

Augmented Coliseum: Display-Based Computing for Augmented Reality Inspiration Computing Robot

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1 Introduction

Augmented Coliseum is an application of Display-based Computing (DBC) technology, a novel technique using the performance of display devices to output arbitrary optical information with division and multiplexing of time and space. Using this technology, Augmented Coliseum shows a symbiosis of Computer Graphics and Robotics. Robots are augmented and controlled by computer graphics drawn by a projector. The symbiosis expands your imagination with real world robots like kid's dreams.

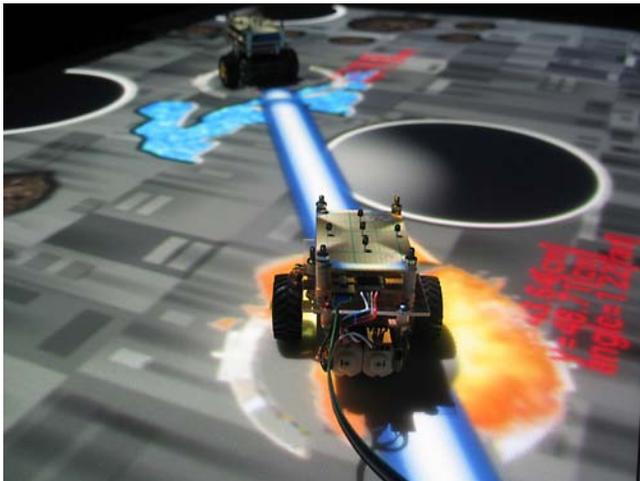


Figure 1: The effects of computer graphics in this environment facilitate virtual abilities for the robots.

Moreover, this system can communicate with a receiver by computer graphics. Many types of projection systems, including displays such as LCDs and desktop monitors can use this measurement and control technology. Thus it has the possibility to become an effective technology in demonstrations of installations and interactive techniques.

2 Exposition

DBC technology no longer needs image capture systems such as a CCD camera for measurement. The system consists of display devices and zero dimensional photo sensors. This system measures the position and direction of a receiver based on the output image.

Therefore, measurement results can be acquired in the same coordinate system as for the output image. This is a major benefit in Mixed Reality applications where virtual environments are composited with the real world. There is also no need for registration between the measurement and the display devices.

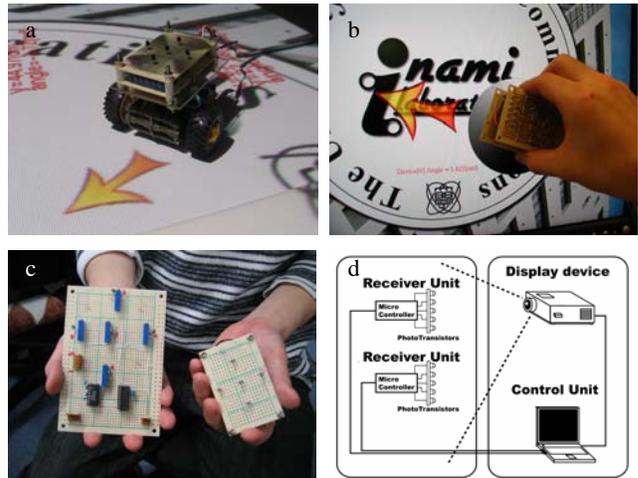


Figure 2: (a): This mobile robot has photo sensors on top. (b): A snapshot of the angular measurement. (c): The receiver units. (d): Overview of the tracking system.

Using this tracking system, we developed an augmented environment with robots. In this environment, robots can be controlled with DBC technology by moving according to computer graphics. This is a very simple approach, but has many possibilities. The goal of this application is the symbiosis of robots and computer graphics. Your imagination might be inspired to project computer graphics to robots as if they were to launch missiles and explode. Hence, computer graphics acquire a physical presence in a specific region, and the robots obtain virtual abilities through this concept.

3 Conclusion

In this demonstration, we propose the concept of measurement and control using DBC technology. This technique is a new use of display devices and computer graphics that are designed to present visual information for human to computer interaction, just as Computer Vision uses camera devices to computer interaction. Measurement and control using DBC are convenient for Augmented Reality applications using display devices. Since we can now track and control devices within the projection area, computer graphics effectively takes on a physical presence; this leads to many fascinating new possibilities for Augmented Reality, computer entertainment, and beyond.