

Tutorial on Biometrics: Image Processing and Analysis in Recognition Systems

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Abstract: Biometrics is a science that deals with human identification on the basis of our biological features. Therefore, Biometrics belongs to Pattern Recognition and is part of it. Biometric examples are all features we are born with like facial image, fingerprints, iris of the eye, ... or the features we learn in our life like the way we write (signature), the way we walk (gait) or any of the behavioural characteristics. During the tutorial a general study of all biometric categories will be discussed with examples. The methods of biometric image preprocessing will also be given. The thinning standard algorithms will be studied in detail, the methods of segmentation will be shown as a way of simplifying the computer system of image description for classification and hence recognition.

Many algorithms with their mathematical models for image feature vectors will be given and discussed.



Biographical notes: Khalid Saeed received the BSc Degree in Electrical and Electronics Engineering in 1976 from Baghdad University in 1976, the MSc and PhD Degrees from Wroclaw University of Technology, in Poland in 1978 and 1981, respectively.

He received his DSc Degree (Habilitation) in Computer Science from Polish Academy of Sciences in Warsaw in 2007. He is a Professor of Computer Science with AGH University of Science and Technology in Poland. He has published more than 120 publications - 17 edited books and 7 text and reference books. He supervised about 30 BSc projects, 90 MSc and 9 PhD theses. His areas of interest are Image Analysis and Processing, Biometrics and Computer *Information Systems*.

He gave 17 invited lectures and keynotes in different universities in Europe, China, India, Japan. The talks were on Biometrics and Image Processing and Analysis. Examples are:

- *Biometrics and the Safety Aspect*. Workshop on Soft Computing as formal Networking Activity, University College of Information Technology, University of Calcutta, Kolkata, India, 2009;
- *Töeplitz Matrices in Biometric Recognition Systems – Part I*. 11th International Conference on Humans and Computers – HC'08, Aizu University, Japan, 2008;
- *When Biometric Systems Fail to be Reliable in Security Systems*. 15th Intern. Multi-Conf. on Advanced Computer Systems – ACS-AIBITS/CISIM'08, Miedzyzdroje, Poland, 2008;
- *Voice-Print and its Töeplitz-based Identifying Algorithms*. International Conference on Electrical Engineering Design and Technologies - ICEEDT Conference, Hammamet, Tunisia, 2007;
- *Töeplitz-Matrix Applications in Image Processing*. 6th International Conference on Intelligent System Design and Applications ISDA'06, Jinan, Shandong, China, 2006;

He received about 15 academic awards:

- Silver Cross of Merit awarded by The President of Poland;
- Bialystok Technical University Rector Award for Publication;
- President of Baghdad University for writing a Manuscript on Mathematics.

He coordinated 6 funded national and international research collaborations and agreements with universities from Britain, France, India and Japan.

He is the Editor-in-Chief of International Journal of Biometrics with Inderscience Publishers.

He is a member of 9 editorial boards of international journals and conferences. He is an IEEE Senior Member and has been an IEEE member since 1994.