Shape and Moment Invariants Local Descriptor for Structured Images

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Abstract

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1 Introduction

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Figure 1: "Is it the same object or scene?" Matching two images under different transformation using local interest regions detected by MSER.
Top image pair (scale and viewpoint): SURF descriptor yields false negative (similarity score 0.096), while the proposed SMI descriptor - true positive (0.89).
Bottom image pair (blur): SURF gives false positive (0.27), while SMI - true negative (-0.11).

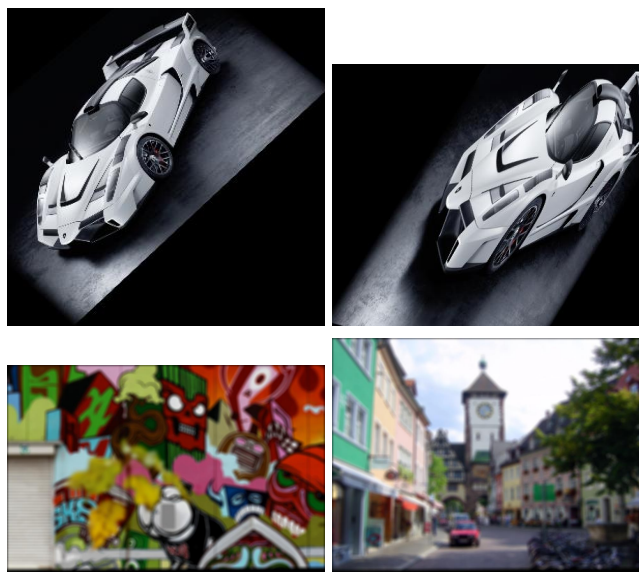Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton. Here goes the Introduciton.Here goes the Introduciton.

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2 Related Work

2.1 Salient region detectors

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Figure 2 shows individual colour channels.

Figure 2: A figure

2.2 Region descriptors

State of the art in region descriptor

3 Image matching with Shape and Moment Invariant descriptor

3.1 Simple shape invariants

3.2 Moment invariants

Consider the variable $x \in \mathbb{R}$,

$$f(x) = x^2 + 2 \tag{1}$$

Equation (1) is a polynomial of order 2.

3.3 Matching

My Paragraph: This is a paragraph.

4 Performance Evaluation

4.1 VGG dataset

The performance results on the VGG dataset are summarized in Table 1.

Det. + descr.	TP	TN	FP	FN	Acc.	Prec.	Recall
MSER + SURF	128	428	4	16	0.965	0.969	0.889
MSER + **SMI**	122	430	2	22	0.958	0.98	0.847
BIN + SURF	122	426	6	22	0.951	0.953	0.847
BIN (All) + **SMI**	84	432	0	60	0.89	1	0.58
BIN (Largest) + **SMI**	112	424	8	32	0.93	0.93	0.77

Table 1: Performance of salient region detectors and descriptors on the VGG dataset.

4.2 OxFrei dataset

The performance results on the VGG dataset are summarized in Table 2.

Det. + descr.	TP	TN	FP	FN	Acc.	Prec.	Recall
MSER + SURF	3309	28848	2904	660	0.90	0.53	0.83
MSER + **SMI**	2957	31162	590	1012	0.95	0.83	0.74
BIN + SURF	2513	28198	3554	1456	0.85	0.41	0.63
BIN (All) + **SMI**	1275	31298	454	2694	0.91	0.73	0.32
BIN (Largest) + **SMI**	2079	28474	3278	1890	0.85	0.38	0.52

Table 2: Performance of salient region detectors and descriptors on the OxFrei dataset.

5 Conclusion

A VGG dataset matching results

B OxFrei dataset matching results

References

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