Iris recognition using Gabor filter

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Bachelor’s Project.
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Steps in Iris recognition

Iris localization

Find the inner and outer boundaries of Iris Using Hough transform. I used MMU database in which eyes are wide open for simplicity

Normalization and denoising

Using rubber sheet model we normalize the image into a rectangular fixed size for comparison and denoise and enhance the image using local histogram equalization

Feature extraction using Gabor filters

Using a bank of filters we extract the features of the image and convert it to a binary number

Classification

Using Hamming distance we compare an image with the database of Iris codes to see if they match

Iris Localization

Read the image in Grayscale

Apply Gaussian Blur to reduce noise

Detect Iris outer boundary circle using Hough Transform & Canny edge detection

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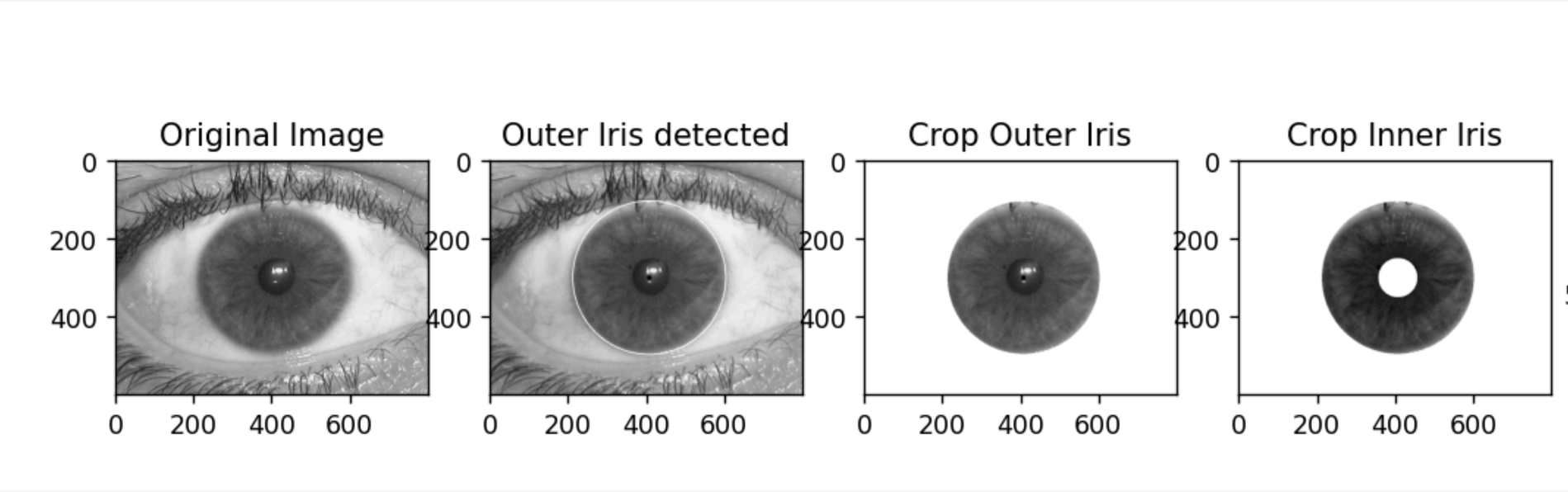
Crop outer Iris boundary and crop the inner Iris boundary to create Iris ring

Iris Localization



Normalization and Denoising

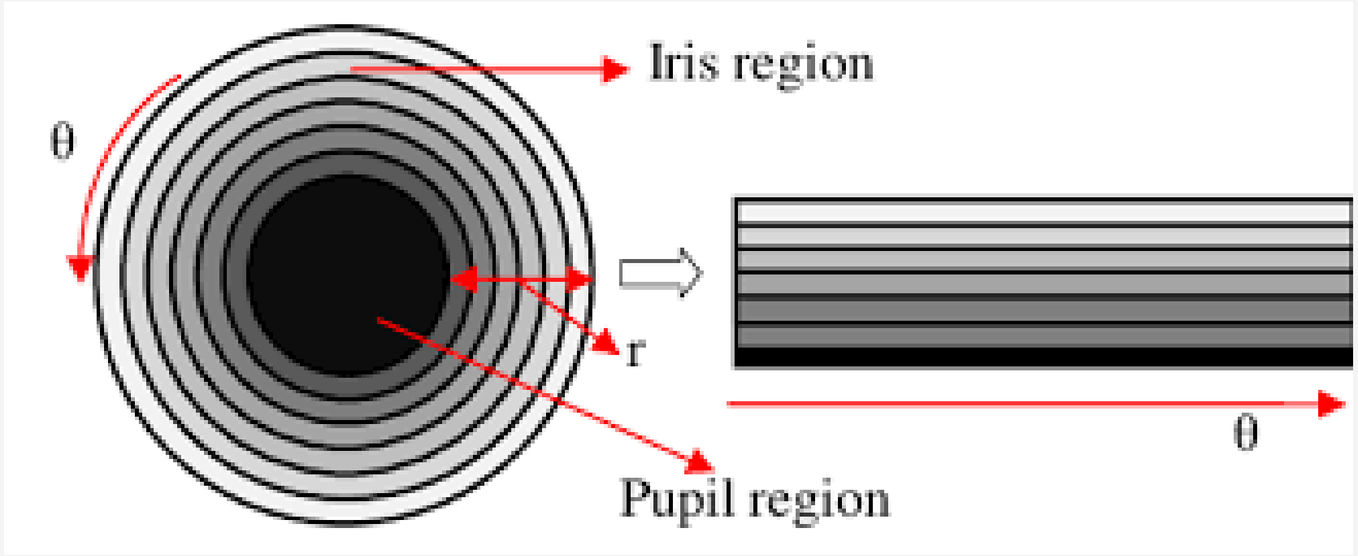
Normalize the iris region using Daugman's rubber sheet model.

Convert the Iris ring to a fixed rectangular image

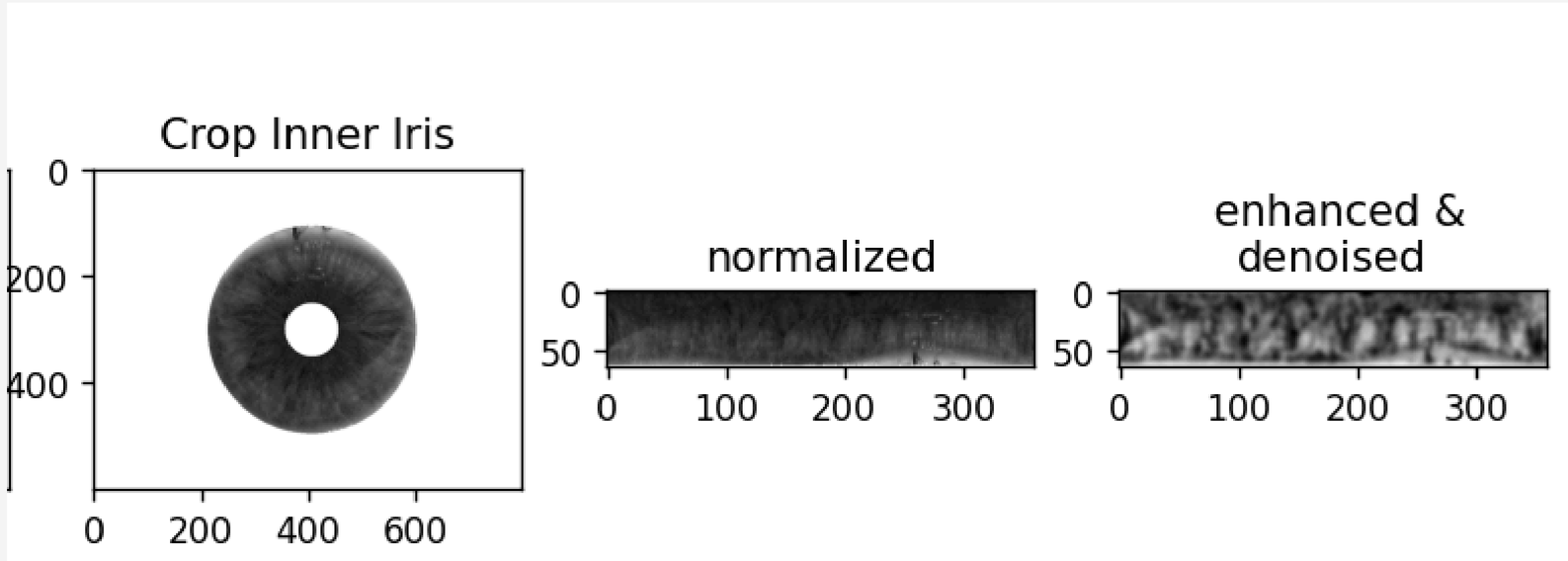
Height: 64 and Width: 360

Apply local histogram equalization.The normalized iris image still has low contrast and may have non-uniform illumination caused by the position of light sources.

Dougman’s rubber sheet model



Normalization and Denoising



Feature extraction

We use a bank of Gabor filters (8)

Orientations from zero to pi with pi/8 steps

Real and Imaginary responses are combined to create a feature vector

Classification

The resultant feature vectors are converted to binary form

Hamming distance is used as a classifier to compare the extracted iris features.

We have 21 person in the database. Each person has 2 images. One image is used for creating the database of Iris codes and the other image is used for testing.

Resourses

Iris Feature Extraction Using Gabor Filter. 2009. Saadia Minhas. Muhammad Younus Javed

Iris Recognition Based on Multichannel Gabor Filtering. 2002.Li Ma, Yunhong Wang, Tieniu Tan

Thank you