



# Fingerprint Recognition System

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# Project Introduction

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## Objective:

- Study History
- Methodology
- Compare reported Algorithms
- Implements a FR system
- Give experimental Results

# Study History

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- Jan Evangelista Purkinje (1787–1869), a Czech physiologist and professor of anatomy at the University of Breslau, published a thesis in 1823 discussing 9 fingerprint patterns, but he did not mention any possibility of using fingerprints to identify people.
- Some years later, the German anatomist Georg von Meissner (1829–1905) studied friction ridges, and five years after this, in 1858, Sir William James Herschel initiated fingerprinting in India.

# Study History

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- ❑ Juan Vucetich, an Argentine chief police officer, created the first method of recording the fingerprints of individuals on file.
- ❑ In the United States, Dr. Henry P. De Forrest used fingerprinting in the New York Civil Service in 1902.
- ❑ The advent of fingerprint detection, many criminals have resorted to the wearing of gloves in order to avoid leaving fingerprints, which thus makes the crime investigation more difficult.

# Project Overview

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- ❑ Fingerprint recognition system is under biometric application used to increase the user security.
- ❑ The system processes the data and collects the identifying features of the fingerprint .
- ❑ Next, it compares this information to previously stored information from various fingerprints.
- ❑ After making the comparisons the system determines if the input image matches the data of a fingerprint already in the database.

# Methodology

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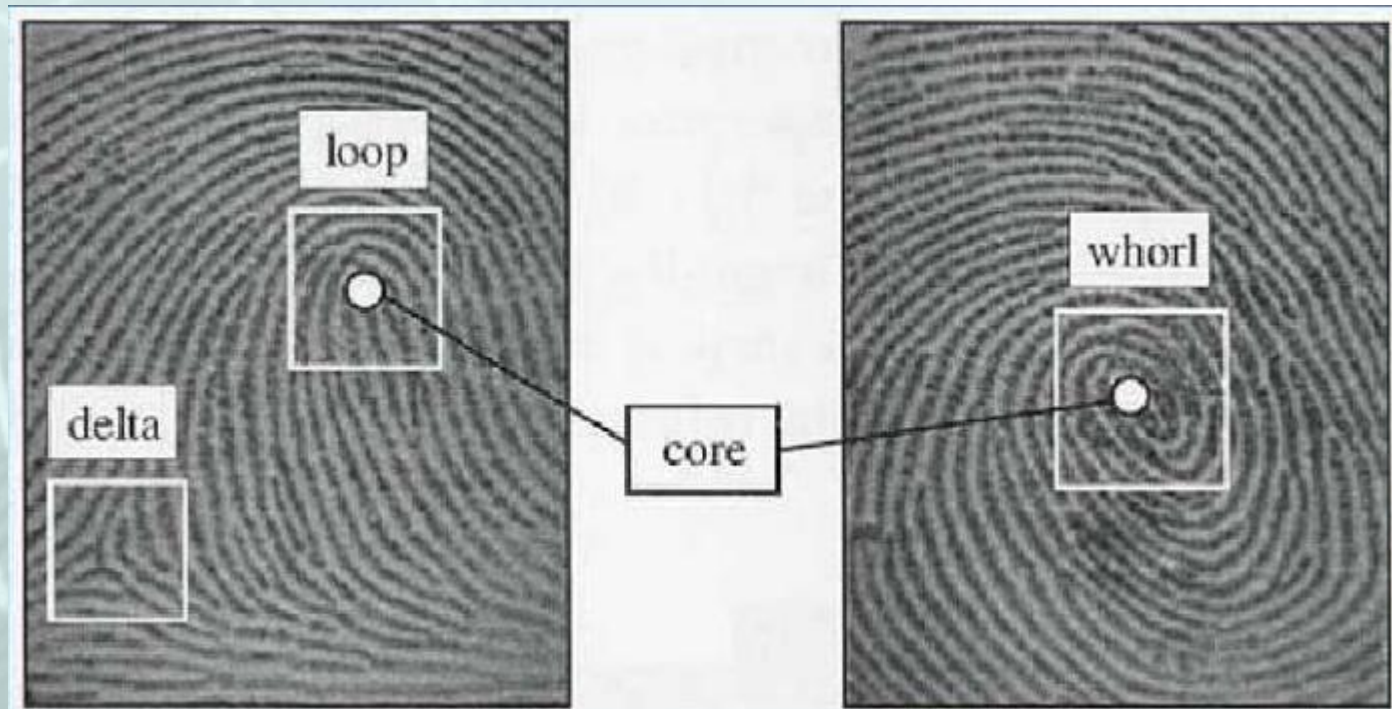
- ❑ A fingerprint pattern is comprised of a sequence of Ridges and Valleys.
- ❑ In a fingerprint image, the ridges appear as dark lines while the valleys are the light areas between the ridges.
- ❑ The fingerprint image will have one or more regions where the ridge lines have a distinctive shape. These shapes are usually characterized by areas of high curvature or frequent ridge endings and are known as singular regions.



# Methodology

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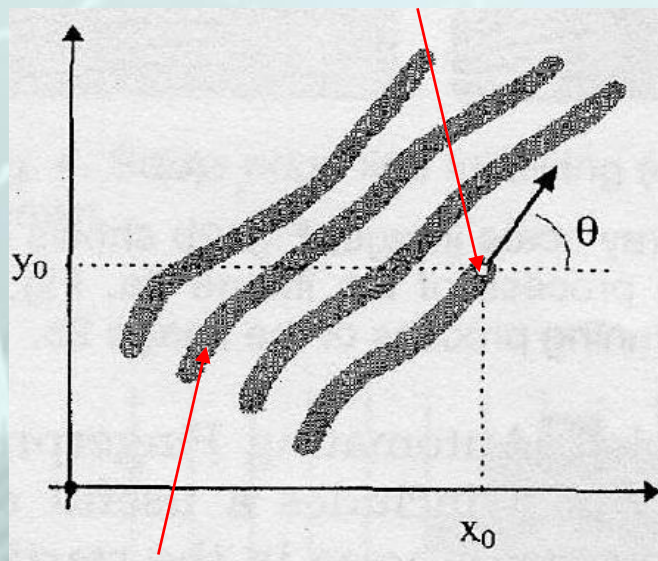
- ❑ The three basic types of these singular regions are loop, delta and whorl.



# Methodology

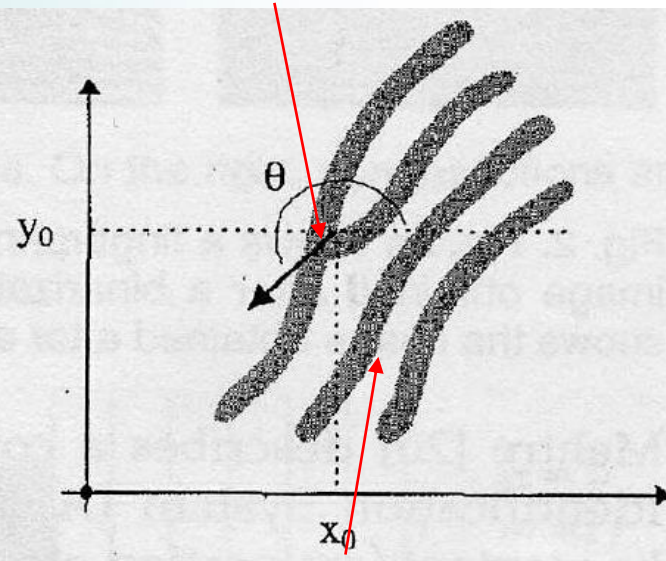
## □ Minutiae-Based Approach:

**terminations**



**Ridge**

**bifurcations**

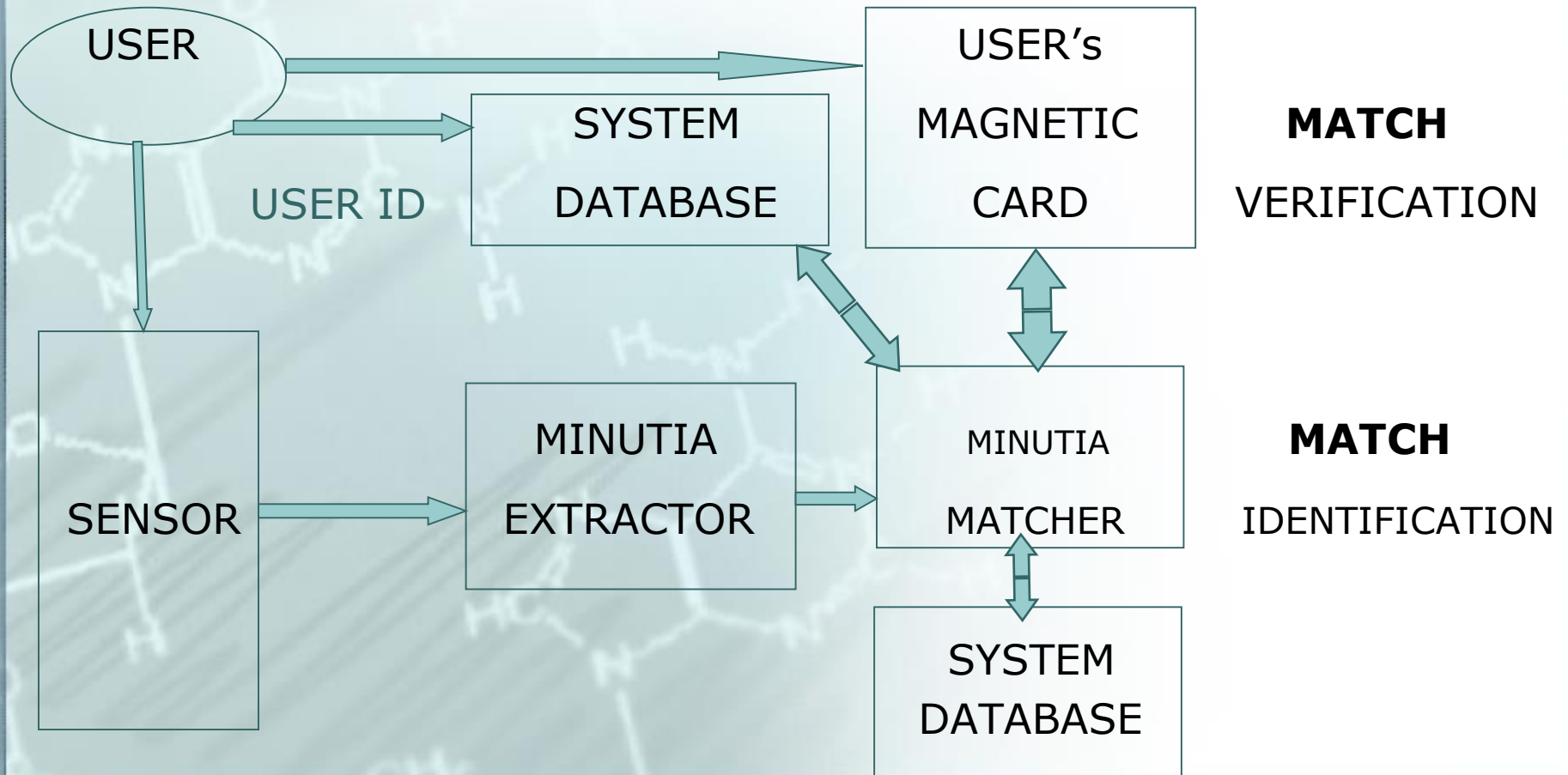


**Valley**



# Methodology

## System Level Design



# Procedure

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## Binarization:

- ❑ It is the process of turning a grey scale image to a black and white image.
- ❑ In a grey scale image a pixel can take on 256 different intensity values while each pixel is assigned to be either black and white image.

# Procedure

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Binarization:



Original Image



Image Following Binarization

# Procedure

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## Thinning:

- ❑ The thinning method to be done with block filtering method attempts to preserve the outermost pixel along each ridge.
- ❑ These steps are applying a morphological process to the images to reduce the ridges. Two morphological process are *DILATION* and *EROSION*.

# Procedure

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Image After Dilation:



# Procedure

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*Post-Processing Steps:*  
False Minutia Remove:

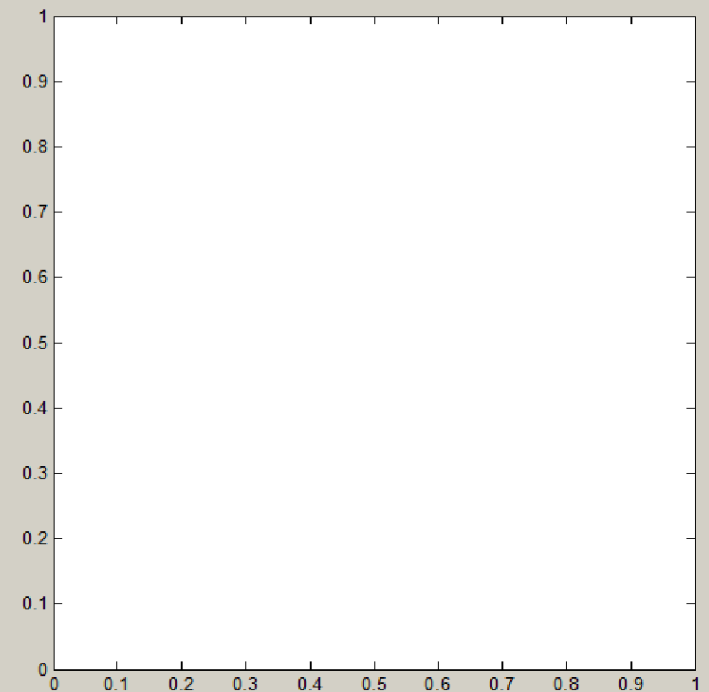
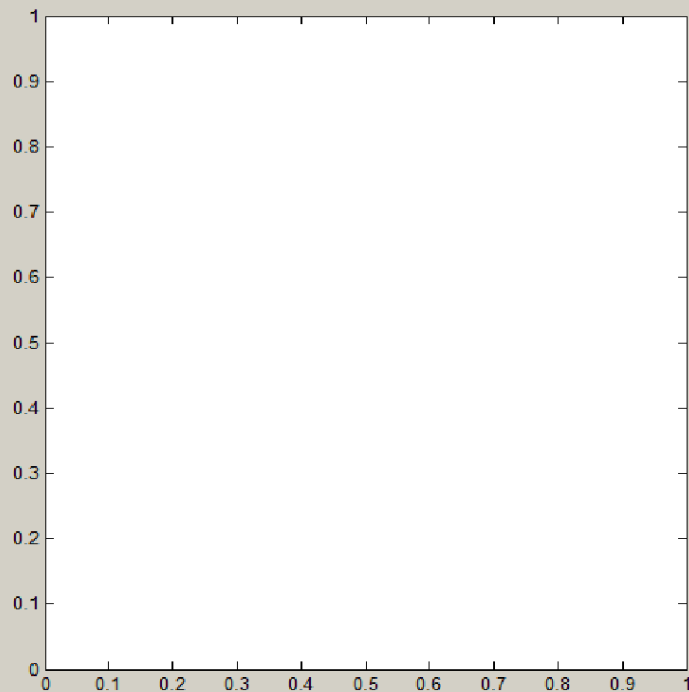




# Procedure

File Edit View Insert Tools Desktop Window Help

Fingerprint Recognition-Arpit,Atul,Nishant,Prakhar



Load  
his-Equalization  
Binarization  
Direction  
ROI Area  
Thining  
remove H bre...  
Removing spike  
Extract  
Real Minutiae  
save  
Match

Fingerprint Verification-Arpit,Atul,Nishant,Prakhar

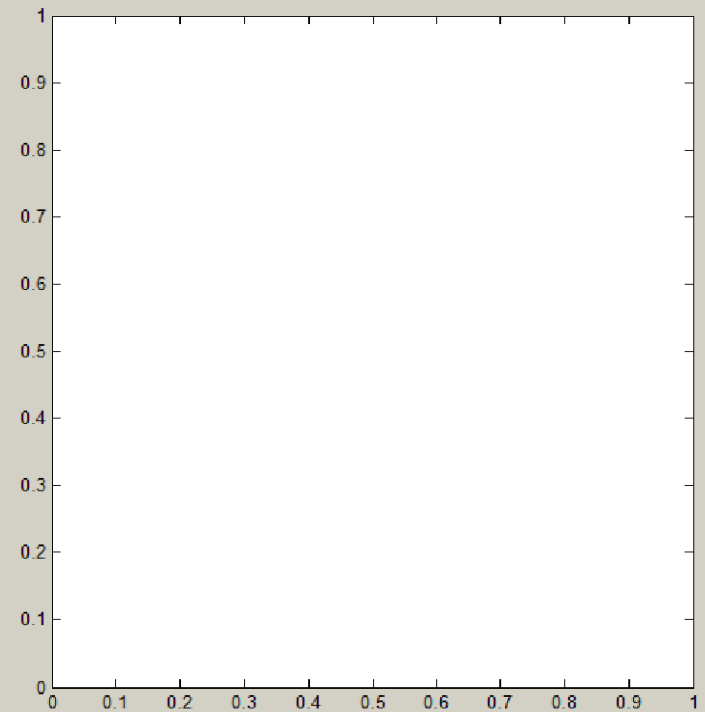
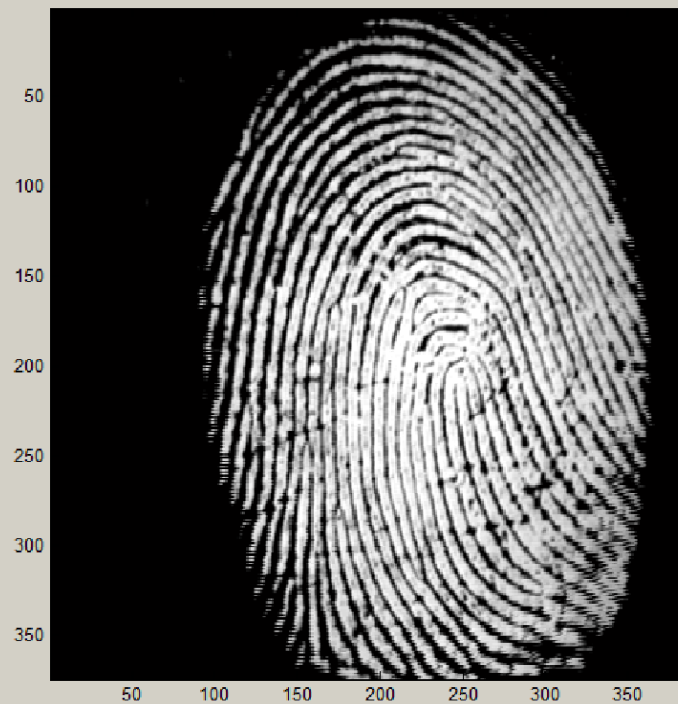
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- Removing spike
- Extract
- Real Minutiae
- save
- Match

Load Fingerprint Image

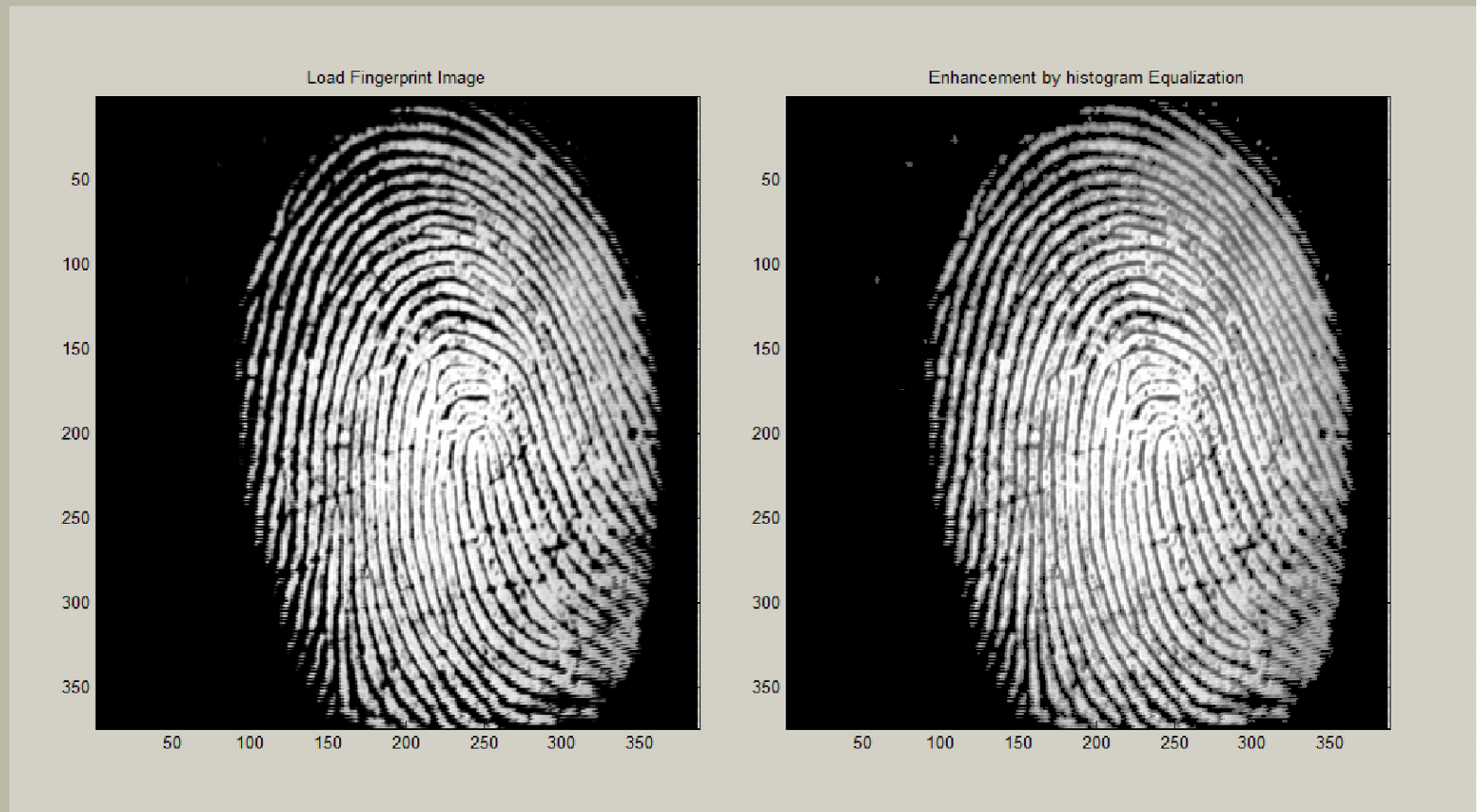


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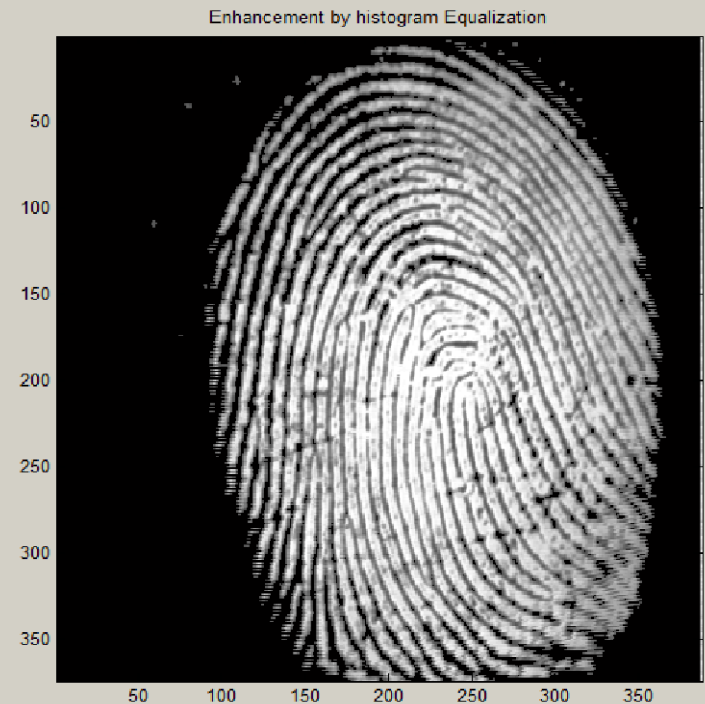
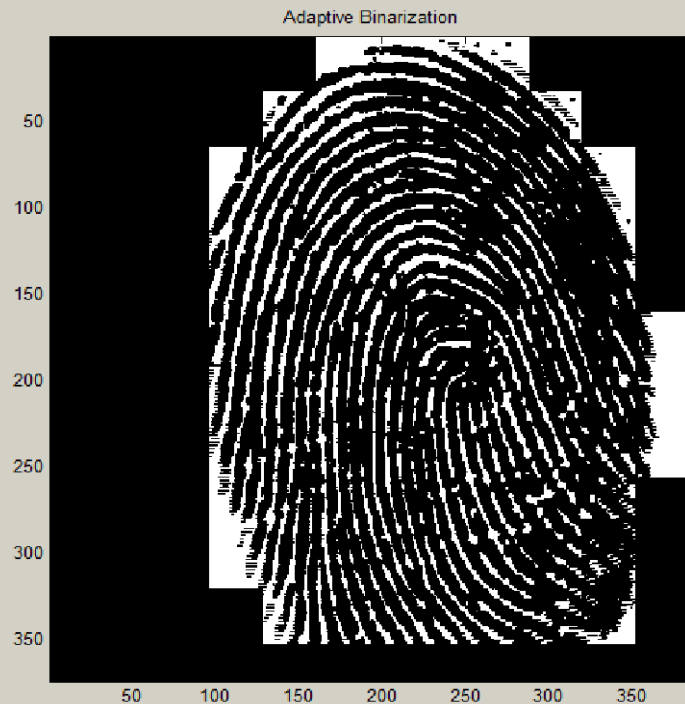
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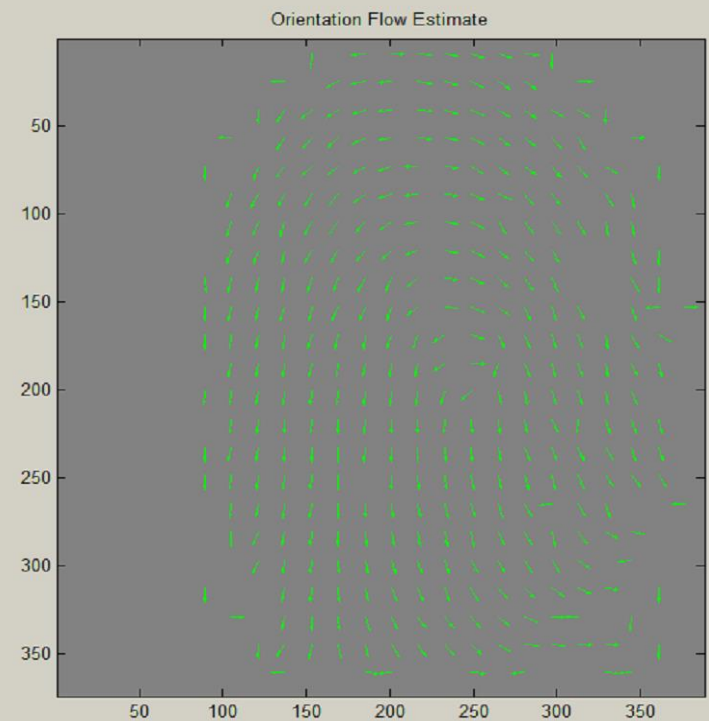
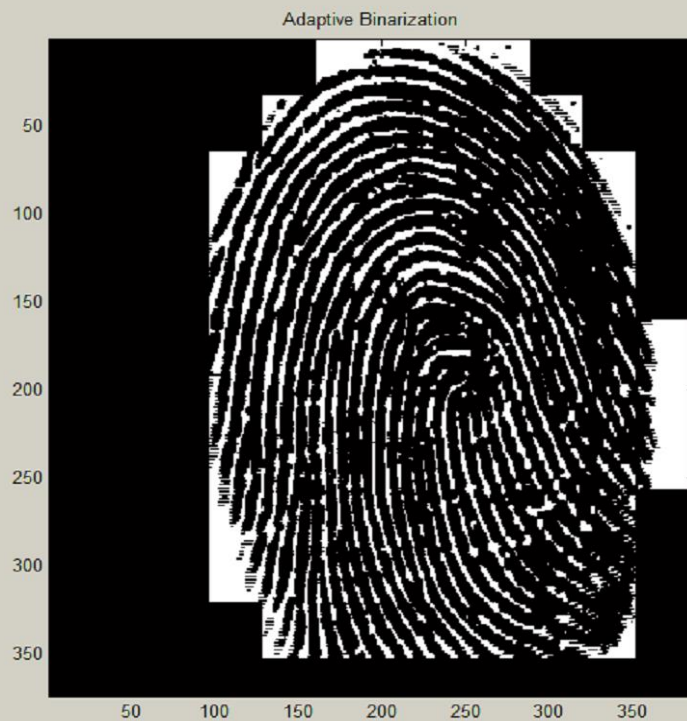
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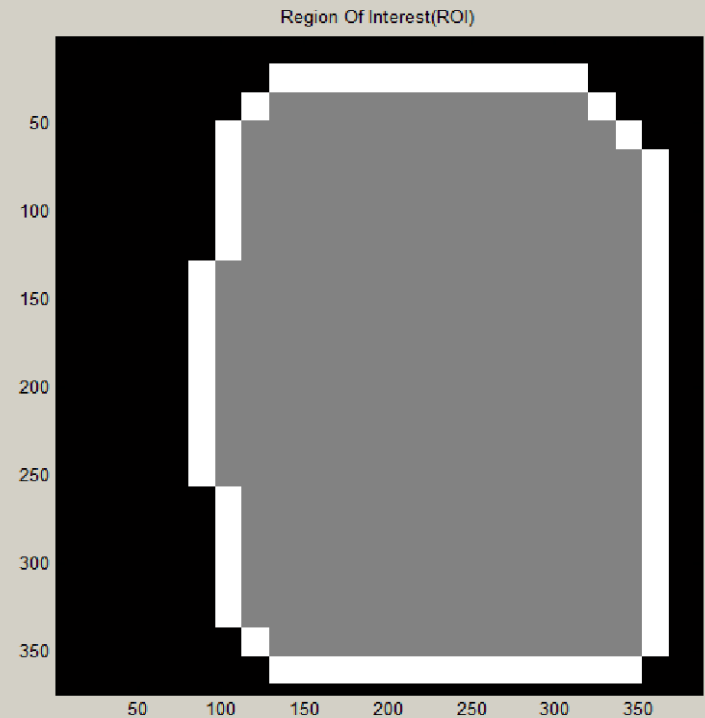
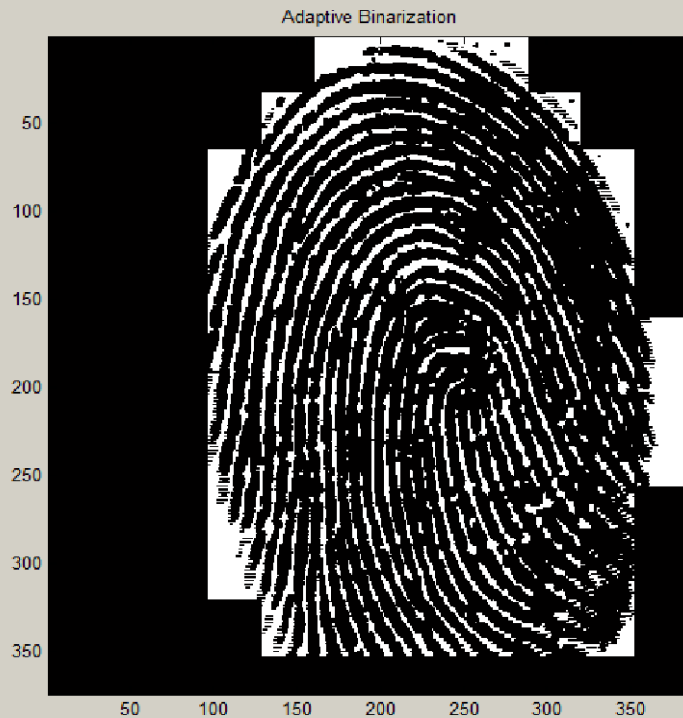
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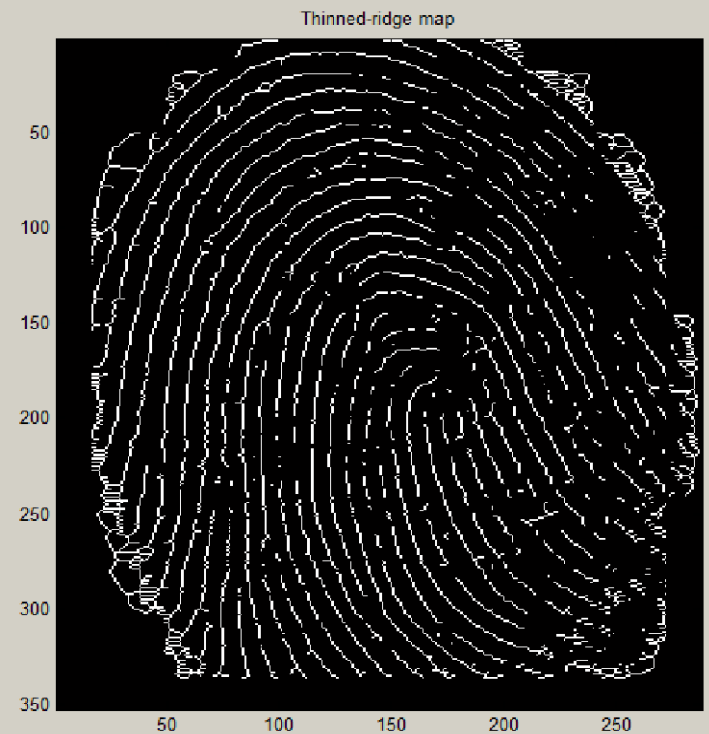
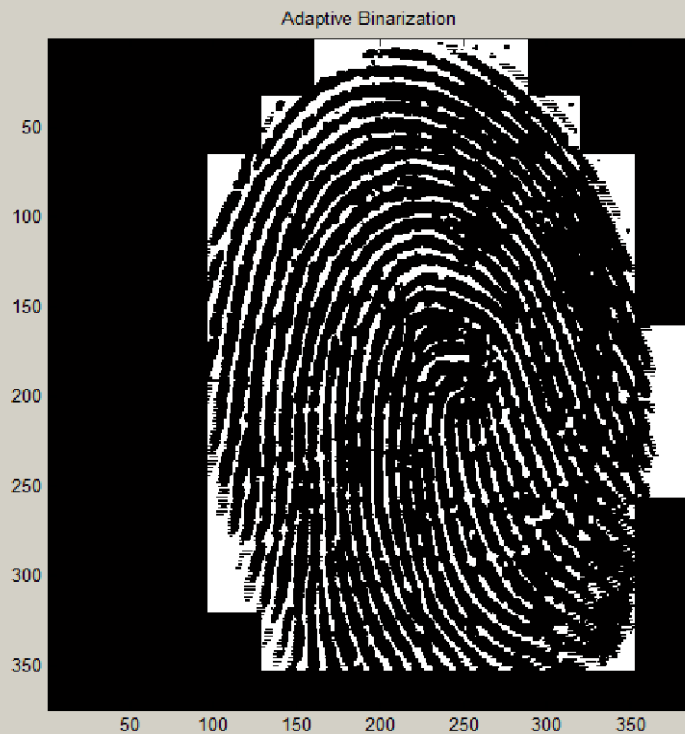
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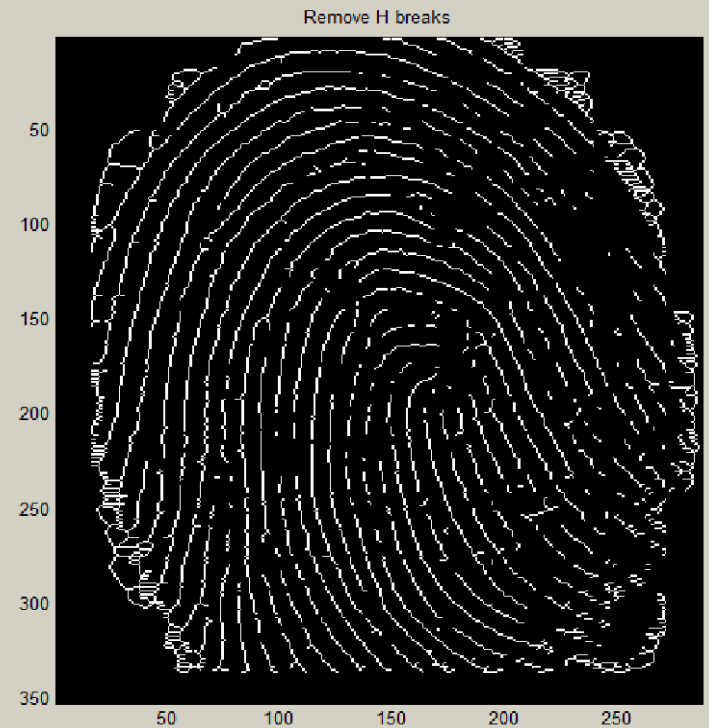
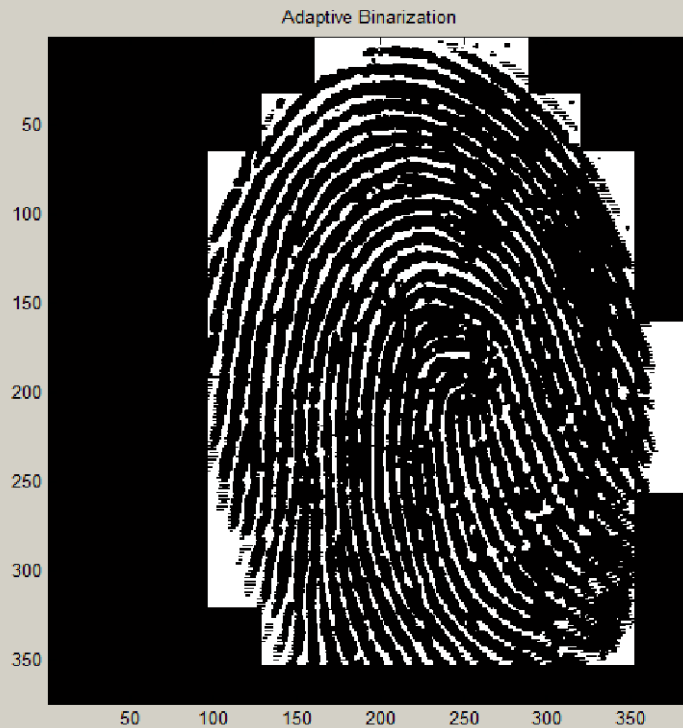
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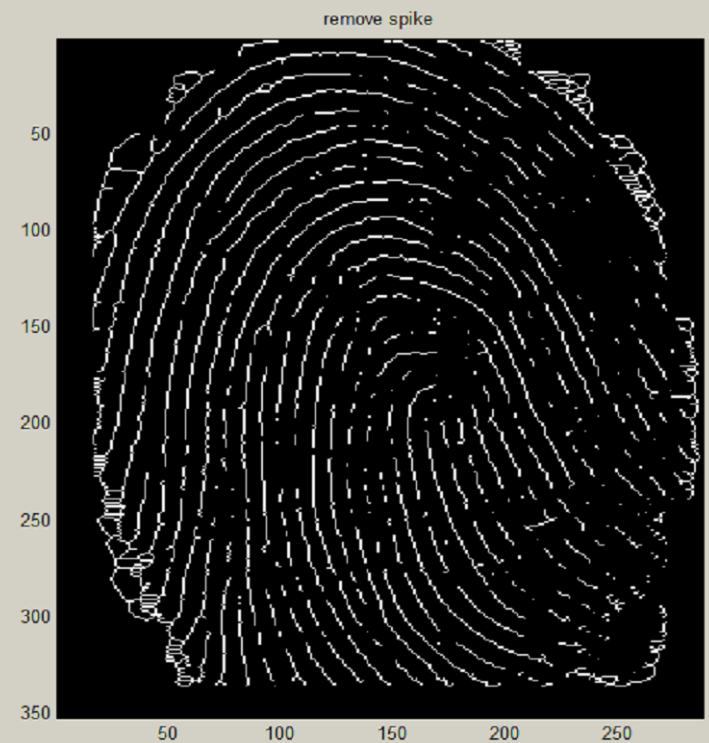
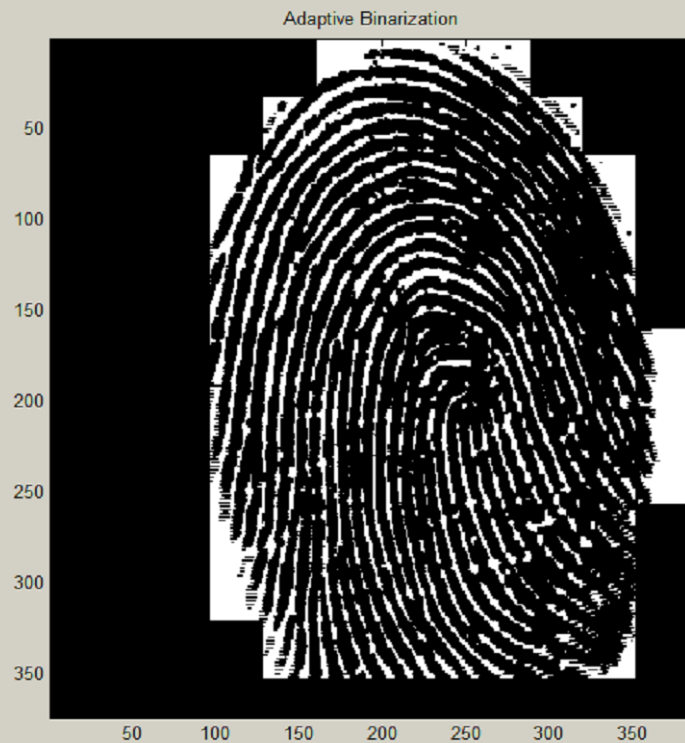
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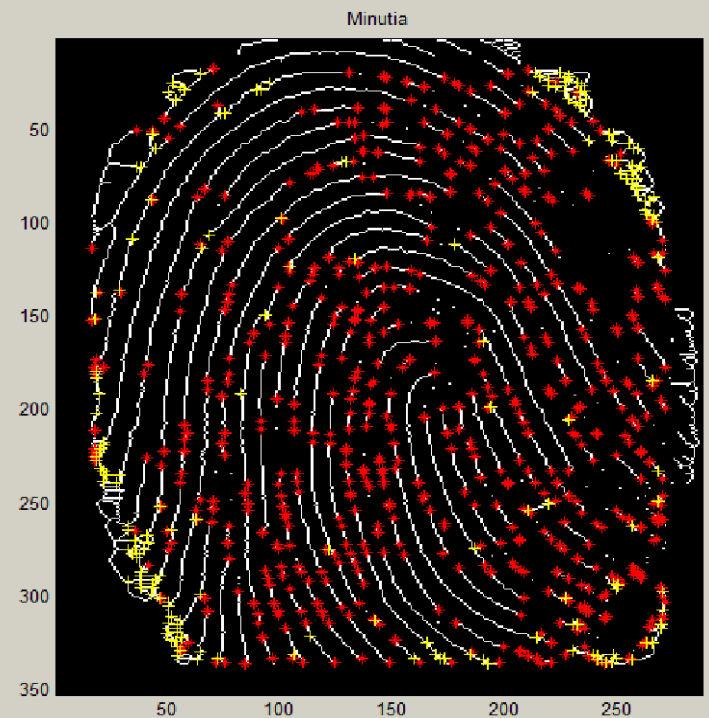
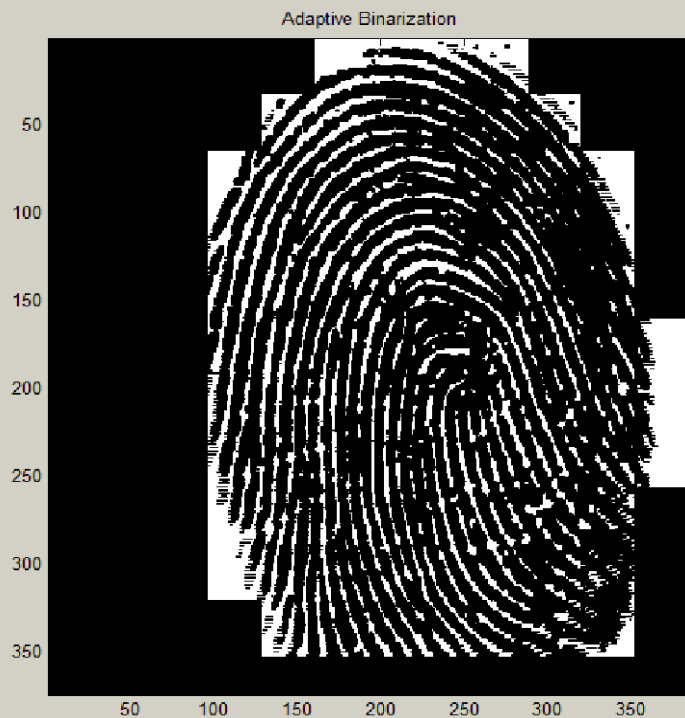
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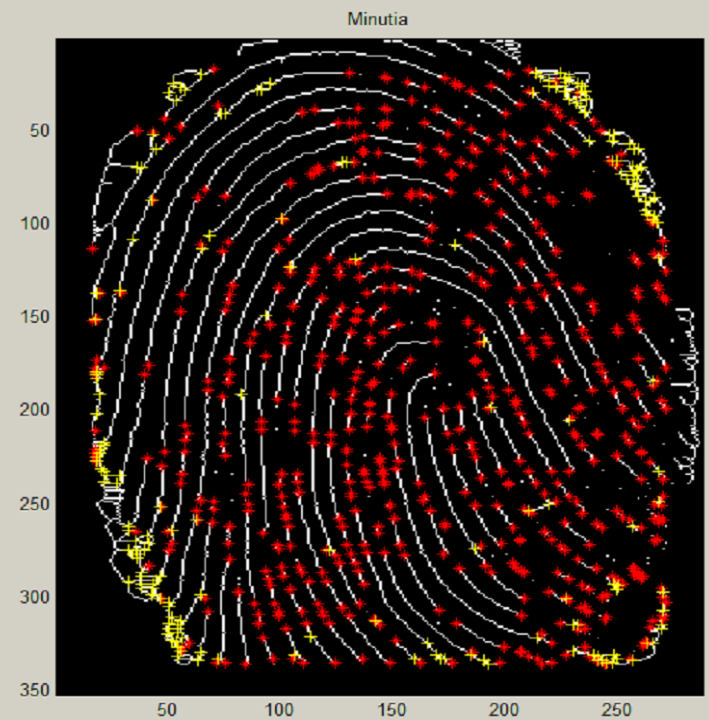
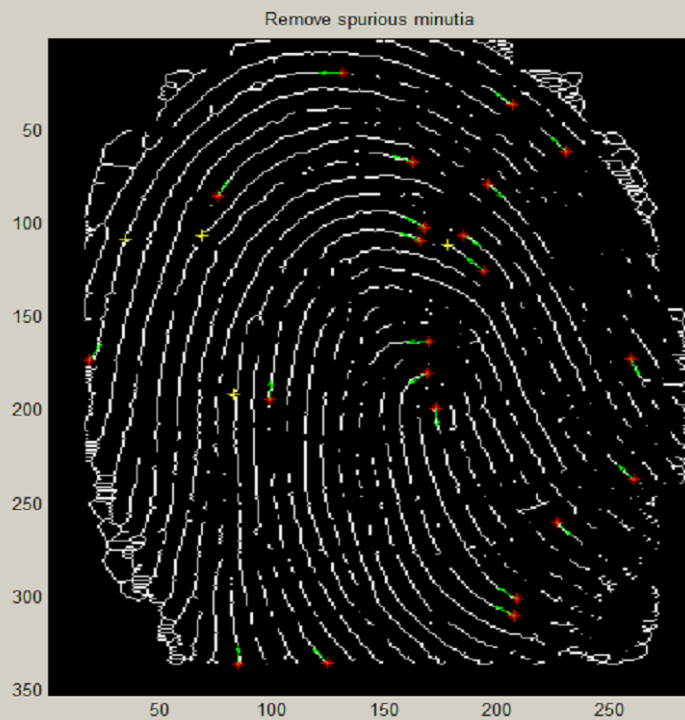
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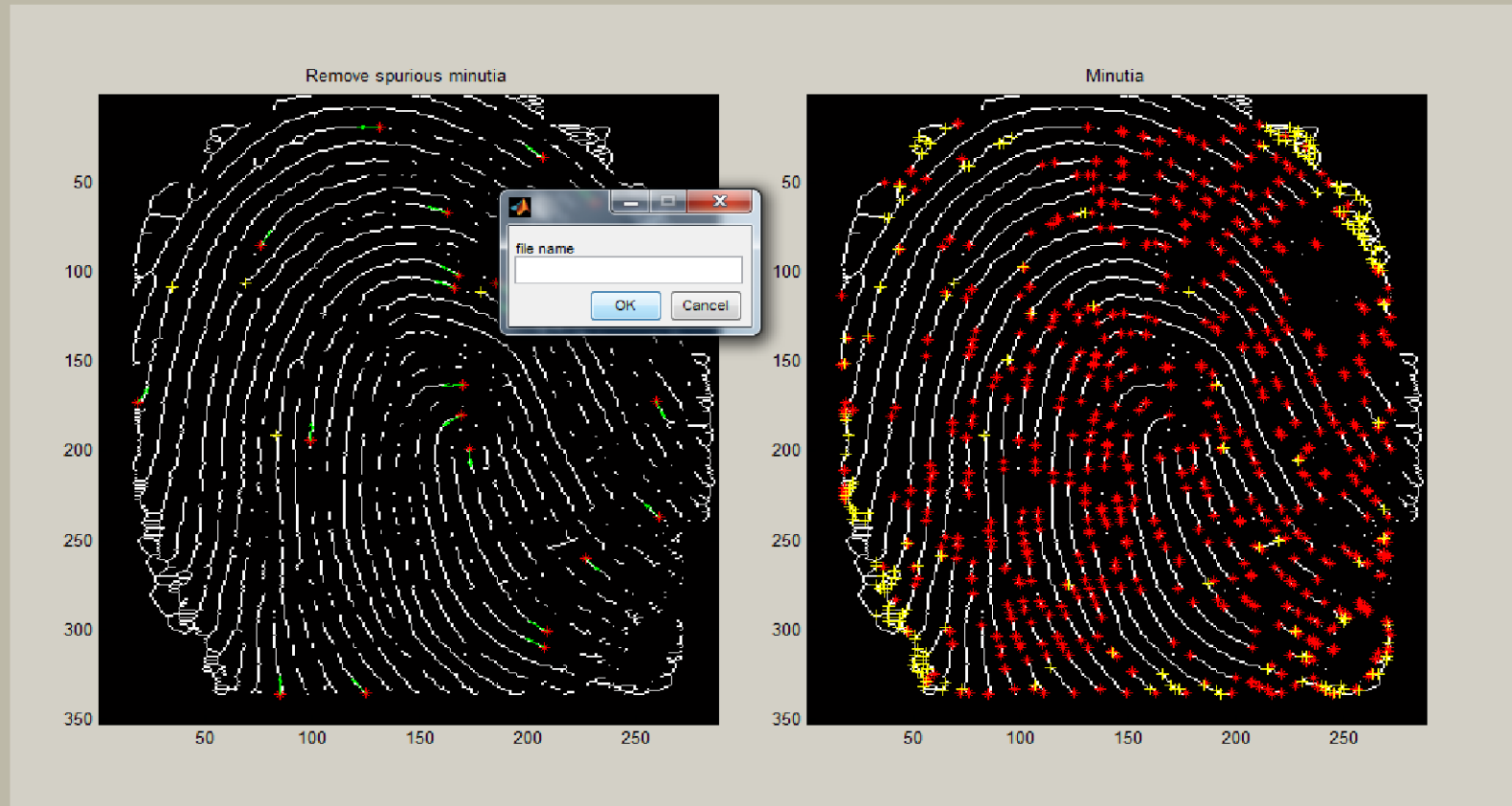
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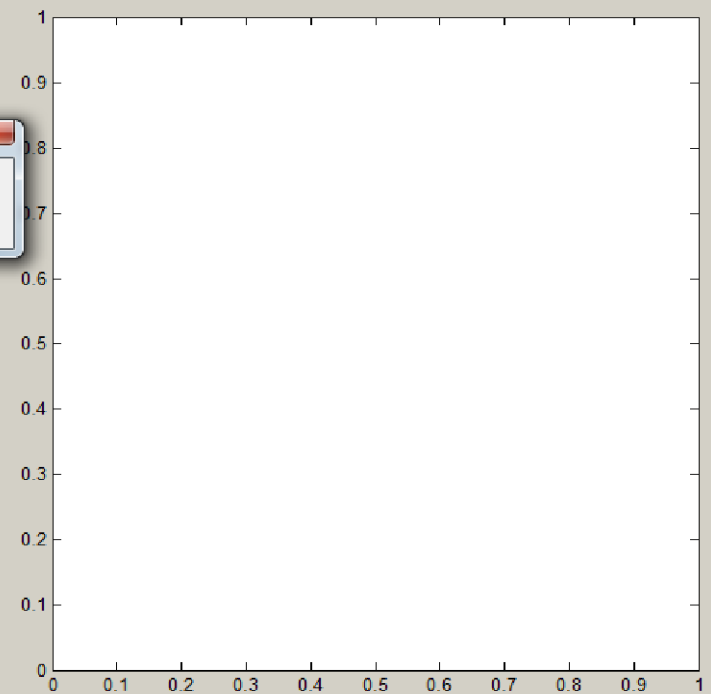
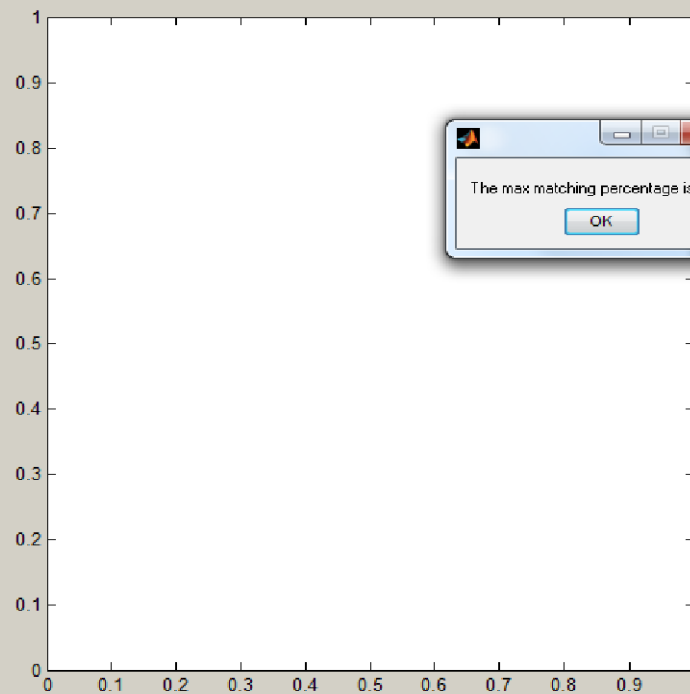
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# Conclusion

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