

# Leveraging Change Blindness for Walking in Virtual Environments

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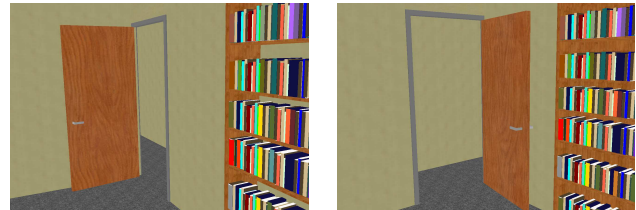
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## ABSTRACT

Change blindness occurs when a person fails to notice alterations to a visual scene. By applying subtle manipulations to the geometry of a virtual environment, this phenomenon can be leveraged to unknowingly redirect a user's walking path while wearing a head-mounted display, allowing a large virtual environment to be represented in a smaller physical space. We implemented a proof-of-concept virtual environment that condenses a 2352 sq. foot office building into 196 sq. feet of physical walking space. Informal testing has suggested a compelling illusion, and anecdotal evidence indicates that small scene manipulations are difficult to detect when not directly observed by users. A formal study is currently being conducted to empirically validate the usefulness of this technique.

**INDEX TERMS:** H.5.1 [Information Interfaces and Presentation]: Multimedia Information Systems—Artificial, augmented, and virtual realities; I.3.7 [Computer Graphics]: Three-Dimensional Graphics and Realism—Virtual reality



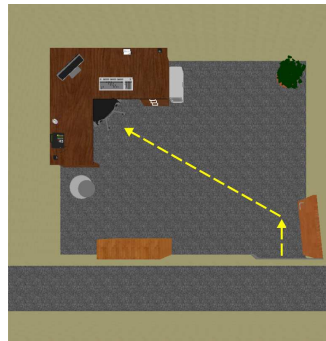
(a) Before Change

(b) After Change

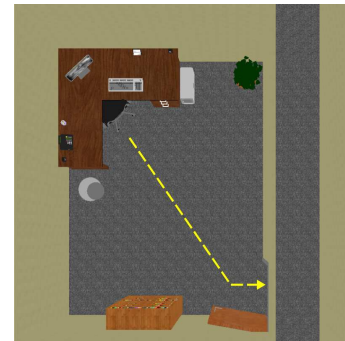
Figure 1. To redirect the user's walking path, doorways are "switched" when the user is looking away. The doorway is rotated by 90 degrees along with the adjoining corridor. Upon exiting the room, users will continue down the hallway in a different physical direction than when they originally entered.



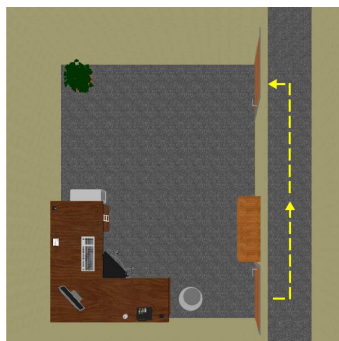
(a) **State 1:** The user approaches the doorway to the first room.



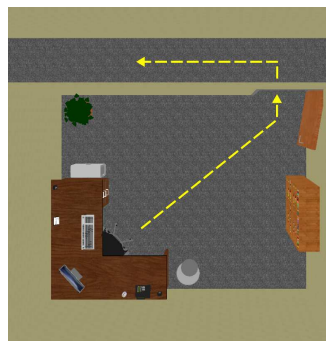
(b) **State 2:** The user enters the first room and walks to the desk to activate a computer monitor.



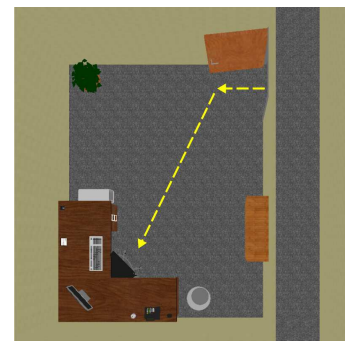
(c) **State 3:** The corridor and the door to exit the room are instantly rotated by 90 degrees. The user turns around and exits the room.



(d) **State 4:** When the user enters the hallway, the second doorway is added, and the contents of the room are swapped with the next room.



(e) **State 5:** The user enters the second room and walks to the desk to activate a computer monitor.



(f) **State 6:** The corridor and the door to exit the room are instantly rotated by 90 degrees. The user turns around and exits the room.

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