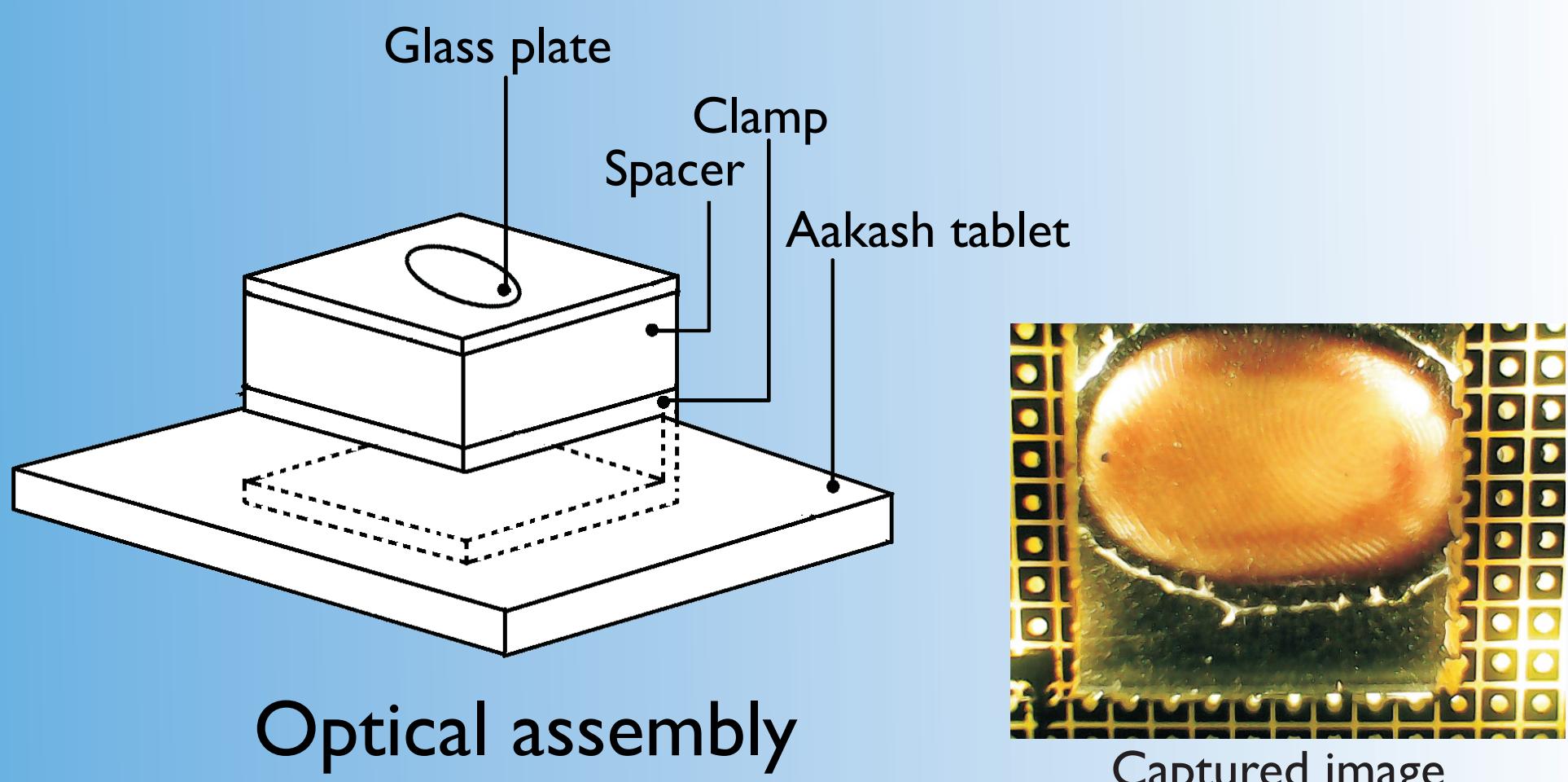


ATTACHMENT FOR AADHAR AUTHENTICATION ON AAKASH

WORKFLOW

IMAGE CAPTURE

The image is captured using the optical assembly, which works on the principle of Frustrated Total Internal Reflection(FTIR).



Optical assembly

LIVE FINGER DETECTION

It detects whether the finger is a spoof or not. It converts the RGB image to grayscale, and then considers the effect of perspiration on it.

ADAPTIVE HISTOGRAM EQUALIZATION (AHE)

This step is used to increase the contrast of the image by stretching the histogram.

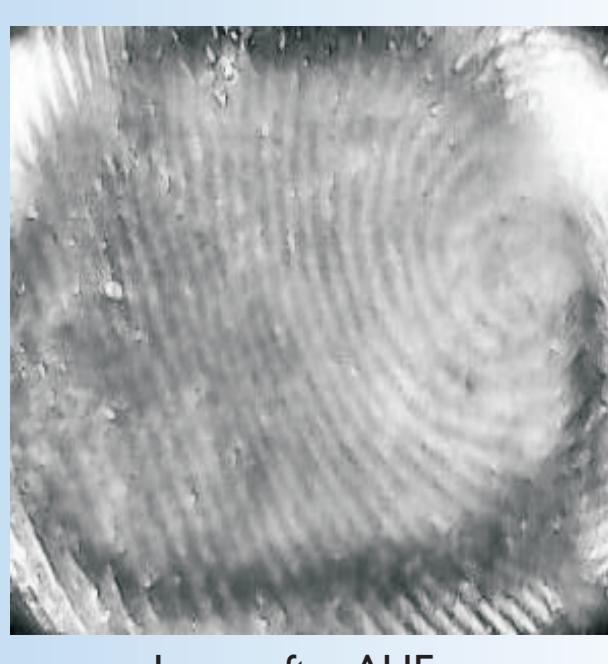
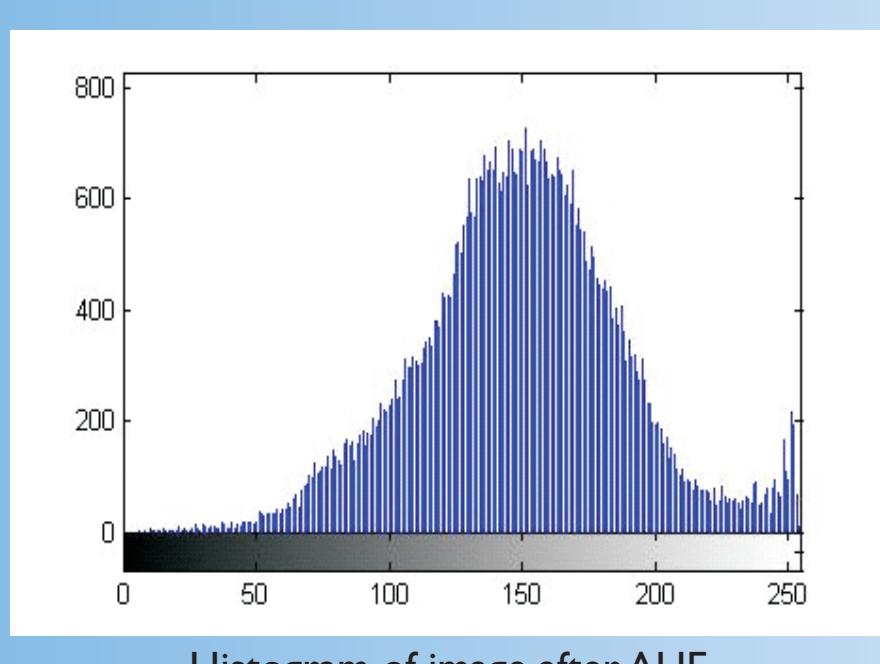


Image after AHE

IMAGE SHARPENING

The ridges of the image are enhanced using Laplacian kernel based convolution.

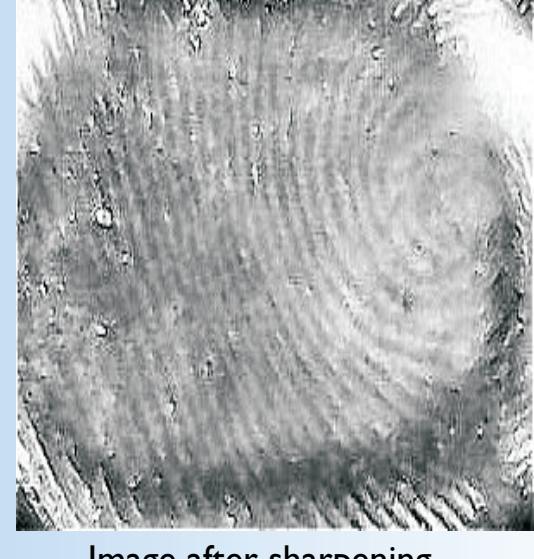
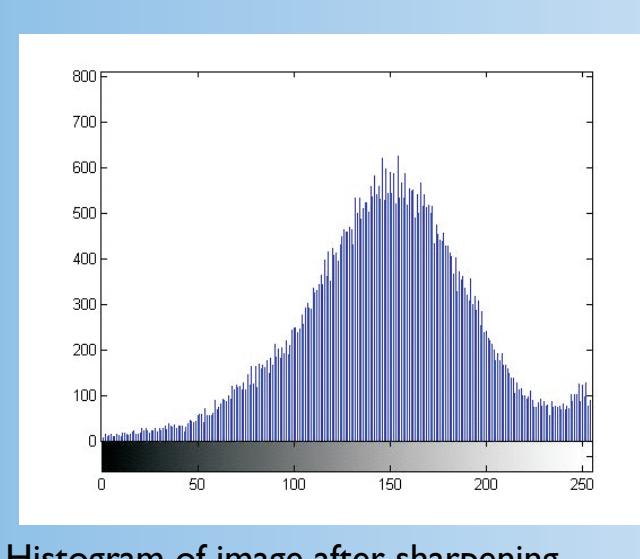


Image after sharpening

PURPOSE

- This application is developed primarily for capturing the user's fingerprint using Aakash tablet.

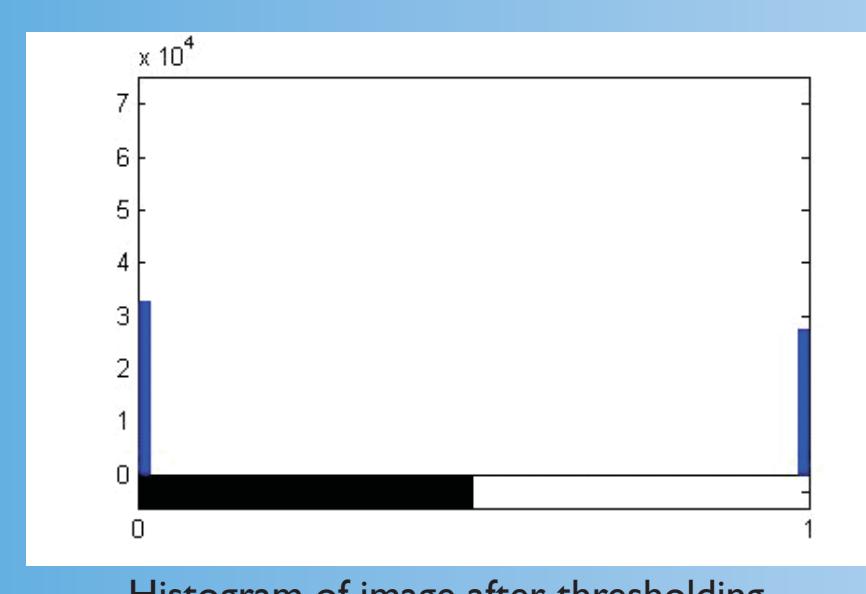
- The existing system uses an external scanner which increases the cost while the system developed by us uses an optical assembly which uses the Aakash tablet's camera itself and hence is low cost.
- The image captured using the tablet's camera is later refined and delivered to Authentication Service Agency(ASA) server for the authentication of the Aadhar card holder.

HARDWARE USED:

- Black acrylic (3 mm thick)
- Transparent acrylic (3 mm thick, 32.5mm x 35 mm)
- PCB
- LEDs (4 quantity, 3 mm thick)
- Resistors (4 quantity, 220 ohms)
- Power source 4.5V (3 AAA (1.5V) cells in series)
- Switch

IMAGE THRESHOLDING

The grayscale image is converted to its black and white image by using threshold values. Experimental threshold value : 172



Histogram of image after thresholding

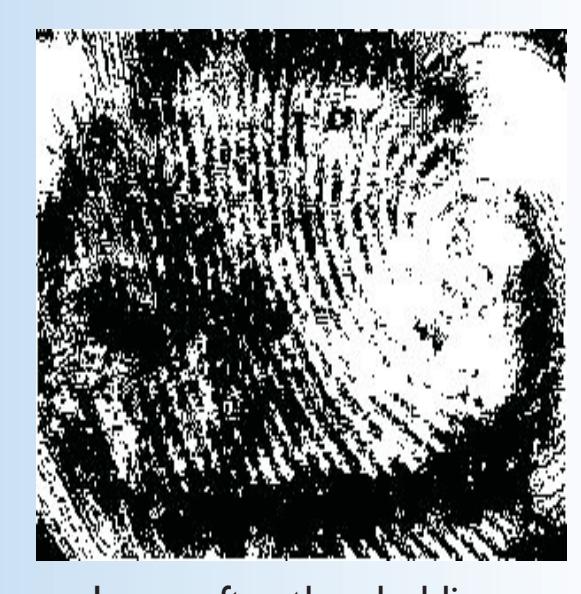
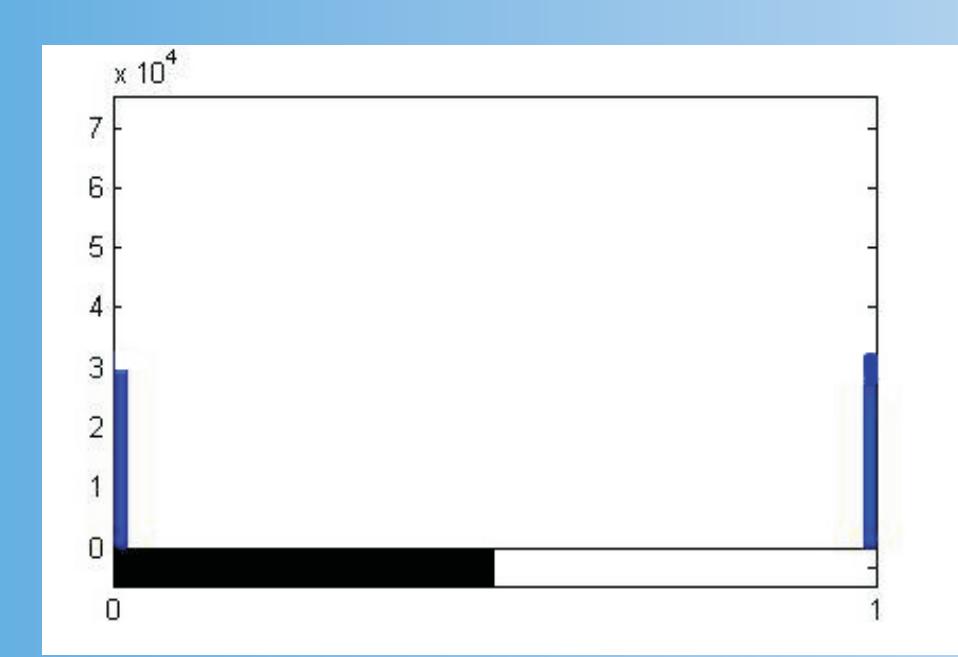


Image after thresholding

IMAGE THINNING

This step reduces the thickness of the ridges to help easily identify the minutiae.



Histogram of image after thinning

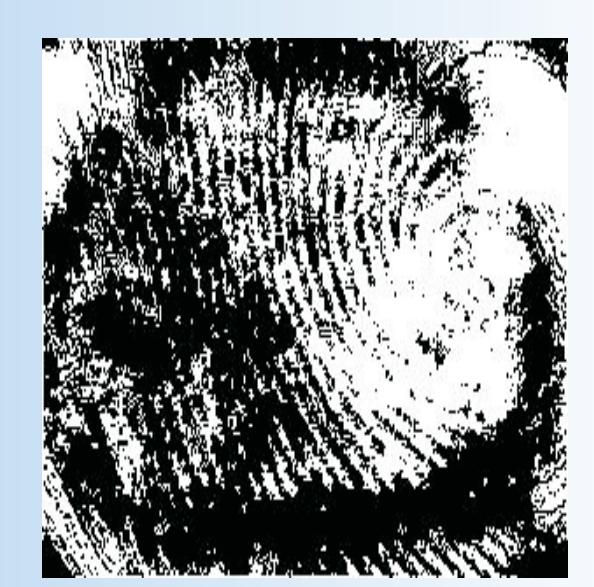


Image after thinning

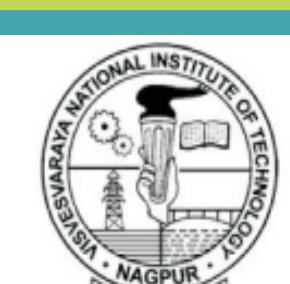
ENHANCED BINARY IMAGE SENT TO SERVER

The final enhanced image is sent to the Aadhar Authentication Service Agency which sends back the authentication result.

FUTURE SCOPE

- Increase the accuracy of optical assembly by testing with IR and SMD LEDs.
- Expand the utility of the application to other devices.
- Use a 35 mm lens (from disposable cameras) to increase the image quality to a great extent.

CONTRIBUTORS



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