

A Stress Relief System Based on Virtual Reality

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Introduction

In today's society, people gradually accumulate various pressures in their hectic lives, leading to issues affecting both physical and mental health. Traditional stress management techniques often fail to provide effective solutions. Recently, advanced virtual reality (VR) technologies have achieved significant applications in fields such as medicine, education, and entertainment.

In this paper, we focus on the integration of VR technologies with Leap Motion gesture recognition, exploring its application in stress relief. By combining innovative technologies, the aim is to provide a new and more personalized stress management experience, allowing users to engage in emotional stress-relief activities in a more natural way.

In addition, we use Arduino and a heart rate sensor system to quantify and analyze the user's physiological data in order to obtain more objective research results. The proposed system, combining technology and psychology, will help enhance the understanding of stress management, while opening up new possibilities for future applications and research fields.

Methods

In the proposed system, we combine data collection and analysis to comprehensively understand the effects of integrating VR technologies with Leap Motion gesture recognition in stress relief. The following is a brief overview of our system:

- We develop a VR-based stress relief system and incorporate Leap Motion gesture recognition.
- We use an Arduino and heart rate sensor system to monitor users' heart rate stress levels in real time.
- We collect data on users' heart rate stress, emotional responses, and qualitative feedback on the user experience. Through this data, the impact of virtual reality on both physiological and psychological aspects can be quantified.
- We perform statistical analysis to compare changes in users' heart rate stress levels before and after using the VR stress relief system. At the same time, we analyze qualitative data to gain a deeper understanding of users' emotions and user experiences.

The proposed system can enable a comprehensive understanding of the impact of VR technologies integrated with Leap Motion gesture recognition on stress management and provide data support and in-depth analysis.

Results

We used Unity to develop a virtual reality system run on a PC with an Intel Core i5-6400 CPU @ 2.7 GHz and a GeForce GTX 960. The VIVE Pro virtual reality device and Leap Motion gesture recognition technology were used to ensure the consistency and accuracy of the experiments.

- Virtual environment experience: Participants can enter a virtual reality environment, use Leap Motion for gesture control, and engage in stress-relief activities in various scenarios. (Figure 1)
- Heart rate stress monitoring: We use an Arduino and heart rate sensor system to obtain relevant data of users' heart rate stress levels in real time. (Figure 2)

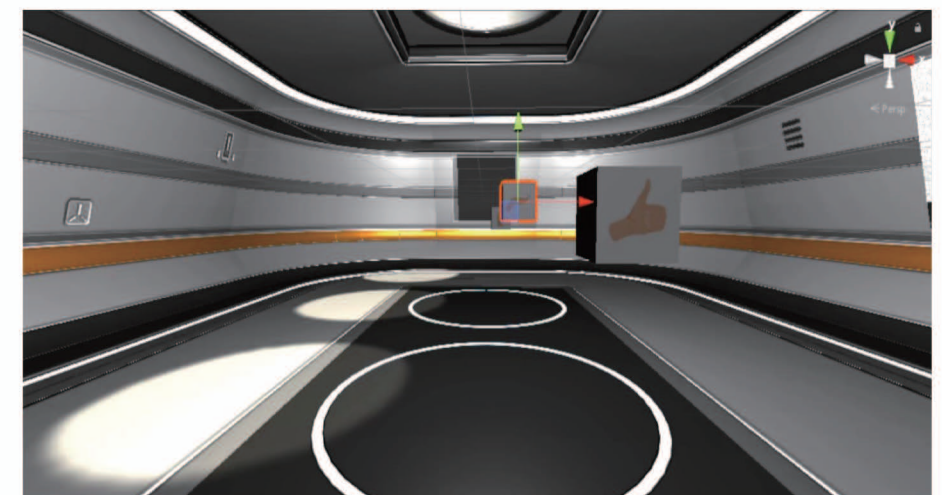


Figure 1 Start the music rhythm interaction, and you can hit in sync with the gesture blocks flying towards you.



Figure 2 The patches can be placed on both sides of the chest or on both arms.

Conclusions

We have integrated VR technologies with Leap Motion gesture recognition to develop a stress relief system. By offering diverse virtual environments and natural gesture controls, our system can provide an immersive stress management experience. Users can reduce heart rate stress levels and improve their emotional state after using the system. In addition, our system can offer a novel and effective stress management method and enrich the application of VR in the field of mental health. The proposed system can enable users to interact in a more natural way and enhance the practicality of stress reduction.

In the future, we will add more sensory elements such as smell and touch to further enhance the immersive experience.