Free Mind – Digital Body

Maverick Geng

(Alexander, 2023)

Project Abstract

With the continuous advancement of technology, people may have great expectations for digital embodiment, believing that it could lead to a significant step forward in information transmission. However, there are also important societal issues worth exploring. While society has become more inclusive of people with disabilities, providing accommodations such as disabled seating and boarding assistance on public transport, have you ever noticed the subtle sense of sadness on their faces? Have you observed the determination on the faces of athletes in the Paralympic Games? Are some people inherently destined to be disadvantaged? Is there anyone willing to speak up for them? Can digital embodiment, as a new technology, help them break free from the constraints of wheelchairs, overcome innate self-doubt, and the sadness of striving for something but often falling short?

Could we create a digital 3D world through new tools like VR, where individuals with disabilities can have their rights and the right to live fully? In this world, they could have the freedom to design their bodies according to their preferences, pursue their passions, and say, "I want to be a rock star, but I was born mute," or "I want to be a painter, but I have no hands." In this digital realm, they could bring countless ideas in their minds to life, composing different arts. A new digital world, a new digital embodiment, it is possible.

The target audience of this project is not only people with disabilities but also others and the technology developers. The goal is to give them a voice, enable new technologies to assist them, and encourage them not to give up.

Contents

Introduction

Virtual reality (VR) or virtual environment (VE) refers to computing technologies that present artificially generated sensory information, creating a simulated world perceived as similar to the real one. VE systems typically simulate a three-dimensional visual environment presented on a monitor, large screen, or inside a helmet-mounted display (HMD). One of the remarkable effects of VE is the feeling of presence, where users feel immersed and connected to the virtual world.

For disabled individuals, VR offers significant benefits, enabling them to engage in various activities without the limitations imposed by their disabilities, providing a safe environment for exploration and learning. Studies show that knowledge and skills acquired in virtual environments can transfer to the real world, including spatial information and life skills.

Although the mainstream media has emphasized the entertainment aspects of VR, there has been a significant surge in industrial, educational, and scientific applications of VEs over the past 5 years. These applications primarily leverage the visualization capabilities of the technology. In the domain of disability, these applications are a logical extension of the longstanding acknowledgment of technology's significance for people with disabilities. Overall, VR's potential for creating an immersive and interactive experience holds promise for enhancing the lives of disabled individuals and expanding their abilities beyond physical constraints.

How can people with disabilities experience a different life in the virtual world?

This actually raises several issues:

1. *The most common way to enter the virtual world is by wearing VR goggles and using hardware such as controllers. However, for people with disabilities, this is likely to be challenging, as some may not be able to handle the controllers at all.*

For example, there is a company calls WalkinVR, it is a VR software for people with motor disabilities. WalkinVR software is tailored to accommodate different types of mobility and neurological limitations.

Difficulties faced by them include limited mobility, inability to press VR controller buttons, difficulty changing body position, and muscle weakness. Virtual movements and rotations using controllers enable players to change positions without physical movement. WalkinVR allows customizable controller positions and range of motion to suit individual needs, overcoming muscle weakness challenges. Kinect technology tracks hand movements for players who cannot hold controllers, eliminating the need for physical controllers in VR games.

(Creativemarket, 2021)

2. *Is the virtual world merely creating a utopia of fantasy for people with disabilities?*

Virtual environment (VE) technology is proving beneficial for disabled individuals in various ways beyond creating a sense of presence in a synthetic world. For physically disabled children, VEs have been utilized to improve spatial learning and orientation abilities. Spatial awareness can be challenging for some disabled children due to neurological damage or limited opportunities for independent exploration. VEs offer a safe and unrestricted environment for exploration, allowing disabled individuals to navigate freely using appropriately designed input devices.

VEs can serve as aids for disabled children to familiarize themselves with real-world environments before visiting them physically. This exploration occurs in a hazard-free and socially safe environment, enhancing individual confidence and conveying essential safety information in an engaging manner.

In an experiment involving a virtual supermarket, the group exposed to VE training completed a real shopping trip faster and made more correct selections than the control group. Additionally, the "Virtual Environment Science Laboratory" was adapted to cater to the needs of students with cerebral palsy, aiming to help them understand the laws of physics effectively.

3. *A purely virtual world may have an impact on users' psychology, leading to a sense of dissociation between their physical reality and the virtual environment.*

An ethical concern in using virtual environments (VEs), especially for children with physical disabilities, is the potential attraction that may lead to addiction and withdrawal from real-world interactions. Designers of VEs must consider the risks associated with their use, especially in research involving individuals with mental incapacity, fear and stress assessment and treatment, and prosthetic interfaces for brain-related care. Caution is crucial when simulating events with real-world equivalents that pose dangers. For instance, children trained to cross the road in a simulator may become desensitized to traffic dangers if errors do not carry consequences. Careful consideration of ethical implications is essential in the development and application of virtual worlds.

(Creativemarket, 2021)

4. *What if a person with disabilities is so impaired that they cannot perform any physical actions, they can still express their thoughts and do what they want in a virtual world.*

Although this technology may still exist in the realm of fantasy – brain-computer interfaces – it represents the closest technological fantasy that could help people with disabilities. Such interfaces would allow direct connections from the brain to the virtual world, enabling individuals to liberate their thoughts from the confines of their heavy physical bodies, experience a different life, and do what they desire. That's why I want to create a video instead of a 3D world – I aim to enhance my video's content and visual effects using a 3D environment, but the end result won't be a 3D environment because it falls short in describing the concept of a "free mind."

Conceptual Research

While the overarching idea is to create a virtual world specifically designed for individuals with disabilities, allowing them to experience a sense of freedom, the primary goal is to find ways to facilitate their rehabilitation in the real world. In fact, virtual reality (VR) technology can be effective in assisting disabled individuals with their rehabilitation process.

There are many books that have responded to this point. For example, like "Virtual Reality in Physical and Motor Rehabilitation" by Patrice L. (Tamar) Weiss and Dafna Fisher, " Virtual Reality in the Rehabilitation of People with Intellectual Disabilities: Review " edited by David J. Brown and Penny J. Standen, and "Rehabilitation Technologies: Virtual Reality and Robotics" by Dario Farina and Winnie Jensen.

These books explain how VR technology is used for therapeutic exercises to improve motor skills and physical functionality. They cover the design principles of effective VR-based rehabilitation programs and provide case studies showcasing how VR enhances the rehabilitation process for individuals with physical disabilities. The books also discuss various enabling technologies, including virtual reality and robotics, in the context of rehabilitation. They highlight how VR contributes to functional recovery and quality of life for disabled individuals. The integration of virtual reality into comprehensive rehabilitation approaches is also explored. The books emphasize the application of virtual reality technology in rehabilitation, covering the theoretical foundations of using VR in rehabilitation, practical considerations for designing effective interventions, and showcasing successful application case studies.

In the article titled "Virtual reality, disability and rehabilitation" by Paul N. Wilson, Nigel Foreman, and Danae Stanton, the authors discuss the applications of virtual reality (VR) technology in the field of disability and rehabilitation. They explore the potential benefits and challenges of using VR to assist individuals with disabilities in various aspects of their lives.

Transfer of Spatial Knowledge from VR to the Real World:
The authors present a case study involving physically disabled children who used a VR simulation of a building to explore and learn the layout. The knowledge acquired from the virtual environment transferred to the real-world building, enabling them to point out objects situated around the building from within it.

Transfer of Life Skills from VR to the Real World for Students with Learning Disabilities:
A case study focused on teaching teenagers with severe learning difficulties essential life skills, such as shopping, in a virtual supermarket. The experimental group that trained in the virtual supermarket outperformed the control group in completing real shopping trips and selecting correct items.

Augmented Reality for Parkinson's Disease Patients:
The authors mention an augmented reality system that assists people with Parkinson's disease in improving their gait. By overlaying a stable grid pattern over the user's view of the ground, the system helps individuals with an awkward gait navigate more effectively.
Applications for Visually Impaired Individuals:
The authors discuss the use of virtual environments based on three-dimensional sound systems, which could be particularly beneficial for individuals with visual impairments. These environments enable sound sources to be generated in specific localities around the user, helping them interact with and navigate the virtual space.

Telepresence Techniques for Medical Treatment:
The authors mention the potential use of telepresence techniques to aid remote medical treatment. For instance, paramedics could communicate with a remote surgeon using television cameras and robotics to perform surgical interventions.

The article acknowledges the practical challenges of VR technology, such as discomfort caused by delays in updating screen images in head-mounted displays (HMDs), and ethical concerns, including the potential addictive nature of VR experiences for vulnerable individuals. Nonetheless, the authors emphasize the potential benefits of VR in rehabilitation, education, training, and enhancing daily living activities for people with disabilities.

# Technical Research

<u>Visual aspect:</u>
My initial idea was to use Unity to create a 3D environment since I had some experience with it during the first half of the year. However, for this project, I intend to craft a video with a powerful visual impact. While researching impactful videos, I noticed that many were created using After Effects. It came to my attention that After Effects can also be used to construct 3D environments. (Example video: https://youtu.be/PnUZksPC-M4)

As I am relatively unfamiliar with this software, I am eager to learn how to utilize After Effects to generate striking effects, such as employing particle plugins like Stardust, Plexus, and Particular. I envision portraying a transformation from the real world into a virtual one in my video project. Therefore, I'll require various types of content. I captured real-world footage using my own DSLR, the Nikon D850. While its video recording capabilities might not be exceptional, its pixel count is sufficient for my needs.

Additionally, I discovered Adobe's new software, Aero, which is still in its testing phase. Aero is designed for crafting AR videos. After watching some promotional material, I believe it's worth experimenting with, although its usability might not be as intuitive due to its beta status. If Aero doesn't meet my expectations, I'll opt for Unity since I've come across more tutorials on creating AR experiences using Unity, a platform I am more familiar with. (Example video: https://youtu.be/gpaq5bAjya8)

I've encountered intriguing software such as Super-me. Its concept aligns well with my artistic vision, as the overarching theme of my project revolves around the "digital body." I intend to incorporate this aspect into my work by depicting the transformation of disabled bodies into virtual forms.

https://www.universaleverything.com/prototypes/super-you
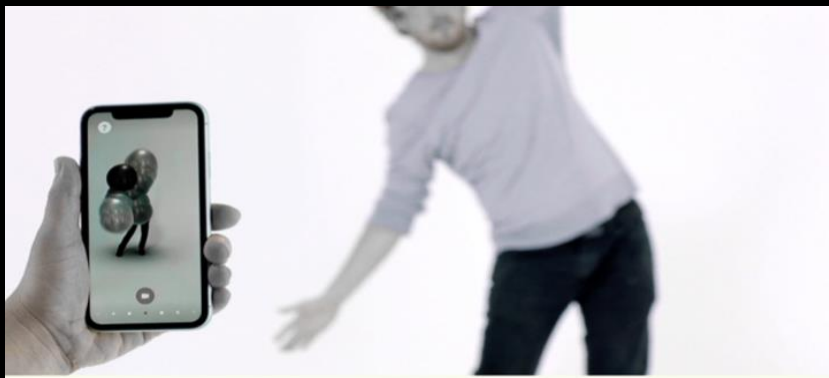
<u>Auditory aspect:</u>

Background music:

There will be scenes response to "How can we offer people with disabilities the tools and experiences to become a rockstar?" However, a rock star-like vibe may not be enough or inclusive enough; it might feel too superficial. How can we achieve a deeper understanding on the auditory level while still delivering the impact of a rock star visually? Creating a rock star persona doesn't necessarily require the use of a rock song?

Yes
I am looking for a grand grand background music.
"Regalia Type Beat"
In the context of a "Regalia Type Beat," it suggests that the instrumental's sound and composition might evoke a sense of grandeur, elegance, or prestige. For the background music, I will attempt to create it using FL Studio or search online for copyrighted material.

Example:
https://b23.tv/kU93lRd
https://b23.tv/7GfCMA4

To make a concert video visually impactful, it doesn't necessarily require cutting many continuous and chaotic singing segments. It can also be achieved through camera zoom-ins and zoom-outs to showcase the rhythm or by capturing the performer's profile in a moment of complete immersion. We can still use after effect to do that.

Example:
https://v.douyin.com/iJetbNXg/

Vocal:

I might try to say something with the beat using slow talk flow.
Example: Eminem "Stan"

I may attempt to use the technique of an acrostic poem for the lyrics, but I'm not sure how to do it in English.

Example:

M……
O……
M……
It's…..
H….
U….
R…..
T……

To create a strong sense of empathy with the audience, I want to incorporate acrostic poetry in the lyrics that aligns with the music. At a certain point in the video, I'll add these initial letters, synchronizing them precisely with the sound I've composed. While the video won't display the actual lyrics I'm singing, it will reveal the acrostic poem's initial letters, and I hope to achieve a compelling effect.

Proposed Approach

Mapping and combining the evolution and understanding of ideas about. "digital body"

- Stage 1：
When the topic "Digital Embodiment" comes up, my first thought is about personal data shared on social media, reflecting a person's virtual presence on the internet. I had lots of ideas, the posts we share on social media are a part of our personal identity, representing highly individualized thoughts. However, they should never be taken as a mirror to judge others because each person's interpretation is vastly different. While we can glimpse a person's interests through their posts, we cannot use them to define someone entirely, as it would be too one-sided. Then I realize I had lots of thoughts, and they are highly subjective, and cannot find a main point, so I passed it.

- Stage 2:
With the new pneumonia pandemic, the potential of the digital body is beginning to be tapped, this project that I researched explores the possibilities of the dancing body in the 21st century using motion-capture and 3D animation technology it is an opportunity to delve into the boundless ways in which human movement could be visualized through digital technology. This work has inspired me greatly and opened up a new way of exploring the digital body. Consequently, I have begun to contemplate what else can be expressed using this approach. https://www.alexanderwhitley.com/digital-body-2021

  I noticed that as the pandemic restrictions are easing, artists worldwide are hosting their performances, ranging from small livehouse shows to large music festivals and stadium concerts. I observed that people express their bodies differently in response to various types of songs and rhythms. I am contemplating how to use digital 3D animation and create a 3D environment to showcase the body movements of people in response to various forms of Hip-Hop music.

- Stage 3:
Based on my second idea, when writing the problem statement, I realized that the thoughts weren't deep enough and lacked consideration of important details such as the target audience and the potential impact on society. Therefore, maybe can focus on creating a 3D world to allow people with disabilities to use virtual reality (VR) and enjoy their lives, fulfilling their dreams. Since your previous idea was related to music and you have more insights in that area, the final idea is: "How can we offer people with disabilities the tools and experiences to become a rockstar?"

Mapping the Evolution of Idea Construction Fantasies

Here is the final idea:
"How can we offer people with disabilities the tools and experiences to become a rockstar?"

- The production of Mixed Reality (MR) videos is fascinating, and attempting to create one could be a great idea. This is the initial thought: to create a Mixed Reality video that combines real-life footage with 3D virtual objects to achieve an impressive effect.
- Since the final topic involves using VR to transport real people to a virtual world, I will need to create a 3D environment using Unity. To combine this with my initial idea, maybe could develop a 3D environment and capture its footage using screen recording for use in the video.

- But later, I discovered that After Effects can directly create special effects for 3D environments. So, I'm planning to invest more time in learning how to use After Effects to create impressive effects that can enhance the overall impact of my videos.

- To combine all the ideas for my video, I have a rough outline in mind. It will start in the real world, gradually introducing elements of Mixed Reality, such as 3D objects appearing in the real environment or using digital effects to manipulate my arms. The transition will slowly shift from reality to a purely digital 3D world, digitally altering the body. Eventually, it will culminate in a virtual VR world as the focal point. Throughout the video, I will consider how to incorporate music (possibly creating my own) and use visually captivating editing to produce a promotional video that gives a voice to people with disabilities.
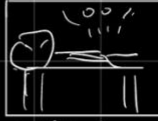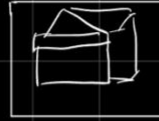
Video storyboard.

Reality

Intro.

Use rapid Unreal Engine effects and a sense of montage to narrate an accident. Color: black and white

Swiftly depict a sequence of events in a hospital using the same technique.

Suddenly a young man on a wheel chair appears in a new place.

A new place calls. Rehabilitation Center for the Disabled.

Ar

Young man don't believe what's happened on him. he doesn't like the life. there he wants to leave.

He can't sleep at night or dream about different things.

Some day he can see some strange things appears in his life. and seems to lead him to somewhere.

It's the sea, those strangers lead him there. he doesn't know where he got the power. he stands and jump into the sea.

3D world

He jumps into the sea. many people jump after him.

Suddenly all the people stand up. they have different kind body. they can jump very high.

He used to dream to be a rockstar, there he had his first concert.

After a crazy time, some people leave, some stays. but he doesn't want to back to the reality

He saw a crazy fan under his stage all the time. Then they had a talk.

The fan actually from the same disable centre. The had a really long talk.

The fan teach him a lot to accept to be a disable to live still, and he helps him use Vr to Rehabilitation

finally the back to the real word. The young man seems happier. he plays sport with another man probably it's the fan under the stage.

Proposed Outcome

After considering all the methods and techniques mentioned above, the ultimate outcome of the project is a video that utilizes a plethora of effects to create Unreal Engine visuals and a sense of montage. By mastering various effects, the aim is to visually present an impactful creation.

In terms of sound, a multitude of auditory effects will be sought to complement the visual production. Expansive background music will be used to enhance the video's structure, achieving a dynamic flow. Additionally, intricate details will be designed, including elements like acrostic poetry, to further captivate the audience's hearts.

Conceptually, the video embodies compassion, portraying how individuals with disabilities enjoy a life akin to that of the able-bodied within the VR world, fulfilling their dreams. However, after these experiences, a return to reality becomes necessary. They forge friendships with fellow disabled individuals through VR rehabilitation, leading to a positive life.

Project Timeline and Scope

Visual aspect:

1. Video footages of disabilities – Must have
    (It nice if I can have more footage resources, I only possess video materials from when I volunteered in my hometown China.)
2. Ar videos – Must have
    (It would be nice to have more Ar videos, if I have more time, I will do more on this because it's not mt main focus on this project, because I have to let the audiences know what I am trying to express first.)
3. 3D environment – Must have
4. Plot construction – Must have

Auditory aspect:

1. Background music – Must have
2. Sound effect – Must have but nice to have more.
3. Acrostic poem – Nice to have

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