Automatic Attentive Focus Determination by Analyzing Human Eyes

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ABSTRACT

The application of human face detection is more extensive and important day by day to be applied to the biometric facial recognition and video surveillance systems. And, the research of attentive focus determination is usually adopted to monitor drivers ’ attention and to analyze the attraction of billboards. In this study, we develop an attentive focus determination system by analyzing the characteristics of human eyes. All face pixels whose colors in the range of facial hue are first detected and grouped into several possible face components. The face range is decided by analyzing the projection profiles of detected boundary facial pixels and judge whether the face is covered or sheltered. Then, the position of eyes is located by extracting connected components consisted of non-facial pixels after the color frame elimination of glasses. Finally, the eyeball position is detected by applying the Hough transform and used to determine the attentive focus. We collect 272 images to evaluate our developed system. At the stage of human face detection, the accurate rate is about 96.5%. The precision rate of human eye position determination exceeds 95.5%. Finally, the exactness ratio of intensive focus judgment is more than 95.4%. The satisfactory experimental results prove the feasibility of our proposed approach and the developed system.

Keywords : face detection, Hough transform, attentive focus determination

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