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REVIEW ARTICLE

Fang FANG, Yizhou WANG

Image understanding, attention and human early visual cortex

Abstract

Keywords

1 Introduction

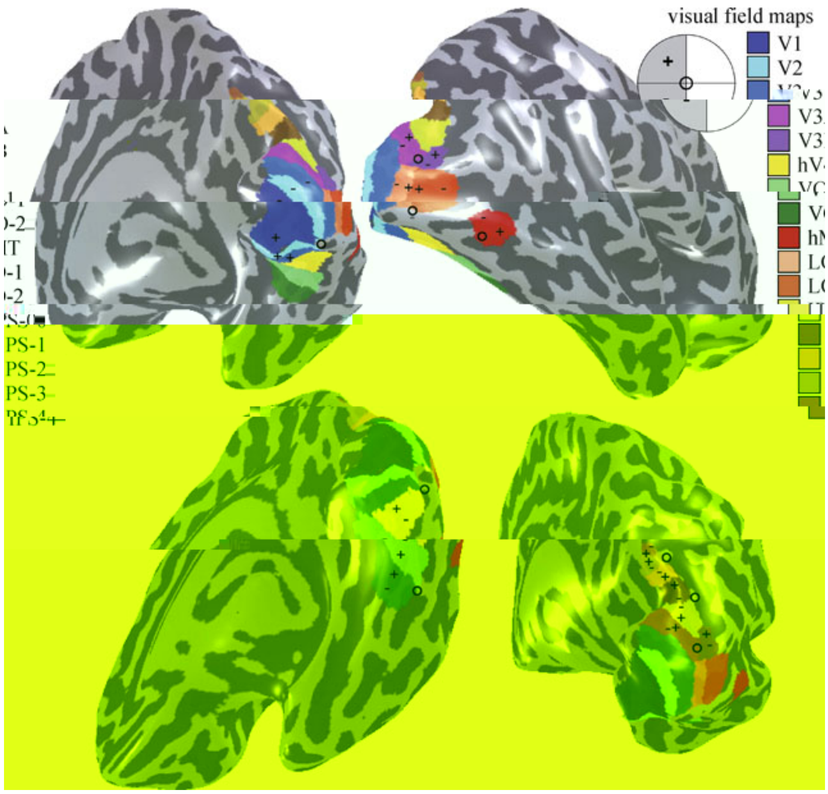

Fig. 1 Visual areas in human visual cortex (adapted from Ref. [1]).

2 Perceived size representation in V1

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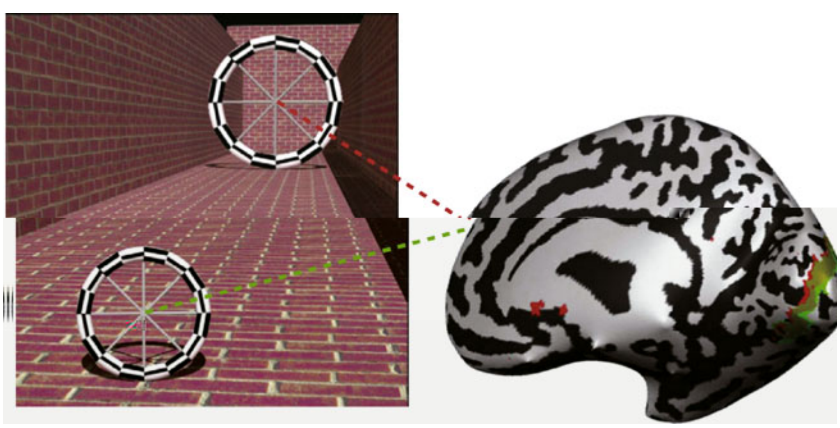

Fig. 2 Perceived size of rings affects retinotopic representations (adapted from Ref. [2]).

3 Border ownership representation in V2

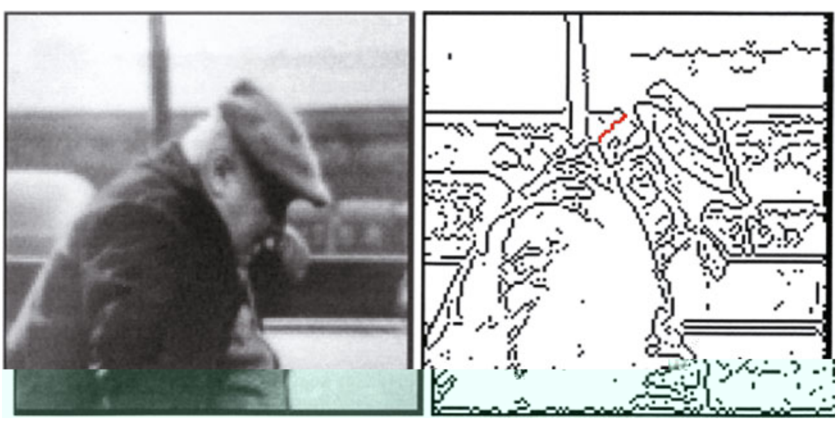

Fig. 3 An image of an old man and the edge signals generated by applying the Canny edge detector to the image (adapted from Ref. [7]). It illustrates that edge signals are inherently difficult to interpret because of the ambiguity of the edge (border) ownership.

4 Neural processing of partially occluded face

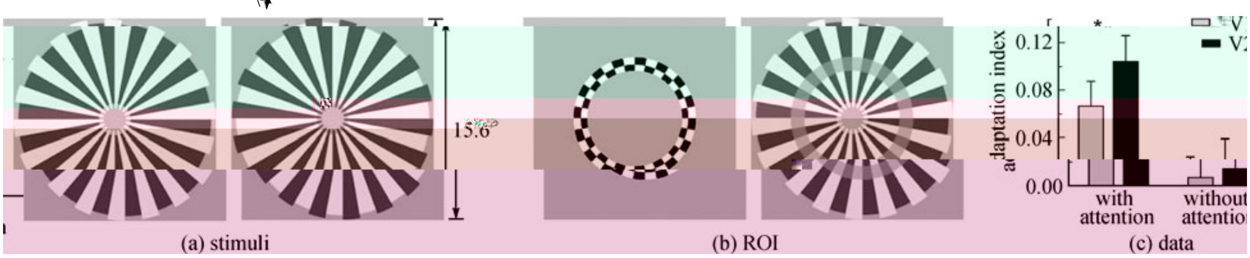

Fig. 4 Border ownership selectivity in human early visual cortex (adapted from Ref. [13]). (a) Stimuli used in the experiment. The interior part of the stimuli was locally identical across the two stimuli, but as a consequence of the difference in the contextual information, the borders between the bright and the dark stripes were perceived to belong to either the bright or the dark stripes. (b) Region of interest (ROI) definition. The checkered ring in the left panel was used to define ROIs in V1 and V2. The transparent gray ring in the right panel shows the size of the checkered ring relative to the stimulus. (c) Adaptation indices of V1 and V2 in the with-attention condition and the without-attention condition. Asterisks indicate a statistically significant difference between the adaptation indices of V1 and V2.

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5 From image understanding to simulating human saccadic scanpaths on natural images

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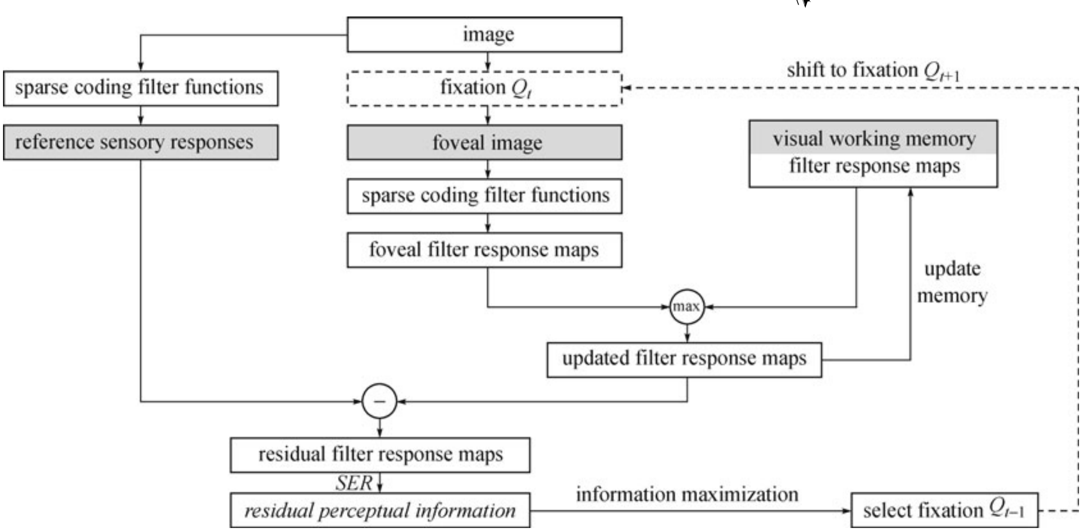

Fig. 6 The proposed framework for our dynamic attention model (adapted from Ref. [30]).

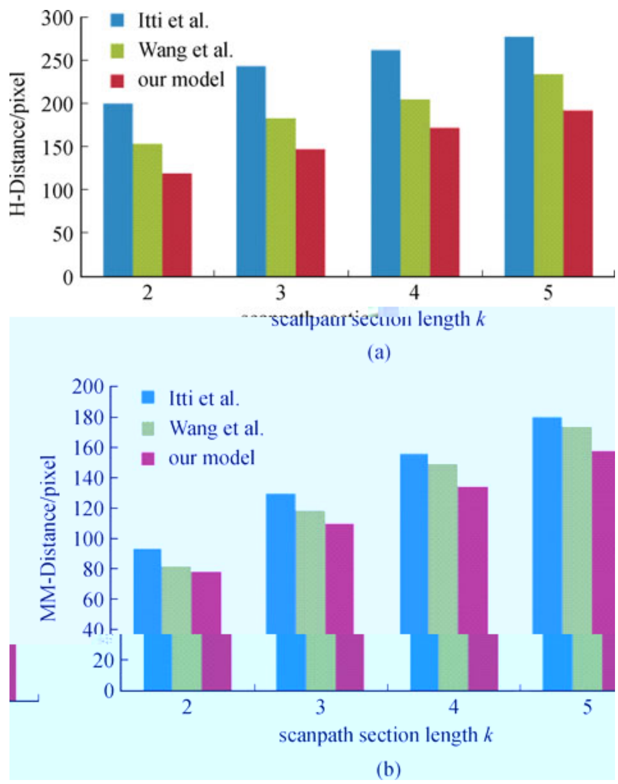

Fig. 7 Comparison results between different models using Hausdorff distance (a) and the mean minimal distance (b) at different scanpath length k (adapted from Ref. [30]).

6 Conclusion

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