

PREFACE

Man has long believed in his ability to establish or verify one's identity based on physiological or behavioural characteristic. According to Quintillian (35-96 AD), "the voice of the speaker is as easily distinguished by the ear as the face is by the eye." As another instance, there had been archaeological evidence of fingerprint being used as an identifier in ancient time. Such human skills belong to the field of biometric authentication. The quest to improve such an ability has never stopped. The invention of digital computers makes possible biometric authentication through computing. The question is how to scientifically measure the individuality of such physiological or behavioural characteristics. Today, biometric technologies are not just in fiction movies. We have seen many of them being deployed for practical use. For example, the fingerprint system has become a low cost and high performance access control tool. Biometric authentication is also called biometrics in general, which is known to be an interdisciplinary research built upon foundations across digital signal processing, pattern recognition, machine learning and human-machine interface. This book documents the recent advances of various technical approaches. Like all other technologies, biometric technologies become useful only when they meet operational goals in real-world applications. This book also provides an account of fusion, decision, and security methodologies that are critical to system deployment.

This book brings together 35 among the most respected researchers and scientists to provide both a concise and accessible introduction to the field as well as a detailed coverage on unique research problems with their solutions in nine parts, namely Voice, Face, Fingerprint, Gait, Hand Geometry, Handwriting, Human Behavior Analysis, Multibiometrics, Security and Others. The contributions present the pioneering efforts, international benchmarking, and state-of-the-art results, with special focus on practical issues concerning system development.

In the past decade, we have witnessed an intensive technological progress spurred on by community initiatives such as international benchmarking and standardization, with increasingly fast and affordable computing facilities. The editors had its first meeting in 2008 to find it was timely and beneficial to the community to have a collective documentation on the recent advances in biometrics. It has not been an easy task putting together an extensive volume within a short time frame. The editors would like to express their sincere gratitude to all

distinguished contributors who make this book possible, and the group of reviewers who have offered invaluable comments to improve the quality of each and every chapter. A special thank is extended to Professor John Daugman for his comment on the listing of topics. A dedicated team at World Scientific Publishing has also assisted the editors continuously from the inception to the final production of the book. We thank them for their painstaking efforts in all stages of production.

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