BMVA
The British Machine Vision Association and Society for Pattern Recognition

BMVA Symposium: Analysis and Processing of RGBD Data

Weds 1st March 2017, BCS London
Chairs: Paul Rosin & Yukun Lai, Cardiff University

The BMVA Technical meeting covered a wide range of topics within the field of RGB-D research, with some presenters focusing on the fundamental challenges of RGB-D systems, while others detailing complex systems enhanced by RGB-D technology.

Amir Atapour-Abarghouei proposed an effective method to fill in holes found in RGB-D images, these holes are primarily caused by limitations in current RGB-D capture systems. Although not infallible, the algorithm presented was capable of producing results that were far more plausible than that of other modern algorithms in a variety of different challenging scenarios. Through a set of real world and synthetic benchmarks, Amir demonstrated that his method was capable of accurately correcting blemishes at the edges of objects, as well as convincingly recovering larger holes within an image. Current RGB-D camera limitations appear to be here to stay, so it is foreseeable that hole filling methods like this will play a crucial role in future RGB-D processing pipelines.

I found Victor Adrian Prisacariu's morning talk of particular interest, presenting a system capable of large-scale 3D scene reconstruction with loop closure. Prisacariu conducted a live demonstration of his 3D reconstruction algorithm running on a tablet device, which – for me – helped exemplify how much commodity hardware has advanced in recent years and how the accessible such technologies are now.

Just after lunch, Dr. Dima Damen gave a fascinating talk on the challenges and opportunities of RGB-D action/activity recognition in the context of several research projects she had collaborated in, including SPHERE a large healthcare project at Bristol University. Covering opportunities in RGB-D technology such as the automation of healthcare monitoring for elderly patients and the integration of instructional systems to help workers in an industrial setting. Dr. Damen covered the challenges involved in implementing each of these systems in their respective environments. In the case of the industrial system, the outstanding problem was the cumbersome implementation, which required a user to wear a set of wrist straps, a backpack and headgear for the system to function. In relation to activity recognition, Dr. Damen highlighted how easily susceptible modern systems are to miscategorising user action due to the difficulties in distinguishing between successfully completed actions and incomplete actions.

Professor Adrian Hilton presented a novel method that was capable of taking a sequence of RGB or RGB-D images and reconstructing dynamic 3D scenes of deforming geometry. In the capture scenarios presented, Professor Hilton was able to reconstruct intricate 3D motions. This was done by accurately segmenting the relevant objects from the background in each frame, then attempting to reconstruct a 3D model. In the examples shown the backgrounds tended to be static, with no occlusions covering the subject, it would have been interesting to see how his system would have coped with such challenges. Nevertheless, the system yielded impressive results when processing image sequences containing highly fluid actions and the talk was humorously punctuated by the use of his system to put a pair of sunglasses on a dog.

The final talk of the day was given by Martin Runz, who presented a system that capable of reconstructing multiple segmented objects within a single scene. The proposed system handled the movement of rigid objects within a scene proficiently, however it showed there was still room for improvement as the system appeared to be incapable of handling non-rigid deformations.

The series of presentations gave me an invaluable insight into the current state-of-the-art in RGB-D based systems. Not only did it demonstrate the capacity of current technologies, but also the limitations of such systems, with their creators openly discussing the flaws in their systems.

Roberto Dyke