

Moving Mixed Reality into the Real World



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Welcome to the special issue on Moving Mixed Reality into the Real World. Mixed reality (MR) and augmented reality (AR) systems have been part of the computer graphics landscape for several decades now, but few systems have moved beyond the laboratory environment and into real-world use. Much of the difficulty of deploying MR and AR systems can be traced back to the enabling technologies; however, tracking and display technologies are now getting to the point where they can be used in the real world. In seeking articles for this issue, we hoped to receive papers that showed how researchers and system designers had dealt with both the technical and practical issues that have typically prevented MR systems from reaching deployment.

Because we have both been working with MR systems for many years, we knew that by asking authors to submit articles showing work that was really moving in the real world, we were issuing a difficult challenge. While the vision of augmented reality, or AR (merging computer graphics with the physical world), has sparked many imaginative efforts, success in placing working systems in the hands of real users—away from the laboratory environment—has been hampered by several issues beyond just the enabling technologies. Our goal was to present systems that come as close as currently possible to resolving these issues as a way of taking stock of the field and motivating research on these key issues.

This begs the question of what the key issues are. We received a number of submissions detailing specific techniques for the enabling technologies in MR systems, as well as a number of submissions that discussed applications as a whole. We have been involved in both sorts of projects ourselves and appreciate the difficulty certain tasks—such as tracking and interaction—present, as well as the complexity involved in creating complete system prototypes.

So, we have selected articles that balance these two types of issues. All the submissions intrigued us, and we enjoyed learning how people interpreted the title and description for this special issue. We chose four articles that we think represent a balanced view of the challenges in dealing with the problems of creating MR systems in the real world, although they do not present a complete discussion of the full range of difficulties fac-

ing MR system design and implementation.

Two articles address the challenges of different interpretations of the real world. In “Mixed Reality in Education, Entertainment, and Training,” Hughes et al. report on a series of case studies in diverse fields ranging from military training to education and entertainment. The emphasis of their work is on creating a rich experience for the participant, and the authors discuss the process of creating the applications and—most importantly—the content that will achieve a lasting impact on MR systems users.

In “Using Augmented Reality to Treat Phobias,” Juan et al. focus on an application’s creation and evaluation for phobia treatment using AR techniques. This is not only a first successful demonstration of an application class often proposed by AR researchers, but also explores the issue of how believable the graphical elements in an AR system must be for an experience to be effective.

One article addresses the tracking problem, one of the most notoriously difficult problems that MR researchers must deal with. In “Pedestrian Tracking with Shoe-Mounted Inertial Sensors,” Foxlin presents a novel system that offers the possibility of wide-area tracking that works seamlessly across indoor and outdoor environments. While still preliminary in its evaluation, the system pushes forward the capabilities of MR enabling technology in a way that could be successfully applied to a growing set of applications in the military, tourism, and entertainment fields.

We also selected an interesting survey article by Regenbrecht, Baratoff, and Wilke titled “Augmented Reality Projects in the Automotive and Aerospace Industries.” In this article, the authors discuss a series of AR applications in the automotive and aerospace industries. Based on the lessons learned in implementing numerous prototype systems, they draw some general guidelines for successful industrial applications of AR. Perhaps the most surprising aspect of these lessons for many readers will be the prominence of factors that are not centered on the technology.

We hope you will find these articles as thought-provoking as we have, and that for some of you, they provide the inspiration to attack the notoriously difficult problem of moving mixed and augmented reality research from the lab into the real world. ■



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