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FINGERPRINT RECOGNITION

This article introduce the optical fingerprint recognition.

INTRODUCTION

Fingerprinting is a kind of biometric identification.But the object is fingerprint features.Fingerprint features were first discovered and applied, so the history of fingerprint recognition is much longer than other recognition technologies.The automatic fingerprint identification system until now, the current fingerprint identification technology has gradually penetrated into people's life and work.

I. IMAGE CAPTURE

At present, there are many ways of image acquisition, such as the more common punch card machine type optical fingerprint acquisition module and the capacitive fingerprint acquisition module used on mobile phones or other terminal devices.Put the finger on the optical lens, fingers in the built-in light source, with a prism projected on the charge coupling device (CCD), and form a ridge (fingerprint image has a certain width and direction) is black, valley line (depression between lines) in white digital, can be processed by fingerprint device algorithm of gray fingerprint image.

II. ENHANCEMENT

Although the outline of the normalized image is clearly visible, there are still many deviations for fine computers.At this point, we can use algorithms to do image enhancement, the purpose is to make the fingerprint ridges clearer, broken ridges can be connected, and maintain the original structure.The frequently used method is filtering for denoising.For example, the commonly used frequency domain filtering is to convert the image to the frequency domain, through the filtering to find the maximum energy, conform to the fingerprint frequency range, restored to the spatial domain, you can get a clear fingerprint airspace image.

III. FEATURE EXTRACTION

The characteristics of human fingerprints can be reflected in the degree of similarity between fingerprints from different fingers in a given human population.Many fingerprint feature information, all of these fingerprint feature information constitute a huge collection of fingerprint features.The detailed characteristics of the fingerprint mainly refer to the thread end point (RidgeEnding) and the thread bifurcation point (RidgeBifurcation).The end point refers to the position where the line suddenly ends, while the fork point is the position where the fingerprint line is divided in two.A large number of statistical results suggest that the use of these two types of feature points is sufficient to describe the uniqueness of fingerprints.MCC proposes a cylindrical coding algorithm based on 3 D data structure, which is constructed from the distance and angle of detailsFor a multi-level fingerprint matching method, it uses not only detail point features but also features such as direction field.Features are regarded as a local structure, and they also as a 3D structure.

IV. MATCHING FEATURE OPERATORS

When we collected another fingerprint, after all the above steps, will go to our fingerprint library matching have consistent fingerprint image, through a specific algorithm to score the matching degree, if the score pass (we can define pass score), then we think the new fingerprint can be with our database a fingerprint matching success.There are three main methods for feature point matching: 1.Judging by the distance 2.Find a feature point, walk num distances along the line, and calculate the distance of each step from the feature point, and finally get a num array of length information. If two fingerprints are the same, they have the same feature points and the data of the corresponding position of the array is basically equal 2. Triangle edge length match After finding a feature point, you can find out that the two nearest endpoints and the original feature point form a triangle. If the triangle edge length of the two pictures is equal, it means that the two pictures match. 3.A Point Type Match After finding a feature point, the nearest num endpoints are found, and the number of ends and intersections in the num endpoints is counted. If the two plots match, the proportion of endpoints is roughly the same.

V. SUMMARY

Fingerprint identification technology has great development prospects, based on the accuracy of fingerprint identification in identity identification, we can imagine, if we apply fingerprint identification technology in daily life, is it very convenient to our life,due to the uniqueness of each individual's fingerprint feature, if the uniqueness can be used as a means of payment.Users extract and save their fingerprints in mobile banking.The fingerprint will be the user's sole identification and linked to its bank account.When making consumer shopping, users

only need to verify the fingerprint information and complete the payment after confirming the identity, which greatly shortens the payment time and greatly improves the efficiency of users.so that the user can only need to identify himself through the fingerprint to complete the payment, which greatly reduces the payment time and is very convenient.

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