Group 12 Final Project Proposal

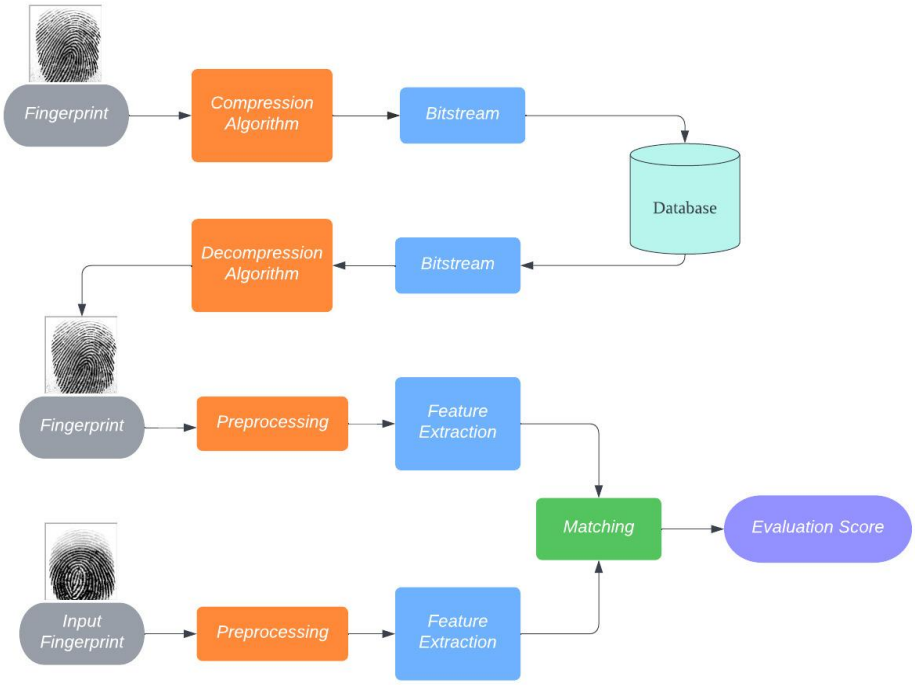
Topic : Fingerprint Compression

Introduction : The field of biometric authentication, specifically fingerprint recognition, plays a crucial role in various applications such as access control systems, forensic investigations, and personal identification. As the size of fingerprint databases continues to grow, efficient storage and fast retrieval of fingerprint data become paramount. Moreover, maintaining high recognition accuracy is essential for reliable authentication. This project aims to implement a fingerprint compression and recognition system that achieves both a high compression ratio and exceptional recognition accuracy.

Objective:

- Obtain highest recognition accuracy
- Getting highest compression ratio without reducing too much recognition accuracy

System Design



Compression/Decompression Algorithm: Slimmable Compressive Autoencoders for Practical Neural Image Compression (SlimCAE) Encoder..

Preprocessing: Enhance the fingerprint image using oriented gabor filter bank. The orientation of the gabor filters is decided by the orientation of ridges.

Feature Extraction: Extract important fingerprint minutiae features such as ridge endpoints and ridge bifurcations. The extracted data is stored in the matrix format, consisting of row and column indices of minutiae points, orientation angle of minutiae points, and type of minutiae features.

Matching Algorithm: Minutiae based score matching algorithm.

Parts related to the content of this course:

- **Compression/Decompression** : Quantization
- **Preprocessing** : Normalization, Filtering, Convolution, and Thresholding
- **Feature Extraction** : Filtering and Convolution

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