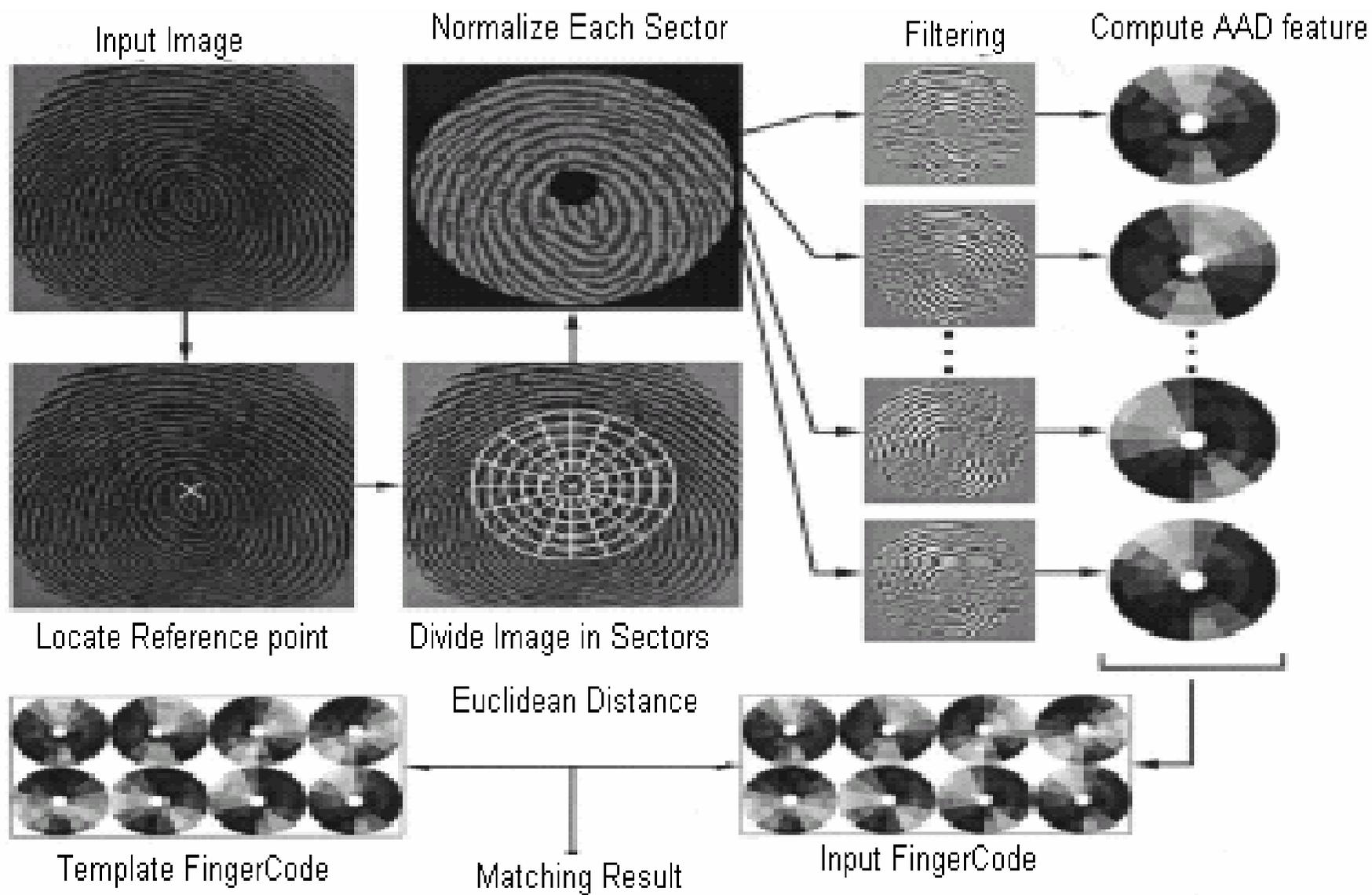

FILTERBANK-BASED FINGERPRINT MATCHING

- Dinesh Kapoor(2005EET2920)
 - Sachin Gajjar(2005EET3194)
 - Himanshu Bhatnagar(2005EET3239)
-

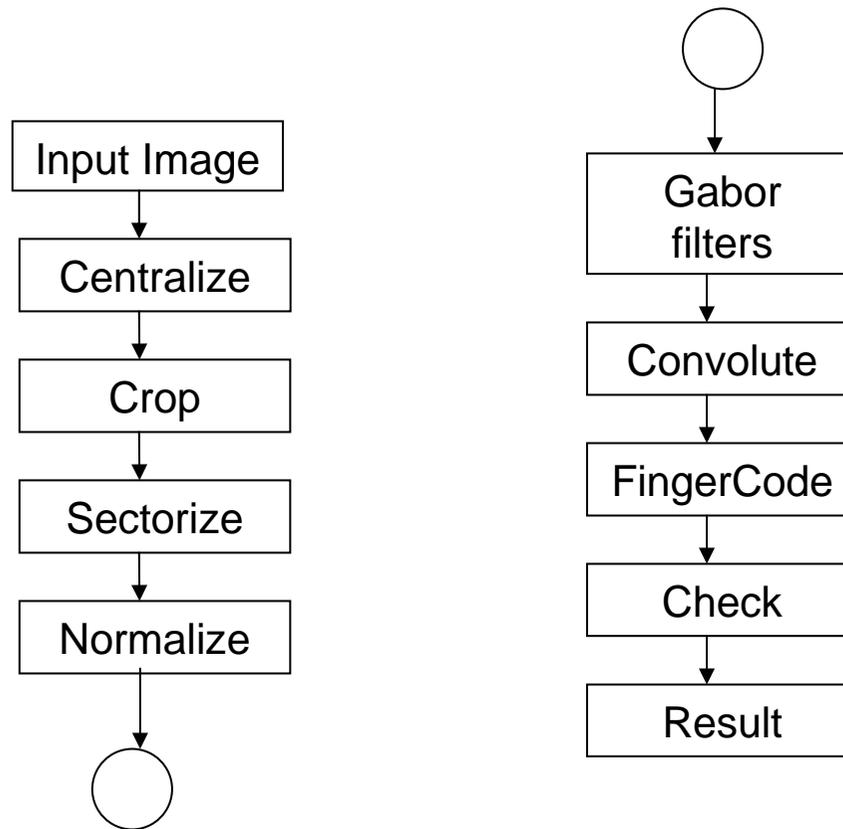
Filter bank-Based Fingerprint Matching

- Steps in feature extraction
 1. Determine a reference point and region of interest for the fingerprint image
 2. Tessellate the region of interest around the reference point
 3. Filter the region of interest in eight different direction using a bank of Gabor filters
 4. Compute the average absolute deviation from the mean (AAD) of gray values in individual sectors in filtered images to define the ***FingerCode*** (feature vector)
-

System diagram of Filterbank-Based Fingerprint Matching



Flow Chart



Files

- Fpextractdemo
 - The main file calling the other functions, user interface controls
 - Centralizing
 - Calculates the center point
 - Cropping
 - Does image cropping, selecting the region of interest
 - Sector_norm
 - Define the sectors and normalize region of interest
 - Gabor2d_sub
 - Does Gabor filtering of the sectorized image
 - Which_sector
 - Finds the given pixel is in which sector
-

Centralizing

- Divide the input image into non overlapping blocks
- Compute the gradients at each pixel
- Estimate the Local ridge orientation of each block centered at pixel
- Binarize



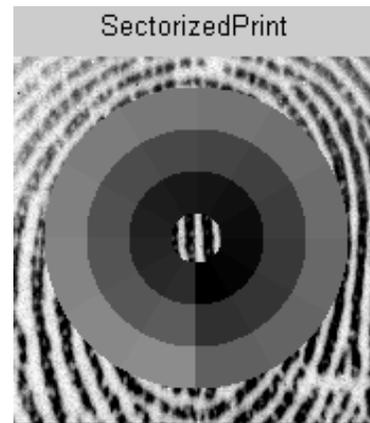
Cropping

- Selecting the region of interest
- From the center point take 175 x 175 pixel area



Sectorizing

- The region of interest is divided into collection of sectors with
 - Center is of 12 pixels
 - Five concentric bands of width 15 pixels
 - Sixteen sectors in each band
 - Total Eighty sectors

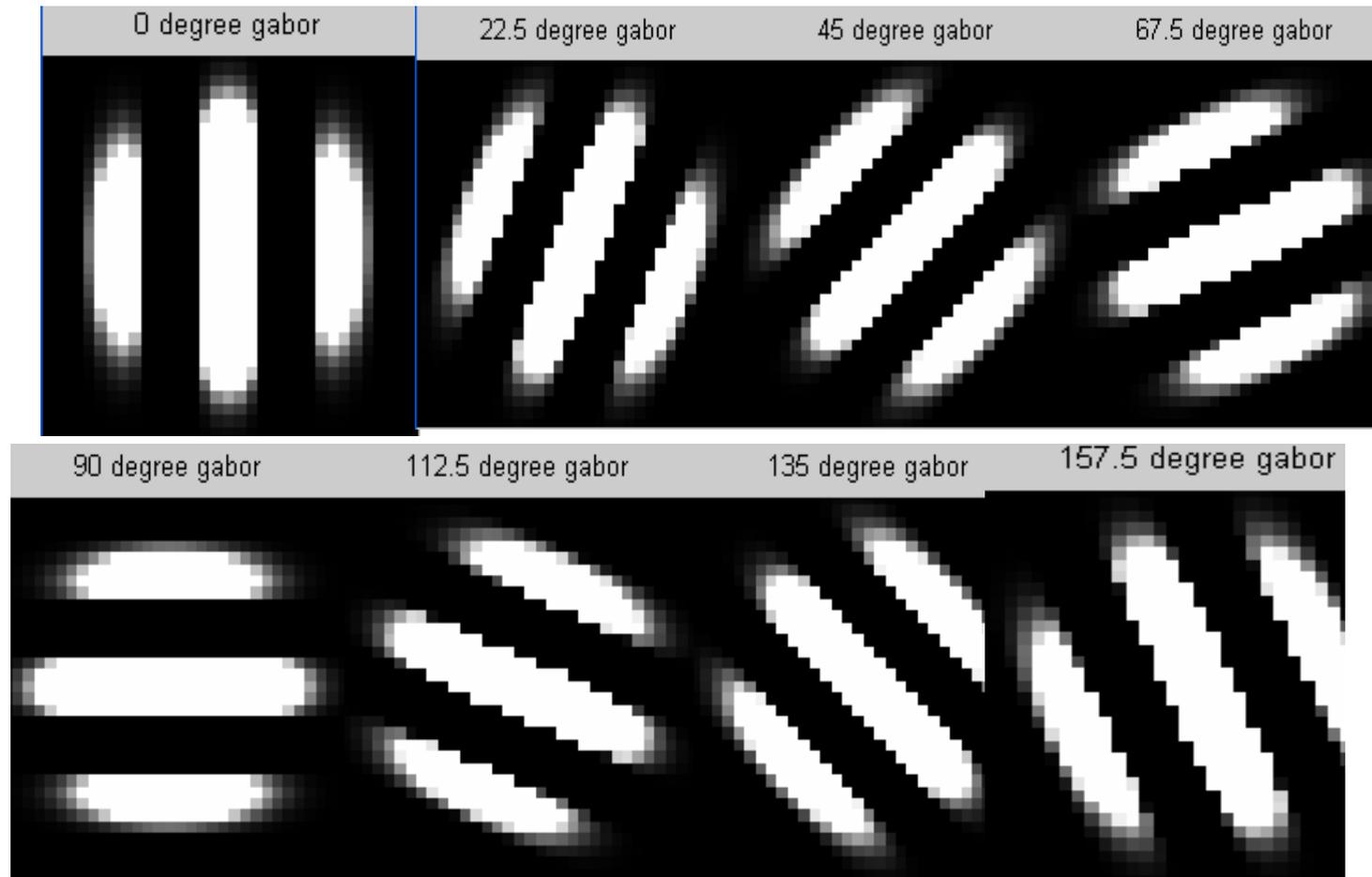


Normalizing

- Done to remove effects of sensor noise and gray level deformation due to finger pressure differences.
- Normalize each sector separately to a constant mean and variance.
- Normalization is a pixel wise operation which does not change the clarity of the ridge and valley structures.

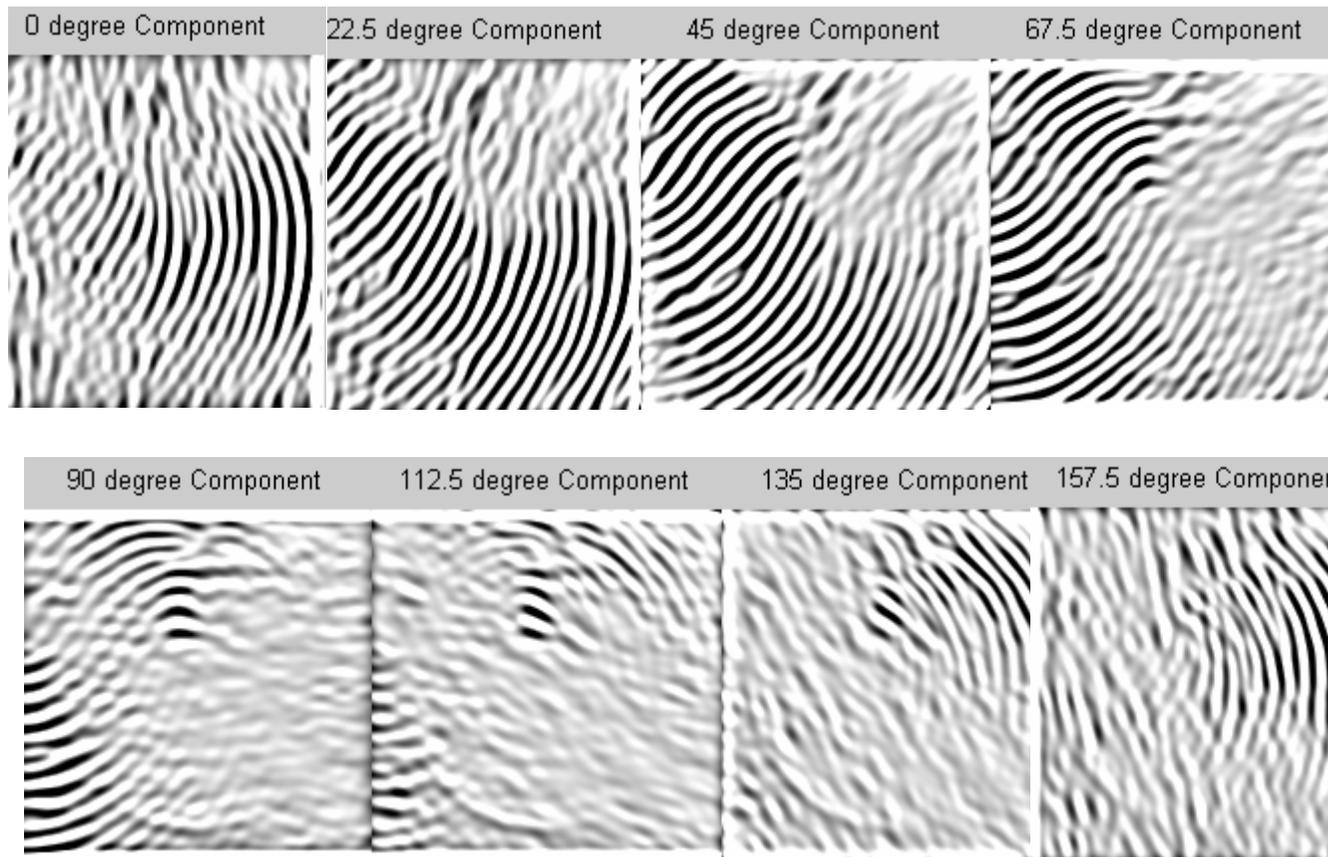


Gabor Filtering



Convolution

- Convolute normalized image with gabor filters

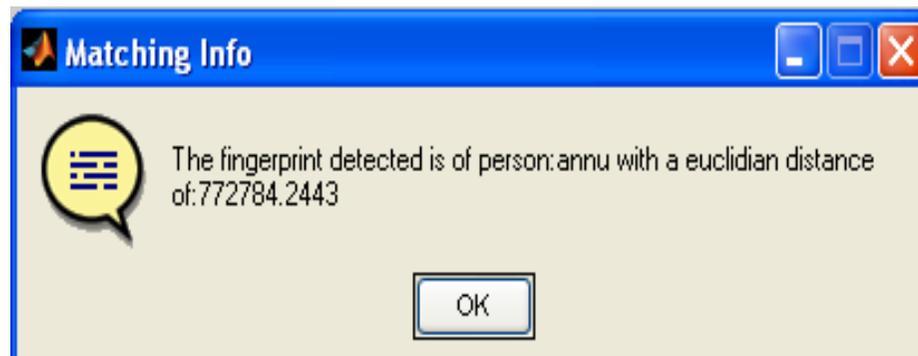


FingerCode

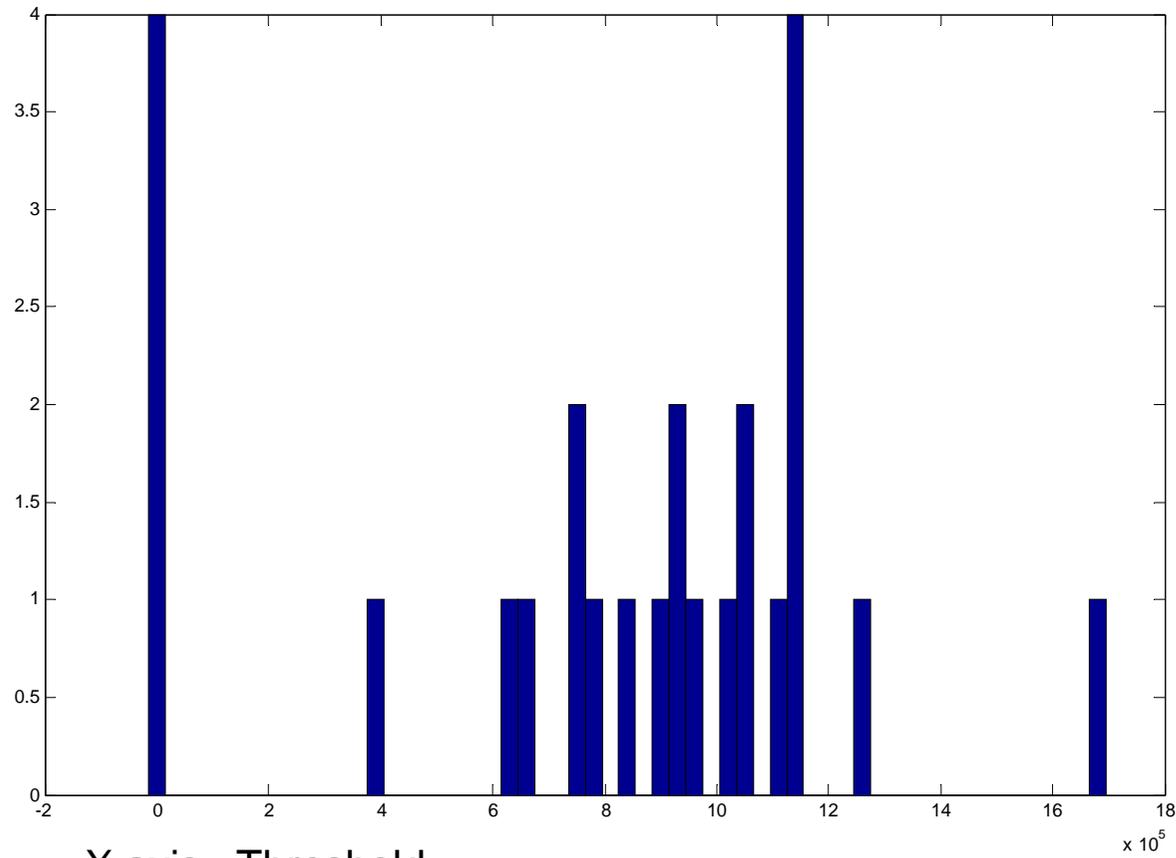
- Compute the average absolute deviation from the mean (AAD) of gray values in individual sectors in filtered images
 - Stored in the database file along with the name of the person
-

Check

- Finding the Euclidean distance between the FingerCode of input image and the image in the database



GENUINE DISTRIBUTION



X axis : Threshold

Y axis : Frequency



Thank You

