Paper: Finger Vein Recognition Based on Anatomical Features of Vein Patterns
Link: https://ieeexplore.ieee.org/document/10061859

1 SUMMARY:

1.1 Motivation:

The hypothesis of the paper "Finger Vein Recognition Based on Anatomical Features of Vein Patterns" is that a feature representation based on the anatomy of vein patterns can improve the recognition performance of finger vein recognition systems.

1.2 Contribution:

The authors propose a new feature representation based on the anatomy of vein patterns. They identify that every finger vein image contains one or more of a kind of 4 special vein patterns which they referred to as Fork, Eye, Bridge, and Arch (FEBA). They further enlarge this set to 6 vein patterns (F2EB2A) by identifying two variations in the Fork and Bridge vein patterns.

1.3 Methodology:

The authors propose a new feature extraction method based on the anatomy of vein patterns. They identify that every finger vein image contains one or more of a kind of 4 special vein patterns which they referred to as Fork, Eye, Bridge, and Arch (FEBA). They further enlarge this set to 6 vein patterns (F2EB2A) by identifying two variations in the Fork and Bridge vein patterns1. Based on 6 anatomical features of the possible 6 vein patterns in a vein image, they define a 6x6 feature matrix representation for finger vein images.

1.4 Conclusion:

The conclusion of the paper "Finger Vein Recognition Based on Anatomical Features of Vein Patterns" is that a feature representation based on the anatomy of vein patterns can significantly improve the recognition performance of finger vein recognition systems.

2 LIMITATIONS:

2.1 First Limitation:

The first limitation of the paper "Finger Vein Recognition Based on Anatomical Features of Vein Patterns" is that the existing finger vein recognition methods, which are based on minutiae features or binary features such as LBP, LLBP, PBBM etc., or from the entire vein pattern, cannot accurately represent the structural or anatomical aspects of the vein pattern. This issue with the minutia feature led to increased false matches.

2.2 Second Limitation:

The second limitation of the paper “Finger Vein Recognition Based on Anatomical Features of Vein Patterns” is that recognition based on binary features such as LBP, LLBP, PBBM etc. have limitations such as increased false matches, sensitivity to the translation and rotation, security and privacy issues. This means that these methods may not perform well under different conditions and may not provide adequate security and privacy.

3 Synthesis:

The paper concludes by suggesting potential future directions for research, including improving the feature extraction algorithm, expanding the dataset, exploring real-world applications, addressing security and privacy concerns, and conducting comparative studies with other biometric authentication techniques.