Guest Editors’ Introduction: Special Section on ACM VRST 2010

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The ACM Virtual Reality Software and Technology (ACM VRST) Symposium is an annual conference devoted to the technical aspects of virtual reality that was first started in 1994. The ACM VRST 2010 was the 17th conference in the series. This special section contains the extended versions of four of the best papers from the ACM VRST 2010. The selection of these four papers was done by the guest editors after considering the quality of the papers, the reviews of the papers from the conference as well as from the additional review process, and their suitability to IEEE Transactions on Visualization and Computer Graphics (TVCG).

The four papers cover three areas of virtual reality. The first two papers deal with interaction problems, one on predicting the gaze point and the other on multitouch interactions. The third paper deals with auto-calibration of multiprojector systems. The final paper deals with modeling small pedestrian groups.

The first paper is by Sébastien Hillaire, Anatole Lécuyer, Tony Regia-Corte, Rémi Cozot, Jérôme Royan, and Gaspard Breton entitled “Design and Application of Real-Time Visual Attention Model for the Exploration of 3D Virtual Environments.” This paper studies the design and application of a novel visual attention model designed to compute the user’s gaze position automatically, i.e., without using a gaze-tracking system. The model is designed for real-time, first-person exploration of 3D virtual environments. This paper also discusses applications of the visual attention model.

The second paper is by Anthony Martinet, Géry Casiez, and Laurent Grisoni entitled “Integrality and Separability of Multitouch Interaction Techniques in 3D Manipulation Tasks.” This paper proposes a taxonomy for 3D manipulation techniques with multitouch displays, based on an analysis of the integration and separation of degrees of freedom. Using this taxonomy, the paper introduces DS3 (Depth-Separated Screen-Space), a new 3D manipulation technique based on the separation of translation and rotation. In a controlled experiment, the paper compares DS3 with Sticky Tools and Screen-Space. Results show that separating the control of translation and rotation significantly improves the performance of 3D manipulation.

The third paper is by Behzad Sajadi and Aditi Majumder with the title “Autocalibration of Multiprojector CAVE-Like Immersive Environments.” This paper presents the first method for the geometric auto-calibration of multiple projectors on a set of CAVE-like immersive display surfaces including truncated domes and four or five-wall CAVEs (three side walls, floor, and/or ceiling). All such surfaces are categorized as swept surfaces and multiple projectors are registered on them using a single noncalibrated camera without using any physical markers on the surface. The proposed method can also handle nonlinear distortion in projectors. When the whole swept surface is not visible from a single camera view, the proposed method can register the projectors using multiple pan and tilted views of the same camera. Thus, the proposed method scales well with different sizes and resolutions of the display, and can achieve registration that is correct from any arbitrary viewpoint appropriate for head-tracked, single-user virtual reality systems.

The fourth paper is by Ioannis Karamouzas and Mark Overmars with the title “Simulating and Evaluating the Local Behavior of Small Pedestrian Groups.” This paper presents a novel approach to simulate the walking behavior of small pedestrian groups. The proposed model describes how group members interact with each other, with other groups, and individuals. The paper demonstrates the realistic group behavior determined by the proposed method through a wide range of test-case scenarios. It evaluates the results from simulations using a number of quantitative quality metrics, and provides visual and numerical comparisons with video footage of real crowds.

Finally, we would like to thank the people who helped make this special section possible. Most important of all, we would like to thank Thomas Ertl, the former Editor-in-Chief of IEEE TVCG, for his support to have this special section. We would also like to thank the authors for contributing their work and for their efforts in revising their papers and the anonymous reviewers for their constructive comments and suggestions.

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Guest Editors
Taku Komura received the PhD degree in computer science from the University of Tokyo. He is a Reader in the School of Informatics, Edinburgh University. He has served as the program cochair of MIG 2010 (Utrecht) and ACM VRST 2010 (Hong Kong). He has also served as the conference chair of MIG 2011 (Edinburgh) and is serving as the conference cochair of ACM SIGGRAPH/Eurographics SCA 2012 (Lausanne).

Qunsheng Peng received the PhD degree in the School of Computing Studies, University of East Anglia, UK, in 1983. He is currently a professor at State Key Lab of CAD&CG, Zhejiang University, and serves as the vice chairman of the Lab Academic Committee. His research interests include realistic image synthesis, virtual reality, bio-molecule graphics, and scientific visualization. In these fields, he has authored and coauthored more than 200 journal and conference papers, including ACM SIGGRAPH, ACM VRST, ICCV, Eurographics, Pacific Graphics, etc. He won the best paper award of Eurographics 1989 and received the Computer Graphics Achievements Award of China at Chinagraph 2000. He is a member of the editorial board of *The Visual Computer, Science China: Information Sciences*, and several Chinese journals.

George Baciu holds degrees in computer science, applied mathematics, and systems design engineering from the University of Waterloo. He is currently a full professor in the Department of Computing at the Hong Kong Polytechnic University. He has been a member of the Waterloo Computer Graphics Lab and the Pattern Analysis and Machine Intelligence group. He is the founding director of the Graphics and Multimedia Applications (GAMA) Laboratory at the Hong Kong Polytechnic University. He has been working on image and texture analysis, deformable objects and cloth simulation, 3D motion capture, tracking and location awareness, animation, collision detection, geometric modeling, user interfaces, and cognitive models for color and texture perception. He has published more than 100 technical papers in international journals and conferences, two books, and a number of editorial proceedings. Dr. Baciu has served as chair and/or cochair of international conference committees such as Game Technology Conference (GTEC), Pacific Graphics, Virtual Reality Software and Technology (VRST), Eurographics, Computer Graphics International, CAD/Graphics, and Computer Animation and Social Agents (CASA). His research interests include scalable micro-surface imaging and reconstruction, near-regular texture analysis, high performance location awareness, collision detection, motion synthesis, dynamics of large scale deformable surfaces, virtual clothing, and geometric modeling. He is a member of the IEEE and ACM.

Rynson W.H. Lau received the PhD degree from the University of Cambridge. He has been with the faculty of Durham University, City University of Hong Kong, and The Hong Kong Polytechnic University. He serves on the editorial boards of *Computer Animation and Virtual Worlds*, the *International Journal of Virtual Reality*, and the *IEEE Transactions on Learning Technologies*. He has served as the guest editor of a number of journal special issues, including IEEE Internet Computing, the ACM Transactions on Internet Technology, *IEEE Transactions on Multimedia, IEEE Transactions on Visualization and Computer Graphics*, and *IEEE Computer Graphics & Applications*. In addition, he has also served on the committees of a number of conferences, including serving as program cochair of ACM VRST 2004 (Hong Kong), ICWL 2005 (Hong Kong), ACM MTDL 2009 (Beijing, China), and IEEE U-Media 2010 (Jinhua, China), and as conference cochair of CASA 2005 (Hong Kong), ACM VRST 2005 (Monterey, California), ICWL 2007 (Edinburgh, United Kingdom), ACM MTDL 2009 (Beijing, China), and ACM VRST 2010 (Hong Kong).