Fingerprint Identification System

6.111 Final Project

Spring 2006

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Fingerprint Overview

What is a fingerprint?

- Ridges and furrows on finger surface
- Pattern of ridges and furrows creates print uniqueness

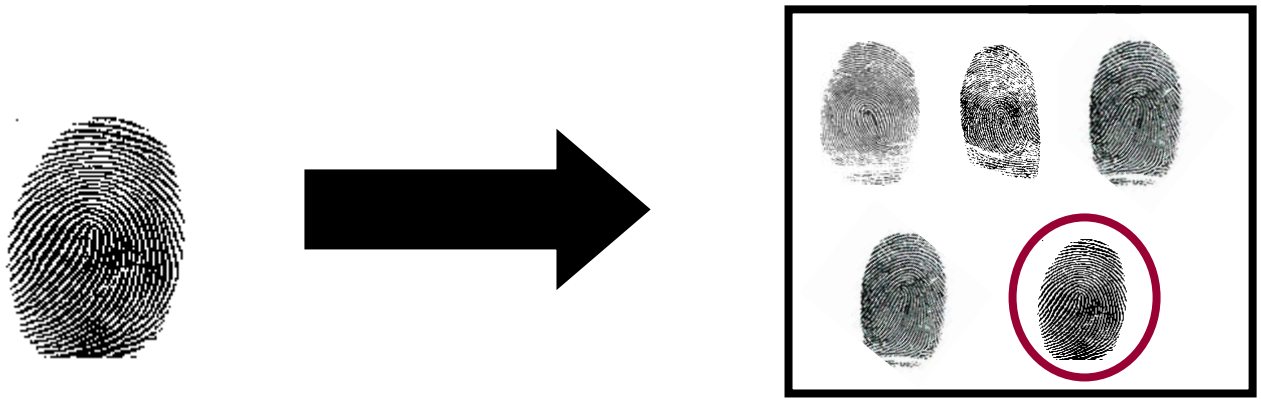
How does a fingerprint identification system work?

- 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

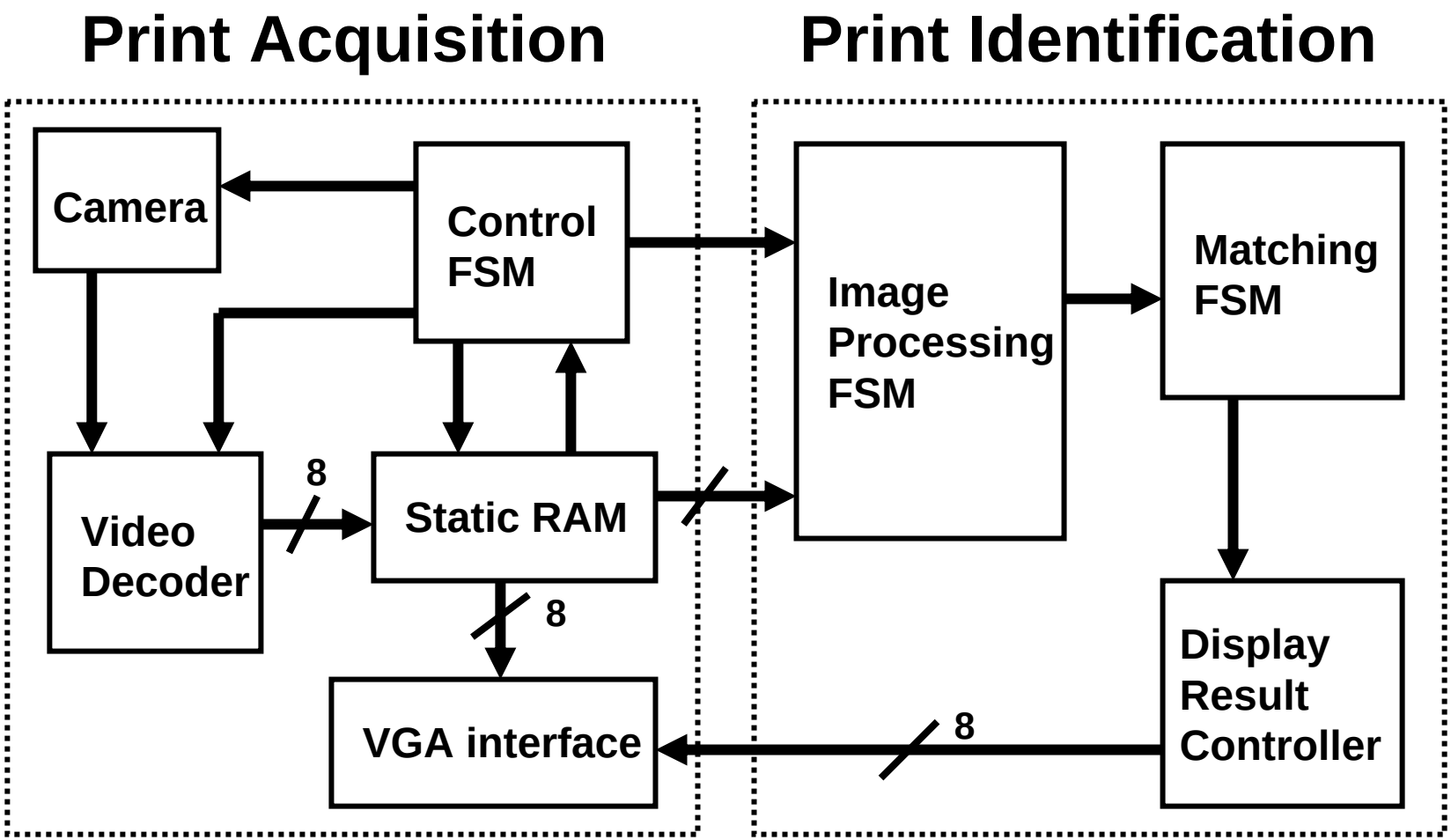
Acquisition: Capture image of inked print sample via a camera interface

Identification: Verify print in database via ridge edge detection filters

Example Application

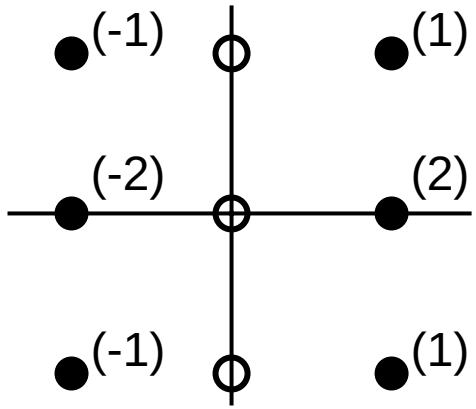
Quick personnel identification in a large company

System Overview

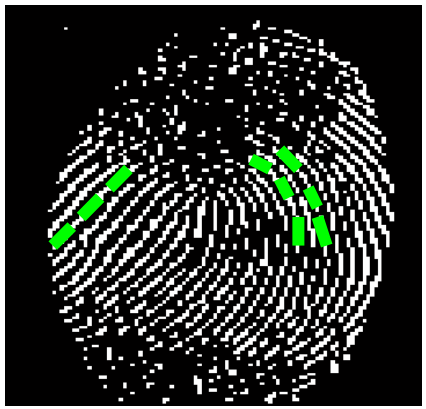


Identification Filters

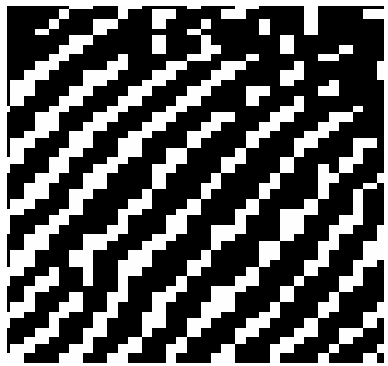
Original Image



Edge Detection



Direction vectors



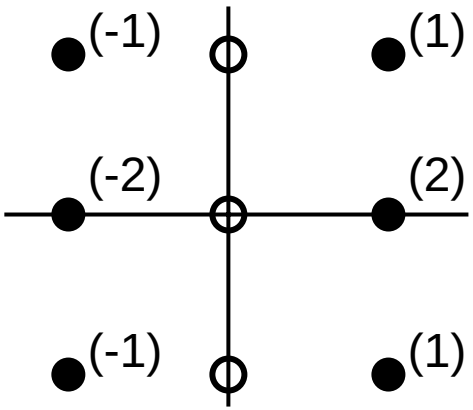
Distance scaling

Identification Filters

Original

Edge Detection

Vertical Edges



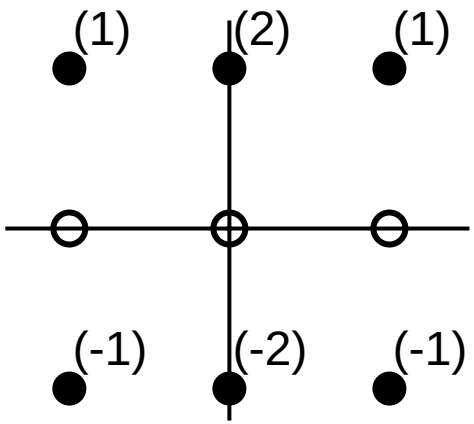
Binarized edge map

Identification Filters

Original

Edge Detection

Horizontal Edges

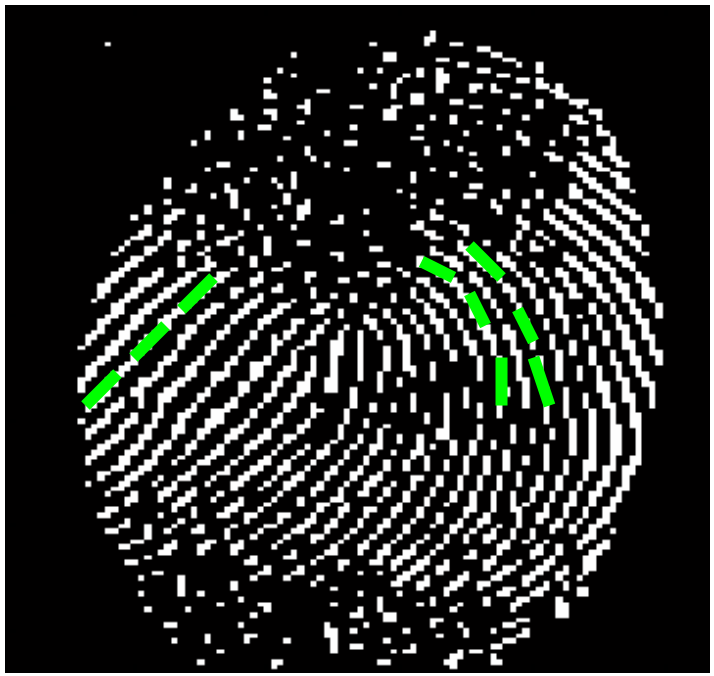


Binarized edge map

Identification Filters

Direction Vectors

Original

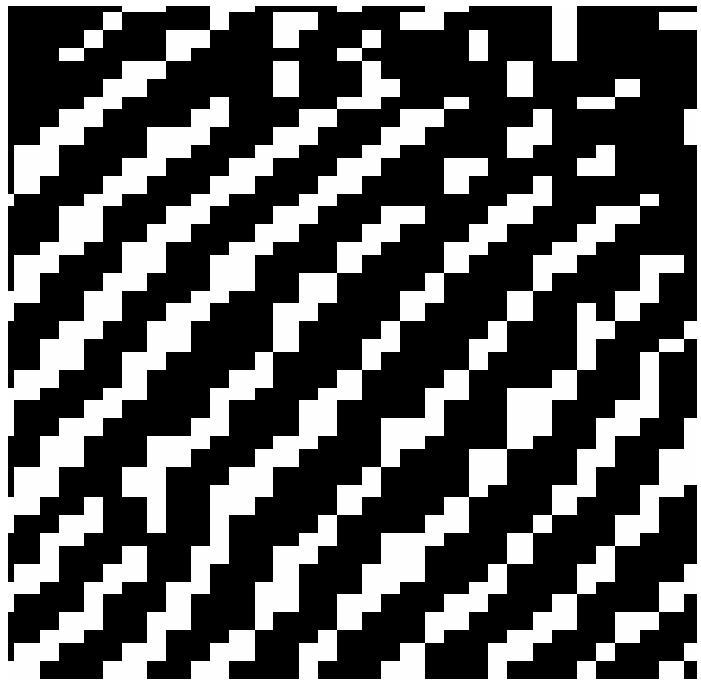


Binarized edge map

Identification Filters

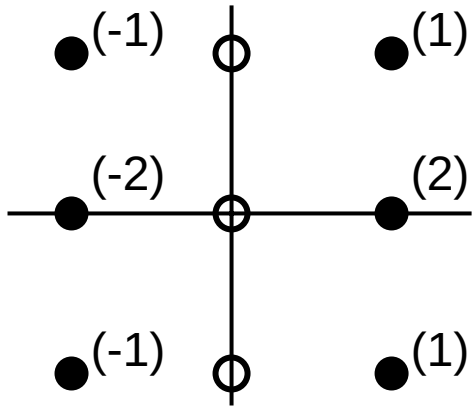
Original

Distance Scaling

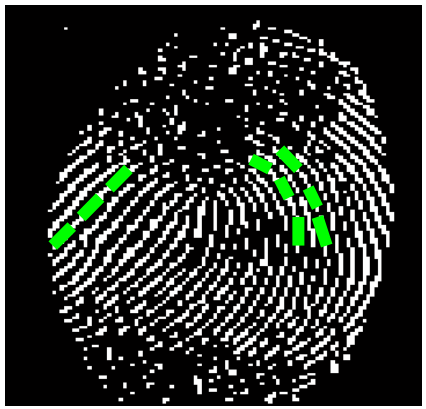


Identification Filters

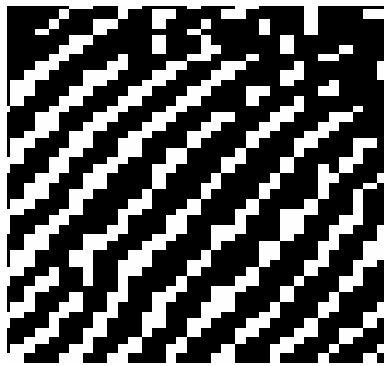
Original Image



Edge Detection



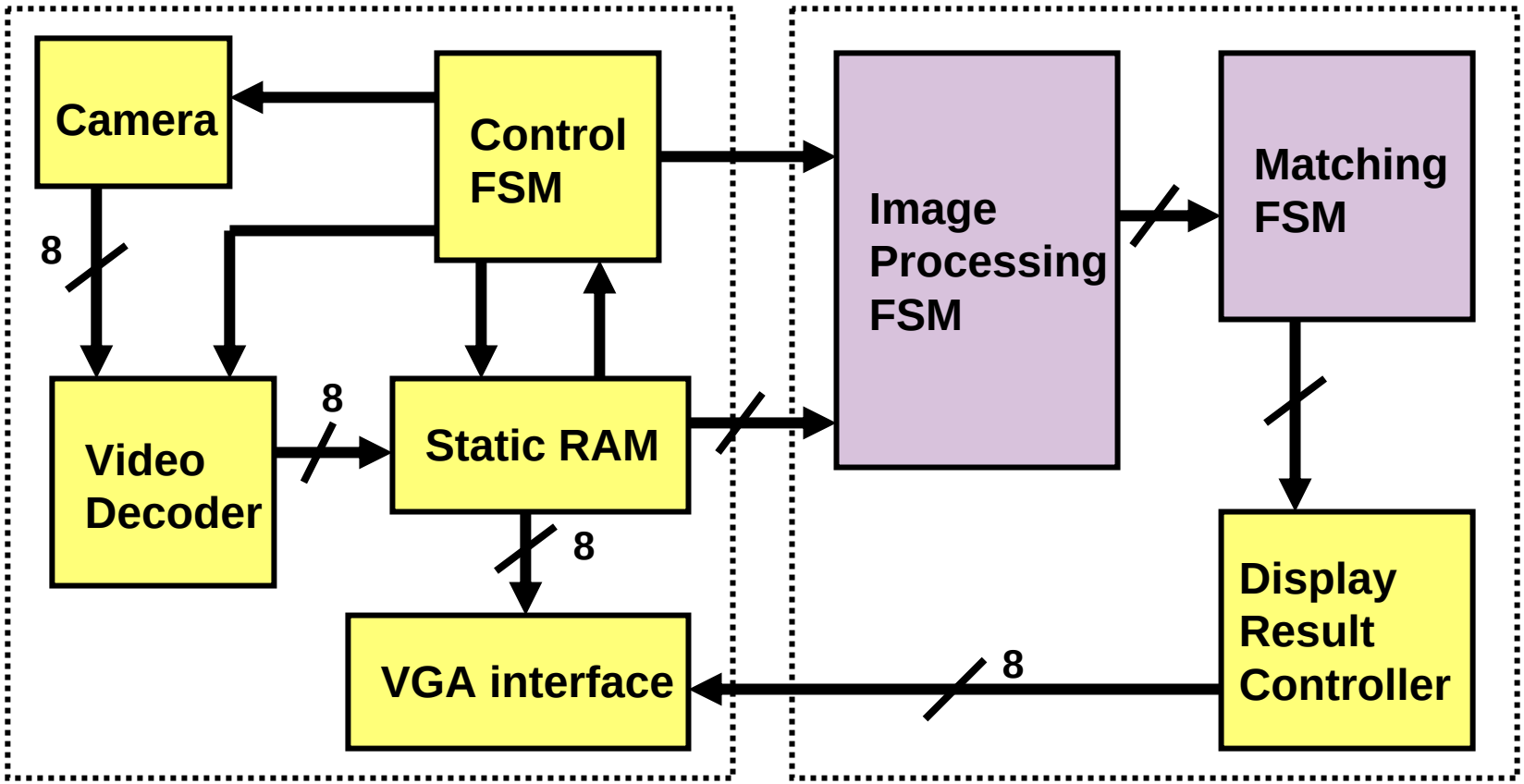
Direction vectors



Distance scaling

Project Management

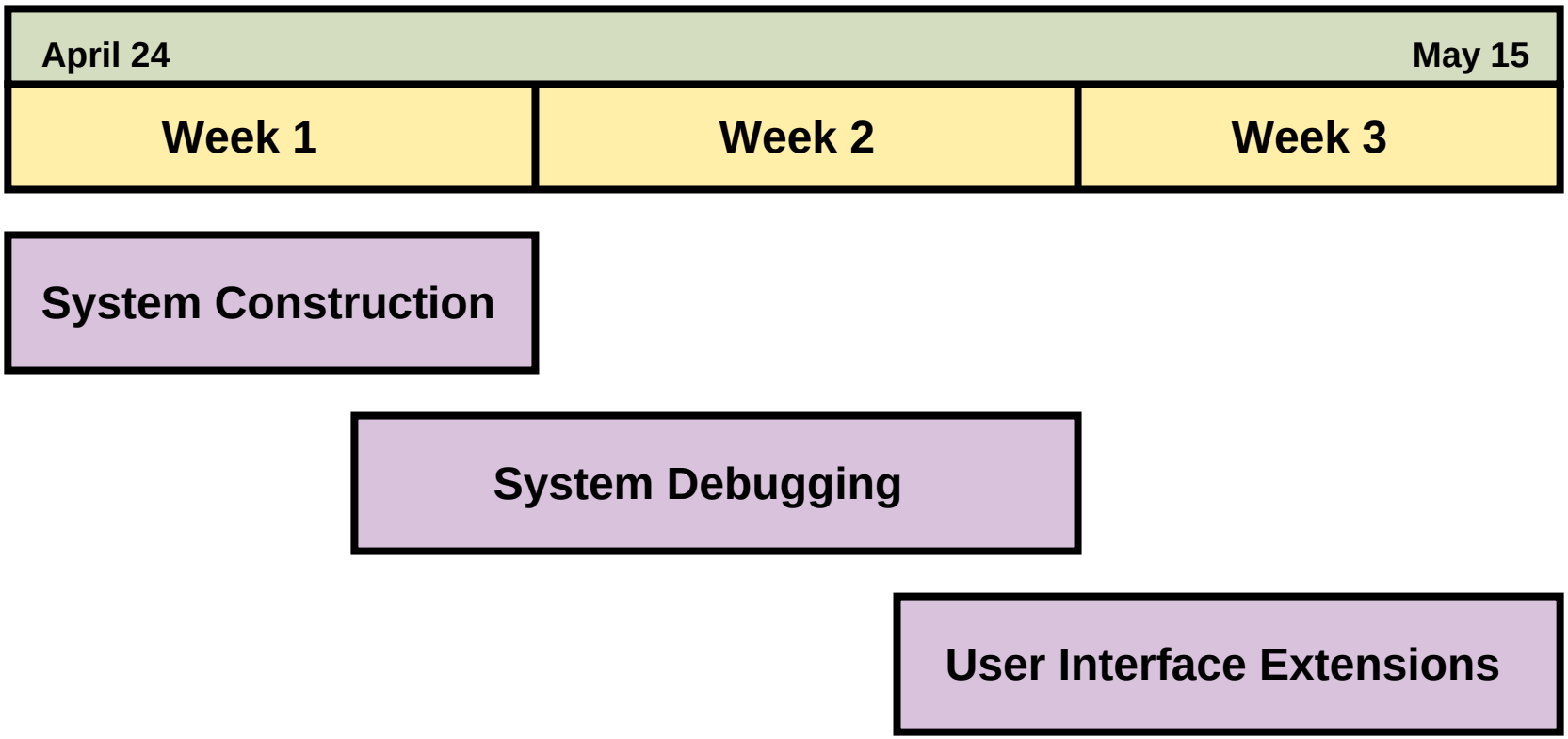
Work Breakdown



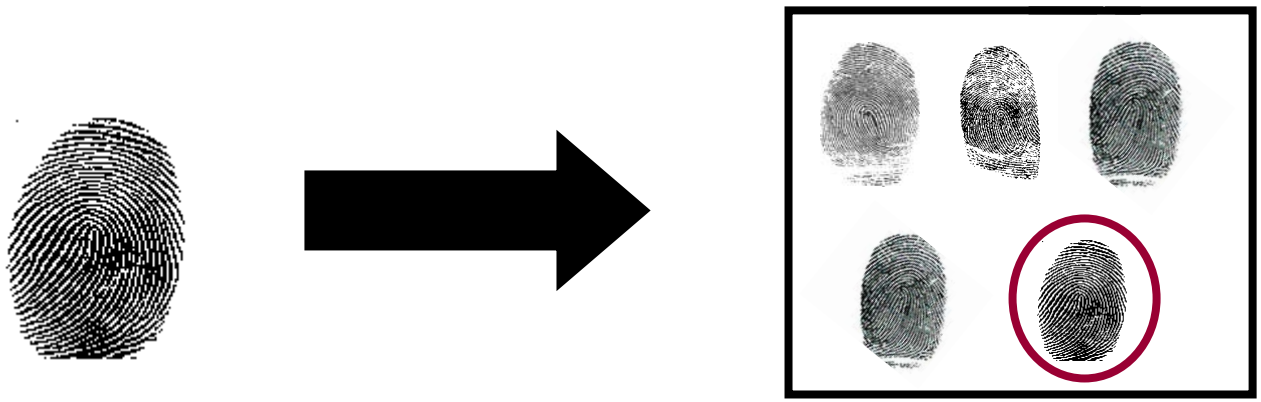
Costs: All components available via 6.111 lab kit or EECS stockroom

Project Management

Timeline



Summary



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