Supporting Mixed Reality Usability Studies

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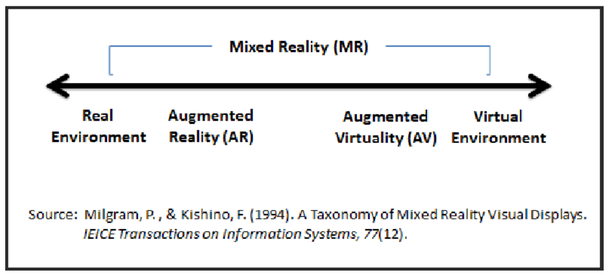
Virtuality Continuum



Virtuality Continuum

Mixed Reality (MR) is a term that encompasses a range of technologies that blend real and virtual objects and environments, from Augmented Reality to Virtual Reality (Milgram & Kishino, 1994).

MRAT Introduction

Professor Nebeling's research team created MRAT, the *Mixed Reality Analytics Toolkit*, designed for non-technical usability researchers to collect usability data on MR apps. MRAT allows users to add data trackers and study tasks to their MR apps.

My role on MRAT was to:

- help develop protocols for interviews and workshops to gather requirements for and evaluate the MRAT tool
- contribute to the technical aspects of the project (specifically exploring the potential to expand MRAT into smartphone-based AR).

MRAT Research Design

Interview 6 research teams → Brainstorming and MRAT Prototypes → Workshop with 3 teams

MRAT Interviews/Workshops

In order to validate the efficacy of MRAT, our research team collaborated with other researchers on campus that are working with AR (and VR) apps. I helped to develop a way to structure workshops so that we could get a better understanding of what the goals and requirements these teams have for their apps are and whether or not MRAT would be helpful to evaluating and improving their apps.

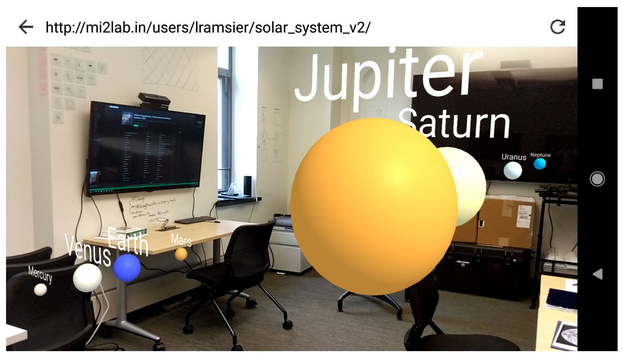
The workshops are held in two parts:

1) Discuss requirements for AR/VR apps with domain experts
2) Evaluate MRAT with domain experts on a prototype app that emulates the functions of the apps used in their research.

MRAT Apps

I developed two app prototypes to test how MRAT can work with smartphone AR.

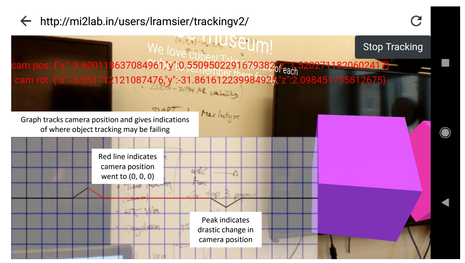
Cube Museum AR App



Solar System AR App

MRAT Camera Tracking

Given that smartphone-based AR is not as sophisticated as specialized devices like HoloLens, I created a visualization for AR tracking data on smartphones. The visualization depicts sensor data with real-time updates.



Tracking Data Visualization

Next Steps

- Finish follow-up workshops
- Apply MRAT to smartphone AR using proof-of-concept apps
- Include tracking accuracy as part of the data collected by MRAT
- Show how MRAT can benefit the design of future MR apps
- Show how MRAT can benefit existing MR apps
- Assess the usability of MR apps
- Co-author and submit a paper to CHI 2019

Reference

Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. IEICE TRANSACTIONS on Information and Systems, 77(12), 1321-1329.

Acknowledgments

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