19PM2A-5 Improvement of Preprocessing Method on Fingerprint Identification System by Layered Neural Networks

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We constructed individual identification system of fingerprint by three-layered neural networks, and investigated the effects of the preprocessing method determining a center of fingerprint images and the neural networks on the performance of individual identification system. The fingerprint images were classified into four directions, 0, 45, 90 and 135°, then two kinds of smoothing were done and the neural networks were optimized. From the results, we found that the preprocessing and the layered neural networks were useful for the individual identification system with the high performance and that the preprocessing method determining a center of fingerprint images produced higher performance than the system without the preprocessing.

19PM2A-6 An Application of Fuzzy Logic and Neural Network to Fingerprint Recognition

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The correct minutiae extraction is very important in an automatic fingerprint identification system. However, the presence of noise in poor-quality images will cause many extraction faults, such as the dropping of true minutiae and inclusion of false minutiae. Nowadays, most fingerprint identification systems are based on precise mathematical models, but they can not handle such faults properly. As we know, human beings are good at recognizing fingerprint pattern. Therefore, a human-like method is applied. This paper presents an adaptive fuzzy logic and neural network method which has variable fault tolerance. Our experimental results have shown that this fingerprint identification method is robust, reliable and rapid.

19PM2A-7 Improvement of the Fingerprint Core Detection Using Extended Relation Graph

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We presented a new fingerprint core detection methodology using the extended relational graph, which is generated by the segmentation of the ridge directional image. The previous approach we proposed concerns only to detect the fingerprint core. This paper describes the improvement of our fingerprint core detection using the extended relational graph. This approach can detect not only the core location but the delta location by the modification to find both of the core loop and the delta loop in the extended relational graph. Furthermore to reduce the computation time, each difference of the ridge direction on the boundary along the loop is used to detect the fingerprint core except the approximated straight lines generated by the boundary information in the extended relational graph. The experimental results for 224 fingerprint samples show that an average of 6% reduction of the processing time is achieved. The 95.6% of cores and deltas can be detected successfully.

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