A Multi-Stage Fingerprint Recognition Method for Payment Verification System

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Abstract. This thesis is on fingerprint recognition method and system, more in detail, the layered fingerprint recognition method and system to compare not only the minutiae or singular point, but also compare the images of detailed area for making prompt and accurate comparison of fingerprint. Through the experiment that applies this theory, we have confirmed that there is a great improvement of verification rate and erroneous recognition rate of other person’s fingerprint. In the world security market, the size of the biometric industry is gradually increasing, of which the fingerprint verification is recognized of its superiority and marketability in terms of relatively low cost, light weight and uneasiness to input bio-information, compared to other biometric methods. This paper proposes a method to utilize the strengths of the Multi-Stage Fingerprint Recognition Method for Fingerprint Payment Verification System. The example of the utilization of the credit card payment is the model business of fingerprint verification credit card payment applied for three months in large domestic marts, to discuss the possibility to settle the non-medium credit trading by the biometric technology and the applicability to the financial services.

Keywords: Fingerprint, Recognition Method, core point, delta point, Verification System

1 Introduction

The process of verification by using fingerprint is largely divided into the classification of several fingerprints into different shapes and the procedure of matching for the subject person. In addition, such an individual verification system of fingerprint is further divided into the identification system of one to multiple number to distinguish the inputted fingerprint from the registered fingerprint and the verification system that contrast and distinguish the inputted fingerprint with the registered fingerprint on one to one basis [1]-[3].

The previous fingerprint recognition method that used the singular point or the minutiae was the method using the coefficient relationship between the minutiae adjacent or the position that was dispersed in space between the minutiae that depended completely on the extraction of the minutiae that the rate of error in
recognition became larger when the minutiae was mistakenly extracted or having similar patterns.

2 Main Context

2.1 Multi-Stage Fingerprint Method

In most systems, the two fingerprints are deemed to be the same person since the type information of minutiae in the ending point and bifurcation due to the error arising from the filtering process of the image. However, looking into the detailed area, the minutiae patterns of these two images are different, particularly, the ridge pattern of the center area is different. This thesis calculates the relativity between the minutiae and extracts certain area for the standard on similar patterns in measuring the similarity that it provides effective identification on the consistency on fingerprint with similar minutiae and fingerprint with prompt and rotation in fabric.

2.2 Interface device between POS and Fingerprint Identification System

This chapter explains the interface device and its method between POS (POS: Point-of-sale) system and fingerprint identification system and the credit dealing system made by it. This device is composed of the switching part which transfers to the POS system the input signal from the keyboard of POS system.

3 Experiment

The credit dealing system in the past has used POS system to make the calculation of the sales in a member store and to make payment with cash or credit card.

For the payment by a credit card, they use the card reader of POS system to read the credit card, to request the authorization of the card company or the bank, and as authorized, to receive the authorization results.

This device is composed of the switching part which transfers to the POS system the input signal from the keyboard of POS system, or ignores the input signal of the keyboard and transfers to the POS system the input signal from the fingerprint identification system, the control part which prints out the input signal from the keyboard to the fingerprint identification system, or when a signal is input from the fingerprint identification system, controls the switching part and transfers to the switching part the input signal from the fingerprint identification system, and the interface part for the signal transfer between the control part and the fingerprint identification system.
4 Conclusion

For non-medium transaction, the input is Multi-Stage inputs the fingerprint, and the fingerprint data is composed as follows for optimizing performance of the algorithm of the fingerprint verification system. Fingerprint data are saved as one unit in order to reduce FNMR rate which was heightened as the FMR was adjusted as 0% under the characteristics of the credit dealing authorization system. The fingerprint matching is classified as 1:1 matching and 1:N matching, and this system applies 1:N matching.

Because compared to 1:1 matching, the 1:N matching requires shorter time to match the input templates with all the saved fingerprint templates, the Classification & Search Method which is developed on the basis of the actual user data affects the swiftness and accuracy of the matching results.

References