中村 真務[1)], 道満 恵介[2)], 川西 康友[1)], 平山 高嗣[1)],
井手 一郎[1)], 出口 大輔[1)], 村瀬 洋[1)]
1)
2)

№ ⇔ ≠ ⌐ ⅔ ↑ — ↑ ≤ ⇔ ≡ — √ — ↕
≠ ∆ ∆ ≠
≤ ⇔ ≡ ⇔ ≡ ⇔
⌐ ≠ ≤ ∆ ⌐ √ ⌐ ≠ ™ ≡ — ⌐ ≠ Leave-one-out ⌐ —
™ √ ⌐ ∆ ≠ ⅝ √ ⌐ ≈ ™ ≡ —

Estimating the attractiveness of a boxed lunch focusing on the attributes of side dishes

Masamu Nakamura[1)], Keisuke Doman[2)], Yasutomo Kawanishi[1)],
Takatsugu Hirayama[1)], Ichiro Ide[1)], Daisuke Deguchi[1)], Hiroshi Murase[1)]
1) Nagoya University
2) Chukyo University

Abstract: We propose a method for estimating the attractiveness of a boxed lunch in order to support its arrangement. Here, we define the attractiveness as how nice a boxed lunch appears. This research first determines the attractiveness through subjective experiments, and then construct an attractiveness estimator using attributes and the layout of side dishes. Results from an evaluation experiment by a leave-one-out method showed the effectiveness of the proposed method in terms of rank correlation.

1.

⌐ ⌂ ⅜ — ⌐ ⌂ ≠ № ≤ ↓ — e ⌐ — ∆ ↓ ≤ ≠
— √ ∆ ↓ ≤ ⅜ ≠ ⅝ ⇔ ⅛ ⇔
— √ ⅜ ⌂ e ⌐ ⌂ ⌐ ≠ ™ ⌂ /
⌐ ↓ ≤ ∏ ⇔ ≠ ™ ⅜ ⇔ √ ⌐ تي — √ —
/ — √ ⌐ ∆ ≠ ™ ⅜ № ≠ —
/ — √ ⌐ ⅝ ⌂ ∆ ≠ √ — ↕ — ™ 8 9 ≤ ⇔
№ √ ∆ ↓ ≤ ♪ ♦ ⌂ ⌐ ⅔ ™ ≡ 8 SNS 9 — ™ ≤ ⇔ ≡
⌂ ≥ — e ⌂ — تي ∆
⅛ ∏ ⇔ ≠ ™ ⌂ ⌐ ↓ — ∆ ≡ ™
e ⌂ — ≠ ↕ ≤ ⅜ ™ ≤ ⇔
∂ ⅛ ↕ — 1 ⌐ Kakimori ∆ ⌐ ⅔
∆ 1(a) 1(b) — ⅜ ≠ № ™ ⇔ / e ⌐ ∆ ⇔ ≡
→ ⅜ ≈ e ⌐ ↕ ≡ ™ ↓ ≤ [2] ⇔ ⅛ ⇔ ↓ — ≠ — — —
≠ √ ↔ ⅜ ♂ fi ♩ ⌐ ⌂ e ⌐ ↕ ≡ ™ ⌐ ≈ ™ ≡ ↕ ≡ ⌂ ™ √ ى ⅜
↓ ≤ ⅛ √ ⅜ ↑ ≡ ⅔ ↕ ≡ ™ ⌂ ™ ∆ √ — ⌐ ≈ ™ ≡ ↕ ≡ ™

(a) √ ⅜ ™ئ

(b) √ ⅜ ™ئ

1 پ— ╩ ╕ ┤ ڈ ↑ ئ [1] ╟┤

ـلم — ⌐ Δ ╢ ╚ №╢

Takahashi ╟ | — ⅝≤ ڈ — ┘ ╩

⇔ ـلم— ╩ Δ╢ ╩ ⇔

≡™╢[3] ╕ √ ⋕ ╟ | ـلم— ╩

Δ╢ √ ┗⌐ — ⌐ ╩

⇔ ⁄ — ⅛╟ ـلم ╩ Δ╢

╩ Δ╢ ╩ ⇔≡™╢[4] ⌐ ╟

| — — ⅜ ┘

⌐ ╓Δ ╩ ⇔≡ ╓⅛

⇔ ☻ ◗ ↄ ⁱ ⌐ ⇔ ₁— ـلم ╩

⇔≡ ⩽⩽ — ╩ Δ╢ ╩

⇔≡™╢[5] ⇔⅛⇔ ↓ ╡ ╟— ≠ | —

╩ ╖ ╤∑√ — ⌐≈™≡ | ↕ ╡

≡™⌂™

⁄ ↓≠ ₁ | 1 ≈— ⌐ ⅜ ╟┤

≡ ┤ ڈ ↑ ╟╡≡™╢ ╩ ≤⇔

⅜ ⌂╢ — ╩ Δ╢

خ 2 ≠ | — ╩

Δ╢ ⌐3 ≠ | ♦ ↄ ↻ ☿ ᴾ ♩ — ≤

♦ ↄ ↻ ☿ ᴾ ♩ چ— ـلم ⌐ ڈ ٹΔ╢ ╩

Δ╢ √ ┗— ⌐≈™≡ ═╢ 4 ≠ |

— ╩ Δ╢ √ ┗— ⌐≈™≡

≤≤ ╚⌐ Δ╢ ⌐ 5 ≠

╩╕ Δ┬

2.

| — ⌐ Δ

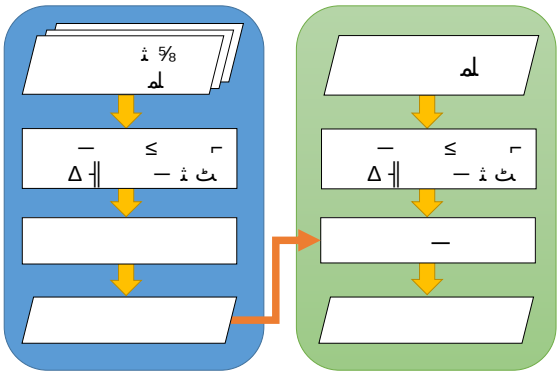
╢ 3 ≈— ╩ ╖ ╤∑≡ ≤⇔

— ⌐↓— ╩ Δ╢ ↓ ≤≠ —

⩽⩽ — ╩ Δ╢

2 ⌐ — ╩ Δ ≠

| ╩ ڈ ٹ⇔√ ـلم ⅛╟ ╩



2 —

⇔≡ Δ╢ ↓ ≤ ⌐ ╟┤ ╩ Δ

╢ ≠ | ⇔√ ╩ ™

≡ ⅜ ≠ №╢ ـلم— ╩ Δ

╢ خ — ⌐≈™≡ ═╢

2.1

≠ | ⌐ ⇔≡ ؤ ⌐ إ ≠ ٹ ٹ

⇔√ ⌐ Δ╢ 3 ≈— ╩

2 ثم ح ◗ ┘ ⁱ ≠ ⇔ ↓ ╡ ╟╩ ⇔≡ —

╩ Δ╢ خ 3 ≈— —

≤ ⁄ ╡ ╟— ⌐≈™≡ Δ╢

ـلم ⌐ ╩ Δ ╩ Δ╢ ╕ ∏

≤Δ╢ — ذ — ↕ ╩ ≠ Δ╢ لحي

ى ⌐ | — ⅜ لـ هي ≠ №╢ ⅛ —╟

e ⌐ ⅜ ⅛╟⌂ ≠ №╢ ╚—╩ ⅜ ذ ™

≤ ╖ ⌂ Δ ⌐ چ— ⌐ ╟≈⅝

™⌐≈™≡ —3 ≠ Δ╢

⌐ ╟≈⅝ ⌐ ╟≈⅝ ىلحي ⌐ |

— ⅝↕≤ ≠ ⌐ ╟≈⅝ ™╩ Δ╢

⌐ ⅜ ķ ! ☻ ☿ ᴾ ◗ ⌂≥⌐ طهي ∫ ≡™╢

⅛ ⅛╩ ≠ Δ╢ ↓ ╡ ⌐ ╟┤ √5 هي ح

◗ ┘ ⁱ ╩ — ≤Δ╢

(1)

	ئو						
	≡ ممم						
1	0.173	0.255	0.228	0.336	**0.165**	0.318	0.291
2	**0.235**	0.325	0.253	0.315	0.260	0.372	0.260
3	0.294	0.308	0.290	0.402	**0.286**	0.438	0.294
4	0.300	0.325	0.257	0.419	**0.237**	0.422	0.316
5	0.293	0.357	0.353	**0.235**	0.367	0.264	0.357
6	0.364	0.345	0.338	**0.262**	0.280	0.301	0.330
7	0.260	0.316	0.235	0.233	0.270	0.230	**0.211**
8	0.345	0.345	0.346	0.356	0.386	0.402	**0.339**
	0.283	0.322	0.287	0.320	**0.281**	0.343	0.300

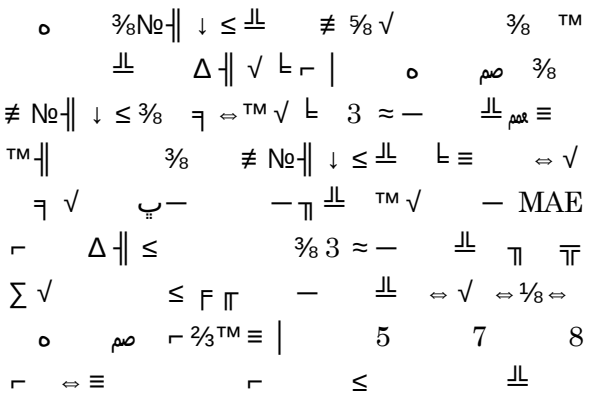
	ئو						
	≡ ممم						
1	**0.89**	**0.89**	0.60	0.14	0.83	0.09	0.14
2	0.14	0.09	0.16	0.09	0.16	**0.37**	0.16
3	**0.77**	0.71	0.60	0.26	**0.77**	0.31	0.27
4	0.54	0.54	0.54	0.43	**0.60**	0.94	0.03
5	0.09	0.54	0.26	**0.26**	0.26	0.20	0.14
6	**0.54**	0.26	0.43	0.43	0.47	0.14	0.09
7	0.31	0.09	0.14	0.60	0.09	**0.66**	0.61
8	0.54	0.54	**0.71**	0.41	0.20	0.14	0.04
	0.46	0.32	0.37	0.18	0.36	0.03	0.19

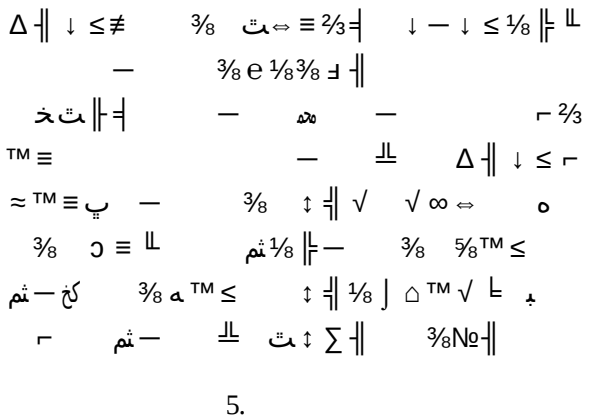
— ╖ 3 ≈ — — e ∟ — 2 ≈ ⅛ ╠ ⌂ ╢
3 ≈ 3 ≈ Δ = ≡ ⅛ ╠ ⌂ ╢
— ممم 7 — ╩ Δ ╢
— ≤ تي | ♦ ⊃ ⍝ ☿ ⍴ ⌡ ـچ — ممم 8
⌐ Δ ╢ Leave-one-out ⌐ ╠ ╡ ∫ √
⌐ | scikit-learn ! ▬ Ķ ! ¡ [8] ـچ —
RandomForestRegressor ╩ ™ √ / — — Ɍ
! ⍵ ⊃ ⍝ | random_state = 2 n_estimators =
6 ≤ ⇔ √ تي | Thurstone — ڀ
⌐ ╠ ╡ ⇔ √ ♦ ⊃ ⍝ ☿ ⍴ ⌡ ـچ — — ≤
↕ ╢ √ — MAE Mean
Absolute Error ≤ ♦ ⊃ ⍝ ☿ ⍴ ⌡ ـچ — ⌐
⅔ ↑ ╢ — ⌐ ╠ ╢ ه ≤ ↕ ╢ √

⌐ ╠ ╢ ه — ╩ Δ Spearman — ه
صم ≤ ⇔ √

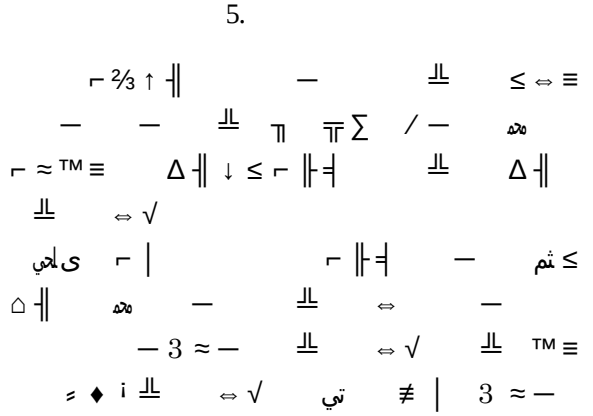
4.2
ئو — ⌐ ╠ ╢ تي ╩ 1 ≤
2 ⌐ Δ ـچ — — | ⌐ ⅔™ ≡
≢ № ∫ √ ئو — ثم ≢ №╢ 1 ⅛ ╠
⌐ ≈ ™ ≡ | ⅜ — ╖ ╩
™ √ ≤ ⊨ ╓ ≢ №╢ ↓ ≤ ⅜ ╢ ڀ
2 ⅛ ╠ ه ⌐ ≈ ™ ≡ | — ╩
⇔ √

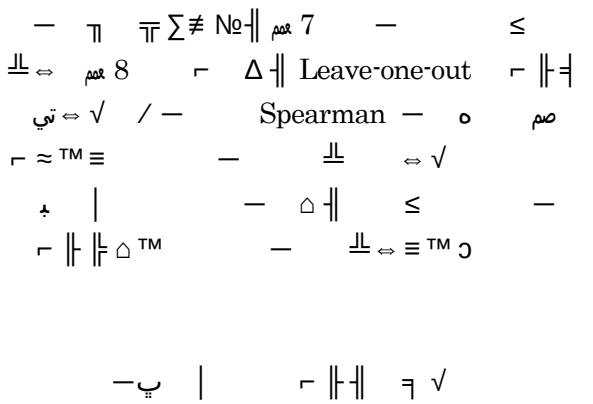
4.3
2 ╠ ╡ | ثم ⌐ ⇔ ≡ ⊨ ╓ —

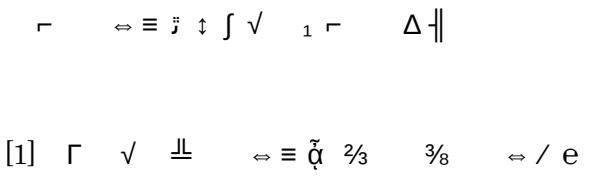




5.







[1]

https://matome.naver.jp/odai/2142422656895844501/. 2018/05/21

[2] T. Kakimori M. Okabe K. Yanai R. Onai Γ A system to support the amateurs to take a delicious-looking picture of foods Δ Proc. SIGGRAPH Asia 2015 Symposium on Mobile Graphics and Interactive Applications 28 2015.11

[3] K. Takahashi K. Doman Y. Kawanishi T. Hirayama I. Ide D. Deguchi H. Murase Γ Estimation of the attractiveness of food photography focusing on main ingredients Δ Proc. 9th Workshop on Cooking and Eating Activities in conjunction with IJCAI2017 1 6 2017.8

[4]

2017-CVIM-207 -36 2017 5

[5]

MVE2017-22 2017 9

[6]

http://www.maff.go.jp/j/syokuiku/zissen_navi/balance/guide.html. 2018/05/21

[7] L.L. Thurstone Γ Psychophysical analysis Δ Am J. Psycholc. 38 368 389 1927.7

[8] F. Pedregosa G. Varoquaux A. Gramfort, V. Michel B. Thirion O. Grisel M. Blondel P. Prettenhofer R. Weiss V. Dubourg J. Vanderplas A. Passos D. Cournapeau M. Brucher M. Perrot E. Duchesnay Γ scikit-learn Machine learning in Python ΔJ. Mach. Learn Res. 12 2825 2830 2011.10

© 2018 by the Virtual Reality Society of Japan (VRSJ)