Supplementary materials: Machine learning for total organic carbon analysis of environmental water samples using high-throughput colorimetric sensors

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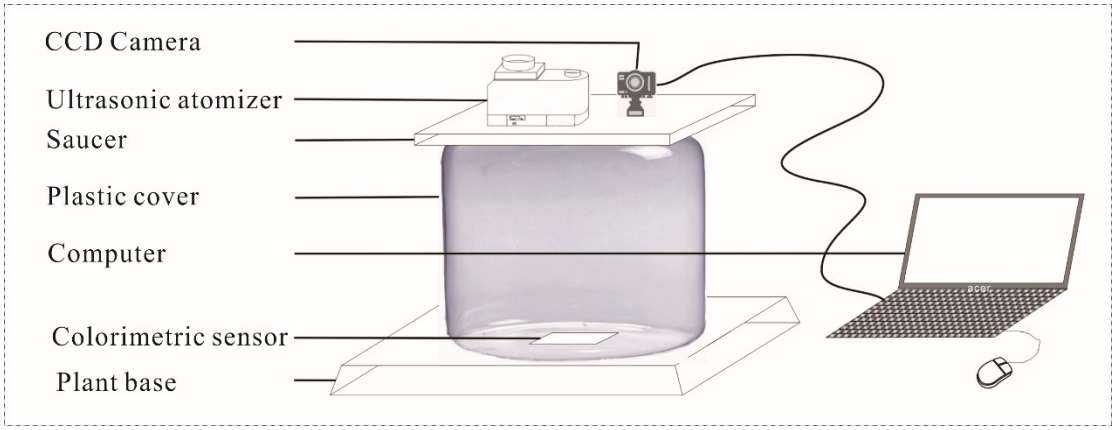

Figure S1. Structure diagram of a self-made spray device. The device was primarily used to atomize ambient water samples evenly onto a colorimetric sensor.

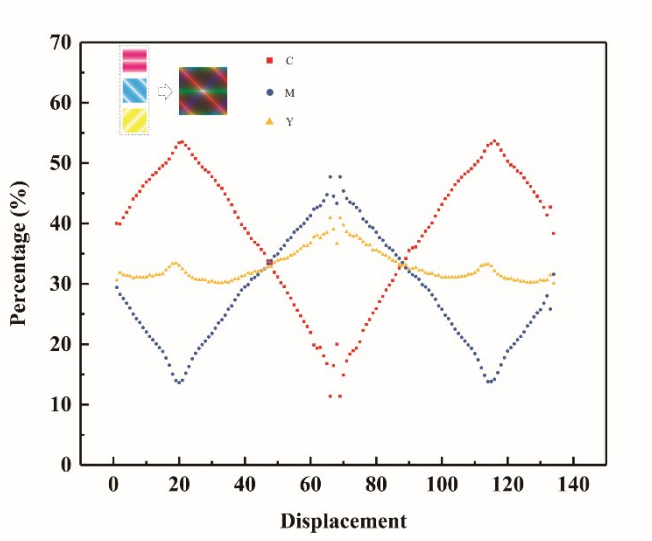

Figure S2. Analysis of some printing molds. Some of the printing molds were chosen to combine. A row of pixels was randomly selected from the combined printing mold for CMY value reading and analysis. The results showed that the CMY values of different pixel points on the printing mold used in this experiment are different, that is, the volume of the reagents at each pixel point was also different.

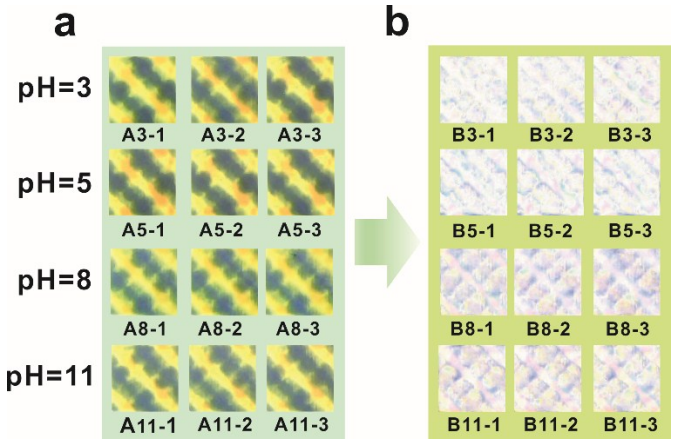

Figure S3. The reaction results with distilled water under different pH conditions. (a) Images of c-sensor after reacting with distilled water of different amounts at pHs 3, 5, 8, 11 (three times for each pH condition). (b) Difference images obtained according to Figure S3a.

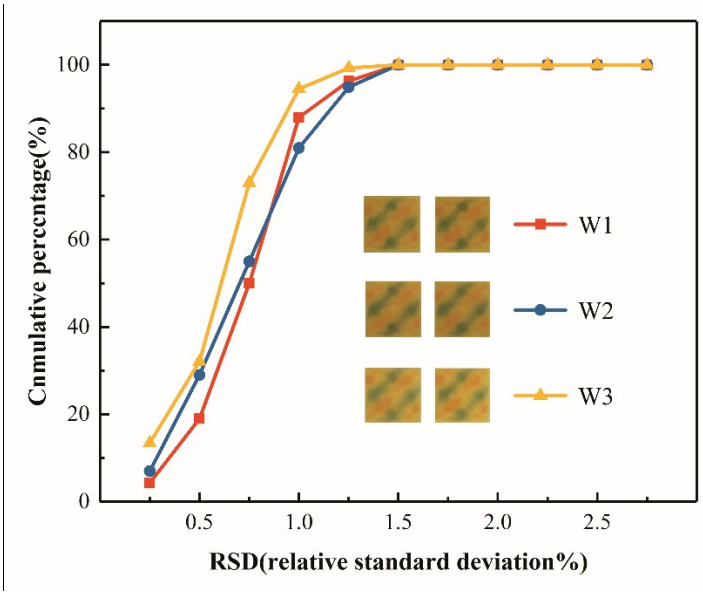

Figure S4. Performance of colorimetric sensors. We randomly selected six different reaction result images of three parallel environmental water samples. Pixel relative standard deviation (RSD) of three parallel samples was calculated. The cumulative trend lines of pixels under different RSD were plotted according to the calculation results. The precision of the colorimetric sensor images in parallel samples were as follows. More than 94.5% of the pixel area, RSD of W3 was less than 1%. The RSD of W1 and W2 was less than 1.25%, over 96% of the pixel area. The results showed that the chemical reaction results of the same samples on two colorimetric sensors were similar.

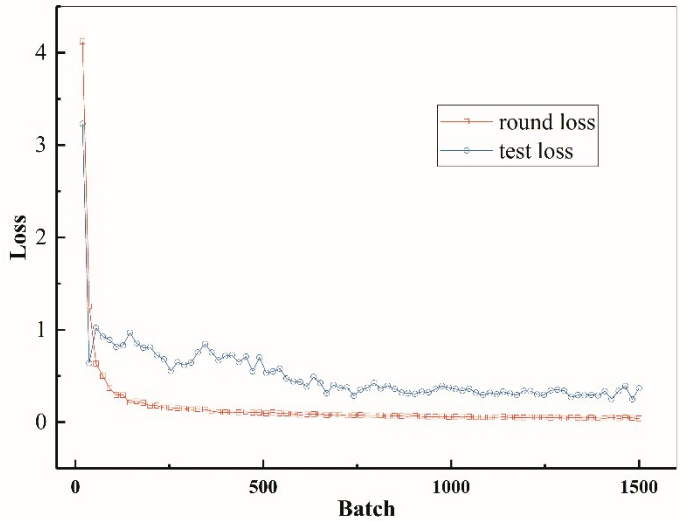

Figure S5. Convolutional neural network (CNN) deep learning ability. As the number of operations increases, both round loss and test loss tended to zero. It indicated that CNN had sufficient deep learning ability and worked well for data sets.

Table S1. Inks and print templates

Number	Reagent	Concentration	Solvent	Template	Ink quantity setting
1	Methyl red	0.1M	Ethylene glycol butyl ether		75%
2	Bromothymol blue	0.1M	Ethylene glycol and ethanol (1:1)		100%
3	Tartaric acid	0.3M	Distilled water		40%
4	Crotonic acid	0.3M	Distilled water		40%
5	Taurine	0.2M	Distilled water		80%
6	L-histidine	0.2M	Distilled water		80%
7	Potassium hydrogen phthalate	0.2M	Distilled water		60%
8	Trisodium citrate	0.2M	Distilled water		60%

Table S2. Total organic carbon (TOC) of environmental water samples

Number	Sample type	TOC(mg/L)
S1	School landfill leachate	3129.0
S2	Fecal wastewater from rural pig farms	1469..4
S3	Domestic sewage from faculty apartment house	387.6
S4	Domestic wastewater of student dormitory	123.0
S5	Septic tank wastewater from student apartment	145.5
S6	School catering wastewater	144.0
S7	Soil suspension from farmlands around campus	112.5
S8	Soil suspension from woods around campus	110.1

Table S3. Load volume statistics of environmental water samples on colorimetric sensors. The total organic mass on colorimetric sensors was calculated from the TOC values and the loading volume of the environmental water samples on colorimetric sensors. TOC predicted values were obtained by convolutional neural network (CNN) simulation.

Number	S1 (ml)	S2 (ml)	S3 (ml)	S4 (ml)	S5 (ml)	S6 (ml)	S7 (ml)	S8 (ml)	Total organic mass (mg)	TOC predicted value (mg)
1	0.7	0	0	0	0	0	0	0	2.19	2.43
2	0.8	0	0	0	0	0	0	0	2.50	2.52
3	0.9	0	0	0	0	0	0	0	2.82	2.92
4	0.4	0	0	0	0	0	0	0	1.25	1.47
5	0.5	0	0	0	0	0	0	0	1.56	1.75
6	0.6	0	0	0	0	0	0	0	1.88	2.31
7	0.3	0	0	0	0	0	0	0	0.94	1.24
8	1	0.3	0	0	0	0	0	0	3.25	3.62
9	1	0.3	0.3	0.3	0	0	0	0	3.73	4.04
10	1	0.3	0.3	0.3	0.3	0.3	0	0	3.81	3.90
11	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.89	3.99
12	1	0.3	0.3	0.3	0.3	0.3	0.3	0	3.84	3.84
13	1	0.3	0.3	0.3	0.3	0	0	0	3.77	4.00
14	1	0.3	0.3	0	0	0	0	0	3.70	4.13
15	1	0	0	0	0	0	0	0	3.13	3.54

16	1.1	0.3	0	0	0	0	0	0	3.56	3.82
17	1.1	0.3	0.3	0.3	0	0	0	0	4.04	4.24
18	1.1	0.3	0.3	0.3	0.3	0.3	0	0	4.12	4.14
19	1.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	4.20	4.23
20	1.1	0.3	0.3	0.3	0.3	0.3	0.3	0	4.16	4.16
21	1.1	0.3	0.3	0.3	0.3	0	0	0	4.08	4.14
22	1.1	0.3	0.3	0	0	0	0	0	4.01	4.38
23	1.1	0	0	0	0	0	0	0	3.44	3.68
24	1.2	0.3	0	0	0	0	0	0	3.87	4.14
25	1.2	0.3	0.3	0.3	0	0	0	0	4.35	4.27
26	1.2	0.3	0.3	0.3	0.3	0.3	0	0	4.43	4.46
27	1.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	4.51	4.30
28	1.2	0.3	0.3	0.3	0.3	0.3	0.3	0	4.47	4.38
29	1.2	0.3	0.3	0.3	0.3	0	0	0	4.40	4.30
30	1.2	0.3	0.3	0	0	0	0	0	4.32	4.07
31	1.2	0	0	0	0	0	0	0	3.75	3.68
32	0.7	0.3	0.3	0	0	0	0	0	2.76	3.26
33	0.6	0.3	0.3	0	0	0	0	0	2.44	2.89
34	0.8	0.3	0.3	0	0	0	0	0	3.07	3.42
35	0.5	0.3	0.3	0	0	0	0	0	2.13	2.43
36	0.9	0.3	0.3	0	0	0	0	0	3.38	3.47
37	0.3	0.3	0.3	0	0	0	0	0	1.50	1.73
38	0.4	0.3	0.3	0	0	0	0	0	1.82	2.19
39	0.6	0.3	0.3	0.3	0.3	0	0	0	2.52	3.00
40	0.5	0.3	0.3	0.3	0.3	0	0	0	2.21	2.66
41	0.7	0.3	0.3	0.3	0.3	0	0	0	2.83	3.35

42	0.4	0.3	0.3	0.3	0.3	0	0	0	1.89	2.40
43	0.3	0.3	0.3	0.3	0.3	0	0	0	1.58	1.97
44	0.9	0.3	0.3	0.3	0.3	0	0	0	3.46	3.59
45	0.8	0.3	0.3	0.3	0.3	0	0	0	3.15	3.45
46	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0	1.65	1.87
47	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0	3.53	3.66
48	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0	2.59	2.85
49	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0	2.28	2.60
50	0.8	0.3	0.3	0.3	0.3	0.3	0.3	0	3.22	3.61
51	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0	1.97	2.36
52	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0	2.90	3.58
53	0.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.26	3.47
54	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.57	3.68
55	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.95	3.29
56	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.63	2.98
57	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.01	2.35
58	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.70	1.98
59	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.32	2.79
60	0.5	0.3	0.3	0.3	0.3	0.3	0	0	2.24	2.59
61	0.4	0.3	0.3	0.3	0.3	0.3	0	0	1.93	2.32
62	0.6	0.3	0.3	0.3	0.3	0.3	0	0	2.55	2.93
63	0.8	0.3	0.3	0.3	0.3	0.3	0	0	3.18	3.52
64	0.3	0.3	0.3	0.3	0.3	0.3	0	0	1.62	1.96
65	0.7	0.3	0.3	0.3	0.3	0.3	0	0	2.87	3.24
66	0.9	0.3	0.3	0.3	0.3	0.3	0	0	3.49	3.69
67	0.3	0.3	0.3	0.3	0	0	0	0	1.54	1.77

68	0.4	0.3	0.3	0.3	0	0	0	0	1.85	2.37
69	0.9	0.3	0.3	0.3	0	0	0	0	3.42	3.64
70	0.5	0.3	0.3	0.3	0	0	0	0	2.16	2.82
71	0.7	0.3	0.3	0.3	0	0	0	0	2.79	3.36
72	0.6	0.3	0.3	0.3	0	0	0	0	2.48	2.80
73	0.8	0.3	0.3	0.3	0	0	0	0	3.10	3.26
74	0.5	0.3	0	0	0	0	0	0	1.68	2.12
75	0.3	0.3	0	0	0	0	0	0	1.05	1.78
76	0.7	0.3	0	0	0	0	0	0	2.31	2.87
77	0.9	0.3	0	0	0	0	0	0	2.93	3.07
78	0.4	0.3	0	0	0	0	0	0	1.37	1.89
79	0.6	0.3	0	0	0	0	0	0	1.99	2.41
80	0.8	0.3	0	0	0	0	0	0	2.62	3.05
81	1	0.4	0	0	0	0	0	0	3.28	3.72
82	1	0.4	0.4	0.4	0	0	0	0	3.93	4.22
83	1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.14	4.22
84	1	0.4	0.4	0.4	0.4	0.4	0.4	0	4.08	3.89
85	1	0.4	0.4	0.4	0.4	0	0	0	3.99	3.61
86	1	0.4	0.4	0	0	0	0	0	3.88	4.22
87	1.1	0.4	0	0	0	0	0	0	3.60	3.89
88	1.1	0.4	0.4	0.4	0	0	0	0	4.24	4.27
89	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0	4.39	4.19
90	1.2	0.4	0	0	0	0	0	0	3.91	3.61
91	1.2	0.4	0.4	0	0	0	0	0	4.51	4.54
92	0.7	0.4	0.4	0	0	0	0	0	2.95	3.27
93	0.4	0.4	0.4	0	0	0	0	0	2.01	2.49

94	0.8	0.4	0.4	0	0	0	0	0	3.26	3.53
95	0.6	0.4	0.4	0	0	0	0	0	2.63	3.11
96	0.3	0.4	0.4	0	0	0	0	0	1.69	2.05
97	0.5	0.4	0.4	0	0	0	0	0	2.32	2.60
98	0.7	0.4	0.4	0.4	0.4	0	0	0	3.05	3.32
99	0.5	0.4	0.4	0.4	0.4	0	0	0	2.42	2.74
100	0.6	0.4	0.4	0.4	0.4	0	0	0	2.73	3.24
101	0.4	0.4	0.4	0.4	0.4	0	0	0	2.11	2.57
102	0.9	0.4	0.4	0.4	0.4	0	0	0	3.67	3.76
103	0.8	0.4	0.4	0.4	0.4	0	0	0	3.36	3.59
104	0.3	0.4	0.4	0.4	0.4	0	0	0	1.80	2.36
105	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0	2.52	2.87
106	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0	3.77	3.76
107	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0	3.14	3.40
108	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0	2.83	3.02
109	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0	2.20	2.81
110	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0	1.89	2.54
111	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.95	2.34
112	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2.89	3.52
113	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2.26	2.43
114	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2.57	3.03
115	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.51	3.97
116	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.20	3.34
117	0.7	0.4	0.4	0.4	0.4	0.4	0	0	3.09	3.17
118	0.9	0.4	0.4	0.4	0.4	0.4	0	0	3.72	3.70
119	0.3	0.4	0.4	0.4	0.4	0.4	0	0	1.84	2.32

120	0.8	0.4	0.4	0.4	0.4	0.4	0	0	3.41	3.57
121	0.5	0.4	0.4	0.4	0.4	0.4	0	0	2.47	2.92
122	0.6	0.4	0.4	0.4	0.4	0.4	0	0	2.78	3.17
123	0.4	0.4	0.4	0.4	0.4	0.4	0	0	2.15	2.85
124	0.3	0.4	0.4	0.4	0	0	0	0	1.74	2.12
125	0.9	0.4	0.4	0.4	0	0	0	0	3.61	3.83
126	0.5	0.4	0.4	0.4	0	0	0	0	2.36	2.47
127	0.6	0.4	0.4	0.4	0	0	0	0	2.68	2.81
128	0.7	0.4	0.4	0.4	0	0	0	0	2.99	3.37
129	0.8	0.4	0.4	0.4	0	0	0	0	3.30	3.62
130	0.4	0.4	0.4	0.4	0	0	0	0	2.05	2.67
131	0.6	0.4	0	0	0	0	0	0	2.03	2.78
132	0.3	0.4	0	0	0	0	0	0	1.09	1.53
133	0.4	0.4	0	0	0	0	0	0	1.41	1.69
134	0.8	0.4	0	0	0	0	0	0	2.66	3.24
135	0.7	0.4	0	0	0	0	0	0	2.35	3.11
136	0.9	0.4	0	0	0	0	0	0	2.97	3.49
137	0.5	0.4	0	0	0	0	0	0	1.72	1.92
138	1	0.5	0	0	0	0	0	0	3.32	3.55
139	1	0.5	0.5	0.5	0	0	0	0	4.13	3.93
140	1	0.5	0.5	0.5	0.5	0.5	0	0	4.26	3.95
141	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.39	4.39
142	1	0.5	0.5	0.5	0.5	0.5	0.5	0	4.32	3.83
143	1	0.5	0.5	0.5	0.5	0	0	0	4.20	3.91
144	1	0.5	0.5	0	0	0	0	0	4.07	4.04
145	1.1	0.5	0	0	0	0	0	0	3.64	3.64

146	1.1	0.5	0.5	0.5	0	0	0	0	4.44	4.28
147	1.1	0.5	0.5	0.5	0.5	0.5	0	0	4.57	4.60
148	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.70	4.39
149	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0	4.63	4.44
150	1.1	0.5	0.5	0.5	0.5	0	0	0	4.51	4.15
151	1.1	0.5	0.5	0	0	0	0	0	4.39	4.60
152	1.2	0.5	0.5	0	0	0	0	0	4.70	4.43
153	1.2	0.5	0.5	0.5	0.5	0	0	0	4.83	4.80
154	1.2	0.5	0.5	0.5	0.5	0.5	0.5	0	4.94	4.42
155	1.2	0	0	0	0	0	0	0	3.75	4.27
156	1.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5.02	4.65
157	1.2	0.5	0.5	0.5	0.5	0.5	0	0	4.88	4.46
158	1.2	0.5	0.5	0.5	0	0	0	0	4.75	4.44
159	0.8	0.5	0.5	0	0	0	0	0	3.45	3.70
160	0.6	0.5	0.5	0	0	0	0	0	2.82	3.14
161	0.9	0.5	0.5	0	0	0	0	0	3.76	3.75
162	0.4	0.5	0.5	0	0	0	0	0	2.20	2.64
163	0.5	0.5	0.5	0	0	0	0	0	2.51	2.95
164	0.3	0.5	0.5	0	0	0	0	0	1.88	1.85
165	0.7	0.5	0.5	0	0	0	0	0	3.13	3.22
166	0.7	0.5	0.5	0.5	0.5	0	0	0	3.26	3.48
167	0.6	0.5	0.5	0.5	0.5	0	0	0	2.95	3.21
168	0.8	0.5	0.5	0.5	0.5	0	0	0	3.57	3.96
169	0.5	0.5	0.5	0.5	0.5	0	0	0	2.64	2.94
170	0.9	0.5	0.5	0.5	0.5	0	0	0	3.89	3.89
171	0.4	0.5	0.5	0.5	0.5	0	0	0	2.32	2.85

172	0.3	0.5	0.5	0.5	0.5	0	0	0	2.01	2.14
173	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	2.75	2.89
174	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0	3.38	3.75
175	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0	3.07	3.45
176	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0	4.01	4.01
177	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0	2.44	2.67
178	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0	2.13	2.33
179	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0	3.69	3.80
180	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.08	3.59
181	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	3.14	3.47
182	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	3.45	3.88
183	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.20	2.28
184	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.51	3.01
185	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	3.76	3.80
186	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.83	3.12
187	0.9	0.5	0.5	0.5	0.5	0.5	0	0	3.94	3.97
188	0.8	0.5	0.5	0.5	0.5	0.5	0	0	3.63	3.79
189	0.7	0.5	0.5	0.5	0.5	0.5	0	0	3.32	3.42
190	0.5	0.5	0.5	0.5	0.5	0.5	0	0	2.69	2.86
191	0.3	0.5	0.5	0.5	0.5	0.5	0	0	2.07	2.10
192	0.6	0.5	0.5	0.5	0.5	0.5	0	0	3.00	3.31
193	0.4	0.5	0.5	0.5	0.5	0.5	0	0	2.38	2.73
194	0.4	0.5	0.5	0.5	0	0	0	0	2.25	2.79
195	0.9	0.5	0.5	0.5	0	0	0	0	3.81	3.65
196	0.5	0.5	0.5	0.5	0	0	0	0	2.56	3.08
197	0.7	0.5	0.5	0.5	0	0	0	0	3.19	3.39

198	0.6	0.5	0.5	0.5	0	0	0	0	2.88	3.24
199	0.8	0.5	0.5	0.5	0	0	0	0	3.50	3.80
200	0.3	0.5	0.5	0.5	0	0	0	0	1.94	2.01
201	0.4	0.5	0	0	0	0	0	0	1.45	1.69
202	0.3	0.5	0	0	0	0	0	0	1.13	1.29
203	0.8	0.5	0	0	0	0	0	0	2.70	3.05
204	0.7	0.5	0	0	0	0	0	0	2.38	2.68
205	0.6	0.5	0	0	0	0	0	0	2.07	2.53
206	0.9	0.5	0	0	0	0	0	0	3.01	3.26
207	0.5	0.5	0	0	0	0	0	0	1.76	2.05
208	1	0.6	0	0	0	0	0	0	3.36	3.78
209	1	0.6	0.6	0.6	0	0	0	0	4.33	4.73
210	1	0.6	0.6	0.6	0.6	0.6	0	0	4.48	4.29
211	1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.64	4.14
212	1	0.6	0.6	0.6	0.6	0.6	0.6	0	4.56	4.41
213	1	0.6	0.6	0.6	0.6	0	0	0	4.41	4.25
214	1	0.6	0.6	0	0	0	0	0	4.26	4.15
215	1.1	0.6	0	0	0	0	0	0	3.67	3.77
216	1.1	0.6	0.6	0.6	0	0	0	0	4.64	4.75
217	1.1	0.6	0.6	0.6	0.6	0.6	0	0	4.79	4.40
218	1.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.96	4.96
219	1.1	0.6	0.6	0.6	0.6	0.6	0.6	0	4.87	4.91
220	1.1	0.6	0.6	0.6	0.6	0	0	0	4.73	4.72
221	1.1	0.6	0.6	0	0	0	0	0	4.57	4.79
222	1.2	0.6	0	0	0	0	0	0	3.99	3.66
223	1.2	0.6	0.6	0.6	0	0	0	0	4.95	4.73

224	1.2	0.6	0.6	0.6	0.6	0.6	0	0	5.11	4.65
225	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	5.27	4.41
226	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0	5.18	5.19
227	1.2	0.6	0.6	0.6	0.6	0	0	0	5.04	5.08
228	1.2	0.6	0.6	0	0	0	0	0	4.89	5.21
229	0.4	0.6	0.6	0	0	0	0	0	2.38	2.79
230	0.8	0.6	0.6	0	0	0	0	0	3.64	3.74
231	0.7	0.6	0.6	0	0	0	0	0	3.32	3.54
232	0.6	0.6	0.6	0	0	0	0	0	3.01	3.41
233	0.5	0.6	0.6	0	0	0	0	0	2.70	3.38
234	0.9	0.6	0.6	0	0	0	0	0	3.95	3.87
235	0.3	0.6	0.6	0	0	0	0	0	2.07	2.42
236	0.9	0.6	0.6	0.6	0.6	0	0	0	4.10	3.96
237	0.5	0.6	0.6	0.6	0.6	0	0	0	2.85	3.37
238	0.7	0.6	0.6	0.6	0.6	0	0	0	3.48	3.81
239	0.6	0.6	0.6	0.6	0.6	0	0	0	3.16	3.56
240	0.8	0.6	0.6	0.6	0.6	0	0	0	3.79	4.07
241	0.3	0.6	0.6	0.6	0.6	0	0	0	2.22	2.81
242	0.4	0.6	0.6	0.6	0.6	0	0	0	2.54	3.20
243	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0	4.24	4.05
244	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0	2.99	3.03
245	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0	3.62	3.82
246	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0	3.93	3.88
247	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0	3.30	3.50
248	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0	2.68	2.91
249	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0	2.37	2.52

250	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2.76	3.17
251	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2.45	2.90
252	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	3.70	3.78
253	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.02	4.07
254	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	3.08	3.35
255	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	3.39	3.52
256	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.33	4.19
257	0.7	0.6	0.6	0.6	0.6	0.6	0	0	3.54	3.65
258	0.5	0.6	0.6	0.6	0.6	0.6	0	0	2.92	3.51
259	0.8	0.6	0.6	0.6	0.6	0.6	0	0	3.86	4.05
260	0.4	0.6	0.6	0.6	0.6	0.6	0	0	2.60	3.17
261	0.3	0.6	0.6	0.6	0.6	0.6	0	0	2.29	2.59
262	0.9	0.6	0.6	0.6	0.6	0.6	0	0	4.17	3.99
263	0.6	0.6	0.6	0.6	0.6	0.6	0	0	3.23	3.39
264	0.9	0.6	0.6	0.6	0	0	0	0	4.01	4.26
265	0.3	0.6	0.6	0.6	0	0	0	0	2.14	2.74
266	0.8	0.6	0.6	0.6	0	0	0	0	3.70	4.11
267	0.7	0.6	0.6	0.6	0	0	0	0	3.39	3.95
268	0.6	0.6	0.6	0.6	0	0	0	0	3.08	3.48
269	0.4	0.6	0.6	0.6	0	0	0	0	2.45	2.90
270	0.5	0.6	0.6	0.6	0	0	0	0	2.76	3.38
271	0.6	0.6	0	0	0	0	0	0	2.11	2.54
272	0.4	0.6	0	0	0	0	0	0	1.48	1.93
273	0.3	0.6	0	0	0	0	0	0	1.17	1.28
274	0.9	0.6	0	0	0	0	0	0	3.05	3.08
275	0.8	0.6	0	0	0	0	0	0	2.74	2.98

276	0.5	0.6	0	0	0	0	0	0	1.80	2.12
277	0.7	0.6	0	0	0	0	0	0	2.42	2.66
278	1	0.7	0	0	0	0	0	0	3.40	3.73
279	1	0.7	0.7	0.7	0	0	0	0	4.53	4.41
280	1	0.7	0.7	0.7	0.7	0.7	0	0	4.71	4.00
281	1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.89	4.50
282	1	0.7	0.7	0.7	0.7	0.7	0.7	0	4.79	4.51
283	1	0.7	0.7	0.7	0.7	0	0	0	4.63	4.48
284	1	0.7	0.7	0	0	0	0	0	4.45	4.79
285	1.1	0.7	0	0	0	0	0	0	3.71	4.57
286	1.1	0.7	0.7	0.7	0	0	0	0	4.84	5.07
287	1.1	0.7	0.7	0.7	0.7	0.7	0	0	5.02	5.24
288	1.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.21	5.33
289	1.1	0.7	0.7	0.7	0.7	0.7	0.7	0	5.11	4.88
290	1.1	0.7	0.7	0.7	0.7	0	0	0	4.94	4.89
291	1.1	0.7	0.7	0	0	0	0	0	4.76	5.10
292	1.2	0.7	0	0	0	0	0	0	4.03	3.89
293	1.2	0.7	0.7	0.7	0	0	0	0	5.15	4.92
294	1.2	0.7	0.7	0.7	0.7	0.7	0	0	5.33	4.98
295	1.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.52	4.66
296	1.2	0.7	0.7	0.7	0.7	0.7	0.7	0	5.42	5.13
297	1.2	0.7	0.7	0.7	0.7	0	0	0	5.25	5.03
298	1.2	0.7	0.7	0	0	0	0	0	5.08	4.87
299	0.5	0.7	0.7	0	0	0	0	0	2.89	3.32
300	0.4	0.7	0.7	0	0	0	0	0	2.57	3.36
301	0.8	0.7	0.7	0	0	0	0	0	3.82	4.29

302	0.9	0.7	0.7	0	0	0	0	0	4.14	4.54
303	0.3	0.7	0.7	0	0	0	0	0	2.26	2.91
304	0.6	0.7	0.7	0	0	0	0	0	3.2	3.76
305	0.7	0.7	0.7	0	0	0	0	0	3.51	3.70
306	0.8	0.7	0.7	0.7	0.7	0	0	0	4.00	4.25
307	0.7	0.7	0.7	0.7	0.7	0	0	0	3.69	4.08
308	0.5	0.7	0.7	0.7	0.7	0	0	0	3.06	3.64
309	0.4	0.7	0.7	0.7	0.7	0	0	0	2.75	3.33
310	0.3	0.7	0.7	0.7	0.7	0	0	0	2.44	3.28
311	0.6	0.7	0.7	0.7	0.7	0	0	0	3.38	3.71
312	0.9	0.7	0.7	0.7	0.7	0	0	0	4.32	4.64
313	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0	3.23	3.75
314	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0	4.48	4.40
315	0.3	0.7	0.7	0.7	0.7	0.7	0.7	0	2.60	3.35
316	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0	3.54	3.99
317	0.4	0.7	0.7	0.7	0.7	0.7	0.7	0	2.92	3.59
318	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0	3.85	4.08
319	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0	4.17	4.37
320	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.27	4.17
321	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	3.64	4.06
322	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	3.96	4.47
323	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.58	4.76
324	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	3.33	3.86
325	0.3	0.7	0.7	0.7	0.7	0.7	0.7	0.7	2.70	3.72
326	0.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7	3.02	3.63
327	0.7	0.7	0.7	0.7	0.7	0.7	0	0	3.77	4.26

328	0.4	0.7	0.7	0.7	0.7	0.7	0	0	2.83	3.59
329	0.8	0.7	0.7	0.7	0.7	0.7	0	0	4.08	4.17
330	0.5	0.7	0.7	0.7	0.7	0.7	0	0	3.14	3.58
331	0.9	0.7	0.7	0.7	0.7	0.7	0	0	4.39	4.63
332	0.3	0.7	0.7	0.7	0.7	0.7	0	0	2.52	3.23
333	0.6	0.7	0.7	0.7	0.7	0.7	0	0	3.46	3.87
334	0.9	0.7	0.7	0.7	0	0	0	0	4.21	4.53
335	0.3	0.7	0.7	0.7	0	0	0	0	2.34	3.07
336	0.4	0.7	0.7	0.7	0	0	0	0	2.65	3.21
337	0.5	0.7	0.7	0.7	0	0	0	0	2.96	3.52
338	0.7	0.7	0.7	0.7	0	0	0	0	3.59	3.95
339	0.6	0.7	0.7	0.7	0	0	0	0	3.28	3.70
340	0.8	0.7	0.7	0.7	0	0	0	0	3.90	3.94
341	0.7	0.7	0	0	0	0	0	0	2.46	3.07
342	0.6	0.7	0	0	0	0	0	0	2.15	2.75
343	0.3	0.7	0	0	0	0	0	0	1.21	2.19
344	0.9	0.7	0	0	0	0	0	0	3.09	3.56
345	0.4	0.7	0	0	0	0	0	0	1.52	2.13
346	0.8	0.7	0	0	0	0	0	0	2.77	3.35
347	0.5	0.7	0	0	0	0	0	0	1.84	2.67
348	1	0.8	0	0	0	0	0	0	3.44	3.93
349	1	0.8	0.8	0.8	0	0	0	0	4.73	5.10
350	1	0.8	0.8	0.8	0.8	0.8	0	0	4.93	4.80
351	1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	5.15	5.03
352	1	0.8	0.8	0.8	0.8	0.8	0.8	0	5.03	4.93
353	1	0.8	0.8	0.8	0.8	0	0	0	4.84	5.02

354	1	0.8	0.8	0	0	0	0	0	4.64	4.57
355	1.1	0.8	0	0	0	0	0	0	3.75	4.10
356	1.1	0.8	0.8	0.8	0	0	0	0	5.04	4.99
357	1.1	0.8	0.8	0.8	0.8	0.8	0	0	5.25	5.27
358	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	5.46	5.52
359	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0	5.34	5.15
360	1.1	0.8	0.8	0.8	0.8	0	0	0	5.16	4.91
361	1.1	0.8	0.8	0	0	0	0	0	4.95	5.09
362	1.2	0.8	0	0	0	0	0	0	4.06	4.59
363	1.2	0.8	0.8	0.8	0	0	0	0	5.35	5.14
364	1.2	0.8	0.8	0.8	0.8	0.8	0	0	5.56	5.61
365	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	5.77	5.68
366	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0	5.66	5.28
367	1.2	0.8	0.8	0.8	0.8	0	0	0	5.47	5.26
368	1.2	0.8	0.8	0	0	0	0	0	5.26	5.12
369	0.9	0.8	0.8	0	0	0	0	0	4.33	4.49
370	0.5	0.8	0.8	0	0	0	0	0	3.07	3.50
371	0.4	0.8	0.8	0	0	0	0	0	2.76	3.36
372	0.8	0.8	0.8	0	0	0	0	0	4.01	4.25
373	0.7	0.8	0.8	0	0	0	0	0	3.70	4.27
374	0.6	0.8	0.8	0	0	0	0	0	3.39	3.95
375	0.3	0.8	0.8	0	0	0	0	0	2.45	2.94
376	0.3	0.8	0.8	0.8	0.8	0	0	0	2.65	3.00
377	0.7	0.8	0.8	0.8	0.8	0	0	0	3.90	4.32
378	0.5	0.8	0.8	0.8	0.8	0	0	0	3.28	3.78
379	0.4	0.8	0.8	0.8	0.8	0	0	0	2.97	3.50

380	0.6	0.8	0.8	0.8	0.8	0	0	0	3.59	4.35
381	0.8	0.8	0.8	0.8	0.8	0	0	0	4.22	4.54
382	0.9	0.8	0.8	0.8	0.8	0	0	0	4.53	4.85
383	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0	3.78	4.04
384	0.5	0.8	0.8	0.8	0.8	0.8	0.8	0	3.47	3.98
385	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0	4.72	4.55
386	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0	4.09	4.47
387	0.3	0.8	0.8	0.8	0.8	0.8	0.8	0	2.84	3.64
388	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0	3.15	3.89
389	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0	4.41	4.76
390	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	4.83	4.70
391	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	4.21	4.50
392	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3.90	4.37
393	0.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	2.96	3.65
394	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3.27	3.83
395	0.5	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3.58	3.86
396	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	4.52	4.52
397	0.7	0.8	0.8	0.8	0.8	0.8	0	0	3.99	4.29
398	0.4	0.8	0.8	0.8	0.8	0.8	0	0	3.06	3.73
399	0.9	0.8	0.8	0.8	0.8	0.8	0	0	4.62	4.58
400	0.5	0.8	0.8	0.8	0.8	0.8	0	0	3.37	4.08
401	0.8	0.8	0.8	0.8	0.8	0.8	0	0	4.31	4.57
402	0.3	0.8	0.8	0.8	0.8	0.8	0	0	2.74	3.53
403	0.6	0.8	0.8	0.8	0.8	0.8	0	0	3.68	4.21
404	0.9	0.8	0.8	0.8	0	0	0	0	4.41	4.71
405	0.8	0.8	0.8	0.8	0	0	0	0	4.10	4.63

406	0.5	0.8	0.8	0.8	0	0	0	0	3.16	3.53
407	0.4	0.8	0.8	0.8	0	0	0	0	2.85	3.61
408	0.3	0.8	0.8	0.8	0	0	0	0	2.54	3.46
409	0.6	0.8	0.8	0.8	0	0	0	0	3.48	4.10
410	0.7	0.8	0.8	0.8	0	0	0	0	3.79	4.25
411	0.3	0.8	0	0	0	0	0	0	1.25	2.10
412	0.4	0.8	0	0	0	0	0	0	1.56	2.34
413	0.5	0.8	0	0	0	0	0	0	1.87	2.54
414	0.7	0.8	0	0	0	0	0	0	2.50	3.14
415	0.8	0.8	0	0	0	0	0	0	2.81	3.48
416	0.9	0.8	0	0	0	0	0	0	3.13	3.67
417	0.6	0.8	0	0	0	0	0	0	2.19	2.83
418	1	0.9	0	0	0	0	0	0	3.48	3.86
419	1	0.9	0.9	0.9	0	0	0	0	4.93	5.29
420	1	0.9	0.9	0.9	0.9	0.9	0	0	5.16	5.25
421	1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	5.40	5.54
422	1	0.9	0.9	0.9	0.9	0.9	0.9	0	5.27	5.50
423	1	0.9	0.9	0.9	0.9	0	0	0	5.06	5.14
424	1	0.9	0.9	0	0	0	0	0	4.83	5.14
425	1.1	0.9	0	0	0	0	0	0	3.79	4.61
426	1.1	0.9	0.9	0.9	0	0	0	0	5.24	5.07
427	1.1	0.9	0.9	0.9	0.9	0.9	0	0	5.47	5.41
428	1.1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	5.71	5.62
429	1.1	0.9	0.9	0.9	0.9	0.9	0.9	0	5.58	5.56
430	1.1	0.9	0.9	0.9	0.9	0	0	0	5.37	5.02
431	1.1	0.9	0.9	0	0	0	0	0	5.14	5.39

432	1.2	0.9	0	0	0	0	0	0	4.10	4.49
433	1.2	0.9	0.9	0.9	0	0	0	0	5.55	5.41
434	1.2	0.9	0.9	0.9	0.9	0.9	0	0	5.78	5.36
435	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	6.02	5.67
436	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0	5.90	5.47
437	1.2	0.9	0.9	0.9	0.9	0	0	0	5.68	5.56
438	1.2	0.9	0.9	0	0	0	0	0	5.45	5.39
439	0.4	0.9	0.9	0	0	0	0	0	2.95	3.52
440	0.9	0.9	0.9	0	0	0	0	0	4.51	4.57
441	0.5	0.9	0.9	0	0	0	0	0	3.26	3.52
442	0.7	0.9	0.9	0	0	0	0	0	3.89	4.15
443	0.8	0.9	0.9	0	0	0	0	0	4.20	4.51
444	0.6	0.9	0.9	0	0	0	0	0	3.58	3.84
445	0.3	0.9	0.9	0	0	0	0	0	2.64	3.31
446	0.8	0.9	0.9	0.9	0.9	0	0	0	4.43	4.74
447	0.9	0.9	0.9	0.9	0.9	0	0	0	4.74	4.98
448	0.6	0.9	0.9	0.9	0.9	0	0	0	3.81	4.30
449	0.5	0.9	0.9	0.9	0.9	0	0	0	3.49	3.89
450	0.4	0.9	0.9	0.9	0.9	0	0	0	3.18	3.48
451	0.3	0.9	0.9	0.9	0.9	0	0	0	2.87	3.40
452	0.7	0.9	0.9	0.9	0.9	0	0	0	4.12	4.52
453	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0	4.96	5.16
454	0.6	0.9	0.9	0.9	0.9	0.9	0.9	0	4.02	4.46
455	0.5	0.9	0.9	0.9	0.9	0.9	0.9	0	3.70	4.13
456	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0	4.33	4.69
457	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0	3.39	4.02

458	0.3	0.9	0.9	0.9	0.9	0.9	0.9	0	3.08	3.48
459	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0	4.64	4.78
460	0.6	0.9	0.9	0.9	0.9	0.9	0.9	0.9	4.15	4.08
461	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	4.46	4.82
462	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	3.52	3.53
463	0.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	3.21	3.68
464	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	4.77	4.94
465	0.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	3.83	4.40
466	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	5.09	5.22
467	0.3	0.9	0.9	0.9	0.9	0.9	0	0	2.97	3.67
468	0.4	0.9	0.9	0.9	0.9	0.9	0	0	3.28	3.78
469	0.8	0.9	0.9	0.9	0.9	0.9	0	0	4.53	4.78
470	0.6	0.9	0.9	0.9	0.9	0.9	0	0	3.91	4.23
471	0.7	0.9	0.9	0.9	0.9	0.9	0	0	4.22	4.60
472	0.5	0.9	0.9	0.9	0.9	0.9	0	0	3.59	4.14
473	0.9	0.9	0.9	0.9	0.9	0.9	0	0	4.85	4.81
474	0.3	0.9	0.9	0.9	0	0	0	0	2.74	3.41
475	0.6	0.9	0.9	0.9	0	0	0	0	3.67	3.63
476	0.8	0.9	0.9	0.9	0	0	0	0	4.30	4.47
477	0.4	0.9	0.9	0.9	0	0	0	0	3.05	3.58
478	0.9	0.9	0.9	0.9	0	0	0	0	4.61	4.83
479	0.7	0.9	0.9	0.9	0	0	0	0	3.99	4.21
480	0.5	0.9	0.9	0.9	0	0	0	0	3.36	3.83
481	0.9	0.9	0	0	0	0	0	0	3.16	3.79
482	0.5	0.9	0	0	0	0	0	0	1.91	2.57
483	0.4	0.9	0	0	0	0	0	0	1.60	2.39

484	0.3	0.9	0	0	0	0	0	0	1.29	2.06
485	0.8	0.9	0	0	0	0	0	0	2.85	3.57
486	0.7	0.9	0	0	0	0	0	0	2.54	2.96
487	0.6	0.9	0	0	0	0	0	0	2.23	2.82
488	1	1	1	1	1	1	1	1	5.65	5.28
489	1	1	1	1	1	1	1	0	5.51	5.63
490	1	1	1	1	1	1	0	0	5.38	4.88
491	1	1	1	1	1	0	0	0	5.27	5.42
492	1	1	1	1	0	0	0	0	5.13	5.20
493	1	1	1	0	0	0	0	0	5.02	5.30
494	1	1	0	0	0	0	0	0	3.52	3.99
495	1.1	1	1	1	1	1	1	1	5.96	5.66
496	1.1	1	1	1	1	1	1	0	5.82	5.61
497	1.1	1	1	1	1	1	0	0	5.70	5.34
498	1.1	1	1	1	1	0	0	0	5.58	5.31
499	1.1	1	1	1	0	0	0	0	5.44	5.52
500	1.1	1	1	0	0	0	0	0	5.33	5.61
501	1.1	1	0	0	0	0	0	0	3.83	4.24
502	1.2	1	1	1	1	1	1	1	6.28	6.08
503	1.2	1	1	1	1	1	1	0	6.13	5.83
504	1.2	1	1	1	1	1	0	0	6.01	6.14
505	1.2	1	1	1	1	0	0	0	5.90	5.57
506	1.2	1	1	1	0	0	0	0	5.75	5.52
507	1.2	1	1	0	0	0	0	0	5.64	5.63
508	1.2	1	0	0	0	0	0	0	4.14	4.64
509	0.6	1	1	1	1	1	1	1	4.40	4.18

510	0.5	1	1	1	1	1	1	1	4.09	4.34
511	0.4	1	1	1	1	1	1	1	3.77	4.24
512	0.9	1	1	1	1	1	1	1	5.34	5.37
513	0.8	1	1	1	1	1	1	1	5.03	4.91
514	0.7	1	1	1	1	1	1	1	4.71	4.85
515	0.3	1	1	1	1	1	1	1	3.46	3.58
516	0.7	1	1	1	1	1	1	0	4.57	4.69
517	0.5	1	1	1	1	1	1	0	3.94	4.41
518	0.3	1	1	1	1	1	1	0	3.32	3.94
519	0.9	1	1	1	1	1	1	0	5.19	5.37
520	0.4	1	1	1	1	1	1	0	3.63	4.10
521	0.8	1	1	1	1	1	1	0	4.88	4.95
522	0.6	1	1	1	1	1	1	0	4.26	4.51
523	0.5	1	1	1	1	1	0	0	3.82	4.06
524	0.3	1	1	1	1	1	0	0	3.19	3.53
525	0.7	1	1	1	1	1	0	0	4.45	4.71
526	0.9	1	1	1	1	1	0	0	5.07	5.21
527	0.6	1	1	1	1	1	0	0	4.13	4.09
528	0.8	1	1	1	1	1	0	0	4.76	4.88
529	0.4	1	1	1	1	1	0	0	3.51	3.63
530	0.4	1	1	1	1	0	0	0	3.39	4.07
531	0.7	1	1	1	1	0	0	0	4.33	4.61
532	0.3	1	1	1	1	0	0	0	3.08	3.56
533	0.6	1	1	1	1	0	0	0	4.02	4.47
534	0.8	1	1	1	1	0	0	0	4.65	4.91
535	0.9	1	1	1	1	0	0	0	4.96	4.79

536	0.5	1	1	1	1	0	0	0	3.71	4.13
537	0.3	1	1	1	0	0	0	0	2.94	3.71
538	0.8	1	1	1	0	0	0	0	4.50	4.19
539	0.7	1	1	1	0	0	0	0	4.19	4.51
540	0.6	1	1	1	0	0	0	0	3.87	4.13
541	0.5	1	1	1	0	0	0	0	3.56	3.63
542	0.4	1	1	1	0	0	0	0	3.25	3.54
543	0.9	1	1	1	0	0	0	0	4.81	5.13
544	0.9	1	1	0	0	0	0	0	4.70	4.79
545	0.4	1	1	0	0	0	0	0	3.14	3.22
546	0.3	1	1	0	0	0	0	0	2.83	3.12
547	0.7	1	1	0	0	0	0	0	4.08	4.30
548	0.6	1	1	0	0	0	0	0	3.76	4.15
549	0.8	1	1	0	0	0	0	0	4.39	4.56
550	0.5	1	1	0	0	0	0	0	3.45	3.45
551	0.3	1	0	0	0	0	0	0	1.33	2.35
552	0.4	1	0	0	0	0	0	0	1.64	2.32
553	0.6	1	0	0	0	0	0	0	2.27	2.88
554	0.5	1	0	0	0	0	0	0	1.95	2.42
555	0.7	1	0	0	0	0	0	0	2.58	2.97
556	0.9	1	0	0	0	0	0	0	3.20	3.69
557	0.8	1	0	0	0	0	0	0	2.89	3.20
558	1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	5.90	5.28
559	1	1.1	1.1	1.1	1.1	1.1	1.1	0	5.74	5.25
560	1	1.1	1.1	1.1	1.1	1.1	0	0	5.61	5.26
561	1	1.1	1.1	1.1	1.1	0	0	0	5.49	5.31

562	1	1.1	1.1	1.1	0	0	0	0	5.33	5.27
563	1	1.1	1.1	0	0	0	0	0	5.20	5.23
564	1	1.1	0	0	0	0	0	0	3.56	4.18
565	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	6.22	5.45
566	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0	6.06	5.77
567	1.1	1.1	1.1	1.1	1.1	1.1	0	0	5.92	5.66
568	1.1	1.1	1.1	1.1	1.1	0	0	0	5.80	5.75
569	1.1	1.1	1.1	1.1	0	0	0	0	5.64	5.59
570	1.1	1.1	1.1	0	0	0	0	0	5.52	5.10
571	1.1	1.1	0	0	0	0	0	0	3.87	4.32
572	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	6.53	6.11
573	1.2	1.1	1.1	1.1	1.1	1.1	1.1	0	6.37	6.22
574	1.2	1.1	1.1	1.1	1.1	1.1	0	0	6.24	5.90
575	1.2	1.1	1.1	1.1	1.1	0	0	0	6.11	5.91
576	1.2	1.1	1.1	1.1	0	0	0	0	5.95	5.56
577	1.2	1.1	1.1	0	0	0	0	0	5.83	5.66
578	1.2	1.1	0	0	0	0	0	0	4.18	4.49
579	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	4.65	4.87
580	0.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	3.71	3.57
581	0.4	1.1	1.1	1.1	1.1	1.1	1.1	1.1	4.03	4.29
582	0.5	1.1	1.1	1.1	1.1	1.1	1.1	1.1	4.34	4.45
583	0.7	1.1	1.1	1.1	1.1	1.1	1.1	1.1	4.96	4.88
584	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	5.28	5.05
585	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	5.59	5.47
586	0.5	1.1	1.1	1.1	1.1	1.1	1.1	0	4.18	4.38
587	0.7	1.1	1.1	1.1	1.1	1.1	1.1	0	4.81	4.85

588	0.9	1.1	1.1	1.1	1.1	1.1	1.1	0	5.43	5.35
589	0.8	1.1	1.1	1.1	1.1	1.1	1.1	0	5.12	5.05
590	0.6	1.1	1.1	1.1	1.1	1.1	1.1	0	4.49	4.47
591	0.4	1.1	1.1	1.1	1.1	1.1	1.1	0	3.87	3.91
592	0.3	1.1	1.1	1.1	1.1	1.1	1.1	0	3.55	3.83
593	0.6	1.1	1.1	1.1	1.1	1.1	0	0	4.36	4.52
594	0.7	1.1	1.1	1.1	1.1	1.1	0	0	4.67	4.78
595	0.9	1.1	1.1	1.1	1.1	1.1	0	0	5.30	5.29
596	0.8	1.1	1.1	1.1	1.1	1.1	0	0	4.98	4.64
597	0.3	1.1	1.1	1.1	1.1	1.1	0	0	3.42	3.78
598	0.4	1.1	1.1	1.1	1.1	1.1	0	0	3.73	4.23
599	0.5	1.1	1.1	1.1	1.1	1.1	0	0	4.05	4.42
600	0.4	1.1	1.1	1.1	1.1	0	0	0	3.61	3.85
601	0.9	1.1	1.1	1.1	1.1	0	0	0	5.17	5.11
602	0.7	1.1	1.1	1.1	1.1	0	0	0	4.55	4.98
603	0.5	1.1	1.1	1.1	1.1	0	0	0	3.92	4.38
604	0.8	1.1	1.1	1.1	1.1	0	0	0	4.86	5.04
605	0.3	1.1	1.1	1.1	1.1	0	0	0	3.30	3.66
606	0.6	1.1	1.1	1.1	1.1	0	0	0	4.23	4.52
607	0.3	1.1	1.1	1.1	0	0	0	0	3.14	3.52
608	0.5	1.1	1.1	1.1	0	0	0	0	3.76	4.14
609	0.8	1.1	1.1	1.1	0	0	0	0	4.70	4.92
610	0.9	1.1	1.1	1.1	0	0	0	0	5.01	5.15
611	0.4	1.1	1.1	1.1	0	0	0	0	3.45	3.73
612	0.6	1.1	1.1	1.1	0	0	0	0	4.07	4.47
613	0.7	1.1	1.1	1.1	0	0	0	0	4.39	4.29

614	0.9	1.1	1.1	0	0	0	0	0	4.89	4.98
615	0.6	1.1	1.1	0	0	0	0	0	3.95	3.81
616	0.4	1.1	1.1	0	0	0	0	0	3.33	3.36
617	0.7	1.1	1.1	0	0	0	0	0	4.27	4.42
618	0.5	1.1	1.1	0	0	0	0	0	3.64	3.94
619	0.8	1.1	1.1	0	0	0	0	0	4.58	4.64
620	0.3	1.1	1.1	0	0	0	0	0	3.01	3.30
621	0.3	1.1	0	0	0	0	0	0	1.37	2.10
622	0.7	1.1	0	0	0	0	0	0	2.62	3.14
623	0.4	1.1	0	0	0	0	0	0	1.68	2.41
624	0.6	1.1	0	0	0	0	0	0	2.30	3.03
625	0.9	1.1	0	0	0	0	0	0	3.24	4.13
626	0.5	1.1	0	0	0	0	0	0	1.99	2.48
627	0.8	1.1	0	0	0	0	0	0	2.93	3.41
628	1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.16	5.82
629	1	1.2	1.2	1.2	1.2	1.2	1.2	0	5.98	5.69
630	1	1.2	1.2	1.2	1.2	1.2	0	0	5.84	5.42
631	1	1.2	1.2	1.2	1.2	0	0	0	5.70	5.26
632	1	1.2	1.2	1.2	0	0	0	0	5.53	5.23
633	1	1.2	1.2	0	0	0	0	0	5.39	5.47
634	1	1.2	0	0	0	0	0	0	3.59	3.90
635	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.47	5.86
636	1.1	1.2	1.2	1.2	1.2	1.2	1.2	0	6.30	5.91
637	1.1	1.2	1.2	1.2	1.2	1.2	0	0	6.15	5.82
638	1.1	1.2	1.2	1.2	1.2	0	0	0	6.01	5.45
639	1.1	1.2	1.2	1.2	0	0	0	0	5.84	5.47

640	1.1	1.2	1.2	0	0	0	0	0	5.71	5.18
641	1.1	1.2	0	0	0	0	0	0	3.91	4.22
642	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.78	6.11
643	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0	6.61	5.95
644	1.2	1.2	1.2	1.2	1.2	1.2	0	0	6.46	5.72
645	1.2	1.2	1.2	1.2	1.2	0	0	0	6.33	5.60
646	1.2	1.2	1.2	1.2	0	0	0	0	6.15	5.71
647	1.2	1.2	1.2	0	0	0	0	0	6.02	5.63
648	1.2	1.2	0	0	0	0	0	0	4.22	4.47
649	0.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.97	4.12
650	0.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.90	3.96
651	0.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.59	4.88
652	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.53	5.57
653	0.7	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.22	5.12
654	0.9	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.84	5.33
655	0.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.28	4.18
656	0.4	1.2	1.2	1.2	1.2	1.2	1.2	0	4.11	4.28
657	0.5	1.2	1.2	1.2	1.2	1.2	1.2	0	4.42	4.80
658	0.7	1.2	1.2	1.2	1.2	1.2	1.2	0	5.04	5.16
659	0.6	1.2	1.2	1.2	1.2	1.2	1.2	0	4.73	4.97
660	0.9	1.2	1.2	1.2	1.2	1.2	1.2	0	5.67	5.28
661	0.3	1.2	1.2	1.2	1.2	1.2	1.2	0	3.79	4.06
662	0.8	1.2	1.2	1.2	1.2	1.2	1.2	0	5.36	5.01
663	0.5	1.2	1.2	1.2	1.2	1.2	0	0	4.27	4.72
664	0.6	1.2	1.2	1.2	1.2	1.2	0	0	4.58	4.61
665	0.7	1.2	1.2	1.2	1.2	1.2	0	0	4.90	4.74

666	0.9	1.2	1.2	1.2	1.2	1.2	0	0	5.52	5.31
667	0.3	1.2	1.2	1.2	1.2	1.2	0	0	3.64	3.72
668	0.4	1.2	1.2	1.2	1.2	1.2	0	0	3.96	4.46
669	0.8	1.2	1.2	1.2	1.2	1.2	0	0	5.21	5.01
670	0.7	1.2	1.2	1.2	1.2	0	0	0	4.76	5.01
671	0.9	1.2	1.2	1.2	1.2	0	0	0	5.39	5.59
672	0.8	1.2	1.2	1.2	1.2	0	0	0	5.07	5.20
673	0.6	1.2	1.2	1.2	1.2	0	0	0	4.45	4.63
674	0.3	1.2	1.2	1.2	1.2	0	0	0	3.51	4.05
675	0.5	1.2	1.2	1.2	1.2	0	0	0	4.14	4.92
676	0.4	1.2	1.2	1.2	1.2	0	0	0	3.82	4.36
677	0.6	1.2	1.2	1.2	0	0	0	0	4.27	4.65
678	0.8	1.2	1.2	1.2	0	0	0	0	4.90	5.03
679	0.3	1.2	1.2	1.2	0	0	0	0	3.34	3.74
680	0.9	1.2	1.2	1.2	0	0	0	0	5.21	5.36
681	0.4	1.2	1.2	1.2	0	0	0	0	3.65	4.03
682	0.5	1.2	1.2	1.2	0	0	0	0	3.96	4.38
683	0.7	1.2	1.2	1.2	0	0	0	0	4.59	4.95
684	0.7	1.2	1.2	0	0	0	0	0	4.45	4.81
685	0.4	1.2	1.2	0	0	0	0	0	3.52	3.75
686	0.9	1.2	1.2	0	0	0	0	0	5.08	4.99
687	0.6	1.2	1.2	0	0	0	0	0	4.14	4.51
688	0.3	1.2	1.2	0	0	0	0	0	3.20	3.62
689	0.8	1.2	1.2	0	0	0	0	0	4.77	4.99
690	0.5	1.2	1.2	0	0	0	0	0	3.83	3.93
691	0.3	1.2	0	0	0	0	0	0	1.40	2.33

692	0.6	1.2	0	0	0	0	0	0	2.34	3.11
693	0.7	1.2	0	0	0	0	0	0	2.66	3.31
694	0.8	1.2	0	0	0	0	0	0	2.97	3.61
695	0.5	1.2	0	0	0	0	0	0	2.03	3.32
696	0.9	1.2	0	0	0	0	0	0	3.28	3.65
697	0.4	1.2	0	0	0	0	0	0	1.72	2.31

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Table S4. Initial network structure

Layer	Layer(type)	Output Shape
0	Input Layer	(None, 64, 64, 3)
1	Convolution Layer	(None, 28, 28, 50)
2	Ramp	(None, 28, 28, 50)
3	Pooling Layer	(None, 14, 14, 50)
4	Ramp	(None, 14, 14, 50)
5	Batch Normalization Layer	(None, 14, 14, 50)
6	Convolution Layer	(None, 13, 13, 20)
7	Ramp	(None, 13, 13, 20)
8	Dropout Layer	(None, 13, 13, 20)
9	Convolution Layer	(None, 12, 12, 50)
10	Ramp	(None, 12, 12, 50)
11	Pooling Layer	(None, 6, 6, 50)
12	Batch Normalization Layer	(None, 6, 6, 50)
13	Flatten Layer	(None, 1800)
14	Linear Layer	(None, 200)
15	Ramp	(None, 200)
16	Dropout Layer	(None, 200)
17	Linear Layer	(None, 2000)
18	Ramp	(None, 2000)
19	Linear Layer	(None, 1)
20	Output	(None, 1)