
−0.436	0.319	0.110	−0.215	1	−0.107	−0.031	−0.003	0.185	1
0.026	−0.012	0.029	−0.006	0	0.211	−0.060	−0.053	0.105	1
−0.009	0.008	−0.008	0.018	0	0.210	−0.274	−0.177	−0.086	1
0.026	−0.012	0.029	−0.006	0	−0.245	0.135	−0.135	−0.046	1
0.161	−0.091	0.296	−0.226	1	0.141	−0.174	−0.068	−0.038	1
−0.002	−0.009	0.001	0.019	0	0.034	0.173	0.480	−0.280	1
0.066	−0.076	0.078	0.138	1	0.157	−0.317	0.373	−0.373	1
−0.103	0.191	−0.161	0.084	1	−0.026	−0.113	−0.246	0.253	1
0.614	−0.634	−0.437	0.084	1	−0.058	0.114	0.040	0.017	1
0.502	−0.525	−0.098	0.274	1	−0.010	0.026	0.008	0.013	0
0.006	0.026	−0.013	0.052	0	0.033	−0.011	0.002	0.021	0
0.049	−0.169	−0.180	0.071	1	0.005	0.016	−0.007	0.000	0
0.133	0.097	0.293	−0.072	1	−0.004	0.071	−0.005	0.042	0
0.160	0.011	0.168	0.112	1	0.063	0.005	−0.021	−0.021	0
0.152	−0.089	−0.342	0.111	1	0.418	−0.178	−0.302	0.856	1
0.153	−0.250	0.051	−0.056	1	0.045	0.015	0.117	0.010	0
0.030	−0.038	0.026	−0.035	0	−0.076	−0.013	−0.148	0.070	1
0.003	0.006	0.006	0.032	0	0.011	0.054	−0.012	0.061	0
0.042	0.033	0.082	−0.031	0	0.302	0.029	0.588	−0.245	1
0.095	0.341	−0.102	0.111	1	0.013	0.051	0.035	−0.009	0
−0.001	0.019	0.016	0.023	0	0.020	−0.034	0.030	−0.033	0
0.009	0.020	−0.034	0.049	0	0.044	−0.002	0.069	−0.023	0
0.025	0.020	0.015	0.003	0	0.024	0.016	0.046	0.003	0
0.041	−0.000	−0.032	0.069	0	0.382	0.097	0.368	0.133	1
0.027	0.004	−0.007	−0.017	0	−0.044	−0.062	0.171	0.240	1
0.184	0.107	0.097	0.241	1	−0.015	0.018	−0.014	0.036	0
0.222	0.098	0.109	0.055	1	0.146	0.185	0.165	−0.009	1
0.166	0.127	−0.073	0.098	1	−0.018	0.056	−0.034	−0.012	0
−0.030	0.003	−0.050	0.028	0	0.040	0.026	−0.007	0.032	1
0.022	0.012	−0.003	−0.057	0	−0.253	0.042	−0.138	−0.010	1

B.3 Gold Prices

The following numbers indicate daily gold prices on international markets; the task is to develop a neural network that can forecast these prices. Prices on successive days are given on the same line, and the first entry in a line pertains to a date that follows the last entry on the preceding line.

329.95	329.60	329.95	328.20	330.15	329.55	329.75	330.51
329.75	328.50	328.65	324.75	328.45	328.35	328.15	326.32
328.05	327.80	328.15	327.34	328.15	327.75	328.05	327.28
327.95	328.30	328.50	329.00	328.85	331.80	330.15	328.92
331.55	331.25	331.80	329.84	330.95	328.80	328.35	329.66
328.55	328.80	328.55	329.09	329.25	332.00	331.65	330.26
331.85	330.10	330.30	331.87	330.15	330.00	330.00	327.90
330.95	329.90	330.65	331.20	329.25	327.85	330.00	331.20
329.45	333.50	329.60	328.55	330.55	329.20	330.15	330.73
329.85	329.50	329.55	329.31	329.35	328.15	328.75	327.78
329.15	328.35	328.55	327.63	328.95	329.40	330.10	328.57
330.05	328.80	329.45	330.40	328.45	328.75	328.25	330.40
329.65	329.60	330.15	331.41	328.75	327.00	327.35	326.87
327.35	326.75	326.45	328.47	326.75	326.15	326.55	326.03
326.75	327.00	327.10	327.11	327.05	327.90	327.15	325.86
328.05	329.05	328.65	327.71	329.15	328.85	329.00	329.10
328.55	328.80	329.35	329.10	329.45	330.25	330.45	330.00
330.65	331.50	331.30	331.94	332.45	332.70	332.60	331.97
331.75	331.60	331.75	331.90	331.25	332.20	331.35	330.90
332.65	332.50	332.15	332.78	332.65	332.25	332.50	333.81
332.05	332.00	332.05	331.92	333.15	336.35	335.75	332.20
337.25	336.75	338.35	338.34	336.95	338.20	336.75	336.93
339.45	340.00	340.35	338.28	339.45	339.10	339.30	338.52
338.05	337.50	338.40	338.85	337.35	337.75	336.60	337.47
337.85	337.00	337.30	336.94	337.85	337.00	337.25	336.94
337.85	336.50	337.30	336.94	337.15	336.95	336.65	336.32
337.25	338.50	339.20	338.66	339.55	336.60	338.65	339.71
337.25	338.50	339.05	338.23	340.55	339.90	339.85	340.19
341.15	339.90	340.55	341.08	339.15	339.25	338.85	339.01

337.15	339.60	339.70	339.09	341.15	346.50	334.00	340.87
348.75	352.00	350.10	349.04	352.25	350.00	350.75	352.28
349.75	353.00	351.60	349.64	354.65	355.90	354.90	355.49
354.25	355.80	354.95	354.22				

B.4 Clustering Animal Features

In the following data, each line describes features such as teeth that characterize one animal. A clustering algorithm may be applied to determine which animals resemble each other the most, using eight-dimensional input vectors.

2	3	1	1	3	3	3	3	3	3	1	1	4	4	1	2
3	2	1	0	3	3	3	3	3	3	1	1	3	3	1	2
2	3	1	1	2	3	3	3	3	3	1	1	4	4	1	2
2	3	1	1	2	2	3	3	3	3	1	1	3	3	1	2
2	3	1	1	1	2	3	3	3	3	1	1	4	3	1	2
1	3	1	1	2	2	3	3	3	2	1	1	3	3	1	2
2	1	0	0	2	2	3	3	3	3	1	1	3	2	1	1
2	1	0	0	3	2	3	3	3	3	1	1	3	2	1	1
1	1	0	0	2	1	3	3	3	2	1	1	4	4	1	1
1	1	0	0	2	1	3	3	3	2	1	1	4	4	1	1
1	1	0	0	1	1	3	3	3	2	1	1	3	3	2	2
1	1	0	0	0	0	3	3	2	1	1	1	4	4	1	1
1	1	0	0	1	1	3	3	0	4	1	0	3	3	3	3
3	3	1	1	4	4	2	3	0	4	1	0	3	3	3	3
3	3	1	1	4	4	2	3	0	4	0	0	3	3	3	3
3	3	1	1	4	4	3	2	0	4	0	0	3	3	3	3

B.5 3-D Corners, Grid and Approximation

The first three columns of each line in the following data correspond to input dimensions. The data may be used for clustering, using the first three columns alone. Some of the points fall in the vicinity of a corner of the unit cube, indicated by the fourth column, that may be used as desired output for a classification problem. The same three-dimensional input data may also be used for a three-dimensional chessboard or "grid" problem, in which

adjacent clusters belong to opposite classes; the fifth column in each line indicates the desired class-identifier. The same three-dimensional input data can also be used to perform function approximation. The sixth and seventh columns in each line each give values for two functions of the three inputs: the sixth column represents the polynomial function $x_3(x_1 + x_2 + x_3) - x_1^2$, and the seventh column represents the trigonometric function $\tan(x_1) + \cos(x_2) + \sin(x_3)$.

0.99	0.95	0.08	1	1	1.984	1.496
0.95	0.99	0.96	1	1	1.847	2.789
0.97	0.06	0.55	0	0	1.238	2.437
0.53	0.96	0.55	0	1	0.771	1.680
0.05	0.09	0.56	0	0	−0.282	1.680
0.02	0.10	0.01	1	1	0.002	1.025
0.01	0.97	0.55	0	0	−0.282	1.191
0.95	0.05	0.08	1	1	1.005	1.886
0.09	0.03	0.60	0	0	−0.291	1.769
0.92	0.03	0.52	0	0	1.074	2.365
0.07	0.54	0.56	0	1	−0.238	1.555
0.56	0.54	0.98	0	1	0.200	2.861
0.01	0.58	0.59	0	1	−0.336	1.507
0.56	0.50	0.02	0	1	0.604	1.429
0.92	0.50	0.54	0	1	1.524	2.279
0.56	0.09	0.54	0	1	0.373	2.124
0.93	0.91	0.51	0	0	1.942	1.969
0.59	0.10	0.92	0	0	0.090	2.869
0.95	0.59	0.56	0	1	1.699	2.274
0.99	0.94	0.01	1	1	1.917	1.430
0.94	0.59	0.60	0	1	1.654	2.324
0.51	0.55	0.06	0	1	0.571	1.404
0.60	0.09	0.09	0	0	0.457	1.648
0.94	0.55	0.53	0	1	1.603	2.250
0.98	0.57	0.04	0	0	1.541	1.710
0.92	0.09	0.08	1	1	1.007	1.874
0.02	0.99	0.59	0	0	−0.323	1.234
0.00	0.52	0.52	0	1	−0.266	1.442
0.96	0.50	0.99	0	0	1.392	3.218

0.01	0.59	0.59	0	1	−0.341	1.515
0.59	0.51	0.02	0	1	0.656	1.448
0.94	0.03	0.57	0	0	1.134	2.448
0.97	0.57	0.96	0	0	1.508	3.096
0.04	0.51	0.10	0	0	0.015	1.010
0.96	0.06	0.95	1	1	0.999	3.221
0.91	0.96	0.95	1	1	1.672	2.769
0.09	0.52	0.02	0	0	0.055	0.973
0.91	0.91	0.54	0	0	1.865	2.009
0.95	0.95	0.95	1	1	1.811	2.802
0.02	0.52	0.91	0	0	−0.798	2.187
0.58	0.53	0.94	0	1	0.291	2.793
0.56	0.51	0.52	0	0	0.617	1.980
0.98	0.04	0.58	0	0	1.229	2.491
0.99	0.58	0.98	0	0	1.562	3.146
0.95	0.96	0.56	0	0	2.033	2.013
0.90	0.01	0.10	1	1	0.902	1.885
0.94	0.98	0.53	0	0	2.038	1.947
0.92	0.51	0.94	0	0	1.287	3.049
0.91	0.51	0.03	0	0	1.311	1.688
0.98	0.05	0.05	1	1	1.055	1.878
0.10	0.98	0.54	0	0	−0.127	1.249
0.56	0.05	0.90	0	0	0.033	2.801
0.00	0.55	0.56	0	1	−0.314	1.492
0.97	0.90	0.07	1	1	1.880	1.515
0.59	0.02	0.95	0	0	0.020	2.972
0.52	0.09	1.00	0	0	−0.155	3.045
0.55	0.59	0.96	0	1	0.240	2.800
0.59	0.01	0.05	0	0	0.376	1.605
0.02	0.96	0.97	1	1	−0.893	2.050
0.52	0.52	0.92	0	1	0.167	2.692
0.56	0.08	0.10	0	0	0.404	1.625
0.01	0.56	0.53	0	1	−0.270	1.444
0.09	0.05	0.91	1	1	−0.740	2.386
0.57	0.59	0.59	0	0	0.659	2.038
0.09	0.02	0.54	0	0	−0.230	1.684

0.93	0.93	0.52	0	0	1.929	1.968
0.55	0.02	0.53	0	1	0.316	2.112
0.01	0.91	0.08	1	1	0.007	0.707
0.92	0.07	0.02	1	1	0.930	1.810
0.54	0.00	0.98	0	0	−0.128	2.999
0.06	0.07	0.57	0	0	−0.282	1.687
0.55	0.02	0.94	0	0	−0.047	2.897
0.91	0.59	0.00	0	0	1.366	1.622
0.90	0.03	0.94	1	1	0.812	3.143
0.05	0.54	0.98	0	0	−0.880	2.395
0.60	0.05	0.97	0	0	0.016	3.035
0.53	0.51	0.92	0	1	0.182	2.687
0.58	0.52	0.09	0	1	0.693	1.511
0.06	0.03	0.55	0	0	−0.268	1.669
0.57	0.51	0.54	0	0	0.625	2.013
0.03	0.58	0.56	0	1	−0.271	1.491
0.07	0.91	0.53	0	0	−0.178	1.277
0.92	0.60	0.57	0	1	1.605	2.265
0.51	0.91	0.06	0	0	0.754	1.161
0.10	0.99	0.09	1	1	0.108	0.737
0.59	0.05	0.95	0	0	0.029	2.959
0.91	0.60	0.01	0	0	1.395	1.632
0.96	0.54	0.92	0	0	1.491	2.991
0.50	0.04	0.96	0	0	−0.164	2.902
0.96	0.60	0.99	0	0	1.477	3.176
0.52	0.50	0.99	0	1	0.057	2.894
0.97	0.05	0.98	1	1	0.982	3.307
0.94	0.51	0.56	0	1	1.582	2.302
0.05	0.97	0.98	1	1	−0.860	2.118
0.52	0.54	0.57	0	0	0.528	2.001
0.53	0.95	0.06	0	0	0.810	1.149
0.07	0.08	0.06	1	1	0.010	1.121
0.07	0.51	0.98	0	0	−0.858	2.431
0.08	0.50	0.04	0	0	0.051	0.996
0.58	0.55	0.52	0	0	0.687	1.973
0.08	0.00	0.99	1	1	−0.888	2.592

0.93	0.60	0.03	0	0	1.445	1.659
0.50	0.90	0.59	0	1	0.650	1.779
0.06	0.98	0.09	1	1	0.060	0.711
0.91	0.90	0.99	1	1	1.553	2.942
0.09	0.52	0.98	0	0	−0.813	2.438
0.97	0.95	0.97	1	1	1.865	2.870

B.6 Eleven-City Traveling Salesperson Problem (Distances)

	Anch	Calg	Chic	Daws	Edmo	Hali
Anchorage		2182	3690	1629	1999	5111
Calgary	2182		1608	553	183	3175
Chicago	3690	1608		2001	1691	1627
Dawson Cr.	1629	553	2001		370	3482
Edmonton	1999	183	1691	370		3112
Halifax	5111	3175	1627	3482	3112	
Montreal	4300	2332	847	2671	2301	828
New York	4499	2427	809	2870	2500	923
Ottawa	4172	2236	736	2543	2173	951
Prince Rupert	1666	949	2602	709	911	4023
Quebec	4448	2441	1010	2819	2449	668

	Mont	NYC	Otta	PrRu	Queb
Anchorage	4300	4499	4172	1666	4448
Calgary	2332	2427	2236	949	2441
Chicago	847	809	736	2602	1010
Dawson Cr.	2671	2870	2543	709	2819
Edmonton	2301	2500	2173	911	2449
Halifax	828	923	951	4023	688
Montreal		382	127	3212	160
New York	382		430	3411	566
Ottawa	127	430		3084	283
Prince Rupert	3212	3411	3084		3360
Quebec	160	566	283	3360	

B.7 Daily Stock Prices of Three Companies, over the Same Period

Company G:

Day	Open	High	Low	Close	Vol.	Day	Open	High	Low	Close	Vol.
0	19.50	19.75	18.25	18.75	4948	40	24.00	24.00	23.13	23.50	5205
1	18.63	18.63	18.00	18.25	5624	41	23.00	23.50	22.38	23.25	7410
2	18.25	18.25	18.00	18.00	6631	42	23.38	23.75	23.13	23.38	8874
3	18.13	19.00	18.00	19.00	16329	43	23.38	23.50	23.25	23.50	2666
4	19.00	19.00	18.25	18.88	7877	44	23.25	23.50	23.25	23.25	2895
5	19.25	19.75	19.00	19.50	9066	45	23.38	23.38	22.13	22.50	3254
6	19.63	19.75	19.25	19.50	4215	46	22.25	22.50	21.50	22.25	5502
7	19.50	20.00	19.50	20.00	5251	47	22.13	22.63	22.13	22.25	1417
8	19.88	19.88	19.50	19.75	3792	48	22.38	22.50	22.13	22.13	1178
9	19.88	19.88	19.50	19.75	4775	49	22.13	22.50	21.00	21.63	5040
10	19.75	19.88	19.25	19.88	4086	50	21.88	21.88	20.75	21.38	5371
11	19.63	20.75	19.63	20.75	8789	51	21.38	21.63	20.50	20.75	6259
12	20.50	21.13	20.38	20.75	8331	52	20.88	20.88	19.75	20.00	8160
13	20.75	21.88	20.75	21.63	14729	53	20.13	20.13	19.00	19.25	13108
14	21.75	22.50	21.75	22.13	12251	54	19.38	20.13	19.25	20.13	8950
15	22.38	22.63	21.00	21.00	11599	55	20.00	20.13	19.25	19.38	5340
16	21.00	21.75	21.00	21.50	8895	56	19.50	19.50	18.88	19.38	5418
17	21.63	21.75	21.00	21.63	3911	57	19.38	19.50	18.50	19.38	5317
18	21.63	22.75	21.50	22.50	12108	58	19.25	19.50	18.75	18.88	2794
19	22.63	23.50	22.38	23.13	6969	59	18.88	19.00	17.25	17.63	11542
20	23.25	24.38	23.13	24.13	9003	60	17.75	18.63	17.63	18.00	7856
21	24.50	24.75	22.5	23.13	16155	61	18.13	18.50	17.75	18.38	12074
22	23.25	23.75	22.63	23.38	9558	62	18.50	20.38	18.50	20.38	11396
23	23.38	23.75	23.25	23.75	7187	63	20.00	20.00	19.25	20.00	5014
24	23.75	24.00	21.63	21.88	10214	64	20.25	21.13	20.25	20.50	4354
25	21.00	22.38	20.50	22.13	16471	65	20.75	20.75	19.13	19.75	5213
26	22.38	22.88	21.75	22.50	5185	66	20.25	20.50	19.50	19.50	3421
27	22.75	23.25	22.50	22.75	3534	67	19.63	19.75	18.88	19.00	5114
28	23.00	23.00	21.75	22.00	4116	68	19.13	19.38	18.75	19.00	2015
29	21.00	22.00	20.50	21.25	8520	69	19.00	19.00	18.00	18.13	5063

30	21.50	22.63	21.25	22.25	6976	70	18.00	18.25	17.63	18.00	8043
31	22.50	23.00	22.25	22.63	2942	71	17.63	19.50	17.63	18.75	5450
32	22.50	23.00	22.50	23.00	4577	72	19.00	19.00	18.00	18.38	2737
33	22.88	23.25	22.38	22.50	5588	73	18.13	18.63	17.63	18.50	3273
34	22.63	22.63	22.13	22.50	3560	74	18.75	19.00	18.00	18.50	2210
35	22.50	23.13	22.25	23.00	3103	75	18.75	19.38	18.50	19.06	5424
36	23.13	23.50	23.00	23.25	4908	76	19.25	19.88	18.63	19.50	6214
37	23.25	23.63	23.00	23.13	6103	77	19.75	20.25	19.75	19.88	3604
38	23.25	23.88	23.13	23.63	4517	78	19.88	20.63	19.88	20.63	2534
39	23.88	24.13	23.75	24.00	6871	79	20.50	20.75	19.88	20.25	3026

Company I:

Day	Open	High	Low	Close	Vol.	Day	Open	High	Low	Close	Vol.
0	56.88	57.75	56.88	57.63	14308	40	52.88	53.88	52.50	53.63	20349
1	58.13	59.13	58.00	59.00	18468	41	52.75	53.50	52.13	53.00	27221
2	59.00	59.88	58.50	59.50	25700	42	52.88	53.38	52.63	52.63	16165
3	60.00	60.00	58.50	58.50	23798	43	53.25	53.25	52.38	52.63	17217
4	58.50	59.38	58.00	58.88	14586	44	53.00	53.00	52.13	52.25	17837
5	58.88	59.50	58.50	59.25	17350	45	52.13	54.88	51.38	54.75	46445
6	59.13	59.38	58.50	58.63	16906	46	55.00	55.75	54.75	55.38	37401
7	58.75	58.88	58.13	58.13	15031	47	55.50	56.25	55.13	56.00	30275
8	58.25	59.00	58.25	58.75	18042	48	56.13	56.25	55.25	55.88	16883
9	58.75	59.50	58.38	58.63	15860	49	56.13	57.88	55.88	57.50	29160
10	58.50	58.50	57.13	57.50	15281	50	57.75	58.38	57.38	57.38	24525
11	57.38	57.38	56.38	57.13	22559	51	57.63	58.25	57.13	58.25	18834
12	56.75	57.00	55.75	56.00	19595	52	58.25	58.25	57.50	57.88	18941
13	55.88	55.88	55.13	55.25	22785	53	57.88	58.25	56.75	57.13	32562
14	55.13	55.63	54.75	55.25	31766	54	56.88	58.88	56.75	58.63	27010
15	55.75	58.75	55.75	58.63	42193	55	58.00	58.63	57.75	58.25	18493
16	58.88	59.38	55.38	58.25	101549	56	57.00	57.38	56.63	57.25	26629
17	58.75	58.75	56.00	56.38	40896	57	56.88	57.13	56.00	56.38	20409
18	56.63	57.50	56.50	57.13	22152	58	56.50	56.50	53.63	54.00	29835
19	58.13	58.13	57.50	57.75	15439	59	54.38	54.63	52.50	53.63	33565
20	57.88	57.88	56.50	56.50	20924	60	53.63	54.38	52.50	52.63	31647

21	56.88	57.38	56.50	56.50	18584	61	52.50	55.00	52.50	53.50	41325
22	56.50	56.50	55.50	56.38	21532	62	54.00	54.63	52.00	54.63	34604
23	56.25	56.88	55.75	55.75	17638	63	53.00	53.50	52.25	53.00	27650
24	55.50	55.63	52.00	52.00	35599	64	53.50	54.13	53.00	53.38	23391
25	52.38	54.63	52.25	54.25	41188	65	53.50	53.55	52.75	53.13	19300
26	54.75	54.75	53.38	53.63	20088	66	53.25	53.25	52.25	53.13	17749
27	53.88	54.25	53.13	53.13	19791	67	52.88	53.13	52.38	52.50	13091
28	53.38	53.63	52.75	52.88	15656	68	52.63	53.38	52.25	53.00	13023
29	52.50	53.38	52.00	53.25	19855	69	53.75	53.88	52.50	52.88	18882
30	53.38	54.63	53.38	54.00	18737	70	52.88	53.38	51.88	52.38	34961
31	54.38	54.63	54.00	54.50	17274	71	52.50	53.88	52.50	53.88	26280
32	55.25	55.25	54.50	54.63	14957	72	53.88	54.50	52.63	53.00	26390
33	54.88	55.00	52.50	52.75	22902	73	52.88	54.13	52.75	53.38	31200
34	52.63	52.88	52.13	52.63	26787	74	53.50	53.75	51.38	53.38	20975
35	52.63	53.88	52.63	53.63	12769	75	53.25	53.50	51.75	52.25	22077
36	53.75	54.25	53.25	53.50	11952	76	56.13	58.63	54.00	58.38	87581
37	53.25	53.38	52.63	52.88	16529	77	58.38	59.50	58.00	58.75	56605
38	53.38	53.38	52.63	52.88	10617	78	58.50	59.25	58.25	59.25	30623
39	53.13	53.25	52.63	52.88	9607	79	58.88	59.25	58.50	58.50	22172

Company A:

Day	Open	High	Low	Close	Vol.	Day	Open	High	Low	Close	Vol.
0	29.50	30.00	29.00	29.88	16208	40	36.75	36.75	35.75	36.25	18917
1	30.25	31.50	30.00	31.50	25462	41	35.25	36.25	34.75	35.63	26263
2	31.75	33.88	31.75	33.75	54655	42	35.75	36.25	35.50	35.75	16828
3	33.75	34.00	32.50	32.75	32724	43	36.00	37.50	35.75	36.75	20254
4	32.00	33.25	31.25	33.13	26678	44	37.00	38.13	36.75	37.88	27714
5	33.00	33.88	32.75	33.63	17999	45	38.00	38.00	36.75	37.00	16612
6	33.50	33.75	31.75	31.88	31732	46	36.63	37.50	36.00	37.50	22191
7	32.00	32.25	30.50	30.50	39207	47	37.25	37.63	36.75	37.25	12836
8	30.00	30.75	29.75	30.63	47464	48	37.00	37.75	36.75	37.25	14450
9	30.75	31.75	30.50	31.00	19153	49	38.50	38.50	37.75	38.13	39438
10	31.00	31.50	30.00	30.38	13010	50	38.25	38.25	37.25	37.63	18263
11	30.25	30.25	29.00	29.38	32393	51	37.50	37.75	36.50	36.75	13140
12	29.25	29.75	28.75	29.25	25142	52	36.75	37.00	36.25	36.50	13949

13	29.50	30.75	29.50	29.88	23936	53	36.75	36.75	35.75	36.38	19971
14	33.25	33.50	32.25	33.38	87507	54	36.38	36.50	35.25	35.50	22010
15	33.25	35.25	33.25	35.00	61799	55	35.25	35.50	34.50	35.00	21681
16	34.75	35.00	33.25	33.88	39494	56	35.50	35.50	34.25	35.13	19347
17	33.75	34.00	33.25	33.50	14804	57	35.13	35.25	34.00	34.50	16794
18	33.50	34.25	33.00	34.13	11808	58	34.75	34.75	32.75	32.75	30682
19	34.25	34.75	33.75	34.00	12182	59	33.00	34.00	32.75	33.25	25230
20	33.50	33.75	32.75	32.75	21284	60	33.25	33.75	32.25	32.75	19064
21	33.00	33.50	32.25	33.25	13993	61	32.50	33.25	31.75	32.50	15163
22	33.25	33.25	32.50	33.00	13076	62	32.50	33.50	31.50	33.25	18666
23	33.00	33.63	32.50	33.50	12321	63	32.25	33.25	31.75	33.25	15027
24	33.50	35.00	33.25	33.50	31608	64	33.75	34.25	33.50	33.50	8741
25	33.50	37.13	33.50	36.50	64772	65	34.00	34.00	32.75	33.50	11526
26	36.00	36.50	35.25	35.75	25481	66	33.50	33.75	32.75	33.19	6908
27	35.75	36.50	35.25	36.25	16693	67	33.75	34.00	33.25	33.50	15790
28	36.25	37.50	36.00	36.50	26967	68	33.50	33.50	32.50	33.50	9538
29	36.25	37.50	36.25	37.00	14665	69	33.38	33.38	31.75	32.00	12217
30	37.00	38.00	36.75	37.00	21924	70	32.25	32.50	31.25	31.75	20816
31	36.75	37.50	36.25	37.13	11587	71	30.50	31.75	30.00	31.50	19821
32	37.50	37.50	36.75	36.75	10895	72	31.25	31.50	30.00	30.25	16817
33	37.25	37.88	36.25	37.00	12960	73	30.50	30.50	29.25	29.63	20562
34	36.50	37.00	36.25	36.25	13310	74	29.75	30.00	28.50	29.00	14854
35	36.25	37.50	35.75	37.25	19158	75	29.25	30.00	28.00	28.25	25166
36	37.25	38.25	37.00	37.25	23262	76	28.50	30.50	27.00	29.63	36655
37	37.00	37.25	36.25	36.63	17666	77	31.25	32.00	28.50	29.75	62306
38	37.00	37.25	35.50	36.00	21170	78	29.75	31.00	29.50	31.00	32075
39	36.25	37.00	36.00	36.50	11033	79	31.50	31.50	31.00	31.25	14663

Extracted from University of California—Irvine database.

B.8 Spiral Data

This classic data pertains to a two-input, two-class classification problem. The first two columns of the table indicate location of a point in a two-dimensional space, and the third column indicates the appropriate class membership. Each class contains data belonging to a separate spiral. The spirals are intertwined, thus presenting a non-linear classification problem.

0.000000	0.000000	0	0.164155	0.038695	1	0.274010	0.213270	0
0.000000	0.000000	0	−0.162325	−0.074425	0	−0.274010	−0.213270	1
0.009725	0.001955	0	0.162325	0.074425	1	0.233070	0.270615	0
−0.009725	−0.001955		−0.152495	−0.110795	0	−0.233070	−0.270615	1
0.018300	0.007670	0	0.152495	0.110795	1	0.180020	0.319895	0
−0.018300	−0.007670	1	−0.134385	−0.145980	0	−0.180020	−0.319895	1
0.024645	0.016690	0	0.134385	0.145980	1	0.116495	0.358540	0
−0.024645	−0.016690	1	−0.108120	−0.178085	0	−0.116495	−0.358540	1
0.027825	0.028290	0	0.108120	0.178085	1	0.044680	0.384325	0
−0.027825	−0.028290	1	−0.074270	−0.205230	0	−0.044680	−0.384325	1
0.027130	0.041525	0	0.074270	0.205230	1	−0.032770	0.395475	0
−0.027130	−0.041525	1	−0.033830	−0.225655	0	0.032770	−0.395475	1
0.022095	0.055270	0	0.033830	0.225655	1	−0.112835	0.390790	0
−0.022095	−0.055270	1	0.011805	−0.237805	0	0.112835	−0.390790	1
0.012560	0.068300	0	−0.011805	0.237805	1	−0.192230	0.369685	0
−0.012560	−0.068300	1	0.060885	−0.240430	0	0.192230	−0.369685	1
−0.001310	0.079355	0	−0.060885	0.240430	1	−0.267550	0.332265	0
0.001310	−0.079355	1	0.111365	−0.232660	0	0.267550	−0.332265	1
−0.019045	0.087235	0	−0.111365	0.232660	1	−0.335420	0.279355	0
0.019045	−0.087235	1	0.161005	−0.214070	0	0.335420	−0.279355	1
−0.039850	0.090850	0	−0.161005	0.214070	1	−0.392630	0.212480	0
0.039850	−0.090850	1	0.207455	−0.184730	0	0.392630	−0.212480	1
−0.062675	0.089335	0	−0.207455	0.184730	1	−0.436295	0.133825	0
0.062675	−0.089335	1	0.248360	−0.145225	0	0.436295	−0.133825	1
−0.086245	0.082065	0	−0.248360	0.145225	1	−0.463985	0.046185	0
0.086245	−0.082065	1	0.281500	−0.096640	0	0.463985	−0.046185	1
−0.109120	0.068745	0	−0.281500	0.096640	1	−0.473860	−0.047165	0
0.109120	−0.068745	1	0.304860	−0.040565	0	0.473860	0.047165	1
−0.129805	0.049415	0	−0.304860	0.040565	1	−0.464750	−0.142555	0
0.129805	−0.049415	1	0.316770	0.020980	0	0.464750	0.142555	1
−0.146785	0.024495	0	−0.316770	−0.020980	1	−0.436255	−0.236090	0
0.146785	−0.024495	1	0.315995	0.085605	0	0.436255	0.236090	1
−0.158645	−0.005250	0	−0.315995	−0.085605	1	−0.388780	−0.323800	0
0.158645	0.005250	1	0.301800	0.150645	0	0.388780	0.323800	1

−0.164155	−0.038695	0	−0.301800	−0.150645	1	−0.323550	−0.401810	0
0.323550	0.401810	1	0.496410	0.442040	0	0.751005	0.285910	1
−0.242575	−0.466505	0	−0.496410	−0.442040	1	−0.688305	−0.433625	0
0.242575	0.466505	1	0.405500	0.539145	0	0.688305	0.433625	1
−0.148610	−0.514700	0	−0.405500	−0.539145	1	−0.596510	−0.567635	0
0.148610	0.514700	1	0.295550	0.617445	0	0.596510	0.567635	1
−0.045060	−0.543780	0	−0.295550	−0.617445	1	−0.478615	−0.682200	0
0.045060	0.543780	1	0.170480	0.673205	0	0.478615	0.682200	1
0.064160	−0.551850	0	−0.170480	−0.673205	1	−0.338735	−0.772245	0
−0.064160	0.551850	1	0.034925	0.703510	0	0.338735	0.772245	1
0.174745	−0.537810	0	−0.034925	−0.703510	1	−0.181985	−0.833555	0
−0.174745	0.537810	1	−0.105905	0.706405	0	0.181985	0.833555	1
0.282195	−0.501460	0	0.105905	−0.706405	1	−0.014270	−0.862995	0
−0.282195	0.501460	1	−0.246445	0.681000	0	0.014270	0.862995	1
0.381975	−0.443510	0	0.246445	−0.681000	1	0.157915	−0.858630	0
−0.381975	0.443510	1	−0.380995	0.627540	0	−0.157915	0.858630	1
0.469735	−0.365610	0	0.380995	−0.627540	1	0.327750	−0.819870	0
−0.469735	0.365610	1	−0.503940	0.547425	0	−0.327750	0.819870	1
0.541465	−0.270275	0	0.503940	−0.547425	1	0.488355	−0.747485	0
−0.541465	0.270275	1	−0.609985	0.443180	0	−0.488355	0.747485	1
0.593690	−0.160835	0	0.609985	−0.443180	1	0.633075	−0.643630	0
−0.593690	0.160835	1	−0.694395	0.318380	0	−0.633075	0.643630	1
0.623645	−0.041305	0	0.694395	−0.318380	1	0.755735	−0.511775	0
−0.623645	0.041305	1	−0.753185	0.177535	0	−0.755735	0.511775	1
0.629385	0.083745	0	0.753185	−0.177535	1	0.850940	−0.356600	0
−0.629385	−0.083745	1	−0.783315	0.025915	0	−0.850940	0.356600	1
0.609915	0.209385	0	0.783315	−0.025915	1	0.914260	−0.183820	0
−0.609915	−0.209385	1	−0.782840	−0.130635	0	−0.914260	0.183820	1
0.565240	0.330505	0	0.782840	0.130635	1	0.942480	0.000000	0
−0.565240	−0.330505	1	−0.751005	−0.285910	0	−0.942480	0.000000	1