A Real Time Robust Eye Center Localization using Geometric Eye Model and Edge Gradients in Unconstrained Visual Environment

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Abstract

Accurate eye localization is an essential and fundamental step in initialization for other eye tracking applications. A fast and accurate eye center localization method is proposed in this paper. A novel geometric eye model is derived based on face anthropometry parameters to identify coarse eye region correctly. A novel voting method using edge gradients on the iris boundary are used for fast and accurate eye center localization. A precise range around the boundary of an iris is derived to indicate the region within which the gradients are allowed to vote. Additionally the range between the pupil centers is derived to validate the search region. A weight map is generated for efficient computation, which is combined with edge gradients and the maximum of the multiplication between the dot products and the weight from the map is identified as the eye center. The proposed method is evaluated on challenging BioID database and found to be highly accurate for eye center localization task. The proposed method is efficient under natural lighting condition, has low computational complexity and excellent real-time ability.
References

21. www.bioid.com/About/BioID-Face-Database

Index Terms

Computer Science

Image Processing

Keywords

Eye center localization, Gaze Estimation, Human Computer Interaction.