

ISMAR2011 – A Grant Gathering of the AR Community  
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ISMAR (IEEE International Symposium on Mixed and Augmented Reality) is an international conference, which focuses on the theory and application of augmented reality. Augmented Reality is a branch of virtual reality that aims to augment the environment of the real world with computer generated graphics and information. A typical Augmented Reality system presents a mixed view for the user which is the combination of the real scene and virtual objects.

ISMAR2011 was held in Basel, a small but ancient Switzerland town. Basel lies in the heart of Europe. The city is known as Cultural Capital of Switzerland or University City.

As the most important conference in the field of mixed and augmented Reality, ISMAR2011 attracted almost all the major research institutions in this field all over the world. In this meeting, the researchers discussed the basic theory of Augmented Reality in depth, and presented some new ideas and developments.

The Science and Technology (S&T) part of the conference is divided into 7 sessions: "Planar Tracking", "Mobile Localization and Reconstruction", "Augmented Reality Browsers", "Tracking", "Depth Cameras", "Rendering" and "Applications". "Tracking" is still the most important content of the conference. The S&T part included 26 oral papers, and 15 of them are closely related to the tracking problem.

To us, the most interesting of those ideas is the use of depth camera to perform the task of tracking. This idea opens up a new road of tracking, and has led to a lot of new research achievements. The famous interactive device "Kinect" is now used by many researchers. It indicates that the time of low-cost 3D vision is coming. "KinectFusion" is a representative of those research works. In this paper, the authors built a system for accurate real-time mapping of complex indoor scenes with Kinect, and used a coarse-to-fine iterative closest point (ICP) algorithm to finish the tracking task.

Another noteworthy thing is that the mobile augmented reality applications have become more sophisticated. At present, the main application of mobile augmented reality is navigation, and there is still not a killer product which can help augmented reality become more popular.

One regrettable thing about this conference is that there are few papers focused on the display devices for augmented reality. It seems that most of the researchers already accustomed themselves to using mobile phones as the main display device for augmented reality applications. Very few authors use other alternatives such as head-mounted displays (HMD) as the display device for their systems. The development of the see-through display devices seems to have reached a plateau. The current see-through display devices do not seem to meet the users' requirements. To accelerate the applications of augmented reality technology, more comfortable display devices with larger field of view and higher resolution are needed. We think that ISMAR should attract more experts in the field of optics to discuss and try to solve the problem.

The demo show is another highlight of this conference. The number of demos in this conference is far greater than that in ISMAR2010. One of the interesting demos at the conference is the "lifeClipper3 playground". In this demo, one can test a new augmented reality system called "lifeClipper3" in St. Johannis Park in Basel. The project is a game-like, interactive new-media artwork which is implemented with immersive augmented reality technology. The

project adopts a wearable augmented reality device that includes a computer, a GPS receiver, a 3 degree-of-freedom tracker and a video see-through HMD. A video camera is fixed to the HMD to capture the real image of the park. Most of these components are installed in a big bag, and the bag is very heavy. When a user tries the application, he needs to take both the bag and the HMD. With the device, the user can see the real scene around him and some virtual characters playing on the ground. The user can walk through the grassland freely, and play with those virtual characters.



The appearance of the "lifeClipper"

The most appealing demo is the "Burning Hand". In this demo, a user can see his own hands "on fire" with complex graphics simulating smoke and fire effect in the environment. When the demo is running, the user wears a stereo see-through HMD and sees his own hand via the HMD. Although the user knows that the fire is virtual, most of the users claim that they can feel the warmth of the fire. This demo won the "Best Demo Award".



Demo of "Burning Hand"

SmartAR is another interesting demo. SmartAR is a new tracking technology developed by Sony and runs on a mobile device. This technology allows the addition of animated characters (such as a pink teddy bear) on a natural surface and does not require markers such as 2D barcodes. It is capable of quickly recognizing an object and animating it. SmartAR has taken mobile augmented reality to a previously unseen level.



Demo of SmartAR

Layar is again an active company in the demo show. As a pioneer of commercial augmented reality systems, Layar has achieved great success. This year, they released the new version of their augmented reality browser: "Layar Vision". Layar Vision is an extension of the Layar platform. It allows developers to create new kinds of AR experience for a massive audience. In fact, the number of potential developers is now more than 10,000, and the number of devices installed with the Layar browser is more than 10 million.

Another interesting part of ISMAR is the "ISMAR Art Exhibition". "ISMAR Art Exhibition" is an independent exhibition which focuses on the combination of art and the newest media technology. The exhibition features approximately 20 works from all over the world including Switzerland, Japan, China, and United States, etc.

The most interesting work is an augmented reality book. In this work the artist uses the augmented reality technology to animate a normal book with a lot of gifted ideas. The work consists of two parts: a book and a PC. The book is placed flat on the table. On the screen of the PC the user can see the real image of the book captured by a web camera, which is just mounted on the top of the screen. The content of the book is a detective fiction with a lot of black and white pictures. With this system you can see the flame on the book becomes "animated" on the screen. On another page, the lost part of the picture in the book is completed in the screen, and with the lost part of the picture you can find the secret of the story. In this system you can even find that some roles in the story become animated and some flat words become 3-dimensional. The figure below shows the appearance of the system, in which a person's head profile is painted on the book without eyes and nose. But when you look at the screen, you can see that the face is completed and is saying something to you. The success of this work mainly results from the perfect combination of technology and art. Although many of the visitors of the exhibition are experts of augmented reality, when they play the work, no one talks about the tracking

technology or rendering technology of the system, and they are just amazed by the fun to explore the story.



Demo of AR Book

Another thing that pleased us is to meet an artist from China in the art exhibition. He is a teacher of the China Academy of Art. His work is a very special device consisted of a mask and a handheld camera. In fact, the mask is a head-mounted display. When the system is running, the user holds the camera and “looks” around. The image of real scene can be captured by the camera and sent to the mask. So the user can get the feeling of “Separation of the eyes and head”.



Chinese Art Demo

In ISMAR2011 we made a lot of new friends from different countries, and we got to know a lot of Chinese researchers in this field. Although we are all Chinese, we work in different countries, such as UK, U.S., Germany, Singapore and China. ISMAR2011 gives us a chance to know each other. This picture shows the group of Chinese. We believe that with the rapid development of China, the contribution of Chinese scientists will grow in the field of augmented reality in the future.

