

# SIFT SURF

\*<sup>1)</sup>, \*, \*, \*, \*\*, \*\*<sup>2)</sup>, \*  
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## A Comparison of performance between SIFT and SURF

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(Registration)

Transform) SURF (Speeded Up Robust Feature)가 , SIFT (Scale Invariant Feature Transform)가  
 SURF SIFT

1.

(1) (2) (3) (4)  
 가 (1) 가  
 [1]. MPEG-7 G I (1) 가

(Image descriptor)

(Low-level visual feature)

$$D(x, y, \sigma) = (G(x, y, k\sigma) - G(x, y, \sigma)) * I(x, y) \quad (1)$$

[2].

가

[3],

(Interest feature point)

DoG

2:1

(1)

3\*3

[4].

Scale Invariant Feature Transform(SIFT) Speeded Up Robust Feature(SURF)가

(2)

[5,6].

SIFT SURF

(3)

(4)

2.

(Gaussian Blur)  
 (Scale)

2.1 SIFT

SIFT(Scale Invariant Feature Transform) David Lowe 가

가

가

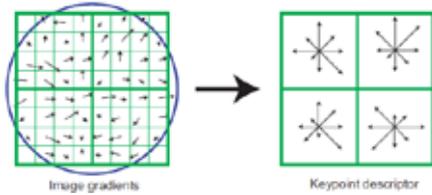
[5]. SIFT 4

1 4\*4

가

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( 1) SIFT

$$v = (\sum d_x, \sum d_y, \sum |d_x|, \sum |d_y|)$$

가 , 4\*4  
64

2.2 SURF

SURF (Speeded Up Robust Features)  
(Multi-Scale Space Theory)

[6].  
(Integral Image)  
Paul [7] ,  $x = (x,y)$   
 $x$   
 $I$   
(2)

$$I_{\Sigma}(x) = \sum_{i=0}^{i \leq x} \sum_{j=0}^{j \leq y} I(i,j)$$

(2)

(3) x

$$H(x, \sigma) = \begin{bmatrix} L_{xx}(x, \sigma) & L_{xy}(x, \sigma) \\ L_{yx}(x, \sigma) & L_{yy}(x, \sigma) \end{bmatrix}$$

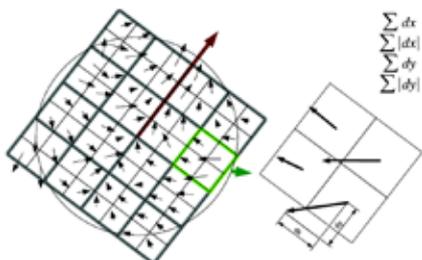
(3)

(3) ,  $L_{xx}(x, \sigma)$   $I$   $x$  가  
2 ,  $L_{yy}(x, \sigma)$   
. SURF

, 2 가 9\*9

가

( 2).



( 2)

3. 가

, 10

가  
2.6 GHz 4  
GB 가  
가 PC Matlab 2010A  
SIFT SURF

3 , (a) (b)

가 SURF  
4 (c) (d)

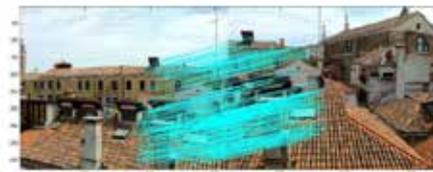
가



(a)



(b)



(c) SIFT



(d) SURF

( 3)

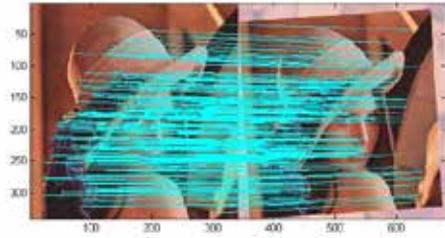
가



(a)



(b)



(c) SIFT



(d) SURF

[1] Ethan Rublee, Vincent Rabaud, Kurt Konolige, Gary Bradski, "ORB: an efficient alternative to SIFT or SURF", International Conference on Computer Vision, pp.2564~2571, 2011.

[2] B.S. Manjunath, Jens-Rainer Ohm, Vinod V. Vasudevan, Akio Yamada, "Color and Texture Descriptors", IEEE Transactions on Circuits and Systems for Video Technology, vol.11, no.6, 2001.

[3] Jun Yang, Shi-jiao Zhu, "Narrowing Semantic Gap in Content-based Image Retrieval", International Conference on Computer Distributed Control and Intelligent Environmental Monitoring, pp.433~438, 2012.

[4] Ran Tao, "Visual Concept Detection and Real Time Object Detection", Computer Vision and Pattern Recognition, 2011.

[5] David G. Lowe, "Distinctive Image Features from Scale-Invariant Keypoints", International Journal of Computer Vision, vol.60, issue.2, pp.91~110, 2004.

[6] Herbert Bay, Tinne Tuytelaars, Luc Van Gool, "SURF: Speeded Up Robust Features", Computer Vision and Image Understanding, vol.110, no.3, pp.346~359, 2008.

[7] Paul Viola, Michael Jones. "Rapid Object Detection using a Boosted Cascade of Simple Features", Conference on Computer Vision and Pattern Recognition, vol.1, pp.511~518, 2001.

[8] Luo Juan, Oubong Gwun, "A Comparison of SIFT, CA-SIFT and SURF", International Journal of Image Processing, vol.3, issue.4, pp.143~152, 2011.

[9] <http://www.mathworks.com>

( 4)

가

8 , SIFT  
SURF ,  
10  
SIFT  
SURF

< 1 >

SIFT	298	3.698
SURF	204	11.590

4.

SIFT SURF