

Developing applications for testing left-handed people in virtual environments

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The great bulk of mankind is right-handed, only 10 percent prefer to use their left hand. We can well observe in our everyday life the differences between left- and right-handed people's motion and in the use of utensils. It is the consequence of the asymmetry of the human brain. Left-handed and ambidextrous encounter difficulties in their daily lives that most right-handers do not. The majority of these difficulties are only annoying and frustrating, but some of them can lead to serious psychic or physical injuries. Utensils must be made both for right- and left-handed people. As today the use of the virtual reality became prevalent, we must examine it in respect of left-handedness. With our research we would like to help the designers to create user-friendly virtual worlds both for left- and right-handed.

The goal of our recent two experiments at the University of Veszprém was to find the characteristics and differences of left and right handed people in motion and behaviour in virtual worlds. This will help to design virtual worlds suitable both for right- and left- handed people. To do this we needed to create a program to display our virtual worlds. This software has many other tasks (i.e.: treat sounds, movement and interactions; store the movement,). In this paper we will describe the method we used to solve some of the difficulties we encountered while creating this application. One of these problems is collision detection, which is solved by binary space partitioning. We'll also speak about the experiments in details, and our results.

In the first research we have built two virtual galleries - one with paintings of Dutch landscape painters and the other with human statues - with the purpose of comparing and analyzing the navigation and orientation of left- and right-handed people. This scenarios display considerably symmetric rooms with no prominent places to draw attention and corrupt the results. The program stores the precise location in the three- dimensional world and the view direction in every second for further investigations. Our other investigation is about equipping virtual worlds. In this research we have compared the ways right- and left-handed people furnish virtual rooms and fit out other virtual environments. The result of this comparison could give us design requirements of virtual worlds for left-handed.