



# Advances in Biometrics: Sensors, Algorithms and Systems

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Recent advances in biometrics include new developments in sensors, modalities and algorithms. As new sensors are designed, newer challenges emerge in the algorithms for accurate recognition. Written for researchers, advanced students and practitioners to use as a handbook, this volume captures the very latest state-of-the-art research contributions from leading international researchers. It offers coverage of the entire gamut of topics in the field, including sensors, data acquisition, pattern-matching algorithms, and issues that impact at the system level, such as standards, security, networks, and databases

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## **Editorial Review**

### Review

From the reviews:

"Ratha and Govindaraju worked hard at bringing together 53 authors who contributed 24 papers on the latest technologies in advance biometrics. ... This book would be especially helpful to graduate students looking for thesis/dissertation topics to pursue under a mentor, or could be used as a textbook in an advanced seminar on interdisciplinary applications of computing." (R. Goldberg, ACM Computing Reviews, May, 2009)

"Editors Ratha and Govindaraju have commissioned contributions from some of the leading authorities in the field and ... provides a most comprehensive cover. ... The contributions also include discussions on biometric standards, the all important security aspects, as well as databases and the created networks. ... Readers will come from many groups of researchers, developers and those in society with an interest in what to many, is a new and fashionable study." (D. M. Hutton, Kybernetes, Vol. 37 (8), 2008)

### From the Back Cover

Biometrics technology continues to stride forward with its wider acceptance and its real need in various new security facets of modern society. From simply logging on to a laptop to crossing the border of a country, biometrics is being called upon to meet the growing challenges of identity management.

With contributions from academia and industry by leading international authorities in the field, this unique book presents a comprehensive treatment of biometrics and offers coverage of the entire gamut of topics in the field, including data acquisition, pattern-matching algorithms, and issues that impact at the system level, such as standards, security, networks, and databases. It has been organized under three sections: sensors, advances in biometric matching algorithms, and topics that deal with issues at the systems level.

### **Key features:**

- Includes new algorithmic advances, including physiological biometrics (face from video, iris at a distance) and behavioral (handwriting, voice) and a strikingly novel modality in headprint biometrics
- Contains new modalities for research, such as infrared and multispectral imaging
- Presents several chapters on the much overlooked area relating to the sensors themselves for the various biometric modalities
- Emphasizes the advances and cutting-edge technologies throughout
- Discusses systems level both from a human-factors point of view and the perspective of networking, databases, privacy and anti-spoofing
- Incorporates chapters devoted to touchless image capture, ultrasonic imaging and swipe methods

Written for researchers and advanced students, this much needed concise volume is an ideal tool to use as a ready reference and captures the very latest in state-of-the-art research, providing readers with a broader and deeper understanding of the topic.

Dr Nalini K. Ratha is a Research Staff Member at the IBM Thomas J. Watson Research Center, New York. He co-edited the successful *Automatic Fingerprint Recognition Systems* and also co-authored *A Guide to Biometrics Selection and System Design*

Professor Venu Govindaraju is Director at the Center for Unified Biometrics and Sensors (CUBS), University at Buffalo, State University of New York.

#### About the Author

**Dr Nalini K. Ratha** is a Research Staff Member at the IBM Thomas J. Watson Research Center, Yorktown Heights, New York. His current research interests include biometrics, computer vision, pattern recognition and special purpose architecture for computer vision systems. He leads the biometrics research effort in the area of enhancing security of biometrics systems and performance evaluation of biometrics systems. He has co-edited a book entitled "Automatic Fingerprint Recognition Systems" published by Springer and co-authored a book entitled "A guide to Biometrics Selection and System design" published by Springer in 2003. He was also general co-chair of IEEE AutoID 02 and SPIE Conf. on Biometrics in Human Identification 2004. He has received several patent awards and a "Research Division" award at IBM.

He received his Ph. D. from the Department of Computer Science at Michigan State University and B.Tech in Electrical Engineering and M. Tech in Computer science and Engineering from Indian Institute of Technology, Kanpur. He is a senior member of IEEE and co-chair of AutoID TC, IEEE Robotics and Automation Society.

**Dr. Venu Govindaraju** is a Professor of Computer Science and Engineering at the University at Buffalo (UB), State University of New York. He received his B-Tech (Honors) from the Indian Institute of Technology (IIT), Kharagpur, India in 1986, and his Ph.D. degree in Computer Science from UB in 1992.

Govindaraju has co-authored more than 200 scientific papers. He is the PI on current NSF sponsored projects on International Digital Libraries and Digital Government. He is the founding director of the Center for Unified Biometrics and Sensors (CUBS).

He serves on the editorial boards of the IEEE Transactions on Systems, Man, and Cybernetics (B), the International Journal for Document Analysis and Recognition, The Journal of Pattern Analysis and Applications and The Journal of Pattern Recognition.

#### Users Review

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**Helene Anderson:**

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