Chapter 12
A Survey on Palmprint-Based Biometric Recognition System

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ABSTRACT

The automatic use of physiological or behavioral characteristics to determine or verify identity of individual’s is regarded as biometrics. Fingerprints, Iris, Voice, Face, and palmprints are considered as physiological biometrics whereas voice and signature are behavioral biometrics. Palmprint recognition is one of the popular methods which have been investigated over last fifteen years. Palmprint have very large internal surface and contain several unique stable characteristic features used to identify individuals. Several palmprint recognition methods have been extensively studied. This chapter is an attempt to review current palmprint research, describing image acquisition, preprocessing palmprint feature extraction and matching, palmprint related fusion and techniques used for real time palmprint identification in large databases. Various palmprint recognition methods are compared.

INTRODUCTION

Today’s electronically interconnected information society requires accurate automatic personal authentication schemes to authenticate a person’s identity before giving an access to resources. The motivation behind such schemes is to guarantee that just a legitimate user and nobody else access the rendered resources. Cases of such applications incorporate secure access to personal computers (PCs), laptops, PDAs, network and applications, control entry to secure areas of a building and automatic teller machine (ATM) and debit transactions. Without solid individual recognition schemes, these systems are vulnerable against the wiles of an imposter.

Traditionally, user authentication systems use passwords or ID cards, which can be lost or forgotten. They are based on something one knows or something one has. Today, people using advance technology of forgery and passwords hacking techniques to gain illegal access to services of a legitimate user. So,
traditional approaches are no longer suitable for information society. Therefore there is need for accurate atomic computer aided personal authentication system in the information based world. Biometric technology has emerged as viable solution for personal identity and security.

The automatic use of physiological or behavioral characteristics (Jain et al., 2008) to determine or verify identity of individual’s is regarded as biometrics. Fingerprints, Iris, Voice, Face, and palmprints are considered as physiological biometrics whereas voice and signature are behavioral biometrics. Among different sorts of biometric identifiers, hand-based biometrics draws in more attention due to their high user acknowledgement and comfort. In real time applications like UID enrolment and access control purpose widely used biometrics are iris and fingerprint. On the other hand it is hard to extract the small, unique feature from unclear fingerprint and iris input devices are costly, other biometric modularity’s like face and voice are less accurate and easy to mimic. Alternatively, the palmprint has several advantages compared to other biometrics which are 1) capture device has cheaper cost 2) palm contains additional features like principal lines, wrinkles, ridges, and 3) Features can easily extracted from low resolution images Palmprint recognition is basically a pattern recognition that is utilized to distinguish or confirm user focused around his or her interesting physical characteristics.

Palmprint is the inner surface of a person’s hand. For quite long time, palmprint have been used for predicting the future. The study of palmprint is ancient and has appeared much in Indian history. Chinese traditional medicine has long observed that the palm print is connected with health and characters, which is generally recognized by more dermatoglyphic experts. Recently, after extensive research, it has been found that the palmprint is related to nationality, geological race, age calculation, gender identification, health, security, intelligence and heredity and so forth. Palmprint is extensively used in security for person identification. China was the first country to use palmprint for forensic applications.

Palm contain many features like geometric features, delta point’s features, principal lines features, minutiae, ridges and creases (Zhang, 2004). Principal lines are namely heart line, head line and life line. Figure 1 shows structure of palmprint. These features are useful for palmprint representation and can be extracted at different image resolutions. Low resolution images (such as 75 or 150 dpi) can extract principle lines wrinkles and texture while high resolution images can extra ridges, singular points and minutia points in additional to principal line and wrinkles. High resolution images are suitable for

*Figure 1. Structure of palmprint*
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