Workshop on Manipulation in Virtual Environments

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KEYWORDS

grasping, grasping space, grippers, haptics, motor control, opposition space, orienting, positioning, teleoperation, telemanipulation, telesurgery, user interfaces, viewpoint, virtual arm, virtual finger, virtual hand, virtual objects, virtual reality, vision.

INTRODUCTION

In all synthetic environment systems, the basic components are a human operator, a machine, and a human-machine interface linking the human operator to the machine. In teleoperator systems, the machine is an electromechanical tool containing sensors and actuators that effectively extend the sensorimotor system of the operator, allowing the sensing and manipulating of the physical environment. In virtual reality, the machine is a programmed computer that synthesizes or generates virtual worlds with which the user can interact. In augmented reality, the synthetic world overlays the physical one, enhancing the user's interaction. (Durlach & Mavor, 1995). In considering grasping and manipulations of physical, virtual and augmented objects in such systems, there are commonalities.

THEME

In keeping with the 1996 conference theme of Common Ground, the theme for this workshop will be Searching for Common Ground in Manipulation of Virtual Environments among those individuals working with manipulation of virtual objects. Regardless of the scale and conditions of the environment to be manipulated (e.g., microsurgery, remote manipulation on space stations), there are elemental problems in viewing perspective, action selection, task and trajectory planning, obstacle avoidance, grasping, object characteristics, task constraints, physical laws, mechanics of manipulation, contacts and compliance, coordinate transformations, representation and rendering.

GOALS

The goals of this workshop on Manipulation in Virtual Environments are:

1) to identify common ground, common issues, common misconceptions, common problems,
2) to provide opportunities for learning from one another, collaboration, sharing solutions,
3) to develop the beginnings of a common vocabulary for more effective communication, and
4) to identify future directions, for research and application.

The workshop will provide a forum for researchers and practitioners to share their issues and insights, and to develop a common vocabulary in this rapidly developing area. The workshop report will update CHI members on the state-of-the-art for manipulation in virtual environments.

WORKSHOP STRUCTURE

The workshop will be one full day, in the conference hotel. Starting with a series of ice breakers and familiarizations, the workshop will consist of: small group breakouts, presentations summarizing the main points covered in the small groups, and whole group discussions. Based on the participants' statements, specific topics, problems and questions will be addressed in these breakouts.

After the workshop, a workshop summary talk and poster will be presented at the CHI 96 conference, a report will be produced for the SIGCHI Bulletin and other information made available on the WWW.

REFERENCES

1. Durlach, N.I. & Mavor, A.S. (Eds). (1995). Virtual Reality: Scientific and Technological Challenges. Washington, D.C.: National Academy Press.