

あらまし

3

キーワード

A study on estimating the attractiveness of food photography composition

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Abstract This report studies a method for predicting the attractiveness of a food photo in order to assist a user to shoot attractive food photos. The proposed method extracts both color features and shape features from the food images, and then integrates them according to a regression scheme in order to predict the attractiveness of an unknown food photo. We created image datasets of food photos taken from various 3D-angles, and set a target value of the attractiveness for each food photo by subjective experiment results. We analyzed the effectiveness and the generalization performance of the proposed method by experimental results, and showed the effectiveness of switching the predictor for each food category.

Key words Food photo, shooting support, attractiveness, shooting angle

1. はじめに

SNS

Web

Web

1

1 (b)

1 (a)

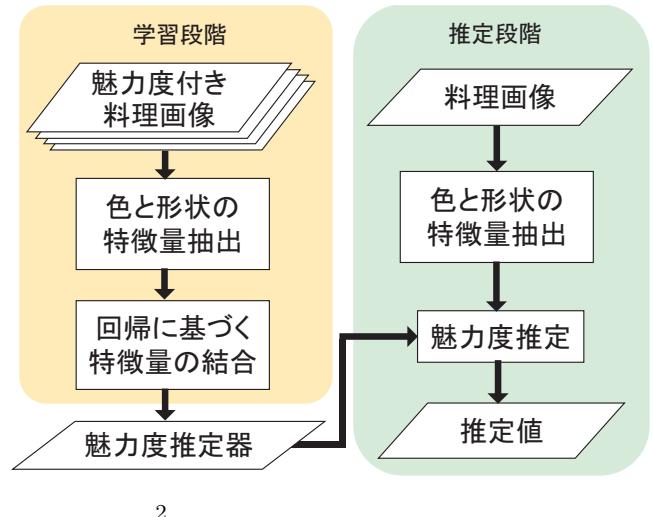


(a)



(b)

1



2

[1]

[2]

[3]

(a)

(b)

3 GrabCut

[4]

[5]

Charles

2.1 学習段階：魅力度推定器の構築

2

GrabCut [7]

GrabCut

3

1

[6] [6]

SVR : Support Vector Regression [8]

2.1.1

2

3

4

5

[9]

2. 画像特徴による料理写真の魅力度推定

2

 $L^*a^*b^*$ $L^*a^*b^* \quad 3$

$$G = (L, a, b)$$

 $L^*a^*b^* \quad 0 \quad 7 \quad 8$

$$\begin{aligned}
R_i &= (\tilde{L}_i, \tilde{a}_i, \tilde{b}_i) & F_{R_i} \\
i & & 0 \leq i \leq 24 & 0 \leq \tilde{L}_i \leq 7 \\
0 \leq \tilde{a}_i \leq 7 & 0 \leq \tilde{b}_i \leq 7 & G & L_i & D_i
\end{aligned}$$

$$D_i = F_{R_i} \sqrt{(L - \tilde{L}_i)^2 + (a - \tilde{a}_i)^2 + (b - \tilde{b}_i)^2} \quad (1)$$

$$\begin{aligned}
D_i & & F_{R_i} \\
25 & & 25 \\
& & \mathbf{D}
\end{aligned}$$

$$\mathbf{D} = (D_1, D_2, \dots, D_{25}) \quad (2)$$

2. 1. 2

1 4

GrabCut [7]

$$\begin{aligned}
m(x, y) & & \theta(x, y) \\
m(x, y) &= \sqrt{f_x(x, y)^2 + f_y(x, y)^2} & (3) \\
\theta(x, y) &= \tan^{-1} \frac{f_x(x, y)}{f_y(x, y)} & (4)
\end{aligned}$$

$$f_x \qquad \qquad \qquad f_y$$

5

2. 1. 3

2. 1. 1 2. 1. 2

3

2. 1. 1 2. 1. 2

SVR

2. 2 推定段階：魅力度の推定

2

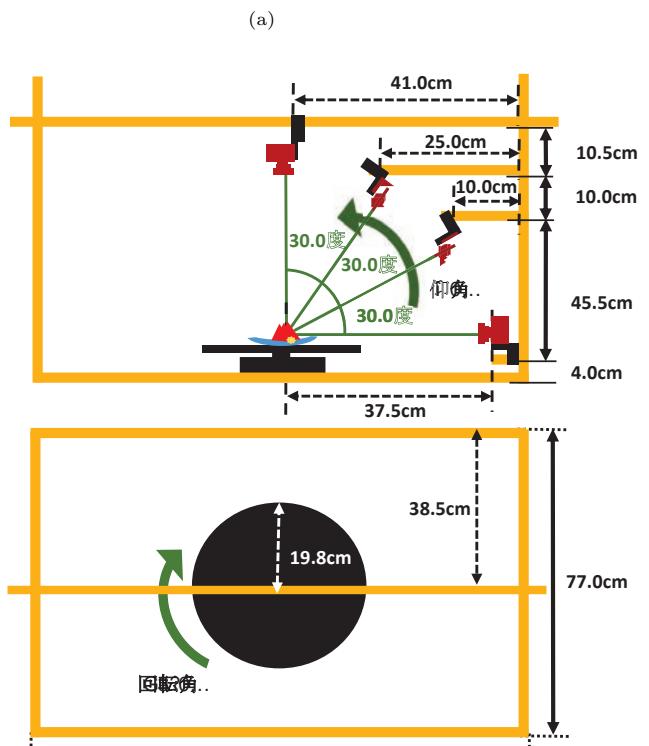
2. 1. 1 $L^*a^*b^*$

2. 1. 2

3. 魅力度付き料理画像データセットの構築

1 4

GrabCut [7]



(b)

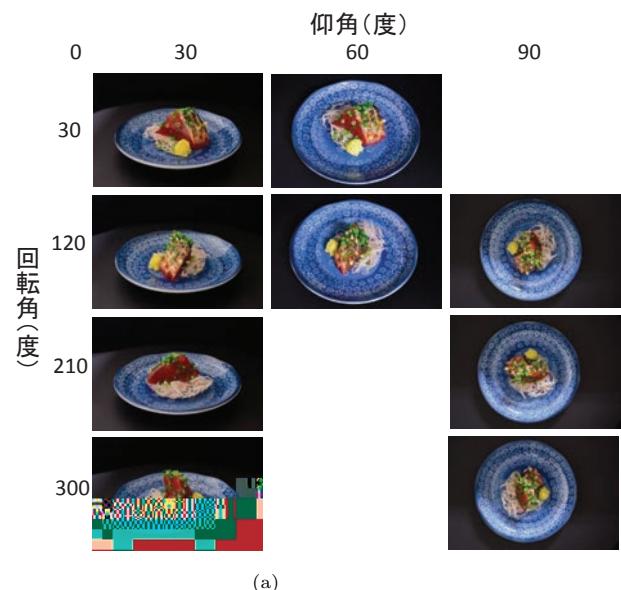
Thurstone

[10]

3.1 対象料理



3.2 撮影方法



3.3 Thurstone の一対比較法による魅力度の算出

Thurstone

12 0 1

Thurstone

$$36 \quad 2 \quad 36C_2 = 630$$

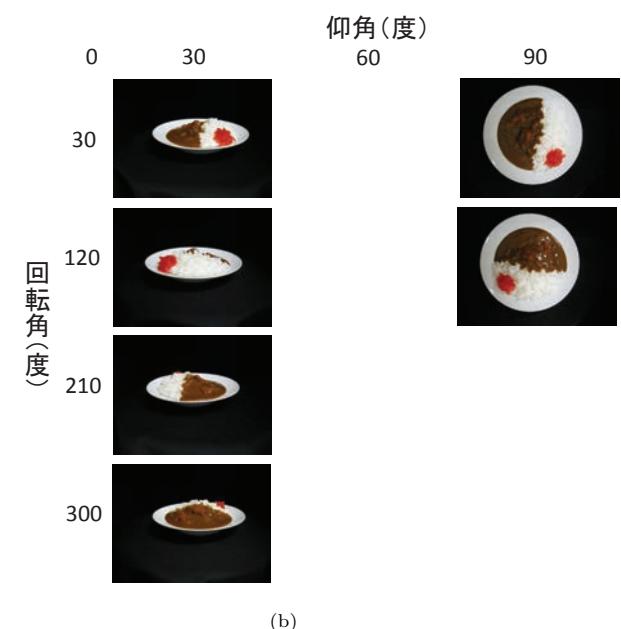
3

6

20

3

[0,1]



60

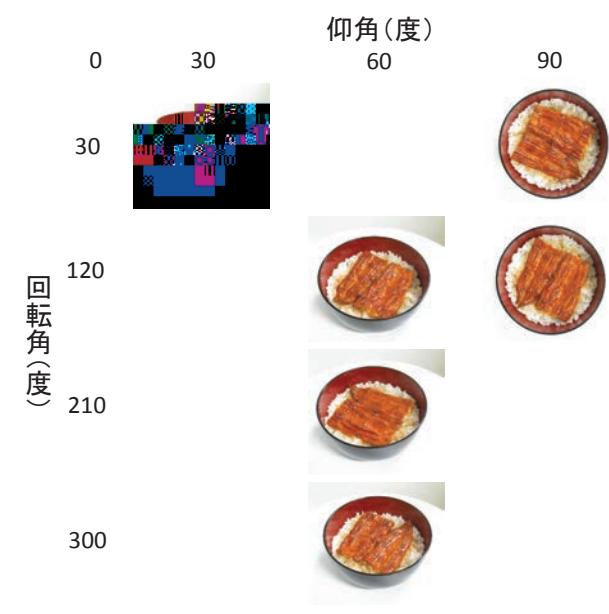
3 7
3

4. 評価実験

1

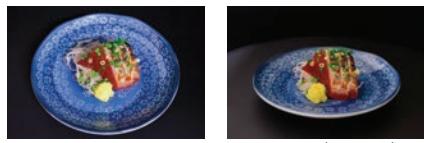
, “
//www.maiduru.biz/ [2015/9/7/].

maiduru pro,” http:





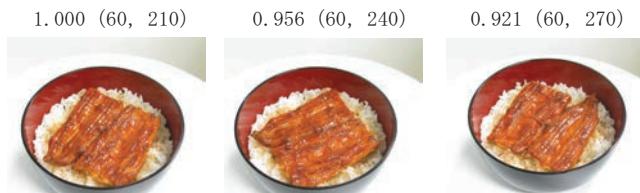
6



1.000 (60, 30)

0.948 (30, 60)

0.945 (60, 60)



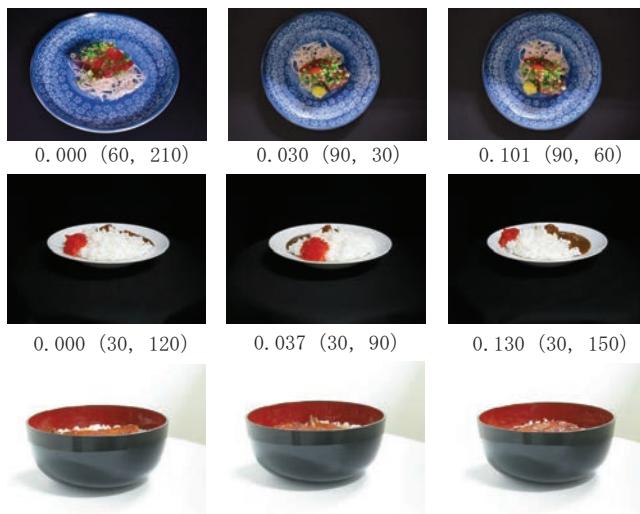
1.000 (60, 120)

0.990 (60, 150)

0.985 (60, 300)

(a)

3



0.000 (30, 0)

0.001 (30, 240)

0.001 (30, 330)

(b)

3

$L^*a^*b^*$	$D)$	特微量	パラメータ名	分割数
		L^*	L^*	8
		a^*	a^*	8
		b^*	b^*	8
		1 4		36

手法 (特微量)	MAE		
	鰯のたたき	カレー	鰻丼
1	0.263	0.215	0.320
2	0.189	0.162	0.086
+	0.159	0.155	0.192

手法 (特微量)	MAE		
	鰯のたたき	カレー	鰻丼
1	0.249	0.241	0.304
2	0.260	0.167	0.326
+	0.255	0.247	0.300

4.1 実験条件

1	$L^*a^*b^*$
L^*	a^*
b^*	8
36	

4.2 実験結果

leave-one-out	3
leave-one-out	2
SVR	
LIBSVM [11]	
0	1
Thurstone	

MAE Mean Absolute Error

4.2.1

2	
0.159	0.155
	0.086

4, 2, 2 3

3

3

3

3

0 249

Q

3

3

4.3 考察

4.3.1

3

謝辭

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4, 3, 2

5. まとめ