Large-Capacity Image Information Reduction Based on Single-Cue Saliency Map for Retinal Prosthesis System

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Abstract : In an effort to restore visual perception in retinal diseases, an electronic retinal prosthesis with thousands of electrodes has been developed. The image processing strategies of retinal prosthesis system converts the original images from the camera to the stimulus pattern which can be interpreted by the brain. Practically, the original images are with more high resolution (256x256) than that of the stimulus pattern (such as 25x25), which causes a technical image processing challenge to do large-capacity image information reduction. In this paper, we focus on developing an efficient image processing stimulus pattern extraction algorithm by using a single cue saliency map for extracting salient objects in the image with an optimal trimming threshold. Experimental results showed that the proposed stimulus pattern extraction algorithm performs quite well for different scenes in terms of the stimulus pattern. In the algorithm performance experiment, our proposed SCSPE algorithm have almost five times of the score compared with Boyle's algorithm. Through experiment s we suggested that when there are salient objects in the scene (such as the blind meet people or talking with people), the trimming threshold should be set around 0.4max, in other situations, the trimming threshold values can be set between 0.2max-0.4max to give the satisfied stimulus pattern.

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