

GUEST EDITORIAL PREFACE

Special Issue on the 20th Portuguese Computer Graphics Meeting (EPCG)

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SPECIAL ISSUE ON THE 20TH PORTUGUESE COMPUTER GRAPHICS MEETING

The 20th edition of the Encontro Português de Computação Gráfica - EPCG (Portuguese Computer Graphics Meeting) (Branco et al., 2012) was held between the 24th and 26th of October 2012, at the Escola Superior de Tecnologia e Gestão of the Instituto Politécnico de Viana do Castelo (IPVC), Portugal.

Since its inception, this event has been gathering researchers, teachers and other experts on Computer Graphics and related areas. It has been an important forum for the dissemination of research results and ongoing work, the exchange of experiences and the discussion of

various topics related to Computer Graphics. This 20th edition received several contributions from the scientific community, covering diverse topics, including Games and Entertainment, Modeling and Reconstruction, Interaction and Applications Augmented Reality and Virtual Reality, and Synthesis and Visualization.

Games and entertainment are ever-growing areas of application of Computer Graphics. Several contributions focused on the challenges of content creation for games, either procedurally by means of reconstruction, or using innovative interaction methods such as the use of tangible and natural interactions.

Procedural modeling and reconstruction were highlighted not only in the context of games, but also within the works concerning

driving simulation scenarios and the reconstruction of cultural heritage sites, in particular based on the automated use of descriptive texts. The automatic segmentation of 3D models within large collections was also explored as a means of increasing system efficacy.

Interaction was one of the important topics in this edition. Work with hand and body gestures was prominent, as multitouch screens and body motion trackers are now widely available. For example, some contributions focused on calligraphic gesture recognition and large displays' interaction using body gestures, as well as the use of tangible interfaces for content creation. Other instances included the interactive exploration of music listening habits and the recognition of complex manual activities.

Augmented reality (AR) continues to be exploited, gaining visibility e.g. in mobile, location-based games. To support such applications, research into effective and interactive ways of merging real, virtual, reconstructed and symbolic information is necessary. This much was shown in interesting works on symbol adaptation for AR, and insertion of real and virtual objects in AR applications for e.g. advertisement, and driving assistance. Other works related to computer vision included the identification of objects in tomographic images using GPGPU's for material analysis, and automatic color adaptation for the color-blind.

Virtual reality was also highlighted, mostly through applications such as the simulation of autonomous underwater vehicles (AUV's) for mission planning, or the treatment of social anxiety. Finally, a series of interesting contributions in the field of synthesis and visualization were also presented, which included the real time visualization of models using bidirectional texture functions (BTF's) and the ray tracing of large Models on multi-projection displays.

From all the varied contributions that made the 20th EPCG, a group of articles was selected to be extended and presented in this special edition the IJCICG. A brief overview of each of those papers is presented in the next section.

IN THIS ISSUE

This special edition of the IJCICG devoted to the 20th EPCG includes extended versions of some of the best papers presented at the conference, representative of the variety of topics embraced.

The first article, "Analysis and Evaluation of Sketch Recognizers in the Creation of Physics Simulations", presents an evaluation of three gesture recognizers. The evaluation relied on a set of real gesture samples drawn from a pool of subjects, with a gesture repertoire arranged for use in SketchyDynamics, a programming library that intends to facilitate the creation of applications by rapidly providing them with a sketch-based interface and physics simulation capabilities. In that work the authors also discuss some improvements to the recognizers' implementation that helped achieving higher recognition rates.

The following contribution, "Dynamic Insertion of Virtual Objects in Photographs", tackles the problem of inserting virtual objects in user-captured photos that should be interactive and respond to real physical environments. The authors present a system that analyses a photo taken by the user and detects high-level features such as vanishing points, floor and scene orientation. The proposed system is semi-automatic, needing user intervention.

GPGPU was also a topic focused in the context object segmentation. In the article "Object Identification in Binary Tomographic Images using GPGPUs", the authors present a hybrid OpenCL CPU/GPU algorithm for identification of connected structures inside black and white 3D scientific data. The approach discussed by the authors exploits parallelism both at CPU and GPGPU levels. The article reports the application of the proposed algorithm to the structural characterization of composite materials via tomography.

Finally, in the paper entitled "A Virtual Reality solution to handle Social Anxiety", an application-oriented solution, the authors describe a Virtual Reality solution to support the treatment of the anxiety of speaking in front

of an audience. The use of Virtual Reality environments for the treatment of phobias usually implies expensive special purpose hardware. The authors aim was to conceive a low-cost solution, easy to install and use for people without expertise in informatics.

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work in this field. Finally, a word to all those who contributed through the last 20 years to the history of Computer Graphics in Portugal, our congratulations and our special acknowledgment of their work.

We are also pleased to acknowledge the colleagues that contributed additional reviews for this issue:

1. Fernando Nunes Ferreira, Universidade do Porto, Portugal
2. Mauro Figueiredo, Universidade do Algarve, Portugal
3. Pedro Faria Lopes, ISCTE - Instituto Universitário de Lisboa, Portugal
4. Paulo Dias, Universidade de Aveiro, Portugal

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Pedro Branco is Assistant Professor at the Department of Information Systems, University of Minho where he is currently the director of the Master Program in Technology and Digital Art. He graduated in Computer Science from University of Porto, participated in the first joint Fraunhofer Center for Research in Computer Graphics/ Rhode Island School of Design New Media program. He joined Fraunhofer's U.S. operations as Researcher/3D Software Engineer in the development of virtual reality interaction techniques. He worked at IMEDIA, Providence, RI, studying user interface usability based on physiological monitoring. He received his doctorate degree in Information Systems from University of Minho with the topic: "Computer-based Facial Expression Analysis for Assessing User Experience". More recently he co-founded engageLab where he is working closely with students from a wide range of backgrounds developing interactive systems that explore a synergy of technology and aesthetics, exploring future directions for our interaction with technology.

Rui Rodrigues is assistant professor at the Faculty of Engineering of the University of Porto, Portugal (FEUP) and researcher at INESC TEC (formerly INESC Porto). His main areas of interest include computer graphics, interaction and game design and development. His PhD work was carried in the context of Philips Research (The Netherlands) in the field of GPU-accelerated 3D reconstruction, following which he was R&D Officer at EDIGMA/Displax (Portugal), with a strong emphasis on public interactive systems. Within his current activities, he teaches graphics, interaction and game design in Masters and PhD courses at FEUP, and researches in Natural User Interfaces, Information Visualization, Serious Games and Physical Computing.

Pedro Miguel Moreira is Adjunct Professor at Polytechnic Institute of Viana do Castelo and the current coordinator of the Computer Graphics and Multimedia degree. He graduated from University of Porto with a degree in Electrical and Computers Engineering in 1993. During the 1994-1996 period we was affiliated with INEB - Instituto de Engenharia Biomédica. He earned a MSc Degree in Electrical and Computers Engineering - Industrial Informatics in 1996 with a thesis in Image Processing and Analysis. In 2009 he completed his PhD in Computer Graphics and Artificial Intelligence. He is affiliated with the Artificial Intelligence and Computer Science Lab at the University of Porto and authored or co-authored several journal articles, book chapters and conference papers. His main research interests are: Interaction; Computer Vision; Computer (Serious) Games; and Artificial Intelligence techniques in Games and in Computer Graphics.

Luis Romero graduated in Systems and Computers Engineering at Minho University, Portugal, earned a Master's degree in Knowledge Based Systems at Heriot-Watt University, UK, and a PhD with the thesis 'Video Based Integration of Real and Virtual Environments', at Porto University, Faculty of Engineering, Portugal. Worked as a programmer at Industrial Association of Minho, Portugal, a researcher at National Laboratory of Engineering and Industrial Technology, Lisbon, Portugal, and presently is an associate professor at Polytechnic Institute of Viana do Castelo where he teaches Graphics Programming Environments, Virtual Reality, Multimedia Systems, Advance Graphic Interaction at Bachelor and MSc courses. Research interests include Graphical Interactive Systems, Virtual and Augmented Reality, Game Development and Pervasive Computing.