

Supporting Information

Adaptive Wavelet Packet Transform for Support Vector Machine Modeling as Globally Optimized by Particle Swarm Optimization Algorithm

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Table S1. The parameters of Ad-WPT-SVMs obtained using PSO while modeling the content of protein, fat and moisture in meat, and the content of protein and moisture in corn.

No.	Meat			Corn	
	Protein	Fat	Moisture	Protein	Moisture
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	0	0	0	1	1
5	0	0	0	0	1
6	1	1	1	0	1
7	0	1	1	1	0
8	1	0	1	1	1
9	1	1	0	1	1
10	1	0	1	1	1
11	1	1	1	0	1
12	1	1	1	1	1
13	0	0	1	0	0
14	0	1	0	1	1
15	0	1	1	1	0
16	0	0	1	1	0
17	1	1	1	1	1
18	1	1	1	0	0
19	1	0	1	1	1
20	Coding	1	0	1	0
21		0	1	0	1
22		1	0	0	0
23		1	1	0	1
24		1	0	1	1
25		1	1	0	1
26		0	1	0	1
27		1	0	0	1
28		1	0	1	0
29		0	1	1	1
30		1	1	0	0
31		1	1	1	0
32		1	0	0	0
33		1	1	1	1
34		1	1	1	1
35		1	0	0	1
36		1	1	1	1
37		1	0	1	0
38		0	0	1	0

No.	Meat			Corn	
	Protein	Fat	Moisture	Protein	Moisture
39	0	0	1	0	1
40	0	0	0	1	0
41	0	1	1	0	0
42	1	1	1	1	1
43	1	1	0	1	1
44	1	1	0	1	0
45	0	0	0	1	0
46	1	1	1	1	1
47	1	0	1	0	1
48	0	0	0	1	0
49	1	0	0	0	0
50	1	1	1	1	1
51	1	0	0	1	1
52	0	1	1	1	0
53	0	0	1	1	0
54	0	0	1	1	0
55	1	1	0	1	0
56	1	1	0	1	0
57	1	1	1	0	1
58	0	1	1	1	1
59	1	0	1	1	1
60	1	1	1	0	0
61	1	0	1	0	1
62	1	1	1	0	1
63	1	0	1	1	0
64	0	0	1	0	1
65	1	1	1	1	1
66	1	1	1	1	1
67	1	0	0	0	0
68	1	1	1	1	1
69	0	1	1	1	0
70	1	1	1	0	0
71	1	1	0	1	1
72	1	1	1	1	1
73	1	0	1	0	0
74	0	1	1	0	1
75	0	0	1	0	1
76	1	1	1	1	0
77	1	0	1	1	1
78	1	0	1	1	1
79	1	1	1	0	1

No.	Meat			Corn	
	Protein	Fat	Moisture	Protein	Moisture
80	1	0	1	1	0
81	1	1	0	0	1
82	0	0	1	1	1
83	1	1	1	0	1
84	0	0	1	0	1
85	1	1	0	0	1
86	1	1	1	0	1
87	1	1	1	0	1
88	1	0	1	0	0
89	0	0	1	0	1
90	1	1	1	0	1
91	0	1	0	1	0
92	1	1	1	0	1
93	1	0	1	0	1
94	1	1	1	1	0
95	1	1	1	1	1
96	1	1	1	0	0
97	1	1	1	0	1
98	0	1	0	1	1
99	1	1	1	0	1
100	0	0	1	0	0
101	1	0	1	1	1
102	1	1	1	0	1
103	1	1	1	1	1
104	0	1	0	0	1
105	0	1	1	1	0
106	1	1	0	0	0
107	1	1	1	0	1
108	1	1	1	1	1
109	0	1	0	1	1
110	0	1	1	0	0
111	0	1	0	1	1
112	0	1	1	1	0
113	1	1	1	0	1
114	1	0	1	1	1
115	1	0	1	1	0
116	0	1	1	1	0
117	0	0	0	0	0
118	0	0	0	1	1
119	1	1	1	1	1
120	1	1	1	1	1

No.		Meat			Corn	
		Protein	Fat	Moisture	Protein	Moisture
121		1	0	1	1	1
122		1	1	1	1	1
123		0	0	1	1	0
124		0	1	1	1	0
125		1	1	1	1	1
126		0	1	0	0	0
127		0	1	1	0	1
128	σ	1.38	1.25	1.38	1.86	04.92E-3
129	C	3.83E+2	9.34E+3	2.09E+3	4.28 E+5	7.44E+2
130	ε	1.23E-2	1.40E-22	2.42E-2	0.59	0.02

note: Coding represents for the PSO optimized coding sequence of WPT tree in each Ad-WPT-SVM; “0” in the coding part implied that the corresponding node does not exist and “1” meant the existence of the corresponding node; Number in the first column from 1 to 127 represents for the sequence of a node as schemed in Figure 2; σ represents for the optimized kernel width, C for penalty constant C and ε for tolerance zone.

Table S2. The R -square score (R^2) of each model for the content analysis of protein, fat and moisture in meat.

	Protein		Fat		Moisture	
	Cal set	Pre set	Cal set	Pre set	Cal set	Pre set
PLS	0.9247	0.9326	0.9763	0.9835	0.9857	0.9851
BPNN	0.7866	0.8470	0.9187	0.9314	0.9078	0.9423
WPT-SVM	0.9390	0.9270	0.9882	0.9868	0.9874	0.9859
Ad- WPT-SVM	0.9580	0.9446	0.9992	0.9986	0.9946	0.9936

note: RMSE represents for root mean square error; Cal set represents for calibration set and Pre set for prediction set.

Table S3. The R -square score (R^2) of each model for the content analysis of protein and moisture in corn.

	Protein		Moisture	
	Cal set	Pre set	Cal set	Pre set
PLS	0.9904	0.9870	0.9380	0.9598
BPNN	0.9212	0.9229	0.8681	0.8638
WPT-SVM	0.9990	0.9990	0.9704	0.9483
Ad-WPT-SVM	0.9998	0.9996	0.9998	0.9998

note: RMSE represents for root mean square error; Cal set represents for calibration set and Pre set for prediction set.