Image Recognition using Coefficient of Correlation and Structural SIMilarity Index in Uncontrolled Environment

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Abstract

The goal of this paper is to analyse and improve the performance of metrics like Coefficient of Correlation (CoC) and Structural Similarity Index (SSIM) for image recognition in real-time environment. The main novelties of the methods are; it can work under uncontrolled environment and no need to store multiple copies of the same image at different orientations. The values of CoC and SSIM get changed if images are rotated or flipped or captured under bad/highly illuminated conditions. To increase the recognition accuracy, the input test image is pre-processed. First, discrete wavelet transform is applied to recognize the image captured under bad illuminated and dull lightning conditions. Second, to make the method rotation invariant, the test image is compared against the stored database image without and with rotations in the horizontal, vertical, diagonal, reverse diagonal and flipped directions. The image recognition performance is evaluated using the Recognition Rate and Rejection Rate. The results indicate that recognition performance of Correlation Coefficient and SSIM gets improved with rotations and discrete wavelet transform. Also it was observed that CoC with proposed modifications yield better results as compared to state of the art enhanced Principal Component Analysis and Enhanced Subspace Linear Discriminant Analysis.
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References

- J. Huang, B. Heisele, V. Blanz, "Component-based Face Recognition with 3D Morphable Models", Proceedings of the 4th International Conference on Audio and Video Based Biometric Person Authentication (AVBPA), 09-11 June 2003, Guildford, UK, pp. 27-34
- L. Kaur and Savita Gupta, "Wavelet based compression using Daubechies filter", National Conf. on Communication at IIT Bombay, 2002

Index Terms

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Keywords

Image Recognition  Discrete Wavelet Transforms  Correlation Coefficient
Structural Similarity Index Metrics