e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

VR GALLERY: VIRTUAL REALITY BASED GALLERY FOR HERITAGE MUSEUM OF ANDAMAN & NICOBAR

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ABSTRACT

The Covid-19 pandemic has struck the human world so hard that it is impossible to actually live a normal life. It has been really difficult to keep the mental health stable. Also, there are many weakened, handicapped humans who only dream of moving out, going to different places, living their life. It is nearly impossible for them.

Virtual Reality (VR), sometimes called Virtual Environments (VE) has drawn much attention in the last few years. Extensive media coverage causes this interest to grow rapidly. Very few people, however, really know what VR is, what its basic principles and its open problems are. In this synopsis report an overview of virtual reality is presented, followed by applications of this technology in tourism and entertainment areas. An insightful study of typical VR systems is done. Finally, the future of VR is considered in two aspects: technological and social.

Entertainment is something we all crave for, and what if it is mixed with Virtual reality and a little bit of tourism addition? Today it is not enough to describe the benefits of the destination, but virtual reality does. It allows people to visit places of their dreams regardless of any physical limitations. Therefore, our application Virtual Reality Based Gallery for Heritage Museum of Andaman & Nicobar provides the users to go on a virtual trip through a VR Headset, exploring and navigating to some of the amazing scenes one can ever dream of. Providing different places to explore, application will give different choices of places to the user to dive in.

Findings The advent of new VR hardware necessitates a distinction for different VR systems applied in the tourism sector. Regardless of the VR system, most studies examine VR as a marketing tool for promotion and communication purposes during the pre-travel phase, focusing on behavioral aspects. Advances in technology will yield new opportunities and application possibilities for the tourism industry. The concluding part of the paper proposes practical implications for tourism businesses together with directions for future studies.

I. INTRODUCTION

1.1 Aim of Project

In today's scenario, talking about the pandemic none of us can travel around the globe. Other than this, there are many disabled people in the whole wide world for whom visiting different places is only a dream. There are many vulnerable places which we look forward to traveling but cannot. We all sometimes in our life want to visit different places around the globe but cannot, due to different reasons we might face. Therefore, we are here with the solution to the rescue, building our own VR experience application for all.

Our team Tech Warriors has come up with an amazing idea for providing our users an immersive and a memorable experience. Our application Virtual Reality Based Gallery for Heritage Museum of Andaman & Nicobar provides the user to visit the museum and explore amazing different places to visit, from islands and beaches to the top of a mountain cliff, one can never be tired of exploring. Therefore, offering a great way to provide a completely new customer journey that takes in all the senses, thereby creating maximum customer value.

The main aim of the project is to achieve user satisfaction by making him/her dive into the VR completely so as they can get to know about the place beforehand. Features such as text and sound description would make it a more immersive experience. It is good to know about the history of a place that we want to visit or its historical knowledge.

VR headsets typically provide the most realistic virtual reality travel experience for the user. A VR headset uses specialist software which tracks the movement of the user's head. This allows the user to explore the travel destination as they would in real life.

Currently, the number of people that own a VR headset is rising at a fast rate. This growth in headsets can largely be attributed to the gaming market, where the technology is being pushed hard.

Also, all the major online platforms including Google, Facebook, and Amazon are all investing heavily in VR headsets and VR content, promising a bright future for this space.

1.2 Objective

Our main objective is to make the user feel that he/she is actually visiting that particular place in real life. Further many disabled and handicapped people do not get a chance to go and to visit their dream places. Therefore, we have come up with an idea of bringing those places to our users virtually. Objective of our project is allowing the user to experience the feeling of "Being There". Therefore, our application is the solution to all the problems.

Virtual Reality Based Gallery for Heritage Museum of Andaman & Nicobar is an engaging virtual reality experience where you, as a person, explore various tourism destinations in a unique and immersive way. Features such as high resolution, along with text and sound description will make more of a friendly experience. Also, navigation and interaction will create memorable and unique experience for the user.

Benefits:

-Providing travel experiences to those that cannot travel.

-Reducing impact of tourism on vulnerable destinations.

1.3 Project Overview

Our project Virtual Reality Based Gallery for Heritage Museum of Andaman & Nicobar consists of the immersive way for a human to interact with the virtual world. We all know that Virtual Reality is vast and is a big help in today's world. With working in different sectors virtual reality has helped humans to see things, creations, world in a different way. With our team sharing this platform we will make it an immersive experience to make humans feel the world they have never felt before.

So, to interact with the virtual world will be creating, designing, testing, lightnings, modeling and much more on the Unity 3D platform which will give users to interact, feel, listen in a way never before. Also, using C# as the scripting language will help to bridge between the software and the hardware. It will make it a new level of dimension.

When we will be viewing the Virtual Reality Based Gallery for Heritage Museum of Andaman & Nicobar in the VR headset or a mobile based headset, there will be a menu for location selection. Either you select moon part or the Earth's places to be explored. After the selection of place of your choice you will be entering a new different world where you can interact with the objects, you can move around, know about the place more by text and sound description. Further to load more and more places there will be a database connectivity so that places can be load directly.

Also, there will be a huge difference if a user is viewing the virtual place in a VR headset rather on the mobile based headset as, the animations, resolution, quality is much more defined in the VR headset like the HTC Vive or the Oculus Rift.

II. LITERATURE SURVEY

Virtual Reality

1. The commonly accepted definition for VR is the use of computer-generated 3D environment, that the user can navigate and interact with, resulting in real-time simulation of one or more of the users five senses (Yung,2019).
2. More specifically, the three key elements that characterize VR are: **Visualization**, where the user has the ability to look around, usually with the use of a head-mounted display; **Immersion**, suspension of belief and physical representation of objects; **Interactivity**, degree of control over the experience, usually achieved with sensors and an input device like joysticks or keyboards. (Yung, Catheryn, 2019).
3. Two terms commonly found within VR research are Virtual Environments and Virtual Worlds. Virtual worlds are described as persistent virtual environments, open 24/7, and enabling people represented by avatars to create, play, and interact in real time. (Yung,2019)

Virtual Reality and Tourism

1. Much like reality, the social aspect is prominent, where avatars can travel to these attractions in groups and interact with other avatars present at the site. (Ryan,2019)
2. Tourists are happy to escape into known simulated experiences like Disneyland, totally absorbed into staged alternate realities. It can be argued that the application of VR into the tourism experiences merely pushes this alternate reality one step further. (Catheryn, Ryan,2019)
3. Research has shown that VR's greatest strength is its ability to visualize spatial environments. This is especially crucial in tourism where products are intangible and are confidence goods which consumers are not able to test in advance. (Ryan,2019)

III. METHODOLOGY

3.1 Problem Statement

Develop application to visualize a museum in virtual reality using a wearable mobile based headset (using Google Cardboard VR or similar technology). User should be able to move in the museum and explore the area in virtual reality in 3D as if he/she was present there.

3.2 Scope

As the project goes, it's suited for all the timelines and is a good escape in this going pandemic. With every new update a place or two will be added which will make it much more interesting to play with. Having your own virtual place is going to be a futuristic thing soon. It's well suited for the coming time as well. People using the application will experience immersive and amazing visuals.

Not only this is feasible to us but also for the disabled people. Therefore, this is scalable in every aspect of a human life from kids to adults to the disabled people, life will be more sorted as we can have a better look upon something beforehand.

Further, by realizing our application on different platforms and on Steam VR (for the Software version) free to download and use. Further, we want to introduce our product in the market where we can customize places and different scenes based on their requirements. Other features such as introducing new places and extending to space, where our users can actually navigate and interact with our virtual world.

3.3 Need of Project

In times like these where it's impossible to travel out, to visit places. Pandemic has taught a lot of different things that can be done when we our still within the comfort zone of our life. Also, let's say if we want to study the history of a monument, we want to see what's the history behind is, what the paintings, scriptures actually mean. That's when the technology comes handy, we can see the better part of the world just by sitting in our room. Features such as navigating, interacting, sound and textual effects make it more than a virtual world. It will always be more. And even people who are handicapped can have a way to live their life. It's a technology that let people explore the parts of the world that can only be dreamt of like travelling to Mount Everest or hiking to a top of the Mountain cliff, exploring an abundant forest and more. It will always be more to what we can imagine and see. One of the greatest strengths of VR is allowing the user to experience the feeling of "being there". Whilst regular images and videos can work well for showing what a destination has to offer, they don't often elicit an emotional response. VR in tourism has the ability to place the user at the heart of the scene and makes it easier for them to imagine themselves at the location.

3.4 Relevance of Project

VR's attributes render it uniquely suitable for the visualization of spatial environments, which is why VR is commonly exploited for the purposes of urban, environmental, and architectural planning. In fact, over one decade ago Cheong recognized, "VR has the potential to serve as an invaluable tool in the formulation of tourism policy and in the planning process as well". Most obviously, VR permits the creation of realistic, navigable VEs that tourism planners can analyze when considering possible developments. When compared with rudimentary, two-dimensional blueprints or fixed, 3D models, VR models offer numerous advantages. For instance, VR models allow planners to observe an environment from an unlimited number of perspectives instead of just a bird's-eye view, and they permit the rapid visualization of potential changes that subsequently can be assessed.

3.5 Software and Hardware Requirements

3.5.1 Software Requirements

1. Unity Engine
2. Blender
3. Adobe Photoshop
4. Firebase

3.5.2 Hardware Requirements

1. VR headset
2. Device with min. Level android 4.4

3.6 Requirement Analysis

As we proceed further in our project, we got to know the requirements of different hardware's to test our virtual scenes which includes VR Headset. Many headsets make provide what they call a 'recommended' hardware configuration for virtual reality. This gives VR developers a baseline hardware target so that they can ensure the consistent FPS requirement is met. If your hardware does not meet the recommended specification, you risk dropping under framerate which can result in a choppy and potentially uncomfortable VR experience. The recommended specs are Oculus, HTC etc.

3.7 Project development Plan

1. Figure out what to be done and how it will go on.
2. Data Collection from internet and other sources.
3. Look into available projects related to this figure out the pros and cons from that that could be implemented.
4. Creating a basic outline structure that what modules, phases, limitations that is this project have.
5. Create a project schedule and assigning the task to members.
6. Breakdown the modules in smaller task and testing it after every successful task completion.
7. After completion of all modules assemble all the modules to make it final product.
8. Testing and debugging.
9. Resolving bugs and errors

Our application focuses on giving users the best experience in memorable and immersive way. The app will be provided with menu of different locations. User can select any location he/she wishes to visit, allowing the user to experience the feeling of "Being There". By this it helps to attract larger audience to see a destination's potential and to show how worthy it is to visit.

3.8 Process Model

The application was developed using the agile software development model. People react to virtual reality applications in different ways so the application was developed in modules (one experiment at a time), tested by users for feedback before moving on to the next module. The iterative nature of agile development makes it easier for changes to be made to a module to suit the requirements of the users. It also provides quick feedback from users compared to the waterfall model.

3.9 Feasibility Analysis

3.9.1 Feasibility of hardware equipment of virtual reality technology

In recent years, the hardware equipment of virtual reality technology has become more and more mature, various kinds of technology are more and more abundant, and its functions are more and more abundant, which provides hardware equipment conditions for the application of art design teaching. The application of virtual reality technology in art design teaching requires sufficient funds to purchase hardware equipment and use it for later maintenance costs, which is one of the key problems encountered in the application of virtual reality technology. The state provides strong support for the field of Applied Science education, reduces the pressure of renewal of school teaching funds, and provides financial support for the application of virtual reality technology. It also provides sufficient information and application guidance for the application of virtual reality technology, and deepens users' understanding and support of virtual reality technology. At present, the price of VR glasses, the hardware equipment of virtual reality technology, has been very low, which greatly

meets the teaching requirements of art design. It can use VR glasses controller for teacher-student interaction to ensure the teaching experience effect.

3.9.2 The Feasibility of Displaying Works of Virtual Reality Technology System

Virtual reality technology system emphasizes the dominant role of human in the virtual system. By using keyboard, mouse and single-dimensional digital information in the computing environment, it constructs a simulation environment of multi-dimensional information, guides people to immerse themselves in the environment created by virtual reality technology, enlightens people's knowledge of complex things, and sublimates them. Understand and learn new skills. The virtual reality system mainly consists of the following modules, including detection, user, feedback, sensor, virtual ring, 3D model, control, real world, modeling module and so on.

3.10 UML Diagrams

UML is an acronym that stands for Unified Modeling Language. UML is a modern approach to modeling and documenting software. It is based on diagrammatic representations of software components. By using visual representations, we are able to better understand possible flaws or errors in software or business processes. UML has been used as a general-purpose modeling language in the field of software engineering. However, it has now found its way into the documentation of several business processes or workflows.

3.10.1 Activity Diagram

Activity diagrams represent workflows in a graphical way. They can be used to describe the business workflow or the operational workflow of any component in a system. Here, the flows start from the main menu where the user has the enter in muesuem, if he/she enter then he/she can move in muesuem freely and can explore very antique pieces and images. Further the database will load your preference that will help you to dive in another world with the help of VR headset.

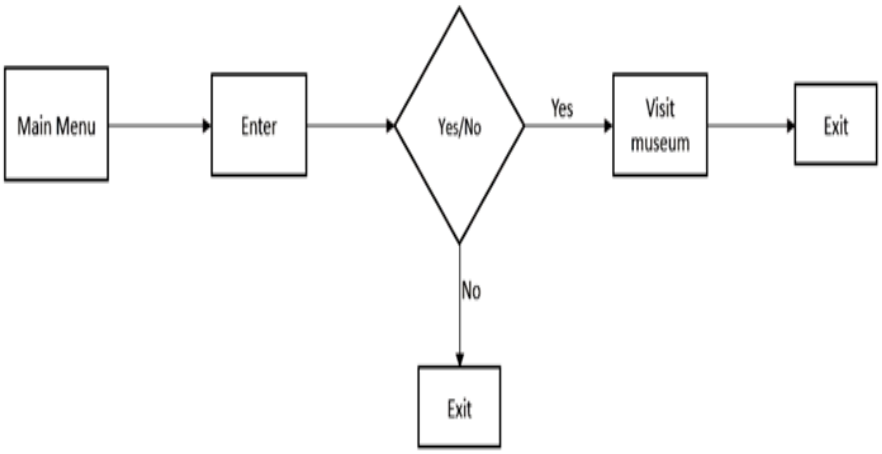

Fig. 3.10.1 Activity Diagram

3.10.2 Use Case Diagram

Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions interact.

There is 1 actor which can use all the settings part, can choose different location also can request for a new location. The database will be loading maps of all the preferred users location.

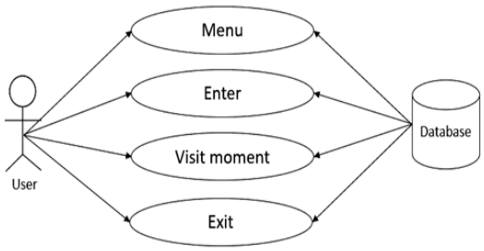

Fig. 3.10.3 Use Case Diagram

IV. CONCLUSION

As the project goes, it's suited for all the timelines and is a good escape in this going pandemic. Having your own virtual space is going to be a futuristic thing soon. It's well suited for the coming time as well. People using the application will experience immersive and amazing visuals. Not only this is feasible to us but also for the disabled people. Therefore, this is scalable in every aspect of a human life from kids to adults to the disabled people, life will be more sorted as we can have a better look upon something beforehand.

We are going to release our application on Play store and on Steam VR (for the Software version) free to download and use. Further, we want to introduce our product in the market where we can customize places and different scenes based on their requirements. Other features such as introducing new places and extending to space, where our users can actually navigate and interact with our virtual world.

With amazing visuals as it provides, viewers will have great experience using it. The places will be updated and some new ones will be there as well. In short, it'll be a nice experience.

People using the application will experience immersive and amazing visuals, since we can create enormous number of different scenarios, people will love to visit new and update locations daily. We are going to release our application on Play store and on Steam VR (for the Software version) free to download and use. Further, we want to introduce our product in the market where we can customize places and different scenes based on their requirements. Other features such as introducing new places and extending to space, where our users can actually navigate and interact with our virtual world.

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