

Robust Iris Segmentation Through Parameterization of the Chan-Vese Algorithm

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Abstract

The performance of an iris recognition system relies on automated processes from the segmentation stage to the matching stage. Each stage has traditional algorithms used successfully over the years. The drawback is that these algorithms assume that the pupil-iris boundaries are perfect circles sharing the same center, hence only use circle fitting methods for segmentation. The side effect posed by the traditional rubber sheet model used for normalization is; one cannot work backwards to place the discriminative features on the original image. This paper proposes a different approach to each stage using algorithms different from the traditional ones to address the above issues. Bresenham's circle algorithm to locate and compute pupil-iris boundaries. Chan-Vese algorithm with pre-defined initial contour and curve evolution parameters for accurate segmentation. Preprocessing techniques to enhance and detect iris features for extraction. Labeling features of strongest pixel connectivity and using Harris algorithm for feature extraction and matching.