A Comparative Analysis of Offline Signature Verification using Zernike Moment and Minutiae using Artificial Neural Network Approach

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Abstract

Signature verification is the oldest and widely used biometrics offering offline (static) and online (dynamic) verification schemes. It has been observed that offline scheme is more complex because of the absence of stable dynamic characteristics and factors like stylish and unconventional writing styles but still it is more into use as it does not require signer’s attendance as it is already stored in the database. The paper presents an offline handwritten signature verification system using ANN classifier. In this paper we attempt to compare the performance of two feature extraction schemes such as Zernike Moment and Minutiae feature in terms of Accuracy, False Acceptance Rate (FAR) and False Rejection Rate (FRR) to recognize the signature. Despite of substantial research in the field of signature verification involving Zernike Moment, almost no attention has been dedicated to Minutiae feature although it has been widely used as a means of biometrics to recognize fingerprints. The proposed method comprises of image enhancement techniques like Power Law Transformation, Ripplet II Transformation and Fractal Dimension. Using a database of 40 signatures it has been observed that Zernike Moment feature shows an encouraging accuracy of 95.5596115 and FRR of 4.336188 over Minutiae feature with accuracy of 95.2241 and FRR of 4.792331 on applying rotations of 30 and 45 degrees respectively as Zernike Moment is scale and rotation invariant. Also it has also been observed that Minutiae feature slightly exceeds in terms of FAR
of 0. 025335 over Zernike Moment with FAR of 0. 093571 respectively.

References

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Index Terms

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Keywords

Offline Signature Verification and recognition techniques used feature extraction image processing.