

Abstract

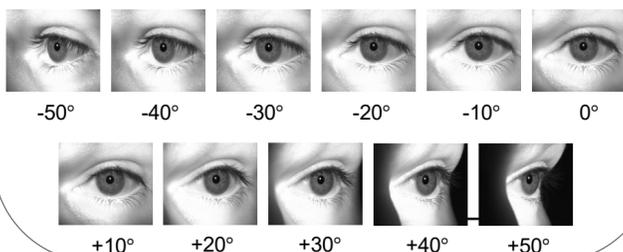
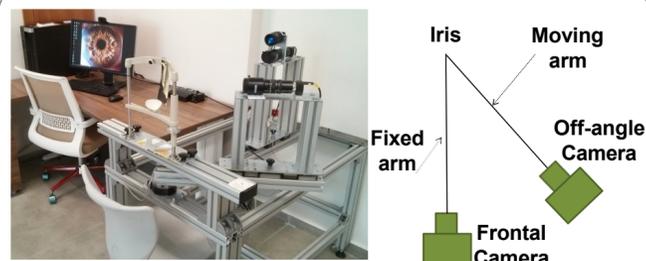
This work investigates two iris normalization techniques to compare their performance including elliptical unwrapping and circular unwrapping after frontal projection for off-angle iris recognition. Elliptical unwrapping samples the iris texture using elliptical segmentation parameters. For circular unwrapping, we first estimate the gaze deviation using ellipse parameters and the image will be projected back to frontal view using frontal transformation. Then, we segment and unwrap it using circular parameters.

Introduction

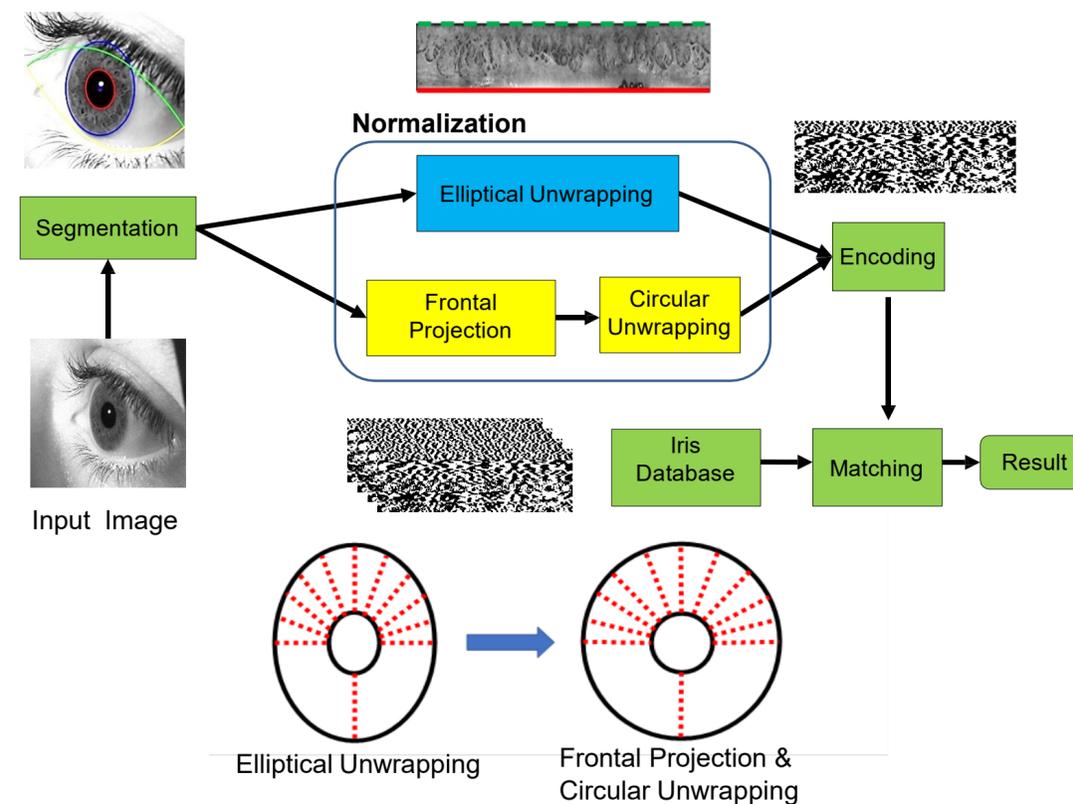
Fast and reliable identification is essential with the ever-increasing need for access control of millions of people passing through secure areas. For this reason, there are several biometric systems present in our everyday life using biometric methodologies. Existing studies on these biometric systems have shown iris recognition as being the most unique, stable, and accurate biometric identifier [1-3]. Recently, iris recognition has become more prevalently used in areas such as passport control, criminal/terrorist identification, missing persons cases, and restricted military installments.

With the development of the standoff biometric systems, iris images can be captured in a less restrictive environment where subjects can move around with more freedom. Therefore, standoff iris images are generally non-ideal images and may also include gaze angle and pupil dilation differences. Off-angle iris images, unlike frontal images, present several distortion issues.

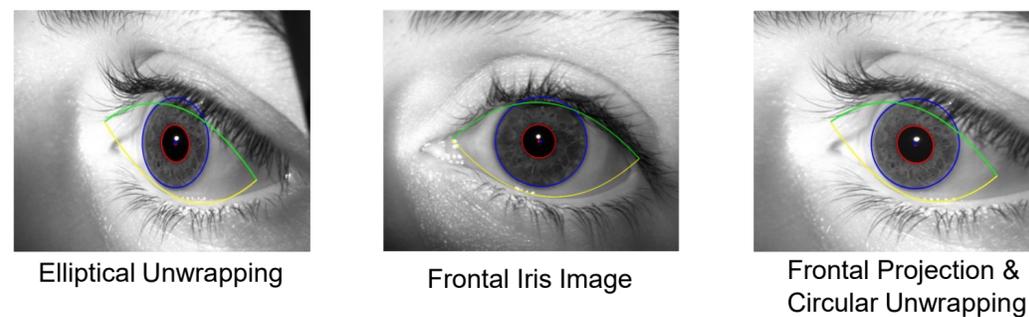
Experimental Setup



Methods

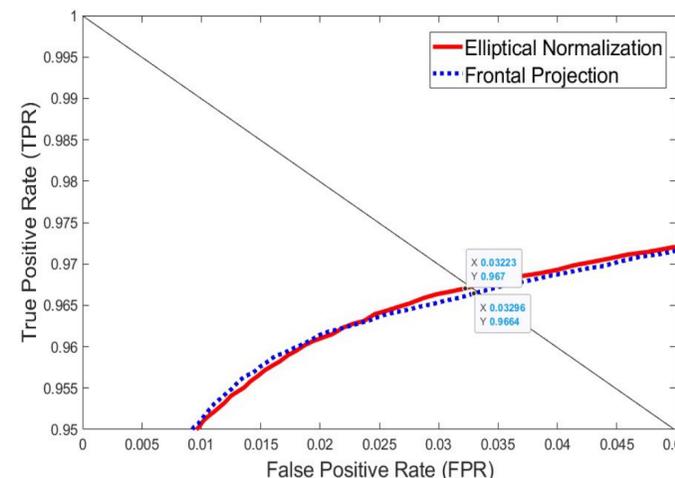


Results



	Elliptical Unwrapping Subset	
	Intra-Class	Inter-Class
Mean	0.309	0.490
Standard Deviation	0.102	0.017

	Frontal Projecting Subset	
	Intra-Class	Inter-Class
Mean	0.307	0.489
Standard Deviation	0.102	0.017



Research Question(s)

Does Elliptical Unwrapping or Frontal Projection have better performance on off-angle iris recognition?

Conclusions

We investigate two different iris normalization techniques elliptical normalization and circular normalization with frontal projection. Experiments were performed on off-angle iris dataset with gaze angles ranging from -50 to +50. We examine how the Hamming distance distribution changes between the two methods of off-angle iris segmentation. Based on our experimental results, we found that the perspective projection has shifted the distributions of intra and inter class Hamming distances to the left and that elliptical normalization equal error rate decrease by 2.2%.

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