A Geometric Approach for Personal Authentication based on Finger Back Knuckle Surface using Tangents and Secants

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Abstract

Biometric based Personal authentication is still active research problem due to various issues such as providing high accuracy, computationally less complex feature extraction method and fusion strategy of multiple feature information. In this work we propose a personal authentication system using one such hand based biometric trait, Finger Back Knuckle Surface (FBKS). The texture pattern produced by the finger back knuckle intact surface is highly unique and makes the surface a distinctive biometric identifier. In comparison with existing approaches, which do not extract any angular data as feature information, this method extracts angular information using geometric analysis based on Tangents and Secants. This system acquires knuckle images using automated low resolution contact less method. In this, image pattern of both primary knuckle and core knuckle is completely considered as intra knuckle parameters of Finger back knuckle intact surface. The feature information of FBKS various fingers such as Left Index Finger, Left Middle Finger, Right Index Finger and Right middle Finger are extracted and fused using matching score level fusion. The experiments were conducted using newly created database for FBKS consists of samples collected from 100 volunteers. The experimental results from the proposed approach are promising and confirm
the usefulness of such an approach for personal authentication.

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Keywords

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