Project Overview

Problem Statement
- Fingerprints have been previously recorded on paper with an ongoing need to digitize these records.
- Previous scanner with Automatic Document Feeder (ADF) has been discontinued, and new scanner has no compatible ADF.

Approach
- The device will automate the feeding process for the new scanner by:
  - Retrieving fingerprint cards from an input bin via robotic arm.
  - Using photocell and whisker sensors to ensure success of movements and scan.
  - Removing the card from scanner, placing it in an output bin.
- Input and output bin size will also increase the throughput by lengthening the run time before routine refill.

Solution
- Built a fully Robotic Automatic Document Feeder (RADF).
- The load capacity has increased from approximately 50 to 500 fingerprint cards.

Objectives

Final Design Features

Gripper
The Bernoulli suction cup allows delicate, porous objects, such as fingerprint cards, to be efficiently transported using compressed air.

Servo Motors
7 servo motors provide the locomotion for the RADF.

Interface
Developed an interconnected interface for the scanner and robotic arm, communicating via socket server.

3D Printing
Majority of the physical components are produced through a high resolution 3D printer. This ensured that the parts are delivered in high quality at a fast delivery time.

Programming
Programmed the servo motors on the robotic arm and the input bin with RIOS software.

Sensors
Photocell sensors will detect whether a fingerprint card has been attached to the suction cup as well as indicating whether the input bin is empty.

Electronics
Designed PCB and cleaned up circuitry components.

Acknowledgements

The Lynxmotion ALSD robotic arm design and the RIOS v1.06 robotic interface software belongs to RobotShop Inc. The final design is intended for sole use by Mentalix Inc.

Industry Mentor: Dale Remmers
Faculty Advisor: Dr. Terry Baughn