

ONGOING RESEARCH- COGNIHAB

Introduction

Amblyopia, commonly known as "lazy eye," is a vision disorder that affects a significant number of individuals worldwide. Cognihab, a health-tech startup, has undertaken groundbreaking research in collaboration with renowned experts in the field to develop Virtual Reality (VR)-based gaming modules for the treatment of Amblyopia. This research report aims to provide a detailed overview of the ongoing research, including its objectives, methodology, participant recruitment, and preliminary outcomes.

Research Objective

The primary objective of this research is to measure the impact of Cognihab's VR-based gaming modules on Amblyopia patients, encompassing both children and adults. By leveraging the immersive and interactive nature of virtual reality, the research aims to enhance visual acuity, depth perception, and overall visual integration in individuals with Amblyopia.

Research Design

The research is conducted using a combination of in-person sessions at designated centers and remote sessions at patients' homes. Patients undergo VR therapy for a duration of 12 weeks, engaging in 30 minutes of treatment daily (subject to adjustment based on outcomes). Cognihab's Android/Oculus Go application serves as the platform for patients' participation in the research.

Patient Consent and Supervision

Before commencing the research, patients or their parents/guardians provide informed consent. The research is conducted under the supervision of Cognihab's research assistants placed at the centers. Their role is to ensure adherence to the research protocol, monitor patient progress, and provide any necessary guidance or support.

Research Details

Amblyopia Games

Cognihab has designed and created seven Amblyopia treatment VR games, developed under the supervision of Dr. Pradeep Sharma, former HOD at AIIMS. These games have been specifically tailored to stimulate visual integration, eye coordination, and binocular vision in Amblyopia patients. The continuous guidance from experts such as Dr. Varshini Shankar, Ms. Bhanu at Shroff Eye Centre, and other esteemed doctors has played a pivotal role in refining the games.

Methodology

Cognihab's methodology for Amblyopia treatment using VR technology is as follows:

Virtual Reality Hardware: Cognihab employs cutting-edge VR hardware to deliver different images to each eye of the patient.

Image Splitting: The virtual reality world is split into two images—one for the strong eye and one for the weak eye.

Signal Strength Modification: The signal strength of objects in the strong eye is deliberately decreased, while it is increased for the weak eye. This modification facilitates the collaboration



between the eyes, making it easier for them to work together. These adjustments are made automatically during the game based on the patient's performance.

Progressive Assistance Reduction: As the patient progresses in the treatment, they require less assistance. Consequently, the difference in signal strength between the eyes decreases gradually.

Skill Development: With repeated practice, the patient's two eyes learn to team up and work together more effectively.

Long-term Goal: The ultimate aim of the treatment is for the patient to no longer require image modification to combine the visual inputs and consistently perceive depth.

Participant Recruitment

For the ongoing research, a total of 171 patients have been recruited from various centers, including AIIMS (Delhi) and Centre for Sight (South Ex). These participants represent a diverse range of age groups, spanning from children to adults.

Data Collection and Analysis

The research team collects and analyzes data on three primary parameters throughout the research:

Right Eye Vision

Left Eye Vision

Stereopsis (Depth Perception)

These measurements enable a comprehensive evaluation of the impact of Cognihab's VR-based gaming modules on the visual capabilities of Amblyopia patients. The data analysis is conducted using appropriate statistical techniques to identify trends, patterns, and significant improvements in visual acuity and depth perception.

Preliminary Outcomes

Among the compliant patients who have returned for follow-up, an encouraging 85% have reported a minimum improvement of one line in their vision. Furthermore, a considerable number of patients have also reported improvements in Stereopsis. These preliminary outcomes showcase the potential effectiveness of Cognihab's VR-based Amblyopia treatment and highlight its promise as a noninvasive and engaging therapeutic approach.

Conclusion

Cognihab's ongoing research in Virtual Reality-based Amblyopia treatment demonstrates promising results in enhancing visual acuity, depth perception, and overall visual integration. The collaboration with esteemed medical professionals, along with continuous refinement of the treatment approach, has contributed to the development of a groundbreaking solution for Amblyopia patients.

By leveraging the power of virtual reality, Cognihab aims to revolutionize the approach to Amblyopia treatment, improving the lives of patients worldwide. Further research and collaboration with medical institutions will help refine the treatment protocols, expand the patient pool, and provide greater accessibility to this innovative solution.