



3D Object Processing: Compression, Indexing and Watermarking

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The arrival, and continuing evolution, of high quality 3D objects has been made possible by recent progress in 3D scanner acquisition and 3D graphics rendering.

With this increasing quality comes a corresponding increase in the size and complexity of the data files and the necessity for advances in compression techniques. Effective indexing to facilitate the retrieval of the 3D data is then required to efficiently store, search and recapture the objects that have been compressed. The application of 3D images in fields such as communications, medicine and the military also calls for copyright protection, or watermarking, to secure the data for transmission.

Written by expert contributors, this timely text brings together the three important and complementary topics of compression, retrieval and watermarking techniques for 3D objects. 3D object processing applications are developing rapidly and this book tackles the challenges and opportunities presented, focusing on the secure transmission, sharing and searching of 3D objects on networks, and includes:

- an introduction to the commonly used 3D representation schemes; the characteristics, advantages and limitations of polygonal meshes, surface based models and volumetric models;
- 3D compression techniques; the 3D coding and decoding schemes for reducing the size of 3D data to reduce transmission time and minimize distortion;
- state of the art responses to the intrinsic challenges of building a 3D-model search engine, considering view-based, structural and full-3D approaches;
- watermarking techniques for ensuring intellectual property protection and content security without altering the visual quality of the 3D object.

3D Object Processing: Compression, Indexing and Watermarking is an invaluable resource for graduate students and researchers working in signal and image processing, computer aided design, animation and imaging systems. Practising engineers who want to expand their knowledge of 3D video objects, including data compression, indexing, security, and copyrighting of information, will also find this book of great use.

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Editorial Review

Review

"The book is excellent resource for researchers, graduate students, and practitioners interested in 3D object processing. The book is well written with a very nice set of references to the literature. I recommend it."
(*Journal of Electronic Imaging*, January - March 2009)

From the Back Cover

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Jean-Luc Dugelay (PhD 1992, Member of the IEEE 1994, Senior Member 2002) joined the Institute Eurecom (Sophia Antipolis) in 1992, where he is currently a professor in charge of image and video research and teaching activities in the Department of Multimedia communications. His research interests are in the area of multimedia signal processing and communications, including security imaging (i.e. watermarking and biometrics) and facial image analysis. He contributed to the first book on watermarking (Information hiding techniques for steganography and digital watermarking, Artech House, 199). He is an author or co-author of more than 150 papers that have appeared in journals or proceedings, 3 book chapters and 3 international patents. he has given several tutorials on digital watermarking (co-authored with F. Petitcolas from Microsoft research, Cambridge) at major conferences (ACM Multimedia, October 2000, Los Angeles, and Second IEEE Pacific-rim conference on Multimedia, October 2001, Beijing). He has been an invited speaker and/or

member of the Program Committee of several scientific conferences and workshops related to digital watermarking. He was technical co-chair and organizer of the fourth workshop on Multimedia Signal Processing, Cannes, October 2001. His group is involved in several national and European Projects related to digital watermarking (RNRT Aquamars and Semantic-3D, 1ST Certimark). Professor Dugelay served as associate editor for several journals and is currently the Editor in Chief of the EURASIP Journal on Image and Video Processing. He is currently a member of several Technical Committees of the IE Signal Processing Society. Email: jd@eurecom.fr.

Atilla Baskurt was born in Ankara, Turkey, in 1960. He received his BS degree in 1984, MS in 1985 and PhD in 1989, all in Electrical Engineering from INSA of Lyon, France. From 1989 to 1998, he was Maitre de conferences at INSA of Lyon. Since 1998, he has been Professor in Electrical and Computer Engineering, first at the University Claude Bernard of Lyon, and now at INSA of Lyon. Since 2003, he has been the Chair of the Telecommunication Department. Professor Baskurt leads the research activities of two teams at the LIRIS Research Laboratory: the IMAGINE team and the M2DisCo team. These teams work on image and 3D data analysis and segmentation for image compression, image retrieval, shape detection and identification. His technical research and experience include digital image processing, 2D-3D data analysis, compression, retrieval and watermarking, especially for multimedia applications. He is chargé de Mission on Information and Communication Technologies (ICT) at the French research Ministry. Email: atilla.baskurt@insa-lyon.fr/abaskurt@liris.cnrs.fr.

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