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Rhodes, Greece, August 20-22, 2008

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Preface

This book contains the proceedings of the 8th WSEAS International Conference on SIGNAL PROCESSING, COMPUTATIONAL GEOMETRY and ARTIFICIAL VISION (ISCGAV'08) which was held in Rhodes, Greece, August 20-22, 2008. This conference aims to disseminate the latest research and applications in Sensors and measuring techniques, Remote sensing, Tele-informatics, Networking, Signal Processing for Wireless communications, Coding, Monitoring, Supervision, Internet, Optimization problems in signal processing, Computational Geometry, Non-linear Computational Geometry and other relevant topics and applications.

The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from **http://www.wseas.org/reports**. Your feedback encourages the society to go ahead as you can see in **http://www.worldses.org/feedback.htm**

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: **www.worldses.org/indexes**

In addition, papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in this conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA .... see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

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Plenary Lecture I

Fast 3D Reconstruction and Recognition

Professor Marcos A. Rodrigues
Sheffield Hallam University
Sheffield S1 1WB,
UK
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Abstract: In this presentation we discuss methods for 3D reconstruction from a single 2D shot using multiple stripe line projection. We also present 3D recognition strategies with an application example to 3D face recognition. The technology has been developed and patented within our research group; we start by considering the required 2D image filtering and enhancement and the mathematical fundamentals of 3D reconstruction. The method allows 3D reconstruction in 40 milliseconds, which renders it suitable for on-line reconstruction with applications into security, manufacturing, medical engineering and entertainment industries.

The incorporation of data acquired as 3D surface scans of human faces into applications such as biometry and multimedia present particular challenges concerning identification and modelling of features of interest. The challenge is to accurately and consistently find predefined features such as the corners of the eyes and the tip of the nose for instance. In the field of biometry, if 3D face recognition is to compete with 2D methods, these features must be found to an accuracy greater than 1:1000. In multimedia, the greatest problem occurs with animated 3D faces, where very small inaccuracies are clearly seen in moving faces. These issues will be considered and examples shown on how the technology can be effectively deployed.

Brief Biography of the Speaker:
Professor Marcos A Rodrigues
Academic qualifications:

BEng in Mechanical Engineering (Federal University of Santa Catarina, Brazil)
MSc in Computer Science (The University of Wales, Aberystwyth, UK)
PhD in Computer Science (The University of Wales, Aberystwyth, UK)
Professor of Computer Science (Sheffield Hallam University, Sheffield, UK)

Marcos Aurelio Rodrigues received his BEng in Mechanical Engineering from the Federal University of Santa Catarina (Brazil) in 1983. He was awarded an MSc in Computer Science in 1989 and a PhD in Computer Science in 1991, both from the University of Wales, Aberystwyth.

He has been appointed a Reader in Intelligent Systems within the School of Computing and Management Sciences at Sheffield Hallam University in January 2000 and awarded a Personal Chair in Computer Science in February 2003.

Marcos has published over 140 technical papers in international journals and conferences on the subjects of robotics, computer vision, pattern recognition, systems modelling and artificial intelligence. His main current research interests include 2D and 3D machine vision, machine learning, and pattern recognition.

Plenary Lecture II

Feature Extraction Methods in Machine Vision Systems

Professor Ryszard S. Choras
Institute of Telecommunications
University of Technology & Life Sciences
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85-792 Bydgoszcz
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Abstract: The machine vision systems have not only to "see" where an object is placed and how it is placed but sometimes also to identify the object. A visual system can perform the following functions: the image acquisition and analysis, the recognition of an object or objects within an object groups. In machine vision systems, visual features such as shape, color and texture are extracted to characterize images. Each of the features is represented using one or more feature descriptors. The feature extraction methods for this applications are discussed.

Brief Biography of the Speaker: Ryszard S. Choras received the MSc degree in electronics engineering and the PhD degree in computer engineering both from the Faculty of Electronic of the Technical University of WrocA,aw, Poland, in 1973, and 1981, respectively. He received DSc (habilitation) in computer science from the Faculty of Electronics of the Technical University of Warsaw in 1993. He is currently Professor in the Institute of Telecommunications of the University of Technology & Life Sciences, Bydgoszcz, Poland. His research experience covers image processing and analysis, image coding, feature extraction and computer vision. At present, he is working in the field of image retrieval and indexing, mainly in low- and high-level features extraction and knowledge extraction in CBIR systems. He is the author of Computer Vision. Methods of Image Interpretation and Identification (2005) and more than 143 articles in journals and conference proceedings. He is the member of the Polish Cybernetical Society, Polish Neural Networks Society, IASTED, and the Polish Image Processing Association. Recent publications: Integrated color, texture and shape information for content-based image retrieval-Pattern Analysis and Applications (2007) 10:333-343; Fuzzy Approach for Image Retrieval-Pattern Recognition and Image Analysis, vol.17, no2, 259-267,2007; CBIR Based on Color and Low-level Texture Features - IASTED SPPRA Int. Conf., Feb 2007, 259-263; Image Retrieval using Color, Texture and Wavelet Transform Moments - in Advances in Pattern Recognition ed. P. Pal, pp. 256-262, World Scientific Press, 2007; Feature extraction for CBIR and Biometrics applications - & WSEAS Conf. on Applied Computer Science, pp.1-9, Venice, 2007 (also PLENARY SPEAKER)

978-960-6766-95-4