

Chapter 11

Authentication by Palmprint Using Difference of Block Means Code

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ABSTRACT

Biometrics is an automatic identification of people with their physiological and behavioural characteristics. There are various modes used in biometrics, such as face, iris, retina, fingerprint, palmprint, palm vein, ear, handwriting, speech, gait, and so on. All these types of biometrics have some shortcomings. Palmprint identification is the biometric methodology used in this chapter, has several advantages over other biometric features which includes user friendliness, environment flexibility, and discriminating capacity. For several years, palmprint identification has been employed in a variety of applications. In the proposed system, the difference of block means approach is used to recognize palmprint which only requires fundamental operations (addition and subtractions), resulting in a significantly lower computing cost compared to existing systems. Even with low-resolution images, the palmprint authentication method yields substantially better results. CASIA Multispectral Palmprint database is used in the experiments. The proposed approach achieves better accuracy.

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INTRODUCTION

In olden days, the authentication was done with passwords, code words (something to remember), and cards (something to hold or carry). The problems with these classic methods are the person has to memorize the secret words and remember to carry the cards. In the password scheme, often he / she has to change the passwords against brute force. For various applications, different credentials have to be used and remembered to avoid cracking the passwords. To overcome these issues in the authentication, in the digital era, biometrics was introduced. Biometrics is an automatic identification of people with their physiological and behavioural characteristics. There are various modes used in the biometrics such as face, iris, retina, fingerprint, palmprint, palm vein, ear, hand writing, speech, gait and so on. All these varieties of biometric modes have some shortcomings such as due to skin issues and the nature of the jobs, about 2% of the population is unable to provide clear fingerprint images in fingerprint authentication; similarly, because of temporary or chronic injuries hand geometry may provide minimal information, resulting in inaccurate human detection or identification; for iris and retina recognition, the user acceptability is less; the face images and fingerprint are easily hacked by the intruders; voice and gait (way of walk) of one person can be mimicked by others. Palmprint refers to the image of the palm region of the hand. In olden days, palmprint was acquired by using ink. In the digital era, it is acquired with the digital cameras. Palmprint is the pattern in the skin surface of palm of the hand. The palm region includes the patterns: points, principal lines, wrinkles, epidermal ridges, and texture. Palmprint identification is the biometric methodology used in this article, which has several advantages over other biometric features such as user friendliness, environment flexibility, and discriminating capacity even to discriminate the twins. For several years, palmprint identification has been employed in a variety of applications. In the proposed system, first the pre-processing is done to remove the noise in the input image. In the pre-processed image, the most interested region i.e., the region which includes the most discriminating features is segmented as region of interest (ROI). Then in the ROI, blocks of size 8x8 is considered and the mean of the block is computed and the difference of block means is computed to create a feature vector. The authentication task includes two phases namely training and testing phase. The entire palmprint database is divided into 2:1. 2/3 of the total images are used for training purpose i.e., to construct the model. The remaining 1/3 of the total images are used for testing i.e., to test the correctness of the constructed model. During the training phase, for all the training images the features are extracted by following the steps mentioned above and stored as templates. During the testing phase, for the test images also the features are extracted as earlier and then these currently extracted features are compared with the template of features using Euclidean distance and

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