**Abstract**

 Prevailing methods of human identification based on credentials (identification documents

and PIN) are not able to meet the growing demands for stringent security in applications such as national

ID cards, border crossings, government benefits, and access control. As a result, biometric recognition,

or simply biometrics, which is based on physiological and behavioral characteristics of a person, is being

increasingly adopted and mapped to rapidly growing person identification applications. Unlike credentials

(documents and PIN), biometric traits (e.g., fingerprint, face, and iris) cannot be lost, stolen, or easily

forged; they are also considered to be persistent and unique. These requirements are typically specified

in terms of identification accuracy, throughput, user acceptance, system security, robustness, and return

on investment.