**BIRZEIT UNIVERSITY**

**Faculty of Engineering and Technology**

COMP432-COMPUTER SECURITY

Report

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The system design described in biometric identification system that use the Scale-Invariant Feature Transform (SIFT) and Brute-Force Matcher (BFMatcher) algorithms for feature extraction and matching of finger print.

- **Modality:**
  - The chosen modality for biometric identification is based on image data. Our system processes images that from both a test dataset and a training dataset, which each image contains unique features that are extracted and compared to identify matches between test and training images.

- **Algorithms Used:**
  - Scale-Invariant Feature Transform (SIFT):
    - SIFT is used for feature extraction from images. It detects and describes distinctive key points and generates descriptors representing the local image features. These descriptors are robust to changes in scale, rotation, which making them suitable for matching.
  - Brute-Force Matcher (BFMatcher):
    - BFMatcher is used to perform brute-force matching between the descriptors extracted from the test and training images. It compares each descriptor from the test image with every descriptor from the training image.

- How System work?
  - The system take image data from two datasets: a test dataset that containing images to be identified and a training dataset that containing reference images.

  - SIFT algorithm is applied to both the test and training images to extract keypoints and compute descriptors representing their unique features.

  - BFMatcher compares the descriptors obtained from the test image with those from the training images to find the matches.

  - The system evaluates FMR and FNMR at multiple thresholds and get the Receiver Operating Characteristic (ROC) curve and then get EER.