



AYRE

Applied Technology for
Emotional Well-being

264,000,000

people suffer from disorders of

anxiety and **300,000,000** of
depression

Most are **unaware** of the
somatic symptoms

Muscle pains, extreme fatigue,
digestive problems, among others, are

Somatizations

of emotional disorders.



The problem

In today's era, marked by rapid changes, hyper-connectivity, and high social pressures, emotional disorders have become a silent epidemic.

A major challenge is that many people with these disorders are unaware of the symptoms of depression and anxiety, instead experiencing manifestations like muscle pains, sleeplessness, appetite changes, digestive issues, and extreme fatigue. Without recognizing these signs as indicative of an underlying emotional condition, individuals might adopt harmful habits to ease their discomfort, lacking a full understanding of the real cause.



The solution



AYRE

A technological application aimed at improving people's quality of life through emotional well-being, by regulating emotions of **Anger**, **Sadness** and **Anxiety**. Using advanced techniques in Artificial Intelligence, Virtual Reality, Augmented Reality, and other emerging technologies.



Design and Validation of Augmented Reality Stimuli for the Treatment of Cleaning Obsessive-Compulsive Disorder

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Fear to contamination is an easy-to-provoke, intense, hard-to-control, and extraordinarily persistent fear. A worsening of preexisting psychiatric disorders was observed during the COVID-19 (coronavirus disease 2019) outbreak, and several studies suggest that those with obsessive-compulsive disorder (OCD) may be more affected than any other group of people. In the face of worsening OCD symptoms, there is a need for mental health professionals to provide the support needed not only to treat patients who still report symptoms, but also to improve relapse prevention. In this line, it is recommended to improve alternative strategies such as online consultations and digital psychiatry. The aim of this study is to develop augmented reality (AR) stimuli that are clinically relevant for patients with cleaning OCD and assess their efficiency to obtain emotionally significant responses. Four AR stimuli were developed: a plastic bag full of garbage, a piece of bread with mold, a dirty sports shoe, and a piece of rotten meat. All stimuli were shown to a clinical group (17 patients with cleaning OCD) and a control group (11 patients without OCD). Relevant results were the design of the AR stimuli. These stimuli were validated with the statistical difference in perceived anxiety in the most stimuli between the clinical and control groups. Nevertheless, when looking at effect sizes, all stimuli present effect sizes from small (plastic bag) to large (meat), with both shoe and bread between small and medium effect sizes. These results are a valuable support for the clinical use of these AR stimuli in the treatment of cleaning OCD.

Keywords: augmented reality, obsessive compulsive disorder, e-health, anxiety, emotion

INTRODUCTION

Fear to contamination is an easy-to-provoke, intense, hard-to-control, and extraordinarily persistent fear. Besides, it is a kind of fear that is often culturally prescribed, highly spread by the media, which makes it more expansive and contagious (Rachman, 2004; Durna et al., 2019). This fear has been identified as the most common symptom of the obsessive-compulsive disorder (OCD; Malhotra et al., 2019). In fact, 46% of OCD patients show obsessions related to fear of contamination even in minor contamination incidents, such as shaking hands or touching dirty objects (Sullivan et al., 2017). Washing or disinfecting hands is the compulsion most associated with contamination

Various studies note the existence of a strong link between the development indicator of a country and its mental health status (Pinto-Gonzalez et al., 2014; World Health Organization, 2004). In this sense, the prevention, attention, and rehabilitation of people affected by mental disorders such as anxiety consist in a growing health concern in Latin America and the Caribbean (García-Batista et al., 2017). Agoraphobia has been shown to be one of the most prevalent anxiety disorders in Latin America. A 2.5% of people have had agoraphobia during the course

Research papers



Design of virtual environments for the treatment of agoraphobia: Inclusion of culturally relevant elements for the population of the Dominican Republic

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ABSTRACT

Virtual reality is a powerful tool for the treatment of agoraphobia. However, how effective is the use of these scenarios when they do not resemble the sociocultural context? Literature suggests that the inclusion of culturally relevant elements increases the ecological validity and transferability of learning since it reduces the gap between the virtual and real world. Unfortunately, in Latin America, the development of virtual environments is incipient, and the use of generic virtual environments is commonplace. The objective of this study was to develop virtual environments that include elements that are culturally relevant to the population of the Dominican Republic. These hand-drawn people with symptoms of agoraphobia were interviewed. Based on the information obtained, four scenarios were designed: house, elevator, park and public transport. In each scenario, the parameters that increase anxiety levels (for example, number of people) may be controlled and modified, allowing the development of a patient level.

1. Introduction

According to the DSM-5 (American Psychiatric Association, 2013), agoraphobia is characterized by the presence of demand anxiety levels when the person finds themselves in place or situation from which escape may be difficult or in which help may not be available in the event of having a panic attack. The anxiety experienced with agoraphobia tends to coincide with a combination of characteristic situations, typically avoided, such as being alone outside the house, riding out of the house, standing in a crowd, and traveling by bus, among others (García-Batista, Cantisano-Guzmán, & Olivares, 2016; Pinto et al., 2015).

Various studies note the existence of a strong link between the development indicator of a country and its mental health status (Pinto-Gonzalez et al., 2014; World Health Organization, 2004). In this sense, the prevention, attention, and rehabilitation of people affected by mental disorders such as anxiety consist in a growing health concern in Latin America and the Caribbean (García-Batista et al., 2017). Agoraphobia has been shown to be one of the most prevalent anxiety disorders in Latin America. A 2.5% of people have had agoraphobia during the course

of their life (The American Health Organization, 2013) and have probably had problems with normal functioning due to the level of disability it causes the person. Likewise, in the Dominican Republic in 2016, 70.9% of Dominicans suffered an emotional disorder when the person finds themselves in place or situation from which escape may be difficult or in which help may not be available in the event of having a panic attack. The anxiety experienced with agoraphobia tends to coincide with a combination of characteristic situations, typically avoided, such as being alone outside the house, riding out of the house, standing in a crowd, and traveling by bus, among others (García-Batista, Cantisano-Guzmán, & Olivares, 2016; Pinto et al., 2015).

The interest in a delivery method for interventions may help in overcoming barriers to treatment and assessment, since it does not require travel time to and from therapy sessions, and is able to overcome the issue of locally available therapists. In fact, a number of internet-delivered programs have already become important tools in the health system (Dedering, García-Batista, Balboa Torres, & Castro-González, 2020). Virtual Reality (VR) is a technology highly compatible with

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ABSTRACT

During the coronavirus outbreak, it was noted that pre-existing psychological illnesses worsened, and numerous research indicate that those with contamination-related obsessions and cleaning compulsions (C-OCD) may be more affected. Virtual Reality (VR) and other immersive technologies have shown to be effective for the treatment of disorders related to anxiety, thus showing their potential to transform OCD treatment by means of integrating virtual elements. VR exposure has shown benefits compared to live or imagined exposure, however, to be effective it must be able to elicit high emotional arousal in users. Based on this, the present work aimed to develop different virtual environments scenarios and evaluate their efficacy in generating an emotional response in people with C-OCD symptoms. Based on the literature review, two virtual scenarios were created (dirty public bathroom and unhygienic kitchen). Subsequently, two groups were then constituted: C-OCD group (n = 20, aged between 18 and 48 years) characterized by an obtained score of more than 13 points (cut-point) in the Yale-Brown Scale for Obsessive-Compulsive Disorder (Y-BOCS) and by showing C-OCD symptoms when doing the structured interview (SCID-I), and a control group (n = 20, aged between 18 and 56 years). All participants were residents of the Dominican Republic. Exposure to the virtual environments generated high levels of state and subjective anxiety in both groups, although significantly higher in the C-OCD group. The results obtained indicate that the VR scenarios developed are suitable for eliciting emotional responses and, consequently, that they can be used to complement the treatment of C-OCD.

1. Introduction

In December 2019, SARS-CoV-2 or COVID-19, a new and extremely contagious coronavirus, first detected in Wuhan, China, and rapidly spread throughout the world before being formally recognized as a global pandemic in March 2020 (World Health Organization, 2020). Most nations have used a variety of strategies to slow the spread of the virus, including social isolation and lockdowns that require people to stay inside (Trigolo et al., 2022). During the pandemic, the media increased the dissemination of information related to the risk of contagion and the importance of preventive actions. Thus, the population was encouraged to protect themselves from incidences of mild contamination, such as

handshake or touching things, and the importance of washing or disinfecting hands was emphasized (Linnik et al., 2021). The coronavirus disease (COVID-19) outbreak was associated with an aggravation of pre-existing psychiatric problems (Yao et al., 2020), and various research indicate that those with contamination-related OCD and washing compulsions ("washers") may be more vulnerable than any other group of individuals (Frostberg et al., 2020; Fossati and Mignani, 2020). According to Davide et al. (2020), the COVID-19 epidemic caused patients who already had symptoms of contamination and patients who had not established remission prior to quarantine to experience worsening of their symptoms. Comparable results were obtained by Inoué et al. (2020) who report an increase in obsessive-compulsive disorder

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2405-8440/© 2022 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

After 30 years of research, scientists have demonstrated that immersive technologies are useful for evaluating and treating mental health disorders.

Different journal articles have shown their benefit for the well-being of the general population: Blum et al., 2019; Cebolla et al., 2019; Naylor et al., 2019; Seabrook et al., 2020; Villani; Riva, 2002; among others



AYRE

This interactive platform offers a range of personalized and adaptive tools that guide users through exercises and activities aimed at reducing **stress**, anxiety, anger, and sadness.

With an intuitive and accessible design, it aims to be a valuable resource for anyone looking **to improve their emotional well-being**, offering a virtual haven for relaxation, self-awareness, and personal growth.



How does it work?



By integrating smart algorithms, the app learns from user interactions and preferences, tailoring sessions to optimize outcomes and foster sustainable progress towards **mental** and **emotional well-being**. It effectively regulates emotions of Anger, Sadness, and Anxiety to lessen cognitive, physiological, and behavioral responses.

Use cases



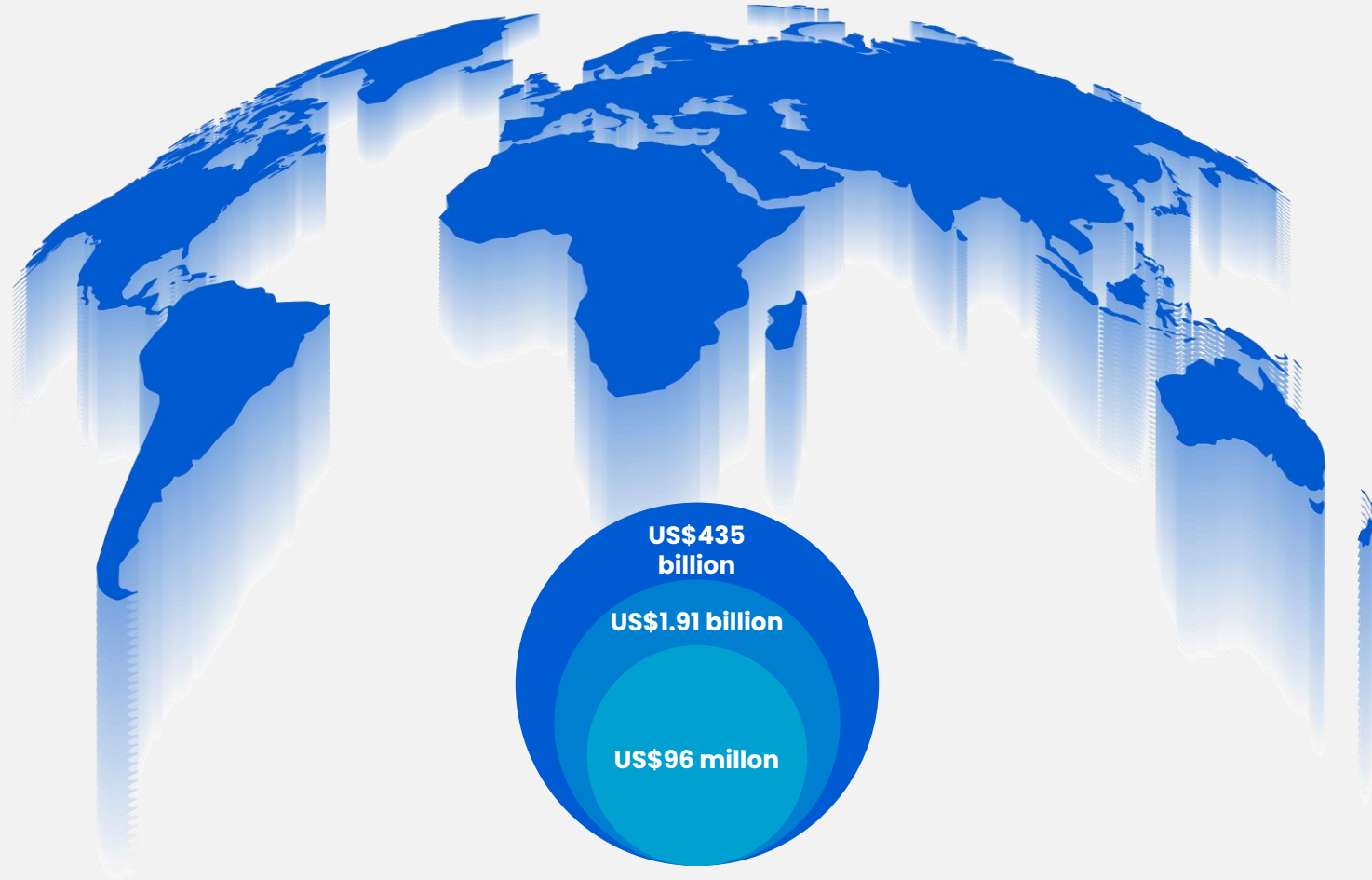
Emotional Balance Rooms for companies.

Emotional Balance Rooms at universities.

Personal and individual use.

Emotion control for performance improvement, achieving balance between necessary or excessive stress in athletes.

Target market



TAM: Global mental health market
SAM: metaverse market for mental health in 2023*
SOM: metaverse market for mental health in 2023 in Latin America

<https://www2.deloitte.com/co/es/pages/life-sciences-and-healthcare/articles/aplicaciones-de-salud-mental-un-mercado-con-potencial-y-en-crecimiento.html>

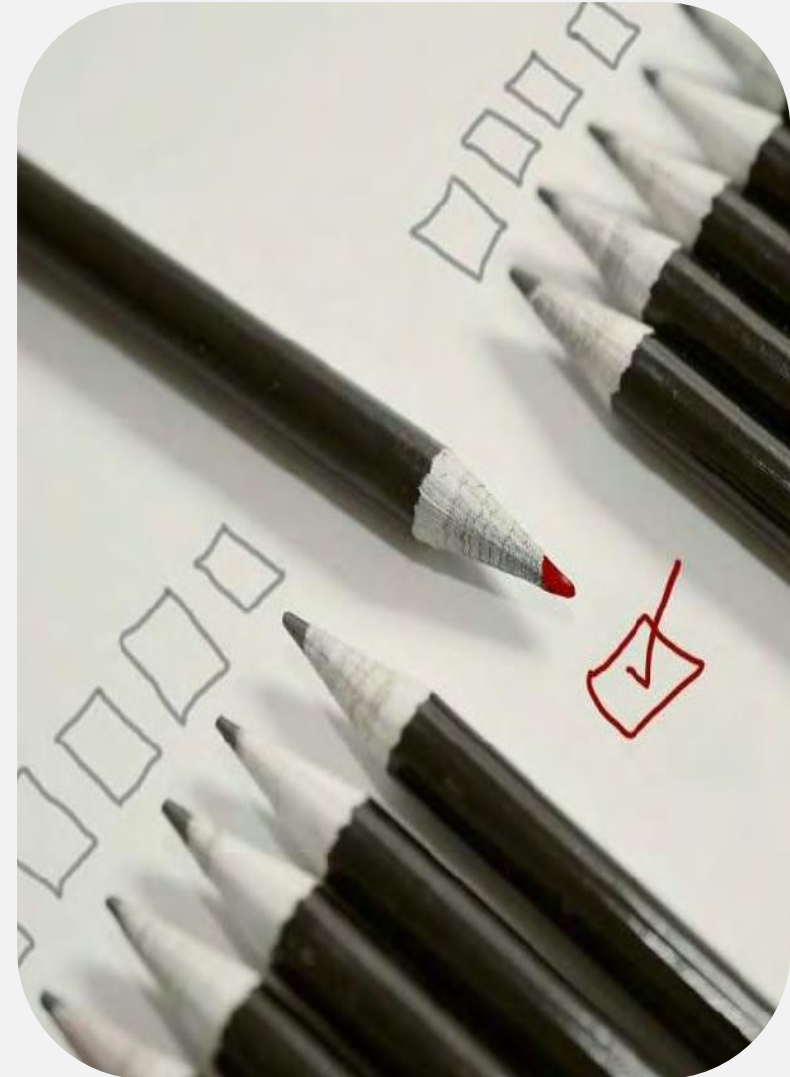
How do we differentiate?

The application leverages Artificial Intelligence to learn from user interactions, tailoring sessions to sustainably enhance mental well-being.

Our app goes beyond virtual reality, enabling any smartphone user to access its benefits.

Our solution has scientific evidence that proves its effectiveness in enhancing emotional well-being.

Our approach focuses on reducing/eliminating somatizations caused by imbalances in emotions such as anger, sadness, and anxiety.



Our team



Dr. Zoilo Garcia

Doctor in Cognition, Emotion, and Stress, with master's degrees in Strategic HR Management and Advanced Studies. Researcher in the Dominican Republic and awarded in clinical psychology. Author of scientific articles and consultant in organizational psychology. Winner of multiple FONDOCyT grants for research on emotions and disorders using emerging technologies.



Dr. Kiero Guerra

Doctor in Quantitative Psychology and Master in the same discipline, Master in Strategic HR Management. Fulbright Scholar, former Vice Chancellor of Research at PUCMM. Specialized in advanced statistics, he has been recognized by FONDOCyT for research in growth curve modeling and mathematical simulation.



Ivan Alsina

Psychologist, professor, and researcher with over 15 years of experience in VR apps for mental health. Creator of "TAVE," he has developed VR systems for various disorders and skills. Associate professor at the University of Vic, teaching about technologies in psychology, and leading at Relax VR, focusing on European alliances.



Dr. Leonardo Medrano

Doctor in Psychology, teaches "Psychometric Techniques" and "Descriptive and Inferential Psycho-Statistics." Acts as a teacher and researcher at various universities. Was Director of LEPE and editor of the Evaluar magazine, working as a psychotherapist and coordinator at the Evidence-Based Psychotherapy Institute.



Martha Baez

Director of Research and Innovation at PUCMM, linked to the private sector in marketing management. Researcher at CEUR/PUCMM and Project Officer for the W.K. Kellogg Foundation for Central America and the Caribbean. Research interests related to knowledge management, innovation, and technology transfer.



Johevan Peralta

Graphic Advertising Design and 3D Generalist, Virtual Reality developer, with experience in Adobe Photoshop, Illustrator, InDesign, Premiere, After Effects, and Substance Painter, Unity3D, 3ds Max, and Blender. Certified User programmer by Unity.