

Effects of gaze-contingent stimulation on eye movements with natural videos

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We measured the effect of presenting peripheral visual patterns on the subjects' scan paths when viewing 20-second video clips of natural indoor and outdoor environments. Small red squares or looming patterns were overlaid on the video for 200 ms at locations between 12-20 degrees away from the position of gaze. The actual location was chosen randomly from candidate locations that had some minimal amount of saliency (mean spatio-temporal curvature).

The red squares had a width of one degree of visual angle and their luminance was dependant on local spatial contrast. The looming pattern was presented in squares with a width of two degrees. Within that square, the video content was zoomed by a factor that changed from one to three within 133 ms.

Results show that in videos with relatively low intrinsic saliency, about 50% of the peripheral stimuli triggered a saccade to the desired location, while in more salient videos this rate was about 25%. Subjects' verbal reports indicated that only a fraction of the stimuli were perceived consciously. The latencies of the saccades varied between 160 and 500 ms.

Part of the results have been presented before at the European Conference on Visual Perception 2004.