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A Computational Model of Visual Search Saliency for Road Signs Diagnostic

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Abstract:

Driving involves visual exploration of the road environment and one important driving subtask is to look for road signs. We propose a new computational model of visual search saliency in natural scenes, as current ones are limited to laboratory situations. Relying on statistical learning algorithms, our algorithm captures the priors a driver learns on road signs appearance. It can also be applied to other kind of objects.

The proposed algorithm is designed to develop a diagnostic system for the road signs saliency allowing to decide if drivers can noticed them well enough. We performed a psycho-visual experiment to asses our model, in a context close to driving, with a remote eye tracker. Subjects were asked to pretend they were drivers of the car from which the images were taken. In the first phase of the experiment, the subjects were asked to count for the "no entry" signs. In the second phase, they had to rate the saliency of each "no entry" sign.

The statistical analysis showed that the proposed model is correlated to human behavior using objectives (detection rates and fixation's durations) and subjectives (scoring) indicators of the visual saliency of road signs.