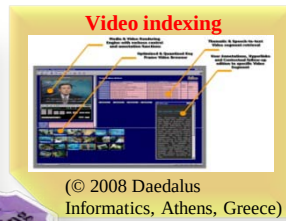


A Robust Real-time Object Tracking using SIFT Features

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Research Contents

Background

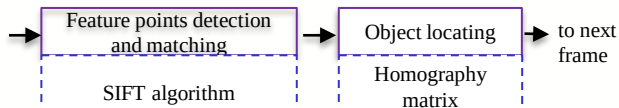


Introduction of SIFT



Target1: Real Time Rigid Object Tracking

Overall tracking procedure in each frame



Proposals for Reducing Time in Tracking

- Use Homograph Matrix to locate ROI
- Use 20 keypoints to describe an object
- No descriptor part for other keypoints

Experimental Results

Test sequence	Type	# of frames	Frame rate	Time(ms) / frame	Time reduction	Average error (pixels)
Book	Mean shift	300	14.9	66.9		16.5
	Traditional SIFT tracker	300	0.37	2673		1.6
	Proposed 20 KPs	300	5.18	193	92.8%	1.8
Small box	Mean shift	265	19.7	50.8		6.5
	Traditional SIFT tracker	265	0.42	2368		1.5
	Proposed 20 KPs	265	5.16	194	91.8%	1.6
Wallpaper	Mean shift	126	17.3	57.9		15.6
	Traditional SIFT tracker	126	0.33	3010		1.6
	Proposed 20 KPs	126	4.58	218	92.8%	1.7
Notice	Mean shift	108	20.2	49.5		10.9
	Traditional SIFT tracker	108	0.54	1840		2.2
	Proposed 20 KPs	108	5.69	177	90.4%	2.4

Targets

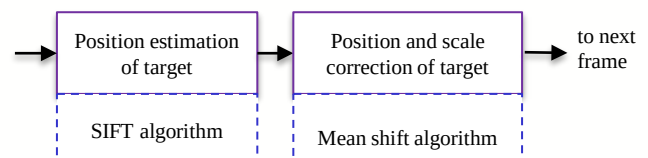
Object trackers using SIFT features		
	Accuracy	Complexity
Rigid object	Traditional Tracker	Target 1
Non-rigid object	Target 2	Future work

Target2: Robust Non-rigid Object Tracking

Performance

- Complex object motion
- Non-rigid or articulated nature of objects
- Partial and full object occlusions

Overall tracking procedure in each frame



Experimental Results

Test sequences	# of frame	size	trackers	Frame rate (fps)	Average error
Complex motion	434	320*240	Mean shift	40.8	8.2
			Proposed	4.2	7.6
Occlusion by branches	488	320*240	Mean shift	43.2	36.0
			Proposed	13.8	8.0
Occlusion by pillar	298	320*240	Mean shift	37.2	18.7
			Proposed	11.4	8.3

Tracking result examples of "Occlusion by pillar"

