
REAL TIME OBJECT DETECTION AS A RANDOM WALK PROCESS

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Abstract

We describe a general approach for very fast automatic object detection inspired on the ideas of sequential statistical decision making. Instead of making decisions at fixed time and with a fixed representation, in sequential decision making one progressively accumulates information until enough evidence is gathered to make a decision. The accumulation of evidence as a function of time can be seen as a random walk process. The time to cross threshold typically changes from pattern to pattern, typically resulting in significant gains on average speed. The approach we propose can be seen as a fine-grain generalization of the cascaded recognition method recently explored by Viola and Jones (2001). Instead of a cascade of complex independent classifiers, as proposed in Viola and Jones, we use a sequence of very simple feature detectors which accumulate information over time until a threshold is reached. The approach is reminiscent of Ratcliff's diffusion model of human reaction time in categorization's tasks. We discuss results of the approach on a real-time automatic face detection system.

References

Viola, P., & Jones, M. (2001). *Robust real-time object detection* (Tech. Rep. No. CRL 20001/01). Cambridge Research Laboratory.