

HUMAN BEHAVIOUR
RECOGNITION,
IDENTIFICATION,
AND COMPUTER
INTERACTION

Edited by

Othman Omran Khalifa, B.Sc., M.Sc., Ph.D.,
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Chapter 33

Introduction to Fingerprint Verification

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33.1 INTRODUCTION

Fingerprint biometric is one of the essential, widely used and accepted biometrics. It has been used as a form of identification for a long time and considers an acceptance and fear. Fingerprints consider by people as unique and can be used to identify someone. This trust comes from governmental and law enforcement use of fingerprints. At the same time, their use of the fingerprint also causes fear about its use. Some individuals involved with fingerprint authentication for network access have expressed the feeling that using their fingerprint for authentication makes their feel like criminals. This feeling can lead to fear of the use of fingerprint biometrics. The use of biometrics must be accompanied with proper user training and communication. By doing so, biometrics can be seen as a privacy-enabling technology, not a technology to be feared. Even with the concern over the use of fingerprints, the finger biometric still remains more widely accepted than any other biometric.

This chapter gives an introduction of fingerprint and its usage in authentication and how can a fingerprint be differentiated from other fingerprints. It also shows briefly the algorithms that have been used for automated fingerprint.

33.2 FINGERPRINT DESCRIPTION

Literatures related to biometrics and fingerprint show that the general classification of fingerprints used today came from the work of Sir Edward Henry, who published his book, *Classification and Use of Fingerprints*, in 1900 (Paul, 2004). This work may consider as the basis for current fingerprint forensics. Investigation on literatures shows that fingerprints are identified by both macro and micro features. The macro features of a fingerprint include: Ridge patterns, Ridge pattern area, Core point, Delta point, Type lines, and Ridge count.

The micro features of a fingerprint are made up of minutia points. Minutia points are classified by: Type, Orientation, Spatial frequency, Curvature, Position. A brief description of such features is given in the following sections.