A ROBUST IRIS RECOGNITION METHOD ON ADVERSE CONDITIONS

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ABSTRACT

As a stable biometric system, iris has recently attracted great attention among the researchers. However, research is still needed to provide appropriate solutions to ensure the resistance of the system against error factors. The present study has tried to apply a mask to the image so that the unexpected factors affecting the location of the iris can be removed. So, pupil localization will be faster and robust. Then to locate the exact location of the iris, a simple stage of boundary displacement due to the Canny edge detector has been applied. Then, with searching left and right IRIS edge point, outer radios of IRIS will be detect. Through the process of extracting the iris features, it has been sought to obtain the distinctive iris texture features by using a discrete stationary wavelets transform 2-D (DSWT2). Using DSWT2 tool and symlet 4 wavelet, distinctive features are extracted. To reduce the computational cost, the features obtained from the application of the wavelet have been investigated and a feature selection procedure, using similarity criteria, has been implemented. Finally, the iris matching has been performed using a semi-correlation criterion. The accuracy of the proposed method for localization on CASIA-v1, CASIA-v3 is 99.73%, 98.24% and 97.04%, respectively. The accuracy of the feature extraction proposed method for CASIA3 iris images database is 97.82%, which confirms the efficiency of the proposed method.

KEYWORDS

IRIS recognition, pupil, edge detector, wavelet,

1. INTRODUCTION

In recent years, application of biometric techniques to identify the individuals in various parts of society has been in the focus of attention. Fingerprints, palm print, face, voice, iris, hand geometry, and retina, which are invariant by natural factors (e.g., temperature, aging, disease, and climate variations), are well-known biometrics. In this context, much attention has been paid to the iris as a biometric system due to its intrinsic characteristics such as its life-time stability [1], uniqueness, reliability, taking image without physical contact (i.e. the ability to register optically without any contact), and the lowest error rate based on the statistical results [2]. The iris identification system works based on the precise location of the iris region in any eye image, extraction of the distinguishing features of the iris, and matching of the iris feature vectors using distance criteria. Different approaches have already been reported in the literature to determine the identity of people through their iris. Daugman [3] in 1993, for example, proposed the first efficient iris recognition system. He located the iris boundaries using a relatively time-consuming differential operator. He calculated the convolution of complex Gabor filters and iris image to extract the image features. Then he evaluated the complex map of phasors and generated a 2048-bit iris code so as to match the iris codes with Hamming distance criteria. Although the Gabor filter-based methods show a high degree of accuracy, they, nevertheless, require a long

DOI : 10.5121/ijcseit.2013.3504