

Virtual Reality as a Friend of the Elderly: A Mini-Review

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ABSTRACT

With the increasing population of the elderly, the use of new solutions and technologies to assist their rehabilitation in physical and mental disorders seems vital. One of the new technologies that has been successfully applied in helping the elderly is Virtual Reality (VR). Considering real-world problems and limitations for old people, this technology helps them to cope with their disorders and to control or treat them as much as possible. Also, it may help them to perform a variety of motivational activities without the help of others. This work presents an overview of the recent advances in the research on using VR for helping the elderly.

Keywords: Virtual Reality; Elderly; Cognitive Disorders; Balance Rehabilitation; Leisure Activities

Introduction

As life expectancy grows more, the number of elderly people who need care and assistance due to physical or psychological disabilities is rapidly increasing [1]. According to WHO reports, nowadays, 12.5% of the world's population is aged over 60 and it is predicted that it will grow to 22% by 2050 [2]. Under such circumstances, physical activity and self-care ability would be decreased which may lead to numerous social consequences such as increased family burden, decreased quality of life, increased health care needs, increased length of stay, increased costs, etc [1]. So, it seems vital using new technologies as a solution to overcome these problems. One of these advanced technologies, which has recently attracted much attention in many areas such as medicine, is Virtual Reality (VR). VR is a 3-Dimensional world which is created by computers so that one can move and interact in it as if they were already there [3-8]. The elderly has also not benefited from this technology, as researchers have used it for a variety of purposes, such as evaluating the rehabilitation and treatment of memory disorders, reducing balance disorders, education, entertainment, traveling and even pain reduction [9-13]. The results of these studies showed good effects on improving mental and social status in older

people. Using a virtual environment, the technology tries to alter the brain's activity and inference process and somehow deceives the brain to achieve its intended purpose. It is necessary for health professionals to recognize the influence, benefits, advantages and disadvantages of using VR in the elderly to be able to use it in the best way in clinical practice. Thus, the present study aimed to make a mini review on the application of virtual reality in the elderly.

Review of Recent Research Works

One of the applications of VR in the elderly is to assist in the evaluation and rehabilitation of cognitive disorders, especially memory disorder, which can cause many problems for the elderly. Using advanced 3D graphics techniques, this technology provides a semi-real environment. This unreality makes one able to deal with his own disorders and work on appropriate exercises to strengthen his abilities and resolve those disorders by being in such environment which is free from the stress of being physically presented in the real environment and facing others. For example, in the field of cognitive disorder rehabilitation in the elderly, VR has been applied in different areas such as orientation and navigating

[14,15], recognizing faces [16], cognitive functioning [15-17], and also other daily activities [18,19] and the results suggest that it is useful for them.

VR can also be used in balance rehabilitation in the elderly in order to help them to prevent falls which is a common problem among them since nearly 30% of them fall at least one time in a year [20]. This technology tries to discover the causes of the falls by simulating the various conditions which causes the elderly to, as well as performing multiple tests in a secure and virtual environment. Then, by using different virtual situation and performing a variety of exercises, it tries to overcome the identified causes and to improve their ability to balance in the real world [21-23].

In addition to the above, one of the most important applications of VR is to improve the quality of life in the elderly through sport, exercises and leisure activities in a safe and virtual environment [24], since they deal with some physical and mental disabilities, they have problems with their social relationships which may lead to loneliness [25]. While leisure activities are crucial to maintaining good health at an early age, VR as an alternative solution can help older people do leisure activities indoors without worrying about outside constraints or weather conditions. In fact, beside these, by using VR, they will be able to travel to different places in the world while enjoying the comfort of their homes and thus combine physical activity with tourism-recreation [26-29].

Discussion

Although some researchers believe that more studies about the VR is needed to fully understand how it works and how it affects the brain, but many studies have shown that it is useful and has had positive effects in the treatment and rehabilitation of various disorders. In fact, VR is not an alternative for direct social interaction among the elderlies, but it rather provides the opportunity to interact with other older people in a virtual environment. It is should be notice, however, that precautionary actions such as doing so in a secure environment and conducting shorter sessions at first should be considered while using this technology. There are some obstacles against using VR such as being expensive, not widely and easily accessible, low experience, need of training in, resistance and rejection by the elderly, and also fear and negative attitude of the elderly among the virtual world and technology, which should be investigated and considered in the first place to get the best results.

Conclusion

Although at first there were many doubts about the use of VR for old people, but as noted in practical examples, numerous studies have suggested its usefulness in quality improvement of life of the elderlies. These kinds of solution may strengthen the ability to communicate, social role and community belonging in older people. Since virtual reality can be adapted to different needs and conditions due to its high flexibility, it is therefore a viable option to

meet the needs of the elderly and soon it will be recognized as the best friend of the elderly in the near future.

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