

Editorial

Michael G. Strintzis

Information Processing Laboratory, Electrical and Computer Engineering Department, Aristotle University of Thessaloniki, Thessaloniki 54006, Greece

Informatics and Telematics Institute, 1st Km Thermi-Panorama Road, Thermi-Thessaloniki 57001, Greece
Email: strintzi@eng.auth.gr

Ferran Marques

Technical University of Catalonia (UPC), Campus Nord, Modul D5, C/ Jordi Girona 1-3, 08034 Barcelona, Spain
Email: ferran@gps.tsc.upc.es

Fabio Lavagetto

Department of Communication, Computer, and System Sciences (DIST), University of Genova, Via Opera Pia 13, Genova, Italy
Email: fabio@dist.unige.it

The high quality and quantity of the contributions to this special issue, as well as the balance of the geographical points of origin clearly indicate that the subject of three-dimensional imaging and virtual reality has come of age. Advances in these areas will provide the viewer with the feeling of “being present in the scene” or a sense of “telepresence,” enhancing the quality of presentation. The need of an altogether different type of “telepresence” is increasingly evident when moving in virtual environments via the WWW infrastructure. Users will be telepresent there when they are able to move in the virtual 3D scenes, encountering 3D virtual objects and even virtual humans. The above trends and issues are reviewed and many related areas are covered by the articles devoted to the three-dimensional imaging and virtual reality area in the present issue. Further, special attention is paid to human face modelling and animation. With almost thirty years of history behind it, the research concerned with human face modelling and animation seemed to suffer from unrecoverable weakness, mainly due to the persistent difficulty in comparing the various solutions proposed. The recognized need for a common reference has recently led the facial animation community to become relevant player in MPEG-4 standardization with the considerable achievement of having defined standard specifications for the representation, coding and transmission of face definition and animation parameters (FDP/FAP). This revolutionary result has given renewed enthusiasm to the entire research area and the number of interesting proposals for competing implementations and for challenging applications is increasing day by day. A multitude of animated characters is already pervading

the web and, not too far away in the future, we will find them at home, in the car, on the train, at school, and on our mobile phone. Facial animation issues are no more “good only for publishing” but are becoming a serious and concrete technology with big commercial potentialities. Facial animation is becoming a business.

In the present issue, we have selected a couple of contributions focused on two key problems typical of any facial animation technology, namely the use of 3D natural video for the automatic model calibration and the realistic reproduction of facial expressions. The paper from Grammalidis et al. provides a novel solution for adapting the geometry of a generic 3D facial model to the semantics of a specific face together with the description of an animation mechanism driven by a text-to-speech (TTS) synthesizer. The paper from Raouzaoui et al., on the other hand, proposes an effective algorithm for interpolating FAP trajectories, able to achieve smooth reproduction of facial expressions with preservation of natural visual prosody. On the relevant analysis issue of head tracking Ström proposes a novel method for tracking nonmarked faces in nonconstrained scenes, providing the ability to use new points or texture as the face turns, along with improving on robustness through a solid reinitialization strategy.

Advances on 3D object modelling are introduced by Sarti and Tubaro with an innovative implementation based on a level set approach, able to improve the performances and reduce the computational cost with respect to other competing solutions. Lei and Hendriks examine the potential of teleconference applications, presenting a real-time multi-step

view reconstruction algorithm. Moreover, Galpin and Morin present a way to automatically build up a series of 3D models of a scene from a video sequence. All 3D models are not consistent with each other, but each model is consistent with its predecessor and successor, due to a bundle adjustment step called "sliding adjustment." Finally, Choo et al. propose a novel algorithm for simplifying 3D mesh data by removing vertexes based on examining a so-called interior angle and triangle height.

The paper by Triantafyllidis et al. deals with the detection of occlusions, visible foreground and background regions between the left and the right frames of a stereo sequence, along with the extraction of the uncovered-background areas between two successive frames of the stereo sequence. A Bayesian framework is adopted to develop a well-founded solution based on a six hypotheses process. The issue concludes with the work of Park et al. who propose a new measure of dissimilarity between two 3D models, using the Z-buffer to calculate depth at specific points.

Michael G. Strintzis
Ferran Marques
Fabio Lavagetto

Michael G. Strintzis received the Diploma degree in electrical engineering from the National Technical University of Athens, Athens, Greece in 1967, and the M.A. and Ph.D. degrees in electrical engineering from Princeton University, Princeton, NJ, USA in 1969 and 1970, respectively. He then joined the Electrical Engineering Department at the University of Pittsburgh, Pittsburgh, Pa, USA, where he served as Assistant Professor (1970–1976) and Associate Professor (1976–1980). Since 1980 he has been a Professor of electrical and computer engineering at the University of Thessaloniki, Thessaloniki, Greece, and, since 1999, Director of the Informatics and Telematics Research Institute, Thessaloniki. His current research interests include 2D and 3D image coding, image processing, biomedical signal and image processing, DVD, and internet data authentication and copy protection. Dr. Strintzis is serving as an Associate Editor of the IEEE Transactions on Circuits and Systems for Video Technology since 1999. In 1984, Dr. Strintzis was awarded a Centennial Medal by the IEEE.



Ferran Marques received the M.S. degree on electrical engineering from the Polytechnic University of Catalonia (UPC), Barcelona, Spain, in 1988. From 1989 to June 1990, he worked in the Swiss Federal Institute of Technology in Lausanne (EPFL) and in June 1990, he joined the Department of Signal Theory and Communications of the Polytechnic University of Catalonia (UPC). In 1991, he was with the Signal and Image Processing Institute at USC in Los Angeles. He received the Ph.D. degree from the UPC in December 1992 and the Spanish Best Ph.D. Thesis on Electrical Engineering Award in 1992.



Since 1995, he became Associate Professor at UPC, having served as Associate Dean for International Relations of the Telecommunication School (1997–2000). He has served for the EURASIP Ad-Com as responsible of the Member Services (1998–2000), as Secretary and Treasurer (2000–2002) and currently as President. He was Associate Editor of the Journal of Electronic Imaging (SPIE) in the area of image communications (1996–2000) and currently he serves in the Editorial Board of the EURASIP Journal on Applied Signal Processing. He is author or coauthor of more than 70 publications that have appeared as journal papers and proceeding articles, 4 book chapters, and 4 international patents.

Fabio Lavagetto was born in Genova, Italy, on August 6, 1962. He received the Laurea degree in electrical engineering from the University of Genova, Genova, Italy, in March 1987 and the Ph.D. degree from the Department of Communication, Computer, and System Sciences (DIST), University of Genova, in 1992. He was visiting researcher with AT&T Bell Laboratories, Holmdel, NJ, USA, during 1990 and a Contract Professor in digital signal processing at the University of Parma, Italy, in 1993. Presently, he is an Associate Professor with DIST, University of Genova, where he teaches a course on radio communication systems and is responsible for many national and international research projects. During 1995–2000, he coordinated the European ACTS project VIDAS, concerned with the application of MPEG-4 technologies in multimedia telecommunication products. Since January 2000, he has been coordinating the IST European project INTERFACE, which is oriented to speech/image emotional analysis/synthesis. He is the author of more than 70 scientific papers in the area of multimedia data management and coding.

