# Visual Noise

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**あらまし**

1 visual noise
Visual noise
visual noise
visual noise
visual noise

**キーワード** visual noise ITS

## 1. は じ め に

(a)

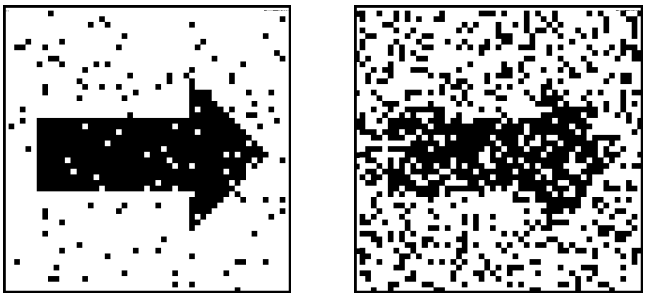
(b)

1

Kimura

[1]

Kimura



(a) Visual noise (b) Visual noise

2 Visual noise

1

1(a) 1(b)

1

1 visual noise

Visual noise

2 visual noise

2(a) visual noise 2(b) visual noise

2(b) visual noise

2(b)

2(a) Visual noise

Shidara Richmond

visual noise

[2]

visual noise

visual noise

2. 3.

4.

5. 6.

## 2. 関 連 研 究

Itti saliency map

[3]

[4], [5]

Itti

[6]

Kimura

[1]

[7]

Engel HOG

SVR

[8]

visual

noise

visual noise

## 3. 雨天時の信号機視認性推定手法

### 3.1 アプローチ

visual noise

$\hat{V}$

$$\hat{V} = F_v(\boldsymbol{v}) + F_c(\boldsymbol{c}) + F_a(\boldsymbol{a}), \tag{1}$$

1 visual noise $\boldsymbol{v}$ 2

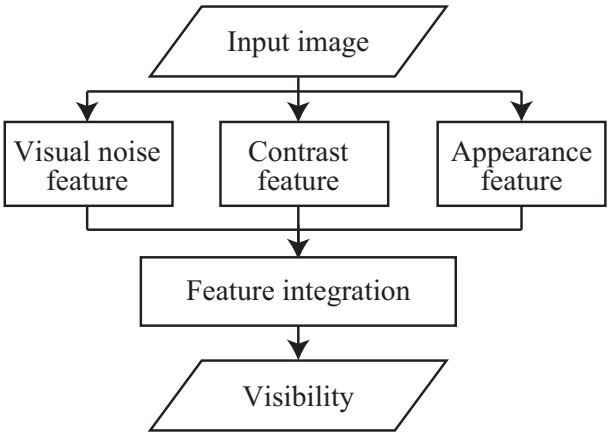
$\boldsymbol{c}$ 3 $\boldsymbol{a}$

(2) (4)

$$F_v(\boldsymbol{v}) = \boldsymbol{w}_v \boldsymbol{v} \tag{2}$$

$$F_c(\boldsymbol{c}) = \boldsymbol{w}_c \boldsymbol{c} \tag{3}$$

$$F_a(\boldsymbol{a}) = \boldsymbol{w}_a \boldsymbol{a} \tag{4}$$




3

$\boldsymbol{w}_v$ $\boldsymbol{w}_c$ $\boldsymbol{w}_a$

(1)

3 visual noise

## 3.2 利用する特徴量

visual noise $\boldsymbol{v}$

$\boldsymbol{c}$ $\boldsymbol{a}$

### 3.2.1 Visual noise $\boldsymbol{v}$

visual noise

2 visual noise

visual noise $\boldsymbol{v} = (v_r, v_s)$

1

$v_r$ 1 $v_s$

$v_r$ $v_s$

$$v_r = N_{\mathrm{rain}}, \tag{5}$$

$$v_s = \frac{1}{N_{\mathrm{rain}}} \sum_{i=0}^{N_{\mathrm{rain}}} S_i, \tag{6}$$

$N_{\mathrm{rain}}$ $S_i$ $i$

[9], [10]

[10]

Canny

4

### 3.2.2 $\boldsymbol{c}$

Kimura

[1]

$W$ $H$ 5(a)

(a) (b)

5

$3 \times 3$

$i$ $f_i$ $(i = 0, 1, \cdots, 8)$

$f_i$ FFT

$P_i(j,k)$

$$c_{\mathrm{tex}} = \sum_{i=1}^{8} \sum_{j=0}^{J} \sum_{k=0}^{K} |P_0(j,k) - P_i(j,k)| \tag{7}$$

$C_{\mathrm{lum}}$

$$c_{\mathrm{lum}} = \sum_{i=1}^{8} |I(i) - I(0)|, \tag{8}$$

$I(i)$ $f_i$

(a)

(b)

7

2

MAE SD

### 4.4 結　　果

#### 4.4.1

2

MAE

SD

MAE

5%　t　　t

visual noise

#### 4.4.2

3　　.

MAE

SD

2　　MAE

SD

| | | MAE | SD |
|---|---|---|---|
| | $c_{\mathrm{tex}}$ [1] | 0.192 | 0.135 |
| | $c_{\mathrm{tex}}$ [1]<br>$v_r$<br>$v_s$ | 0.137 | 0.085 |

3　　MAE

SD

| | | MAE | SD |
|---|---|---|---|
| | [1] | 0.514 | 0.287 |
| | $c_{\mathrm{lum}}$<br>$a_s$<br>$v_r$<br>$v_s$ | 0.248 | 0.205 |

MAE　　5%　t

t

visual noise

## 5. 考　　察

### 5.1 昼　　間

10

10　　0.456　　0.456

11

10

visual noise　　10

### 5.2 夜　　間

9(a)　9(h)

9(b)

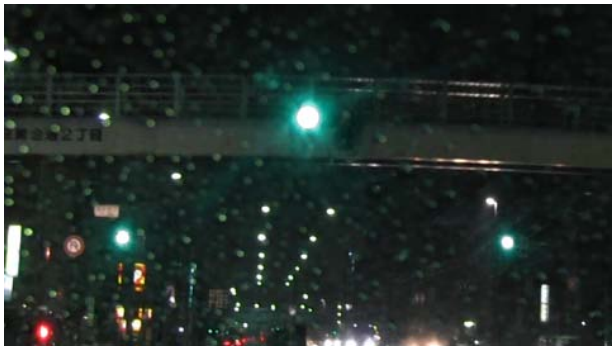
9(h)

visual noise

12

(a) $V = 0.000$

(b) $V = 0.089$



(c) $V = 0.193$

(d) $V = 0.349$

(e) $V = 0.526$

(f) $V = 0.656$

(g) $V = 0.892$

(h) $V = 1.000$

9

Thurstone

[0, 1]

10

11 0.489

12

## 6. む す び

visual noise

Visual noise

visual noise

visual noise

3

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## 謝 辞

JST CREST K23-XVI-373 , MIST http://mist.murase.m.is.nagoya-u.ac.jp/ .


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