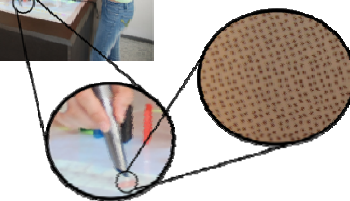


IncreTable, Bridging the gap between real and virtual worlds

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ABSTRACT

IncreTable is a tabletop game inspired by the Incredible Machine. It provides a multi-modal interaction based on a bi-directional projection tabletop, digital pens, a depth camera, and custom-made physical objects, while attracting users for an active participation in creating content which diffuses the boundary between the real and virtual world.

Categories and Subject Descriptors

H.5.1 [Information Interfaces and Presentation]: Multimedia Information Systems— [H.5.3]: Collaborative computing— Computer-supported cooperative work K.8.0 [Personal Computing]: General – games.

Keywords

Mixed Reality, Interaction design, tabletop gaming, tangible user interfaces, pervasive games.

1. INTRODUCTION

In order to improve the social gaming experience, Magerkurth et al. proposed a tabletop setup which combines the advantages of a digital environment with the social impact of board games [1]. Wilson demonstrated PlayAnywhere, a flexible and transportable tabletop projection setup [2]. Wilson also presented the pairing of a depth-sensing camera with an interactive tabletop to create a car racing game in which virtual cars raced realistically over physical objects placed on the table's surface [3]. Motivated by these tabletop games, we developed IncreTable.

2. INCRETABLE

Inspired by the Incredible Machine, the general objective of IncreTable is to arrange a given collection of virtual and real objects in a complex fashion sufficient to perform a simple task. Each level presents a puzzle requiring multi-modal interaction provoking user creativity. Digital pens can be used to place virtual domino blocks. A depth ZSense camera from 3DV Systems, Ltd. is used to recognize physical objects (obstacles) and users' gestures. The result, an 8 bit 320x240 depth image influences the

digital terrain. Players can use any kind of physical objects (folded paper, ramps etc.) to modify the terrain. A projector is used to display the additional content (e.g. a jumping ball) on the surface. When the digital ball, for example, moves over a real ramp, it jumps appropriately. In addition, small robots move around the table interacting again with virtual and real items. These robots have embedded brightness sensors, which track projected markers. Finally, special physical objects, so called "portals", are used to connect the virtual world with the real world. Using these portals, the real domino bricks, for example, can be knocked over by the virtual ones and vice versa. Summarizing, IncreTable has the following novel features:

- Demonstration of multi-modal interaction based on new technologies
- The provision of new experiences dissolving the boundary between virtual and real worlds
- User-generated content through multi-user, interactive interfaces
- Bi-directional projection setup that allows content to be displayed in multiple levels.

The amalgamation of the real and virtual world through our technological developments allow for a new, unparalleled gaming experience. More details, illustrating our system in action, can be found online at: <http://www.mi-lab.org/>.

REFERENCES

- [1] Magerkurth, C., Memisoglu, M., Engelke, T., and Streit, N., Towards the next generation of tabletop gaming experiences. In GI '04: Proceedings of the 2004 conference on Graphics interface, pages 73–80, Ontario, Canada, 2004.
- [2] Wilson, A. Depth-Sensing Video Cameras for 3D Tangible Tabletop Interaction. Tabletop 2007: The 2nd IEEE International Workshop on Horizontal Interactive Human-Computer Systems, 2007.
- [3] Wilson, A. PlayAnywhere: A Compact Tabletop Computer Vision System, Symposium on User Interface Software and Technology (UIST), 2005.