

About how to perform vestibular visual training for patients with vertigo using VR to relieve the use of VR by users with Motion sickness (MS)

Academic project
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Abstract

With the rapid development and wide application of virtual reality (VR) technology, people's practical demand for VR is increasing, and 3D vertigo has gradually become a problem that has not been emphasized by everyone, but has considerable challenges for VR device users, especially in patients with Motion Sickness Disorder (MS). Based on the finding that this vertigo is mainly due to the inconsistency between the vestibular system and the visual inputs, the present study aims to address this issue through an innovative vestibular training method.

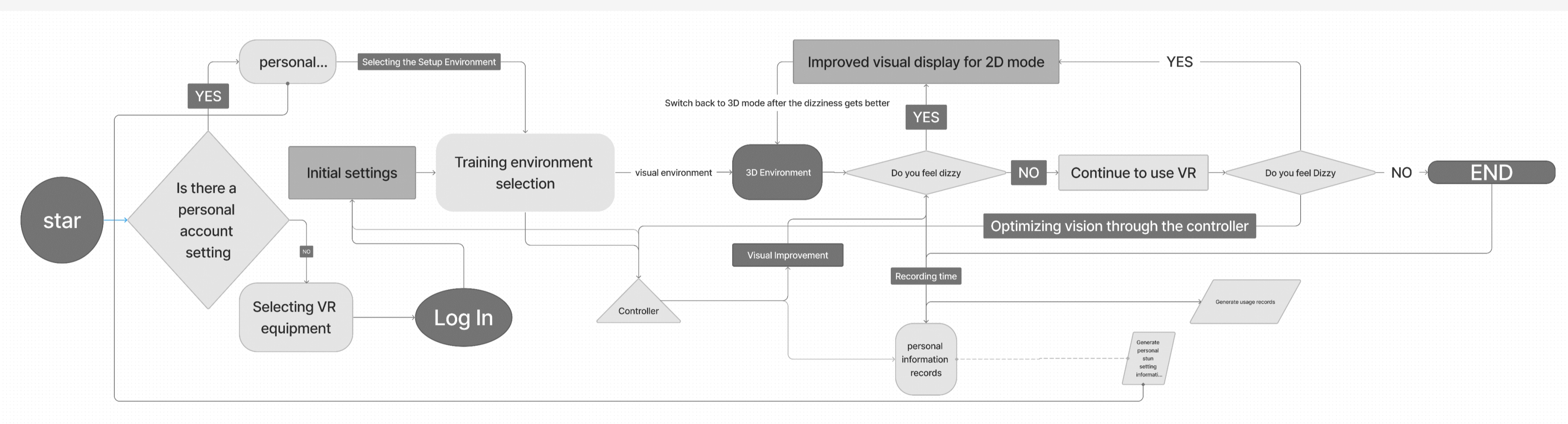
Introduction & Background

3D dizziness is mainly caused by the inconsistency between the vestibular system (responsible for balance and spatial localization) and visual inputs, while today's VR devices are limited by transmission delays, inability to fully synchronize the image and behavioral commands, as well as inability to obtain feedback information to match the brain's preconceptions leading to a mismatch of dizziness in the user, especially for patients with Motion Sickness (MS), and even back to the physical symptoms such as dizziness, regurgitation, nausea and other physiological symptoms. According to Dr. Andreas Koch and others, non-pharmacological treatment, "habituation therapy" is considered by MS patients to be the most direct and effective way to relieve their motion sickness. Habituation can be achieved through repeated contact over a long period of time and can be achieved by simulating the vertigo environment through some virtual realities, thus achieving effective vestibular training (Koch et al., 2018).

Therefore, in this study, we take the visual environment as an example of "vestibular training" to alleviate the vertigo sensation of motion sickness (MS) patients in practical VR

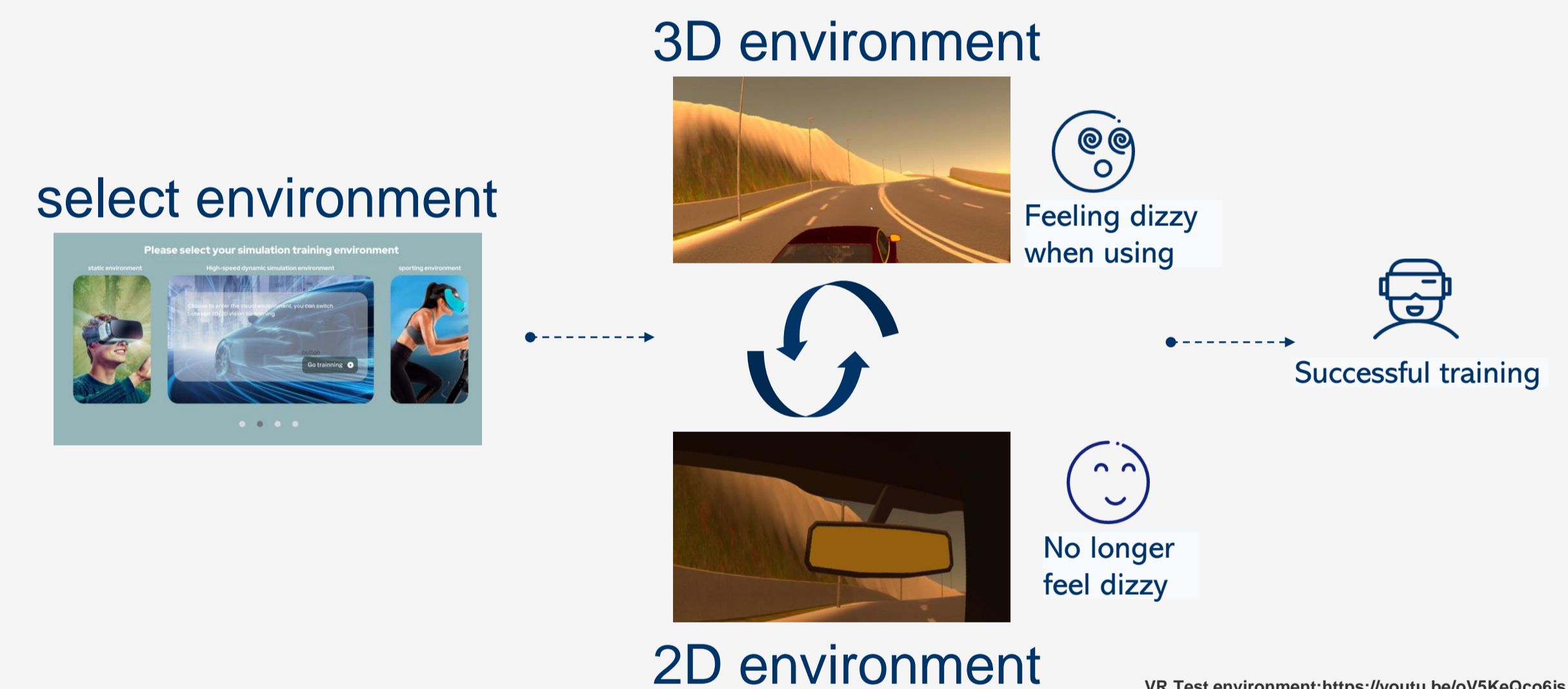
Diagram / Design

User flowchart



figma Hi-Fi link: <https://www.figma.com/file/4i54VhC2g5xK6qGUOS2RY/low-figh?type=design&node-id=0%3A1&mode=design&t=2oprwYXGVUS6C1-1>

Visual Environmental Training



VR Test environment: <https://youtu.be/oV5KeQco6js>

Study Methodology

In the early stage, we searched for patients with vertigo through questionnaires, and interviewed them to ensure that they had experience in using VR, so we decided to invite 5 participants with patients with motion sickness to conduct a test and use EEG to obtain brain information during the test. Activity heatmaps to demonstrate the effectiveness of experiments

Testing & Evaluation

Prior research

Interview:
Interview participant's experiences with VR

Questionnaire:
Screen participants for motion sickness

Prototype testing

A/B test:
Comparison of using VR vision after training and using VR time before training

Interview:
Participants' subjective feelings of using

EGG test:
Objective physiological data

Conclusions & Research Results

Current Results:

Visual vestibular training for VR can provide relief for people with motion sickness. Motion sickness can be relieved by prolonged "acclimatization training".

Prolonged training can increase the duration of headset use in patients with VR motion sickness.

Existing problems:

Although training can provide relief, it cannot eliminate the discomfort of VR use for people with Motion Sickness Disorder.

Future outlook:

Hoped that the vestibular training can be strengthened by other feedback methods. Combined training can improve the training effect more effectively