Introduction

Traits and Challenges

- **FACE:** Expression, illumination, pose, occlusion, age
- **iris:** Occlusion, specular reflection, view cooperation. Difficult to acquire and very expensive equipment on users.
- **FingerPrint:** Fail to acquire quality templates for cultivars and workers, low public acceptance as compared to image, iris.
- **Ear:** Occlusion, illumination.

- **Biometric System:** Authentication Problem - Verification: close to close - matching biometric system.
- **Identification Problem - Recognition:** Due to noisy matching and low matching scores between subject in different scenarios.

Problem Statement

- **Finger knuckle image databases:**
  - **FKI - Deep Matching (Top Down):**
  - **FKI - Deep Matching (Bottom Up):**

Finger Knuckle Image Databases

- **PolyP Fingerprint DB:** Contains 7,000 samples from 700 subjects.
  - **PolyP:** 700 subjects, 700 fingerprints, 7,000 images, 400 images each.
  - **Image Size:** 800 x 800
  - **Age Group:** 10-75

- **ST Fingerprint Image Database:** Contains 700 fingerprint samples.
  - **Image Size:** 700 x 700
  - **Age Group:** 10-75

- **Polyp Contacts Finger Knuckle Image Database:**
  - **Image Size:** 800 x 800
  - **Age Group:** 10-75

Motivation

- **Finger Knuckle feature:** saves in cost and storage space, which is more cost-effective in terms of storage, retrieval, and file transfer.

Proposed Architecture

ROI Extraction and Enhancement

Deep Matching Methodology

FKI - Deep Matching (Top Down)

FKI - Deep Matching (Bottom Up)

Parametrization

ROC Based Performance Analysis

Comparative Performance Analysis

Inferences

- A biometric system is proposed that can be suitable for small financial institutes of rural areas, based on score level fusion of multiple FOP features.
- Samples are transformed using robust BCR-SCF-PIHM technique to obtain robust image representations and are realized using a hierarchical deep learning framework.
- The FOP feature extraction has been used for performance evaluation and is compared to other state of art methods have achieved superior results.
- In future work, we will work towards other Finger Knuckle Pattern and will test our algorithm on more challenging Finger Knuckle Image Databases.