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# ABSTRACT

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## Brain-computer Interface has been adopted in VR for active control and assistive monitor device for a long time. While limited light falls on the potential of passive BCI as the primary interaction method. In this paper, we propose an agent controlled BCI virtual environment (VE). Under the environment, the intelligent agent reads and record the mind state of user and learn to change mind of user towards a pre-defined direction by changing the VE implicitly. During the process the VE evolves without active human effort while could relief stress or enhance activity. This system is affordable, opensource and generally effective.

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H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; See<http://acm.org/about/class/1998> for the full list of ACM classifiers. This section is required.

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# FIGURES and CAPTIONS

We

In recent decades research groups have been bridging Brain-Computer Interface (BCI) and Virtual Reality (VR) [7]. The purposes are (1) using BCI as an input in virtual world and (2) using virtual reality to provide safe experiment environment [2].

The adopt of active BCI input in VR generally involves motor imagery (MI) [7]. People could control objects [9] or navigate [3] in Virtual Environment (VE) via mental state. To connect mind and command, an individual training session is required. One of the pioneer research is conducted in University College Dublin, where users could mind-balance avatars (1 dimension) [6]. Complex controls through MI include driving car (2 dimension) [12] or manipulating characters (3-5 dimension) [10] have been proved robust [13]. Since that, VR community deems BCI as an assistive and intuitive input device for VE interaction.

On the other hand, BCI researchers endorse experiments in VE for safety reason. Historically, BCI research is for prosthesis control and motor substitution for disables [9]. VR is widely used for scenario simulation. One of the classic study in Graz University of Technology build a system testing for BCI controlled wheelchair [4, 8]. Clearly Virtual Reality simulates rich aspects of physical environment except car crash. Moreover, evidence shows that immersive environment is more effective than boring 2D visual stimuli [12]. Since the users are more motivated in VE, the response delay and error rate decline.

recommend you place figures and tables at the top or bottom of the appropriate column or columns, on the same page as the relevant text (see Figure 1). You may wish for a figure or table to extend across both columns, to a maximum width of two columns, or 17.78 cm (7 in.).

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# QUOTES

|  |  | Test conditions | |
| --- | --- | --- | --- |
| Name | First | Second | Final |
| Marsden | 223.0 | 44 | 432,321 |
| Nass | 22.2 | 16 | 234,333 |
| Borriello | 22.9 | 11 | 93,123 |
| Karat | 34.9 | 2200 | 103,322 |

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# ACKNOWLEDGMENTS

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