

VeBall, A Computer Input Device for 3D Manipulation

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Technology description

A 3D input device that allows CAD users to easily perform complicated 3D manipulations with their non-dominant hand.

Description

UW researchers have developed a 3D input device that allows CAD users to easily perform complicated 3D manipulations with their non-dominant hand. This device is capable of performing both 2D and 3D operations required in CAD software applications and/or robotic control. This UW input device, referred to as VeBall (Virtual Environment Ball), has been tested against most popular 3D input devices and outperforms them in terms of task completion time and user performance.

Background

Virtual 3D manipulation of computer generated representations (e.g. in CAD software applications) or robotic control (e.g. surgical devices) is a challenging task in computer control environments that rely on standard input devices such as a keyboard, mouse, joystick, etc. Many such applications require the use of two input devices where less frequently activated functions are allocated to input from a device controlled by the user's non-dominant hand. Unfortunately almost all non-dominant hand input devices to date are somewhat cumbersome and require a high degree of user experience and dexterity in order to master 3D orientation manipulations in a time efficient manner. Based on detailed study of the performance limitations of current commercial 3D input devices, UW researchers have developed a 3D input device called VeBall that changes its form factor (physical shape) in order to separate 2D interactions for translation of objects from the 3D interactions associated with rotating an object using 6 degrees of freedom. VeBall not only outperforms commercially available 3D input devices but also can work as both a desktop and a free-space device (In contrary to other devices that are designed to be just desktop devices).

The invention of the VeBall is based on the integration of separate functionality with a change in the form factor of the device housing.

Advantages

Efficient 3D/2D manipulations performed by non-dominant hand

Suitable for CAD and Robotic Control applications

Haptic feedback is included (eg. CAD image “bumping” detection, gaming, medical rehabilitation applications)

A suitable input device for interactive entertainment/education

Low production costs

Wireless version is feasible with the emergence of more advanced battery technologies

Different transformable form factors are possible i.e. VeCone, VeCylinder

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