A Multi-Projector Display System of Arbitrary Shape, Size and Resolution

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Figure 1: *Four Projector System*

Abstract

A long anticipated system in graphics environments is an inexpensive multi-projector display on immersive surfaces like cylinders or domes that can be easily deployed and maintained. The key feature to popularize its adoption is the capability to run contents (e.g. desktop) on this display very easily. Several commercial vendors like Christie Digital or Scalable displays offer such solutions but at a tremendous cost of deployment and maintenance. Our lab has been a forerunner in developing sophisticated automatic geometric and color registration techniques for deploying seamless multi-projector displays on popular non-planar surfaces (e.g. cylinders, domes, truncated domes) promising a tremendous ease in deployment [Sajadi and Majumder 2010a; Sajadi and Majumder 2009; Sajadi and Majumder 2010b; Sajadi et al. 2011; Sajadi and Majumder 2011; Sajadi et al. 2009]. It received significant attention in Graphics, VR and Visualization venues in the past 5 years. However, it was not integrated with content delivery. Hence, an end-to-end system to deliver content on automatically calibrated non-planar displays has not been demonstrated yet.

1 Our System

Our proposed demo in E-tech will be the first one to demonstrate the content delivery from a windows desktop machine on a multi-projector display that can be of arbitrary shape, size and resolution via reconfiguration of the number and placement of projectors. We will demo a mini graphics system of 2-4 projectors in multiple configurations and flexible display surface. We will demonstrate that any such display can be registered seamlessly using our home grown camera based calibration and a windows desktop content delivered to it — all done by our automated software in minutes. We have set up such systems before for Disney Imagineering and UC Santa Barbara Allosphere [Kuchera-Morin et al. 2014] using customized content delivery. We anticipate this system to be open up a hitherto unseen very inexpensive way to build graphics systems and have contents delivered to them effortlessly.

Keywords: projection, large display

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2 Our Lab

iGravi (Interactive Graphics and Visualization) Laboratory) in University of California-Irvine has been a leader in projection-based displays, in particular in camera-based registration of geometry and color for multi-projector displays. Our lab, lead by Prof. Aditi Majumder, has advanced the frontiers of VR display design and deployment by developing inexpensive VR environments with commodity products and sophisticated and robust registration algorithms, especially for immersive non-planar display shapes including popular shapes of vertically extruded surfaces (e.g. cylinder), swept surfaces (e.g. truncated domes) and spherical surfaces (e.g. domes). We have also developed the first complete color registration method that works better than any method available in the commercial marketplace today allowing the use of extremely commodity products. iGravi have several related work on computational camera/displays and appearance editing. Our collaborators include MIT, Purdue, and Disney. Check out http://graphics.ics.uci.edu/drupal/node/4 for more information.

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