

## **International Conference on Computer and Robot Vision (CRV) 2013**

The International Conference on Computer and Robot Vision (CRV) was held jointly with the Graphics Interface (GI) and the Artificial Intelligence (AI) conferences held in Regina, Saskatchewan, Canada (28.-31. May 2013). A single registration permitted attendees to attend any talk in the three conferences (CRV, GI, AI), which was scheduled in parallel tracks. CRV 2013 was sponsored by the Canadian Image Processing and Pattern Recognition Society (CIPPRS) and International Association of Pattern Recognition (IAPR); the local organisers were Cory Butz, Atefeh Farzindar and Orland Hoerber. According to the involved organisations and association the focus of the CRV were contributions of any aspect of computer vision, robot vision, robotics, medical imaging, image processing or pattern recognition.

The conference included four keynote speakers, 13 poster short talks and 45 presentations in 7 sessions. The first keynote speaker was Stefan Williams from the University of Sydney from the School of Aerospace, Mechanical and Mechatronic Engineering focusing on the topic Autonomous Underwater Vehicles for Environmental Monitoring. This talk examined recent developments in marine imaging from Autonomous Underwater Vehicles (AUV), with a particular emphasis on novel imaging system design, visual navigation and mapping and clustering and classification of the resulting imagery. During the talk a brief overview of Australia's Integrated Marine Observing System (IMOS) program that is facilitating the establishment of benthic reference sites around the country was provided. These sites are revisited on an annual basis to monitor changes in marine habitats by exploiting developments in high resolution mapping using stereo imagery data collected by the AUV systems. The talk also touched briefly on recent challenges related to measuring change and transforming the resulting data into information suitable for the study of marine environments. Stefan Williams concluded with a few thoughts on the direction of future benthic observing programs and the potential role of long range AUV systems in cost-effectively improving our understanding of the oceans.

The second invited talk was given by Larry Matthies (NASA JPL in Pasadena, California) who talked about Autonomous Visual Navigation Systems for Flying Vehicles on Earth and in Space. Planetary exploration requires on-board vision systems for autonomous flying vehicles in several contexts. These include safe and precise landing on Mars, mapping and relative state estimation for low-altitude flight in close proximity to comets or asteroids, and navigating balloons in the atmosphere of Titan. On Earth, micro air vehicles need very closely related capabilities for on-board state estimation, obstacle avoidance, mapping, and landing site detection for a variety of applications, including indoor and outdoor reconnaissance and inspection. This talk described recent progress on vision-based state estimation, obstacle avoidance, and landing site detection for flying vehicles for Earth and space applications, as well as a brief update on the Curiosity rover on Mars.

On the second day Dieter Fox (University of Washington) presented in the third invited talk Grounding Natural Language in Robot Control and Perception Systems. Robots are becoming more and more capable at reasoning about people, objects, and activities in their environments. The ability to extract high-level semantic information from sensor data provides new opportunities for human robot interaction. One such opportunity is to explore interacting with robots via natural language. In this talk Dieter Fox presented recent work toward enabling robots to interpret, or ground, natural language commands in robot control systems. Techniques developed by the semantic natural language processing community on learning combinatory categorial grammars (CCGs) that parse natural language input to logic-based semantic meaning are used. During the talk Dieter Fox demonstrated results in two application domains: First, learning to follow natural language directions through indoor environments; and, second, learning to ground object attributes via weakly supervised training.

The third and final day was open from Wolfgang Heidrich (University of British Columbia) with his invited talk about Shape Reconstruction of Transparent Objects. While the 3D acquisition of opaque surfaces with Lambertian reflectance is a well-studied problem, transparent, refractive, specular and potentially dynamic scenes pose challenging problems for acquisition systems. In this talk Wolfgang

Heidrich discussed a range of computational photography approaches to acquire the shape of transparent solids, liquids, and gases, ranging from surface models of static solids to full volumetric reconstructions of gas flows.

Beside the invited talks there were ten technical sessions on “Robotics/Applications”, “Segmentation, Recognition, and Tracking”, “Features and Their Applications”, “Estimation and Localization”, “Mapping and Reconstruction”, “Vision Fundamentals” and “Interface, Vision Applications, Education”. On the day before the conference there was a workshop on 3D Virtual City Modelling (VCM 2013) in Conjunction with the CRV 2013. The workshop was organized by International Society for Photogrammetry and Remote Sensing (ISPRS) Working Group III/4 and Canadian Image Processing and Pattern Recognition Society (CIPRS) and focused on the latest multidisciplinary research works in virtual city modelling from all of the fields in photogrammetry, remote sensing, computer vision, machine learning, and computer graphics. The organizing Committee of VCM 2013 were Gunho Sohn (York University, Canada), Franz Rottensteiner (Leibniz University Hannover, Germany), Markus Gerke (University of Twente, The Netherlands) and Jan Dirk Wegner (ETH Zürich, Switzerland).



Group photo of VCM (Virtual City Modeling) 2013 attendees.

The success of any event, such as this, also rests on the opportunity to socialise with fellow international participants to discuss and exchange ideas as well as to develop new contacts and friendships. Such an opportunity was given on the night before the conference at the welcome reception held in the Atrium of the Research & Innovation (RIC) Building, and on the first and second night at the BBQ and the banquet both held in the Rotunda of Innovation Place.

Abdul Nurunnabi ([abdul.nurunnabi@postgrad.curtin.edu.au](mailto:abdul.nurunnabi@postgrad.curtin.edu.au)), Curtin University, Perth, Australia