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[1] M. I. Ibrahim, M. S. Nixon, and S. Mahmoodi, "The Effect of Time on Ear Biometrics," in *Proc. IJCB*, Washington DC, USA, Oct. 2011.

The Effect of Time on Ear Biometrics

Abstract

We present an experimental study to demonstrate the effect of the time difference in image acquisition for gallery and probe on the performance of ear recognition. This experimental research is the first study on the time effect on ear biometrics. For the purpose of recognition, we convolve banana wavelets with an ear image and then apply local binary pattern on the convolved image. The histograms of the produced image are then used as features to describe an ear. A histogram intersection technique is then applied on the histograms of two ears to measure the ear similarity for the recognition purposes. We also use analysis of variance (ANOVA) to select features to identify the best banana wavelets for the recognition process. The experimental results show that the recognition rate is only slightly reduced by time. The average recognition rate of 98.5% is achieved for an eleven month-difference between gallery and probe on an un-occluded ear dataset of 1491 images of ears selected from Southampton University ear database.

[2] M. I. Ibrahim, M. S. Nixon, and S. Mahmoodi, "Shaped Wavelets for Curvilinear Structures for Ear Biometrics," in *Proc. ISVC'10*, Las Vegas, USA, Nov. 2010.

Shaped Wavelets for Curvilinear Structures for Ear Biometrics

Abstract

One of the most recent trends in biometrics is recognition by ear appearance in head profile images. Determining the region of interest which contains the ear is an important step in an ear biometric system. To this end, we propose a robust, simple and effective method for ear detection from profile images by employing a bank of curved and stretched Gabor wavelets, known as banana wavelets. A 100% detection rate is achieved here on a group of 252 profile images from XM2VTS database. The banana wavelets technique demonstrates better performances than Gabor wavelets technique. This indicates that the curved wavelets are advantageous here. Also the banana wavelet technique is applied to a new and more challenging database which highlights practical considerations of a more realistic deployment. This ear detection technique is fully automated, has encouraging performance and appears to be robust to degradation by noise

[3] M. M. Hadhoud, W.S. ElKilani, and M. I. Samaan, "An adaptive algorithm for fingerprints image enhancement using gabor filters," in *Proc. International Conference on Computer Engineering and Systems*, pp. 227-236, 2007.

An adaptive algorithm for fingerprints image enhancement using gabor filters

Abstract

Fingerprint image enhancement is a preprocessing step in fingerprint recognition applications. In this paper, an improved algorithm for enhancement of fingerprint image is proposed. The proposed method includes additional steps of adaptive background subtraction and adaptive filtering to the previous fingerprint image enhancement methods based on Gabor filter. The adaptive filtering step enhances the edges of the fingerprints.

[4] M. M. Hadhoud, W.S. El-kelany, and M. I. Samaan, "An adaptive Algorithm for improved Enhancement of Fingerprints," in *Proc. The 23rd National Radio Science Conference (NRSC2006)*, March 14-16, Egypt, 2006.

An adaptive Algorithm for improved Enhancement of Fingerprints

Abstract

Fingerprint image enhancement is a preprocessing step in fingerprint recognition applications. In this paper, an improved algorithm for enhancement of fingerprint image is proposed. The proposed method includes additional adaptive filtering and segmentation steps to the previous fingerprint image enhancement methods based on Gabor filter. The adaptive filtering step enhances the edges of the fingerprints. The segmentation step combines four techniques to separate the fingerprint image from the background. The results show an improvement on the fingerprint for visual inspection and for automatic feature extraction for recognition