Realizing Mixed Reality through Mobile Systems Research

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ABSTRACT

The emergence of mobile mixed reality (MR) and augmented reality (AR) frameworks portends a future of computational immersion, placing virtual objects amidst physical environments. As MR and AR become increasingly accessible and programmable, immersive media experiences will enhance education, training, navigation, productivity, cultural exhibits.

However, to sustain MR and AR use cases, mobile systems will be challenged with system bottlenecks to energy efficiency, computational performance, device security, and user privacy. These bottlenecks stem from the visual sensing needs and graphics-intensive workloads that power MR and AR.

Properly contextualized and adjusted, a variety of prior mobile systems research projects can find relevance in these emerging paradigms, leveraging continuous mobile vision, edge computing, mobile graphics processing, etc. Further advances can come from future mobile systems research projects. Together, the mobile systems research community can realize these immersive paradigms in our future mobile devices.

CCS Concepts/ACM Classifiers

- **Human-centered computing~Mixed / augmented reality**
- **Computing methodologies~Image and video acquisition**
- **Computer systems organization~Embedded and cyber-physical systems**

Author Keywords

continuous mobile vision; edge computing

BIOGRAPHY

Robert LiKamWa is an assistant professor at Arizona State University in the School of Arts, Media and Engineering and the School of Electrical, Computer and Energy Engineering. There, LiKamWa heads Meteor Studio, which designs *Mobile Experiential Technology through Embedded Optimization Research* to raise the performance, efficiency, and expressiveness of smartphones, IoT, VR/AR, and other mobile systems. LiKamWa completed his B.S., M.S., and Ph.D. degrees at Rice University in the Department of Electrical and Computer Engineering. He has also interned at Microsoft Research in Redmond, Washington and in Beijing, China, Samsung Mobile Processor Innovation Lab in Richardson, Texas, and the National Institute of Standards and Technology in Boulder, Colorado.

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