Fingerprint Identification System

6.111 Final Project

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Fingerprint Overview

What is a fingerprint?

- Ridges and furrows on finger surface

- Pattern of ridges and furrows creates print uniqueness

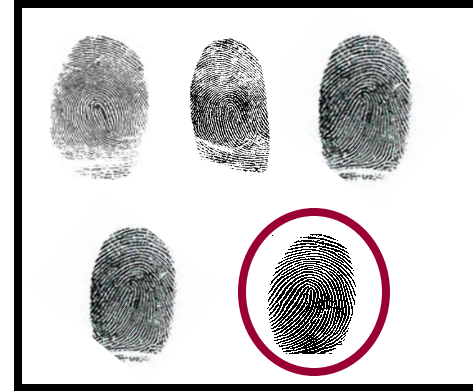## How does a fingerprint identification system work?

- Acquire fingerprint images and represent them in proper format

- Match acquired fingerprint to a sample in a database

Why build a fingerprint identification system?

- Identify individuals within contexts of security, forensics, and personnel management

System Overview

Goal: To produce a fingerprint identification system that can identify print samples in a pre-established database
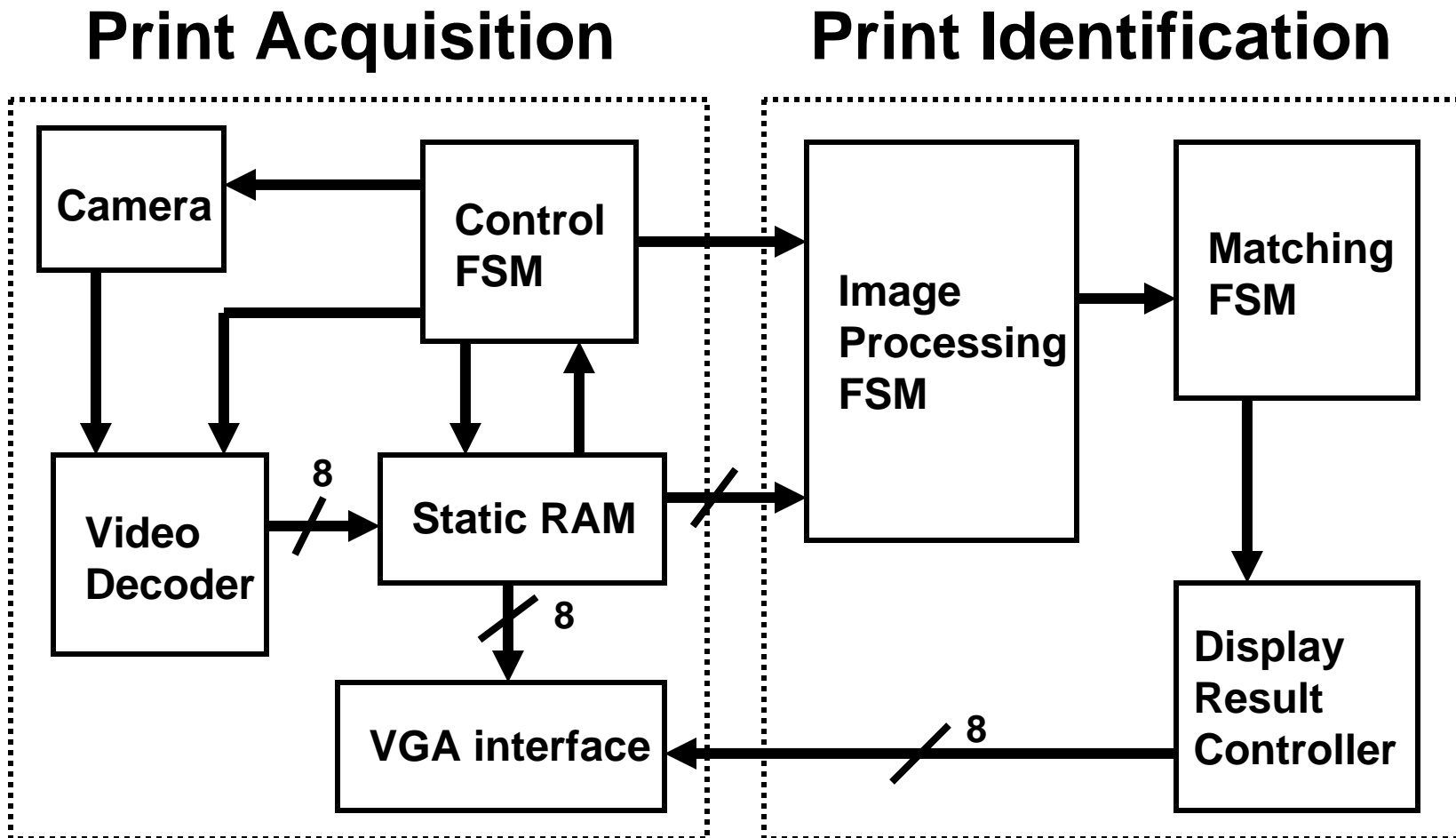
System Components

Acquisition: Capture image of inked print sample via a camera interface

Identification: Verify print in database via ridge edge detection filters

Example Application
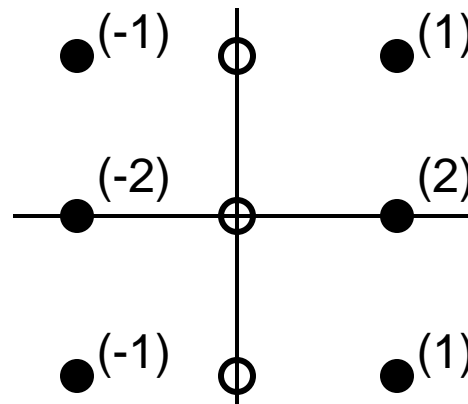
Quick personnel identification in a large company

System Overview

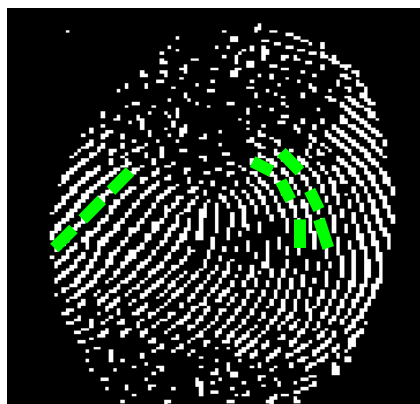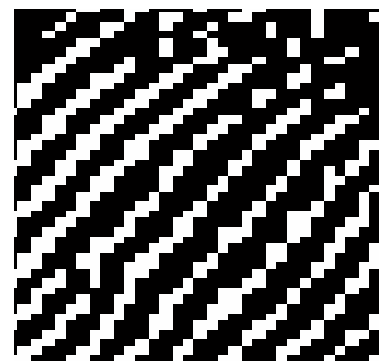**Print Acquisition**

Print Identification

Identification Filters

Original Image

Edge Detection

(-1)　(1)

(-2)　(2)

(-1)　(1)

Direction vectors

Distance scaling

5

Identification Filters

Edge Detection

Original

Vertical Edges

(-1)   (1)

(-2)   (2)

(-1)   (1)
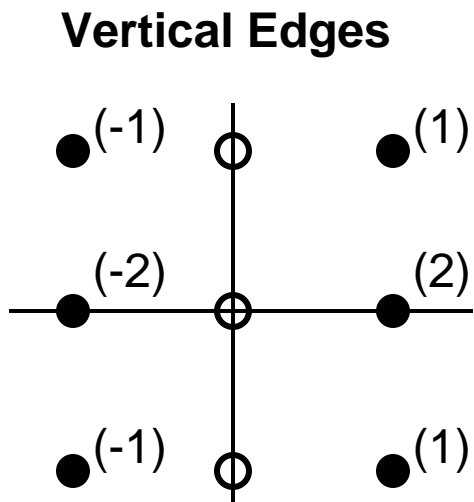
Binarized edge map

Identification Filters

Edge Detection

Original

Horizontal Edges

(1)   (2)   (1)

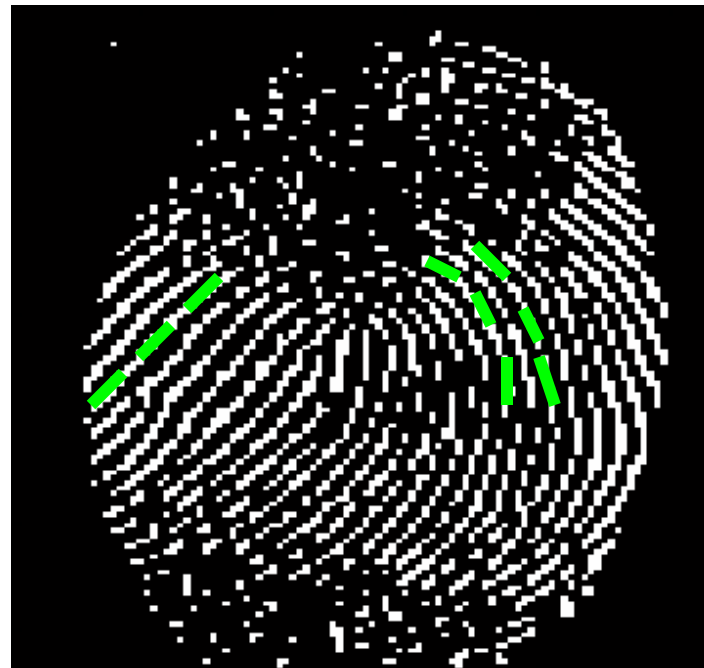(-1)   (-2)   (-1)
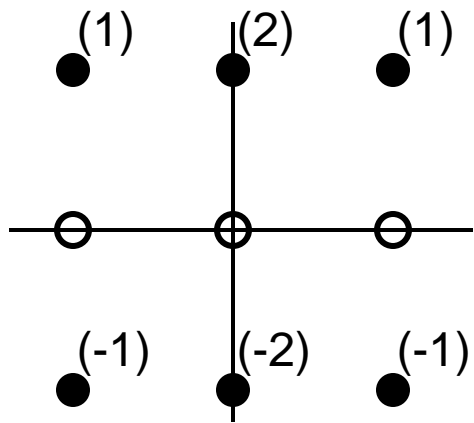
Binarized edge map

Identification Filters

Direction Vectors

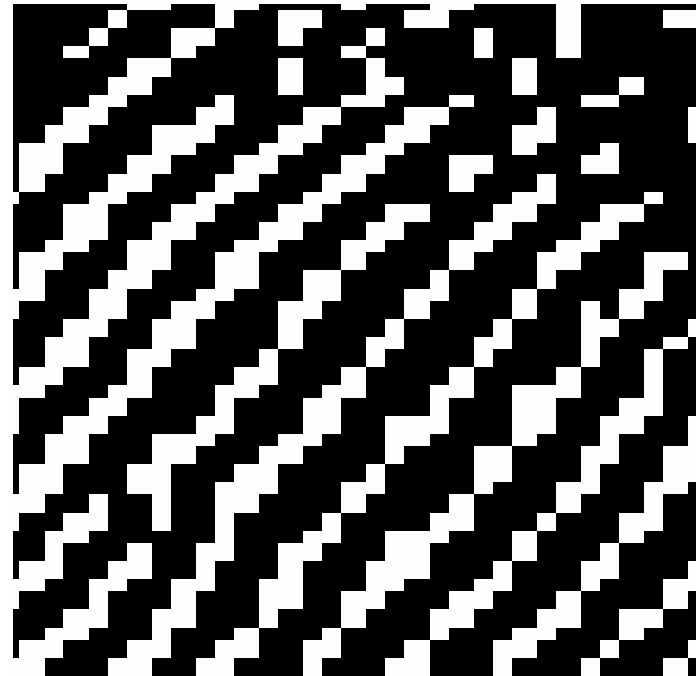**Original**

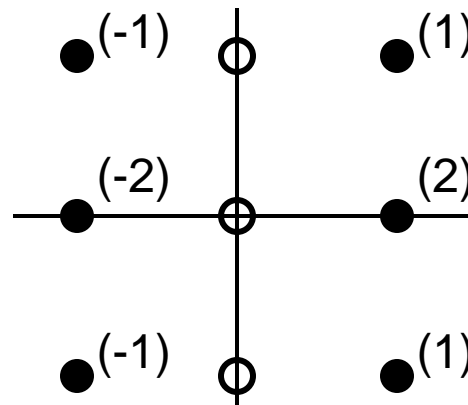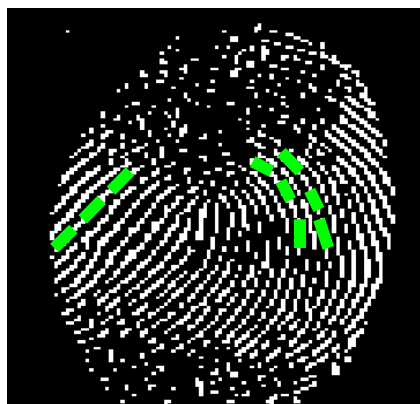**Binarized edge map**

Identification Filters

Distance Scaling

Original

Identification Filters

Original Image

Edge Detection

(-1)   (1)

(-2)   (2)

(-1)   (1)

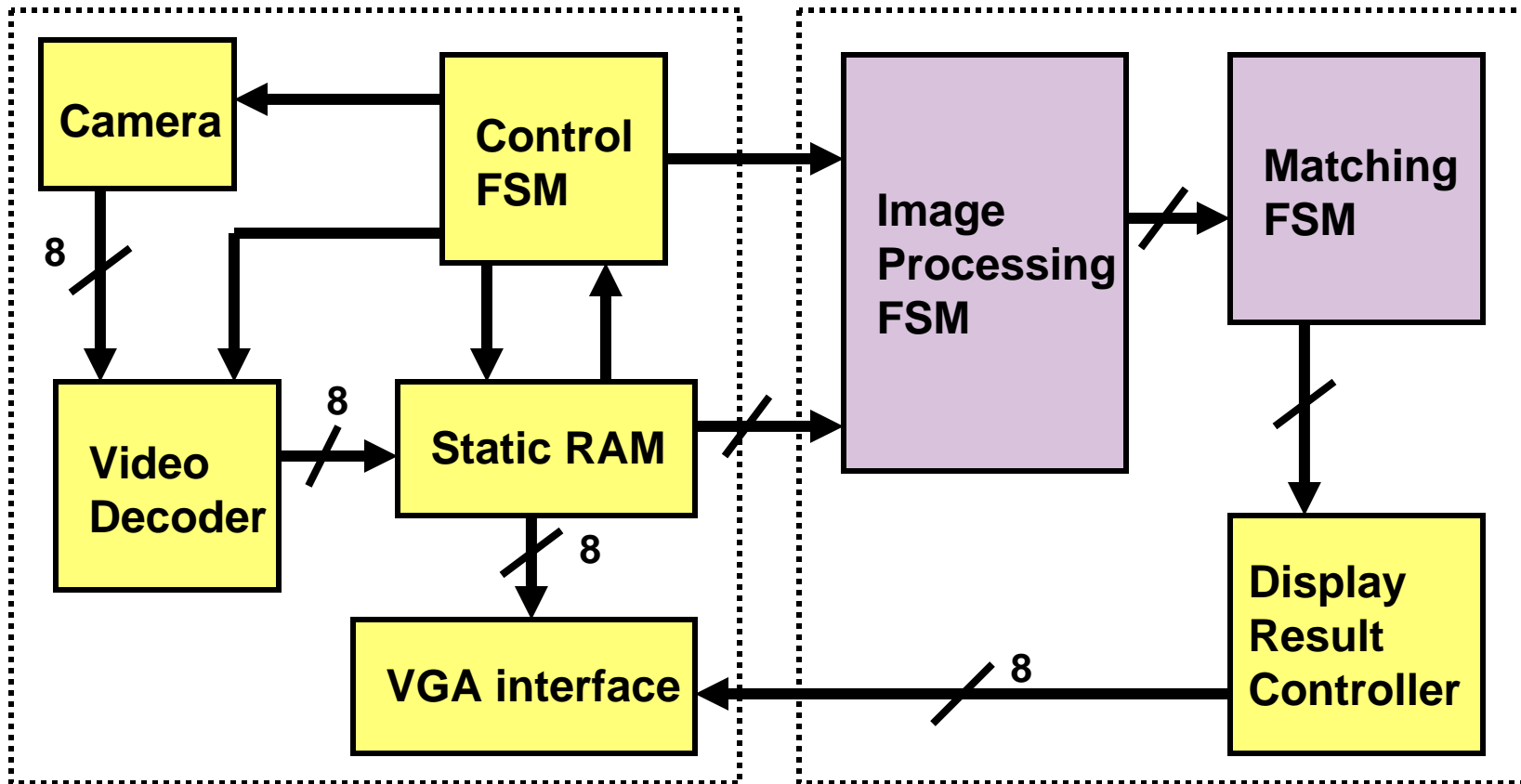**Direction vectors**
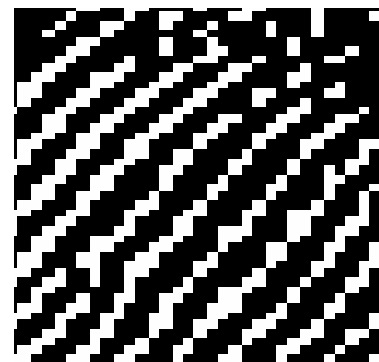
Distance scaling

Project Management

Work Breakdown

Costs: All components available via 6.111 lab kit or EECS stockroom

Project Management

Timeline

April 24		May 15
Week 1	Week 2	Week 3

System Construction

System Debugging

User Interface Extensions

Summary

Goal: To produce a fingerprint identification system that can identify print samples in a pre-established database

System Components

    Acquisition: Capture image of inked print sample via a camera interface

    Identification: Verify print in database via ridge edge detection filters