A Novel Convolution Block-Based Contour Texture Analysis Model for Palmprint Recognition System

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Abstract

The detection of human elements is essential for securing digital data in an IoT World. It can be accomplished utilizing different methods. The palmprint recognition of individuals is providing more security through the recognition of their left or right palms compare to other biometric traits. Our research work is proposed a novel system for enhancing the accuracy of security in biometric technology. A novel Convolution Block-Based Contour Texture Analysis Model for Palmprint Recognition (CBCTPR) system is proposed. To accomplish this system, Two Dimensional-Palmprint Region of Interest (2D-PROI) image is pre-processed and Contour Pre-processed 2D-PROI image (CPI) is created, and extracting the texture features using Block-Based Contour Fractal Dimension (BCFD) approach. In the BCFD approach, CPI is subdivided into 16 × 16 blocks, and apply Probabilistic Box-Counting (PBC) algorithm on each block to fetch the texture features. This research experiment is performed on the Multi-Spectral 2D-PROI database of PolyU, derived from Hong Kong Polytechnic University in Hong Kong. Finally, Extracted texture feature values are put into the proposed BCFD-CNNNet to perform the classification and captured the genuine person authorization at 98.75% of identification accuracy.

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Introduction

Biometric technologies are used for distinguishing an individual in view of the physiological and behavioral characteristics of humans [1]. Palmprint recognition is a biometric confirmation strategy in view of the benefits of ease of use, environment flexibility, and discriminating ability compared with other conventional biometric traits [2]. An entire palmprint recognition system involves pre-processing, feature extraction, feature matching, and decision-making phases [3]. Palmprint consists of lots of unchangeable textures and line characteristics. Extraction of texture and line characteristics is a vital process to gain information on palmprints which is used for authorization. It can be extracted using image processing techniques.

Texture Analysis [4] cites the portrayal of locales in an image by their surface content depicted in terms of rough, smooth, sleek, or bumpy. [5] In a general sense, texture alludes to the surface qualities and appearance of an object given by the size, shape, thickness, density arrangement, and extent of its rudimentary parts. The separation of texture features is utilizing several strategies. [6] [7] One most usable strategy is the model-based texture approach. It has a low computation time compared to other approaches. [8] Measurement of fractal dimension is useful for analysis and classifies the texture image efficiently. [9] Model-based methods take out the basic qualitative properties of the texture.

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