



Eye and nostril localization for automatic calibration of facial action recognition system

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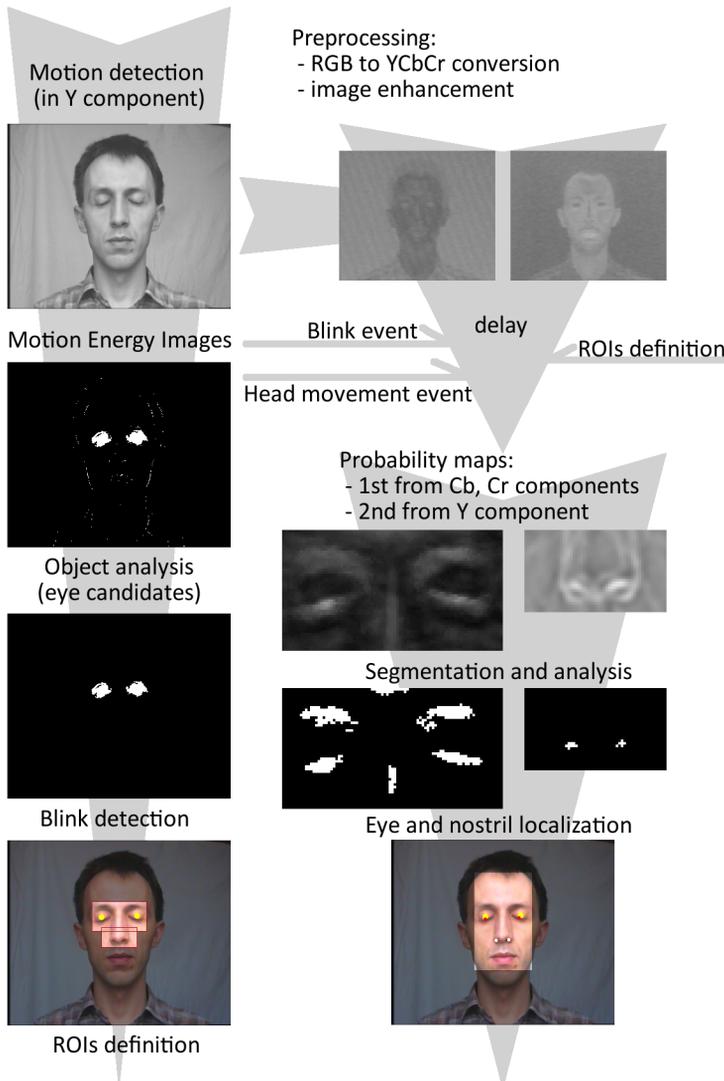
Abstract

The main contribution of this paper is eye and nostril localization algorithm designed to initialize facial expression recognition system or recalibrate its parameters during operation.

Key issues:

- automatic facial action recognition using image analysis algorithms
- application of facial gestures to machine control
- modelling sources of variation in facial appearance is a challenging task
- adaptation of machine to human and environment

Algorithm outline



Experimental results

Video sequences used for algorithm evaluation



MATLAB/Simulink implementation of the algorithm

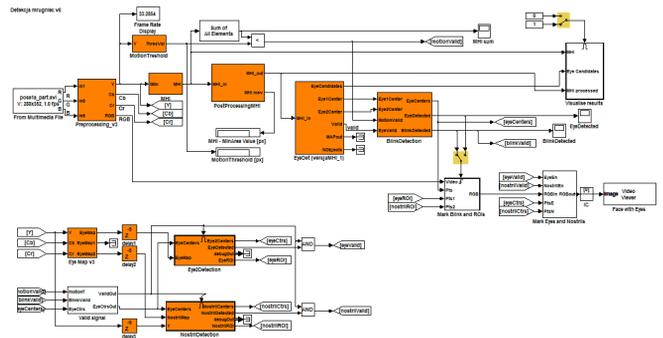


Table 1. Eye and nostril localization results

Video	N_{FP}	N_{TP}	FD	E_{err}^1	E_{err}^2	TP	FD	N_{err}^1	N_{err}^2
eye	eye	eye	eye1	eye2	μ max	μ max	nostril	nostr.1	nostr.2
								μ max	μ max
1a	103	103	0	0	3 6	5 9	103	0	0
1b	67	67	0	1	3 5	5 14	67	0	0
1c	74	74	3	5	3 20	7 22	74	0	7
1d	47	47	0	0	3 5	5 7	47	0	0
1e	71	67	0	0	2 5	3 6	71	0	0
2	73	73	12	9	5 13	8 14	72	0	0
3	128	128	2	2	4 19	3 18	128	0	0
4	190	187	32	17	6 36	4 31	53	15	14
								5 16	5 11

Conclusion

Proposed eye and nostril localization algorithm is efficient and can be used to calibrate facial action recognition system

Current research focus:

- developing blink detection, eye and nostril localization algorithm
- evaluation using images taken by different cameras and under various conditions

Future research focus:

- real-time implementation
- further evaluation and eliminate algorithm weaknesses
- vision based facial action recognition system for people with disabilities