# EARTH / MOON EXPLORER APPLICATION

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*Abstract:* The advancement in the area of every technology helped mankind in several ways and made their lives easier. And travel is one of the most important parts of human's life though traveling has become easier still many people can't travel due to certain reasons like disability, affordability, old-age, other similar problems but what if we can visit different places without anyone's help or a huge fund to invest in traveling or without consuming time in traveling. By using our application users can visualize some different locations present on Earth and Moon which are not easily accessible or impossible to access by common people, people with disabilities, and older people by sitting at their homes or anywhere. The user just requires an HMD (Head Mounted Device) or VR headset for an Android phone with internet and our application to visit different places.

*Keywords*: Virtual Reality, Tourism, Mobile Application.

## I. INTRODUCTION

**Traveling** to new and different places is one of the most interesting, loved and Favorite things to do for Everyone. People love to visit places which have breathtaking views and some of them are very extreme places and difficult to impossible to reach and people with disabilities and older people find it difficult to travel due to their old age or disabilities, but not being able to travel due to one reason or another but this doesn't mean that these people who aren't traveling don't want to travel.

Some people have interest in studying the Moon or want to visit the moon but only few people have landed on the moon and for that one must become an astronaut and still have to go through a lot of process and training and selections in Space Agencies to Land on Moon.

what if we give them a solution which is way affordable, way cheaper to almost free? And even give you a closer and more realistic and immersive experience of the Moon surface.

Yes, our application does provide this solution of traveling to different places on earth and as well as some famous sites on the Moon.

The Earth/Moon Explorer Application based on **Virtual reality Technology**.

**Virtual Reality** is one the fastest growing technologies in the world. Virtual reality is a technology where you can get inside a virtual world and lock yourself from outer world and get immersed into the computer-generated virtual world with virtual objects.

We have used virtual reality technology and 3d models to create an immersive virtual world in our application for the users to visit.

## II. LITERATURESURVEY

The advancement of modern technology has led to new innovations in the tourism sector called virtual traveling. The technology used is the internet, gadgets / computers, and virtual reality. The theoretical basis of this research is technological determinism, computer mediated communication (CMC), and visual culture. This study uses

a qualitative research approach with data collection methods through interviews, literature study, and documentation. This research focuses on the experiences gained by both tourists and travel agents from virtual traveling. These findings indicate that virtual traveling is a technological innovation in the tourism sector that provides users with a special experience, namely tourists in the form of virtual travel through virtual reality facilities. In addition, it encourages the formation of a new community of virtual traveling service users.

Several pieces of research have been done to develop an Earth Moon explorer such as D.A. Bowman [1], Chunli Wang [2], Saran. R [3], Katarina Damjanov, David Crouch [4], and Terasuci Salona1 Septia Winduwati1* [5].

Terasuci Salona1 Septia Winduwati1*. al [5] proposed a system that is in the tourism business sector, travel agents and tourism entrepreneurs have found an innovation in meeting the entertainment needs of their consumers in the PSBB situation. Enough with a gadget equipped with internet quota, visitors can enjoy online travel. With a variety of destinations and tourist destinations as well as cultural values that visitors can learn from, travel agents offer different offers.

D.A. Bowman [1] Presents a categorization of techniques for first-person motion control, or travel, through immersive virtual environments, as well as a framework for evaluating the quality of different techniques for specific virtual environment tasks. Results indicate that "pointing" techniques are

advantageous relative to "gaze-directed" steering techniques for a relative motion task, and that motion techniques which instantly teleport users to new locations are correlated with increased user disorientation.

In our system we addressed the problem focusing for the physically disabled person who cannot travel. By this application they can sit at home and explore the world. It also focuses on travelling, tourism and education purpose.

### III. PROBLEM STATEMENT

Our Problem statement is to Develop an application which can visualize Earth/Moon globe in virtual reality using a wearable mobile based headset (using Google Cardboard VR or similar technology).

Users should be able to select a location (e.g. peak of mount Everest) and explore the area in virtual reality in 3D as if he/she was present there.

### IV. OBJECTIVE

Our solution's objective is to create an application with the scope to provide a very immersive experience to everyone who wants to use it and especially people who have any kind of difficulty in traveling or can't travel due to any kind of problem.

We are focusing on providing a immersive experience with good graphics so that it looks interesting and anyone can enjoy it and feel the place from their home or anywhere also we want to cover multiple locations so there could be endless experiences for people in our application people can also experience the moon surface from very close and can feel like they are present there this could also be helpful for the people learning about the moon and want a closer peek of its surface and different sites present on the moon

### V. METHODOLOGY

This app has one interface which is only for the users. The whole application is supported in VR so you can control it from users' gaze. On the home screen you must select from two options which further provides multiple options to select new locations will be updated from developers' side on the cloud itself so that it can get reflected in the options in the application

### APPLICATION FLOW
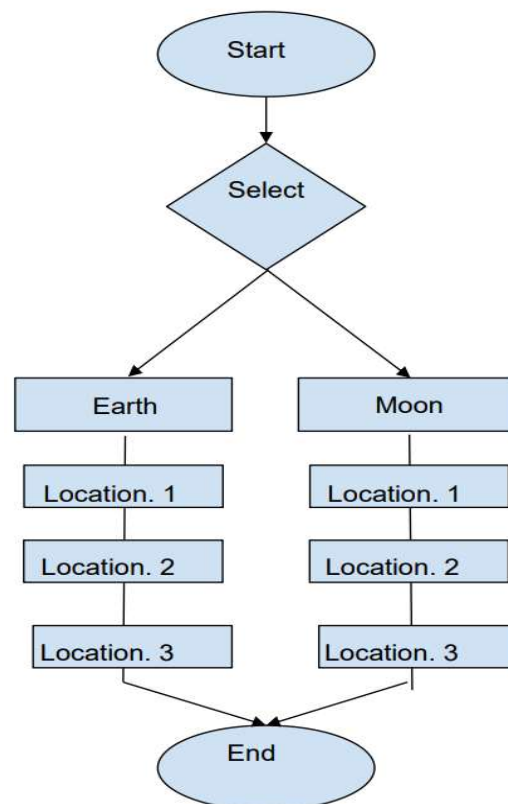


**The Actions required to use the application are:**

1. After starting the application User needs to select the category of location.
2. After selecting it they will find a subcategory to choose the desired location to visit it.
3. Now they can pan rotate and look in any direction to enjoy the view.
4. Now they can use the exit button to close the application.

## APPLICATION SCREENSHOTS

Since our project is made in unity it shows unity's splash screen until we use the Pro or enterprise version.

### Homepage

This screen shows the galaxy from where we can decide where to go on earth or on the moon.
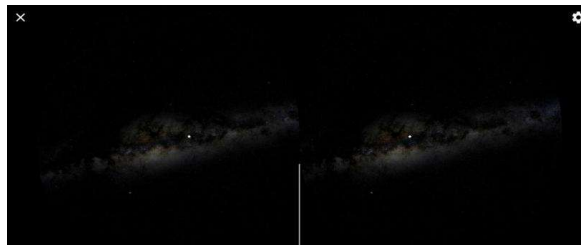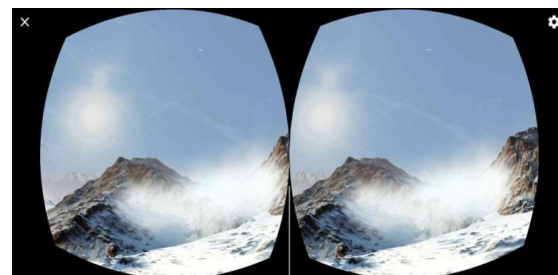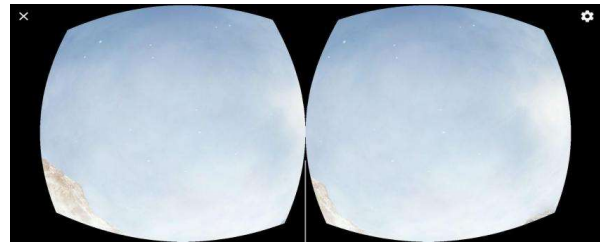




You can use touch as well as gaze to select.

For prototyping we used the location of mt. Everest.

Now selecting it will take the user on mt.



Everest.





## VI. SOFTWARE DESIGN AND IMPLEMENTATION

**The system is developed by using the following technologies.**

   a.   Unity (Game Engine)
   b.   C#
   c.   Blender
   d.   Height Mapper
   e.   Cloud-storage
   f.   Firebase

*The development of this application involved a series of phases.*

Firstly, we decided which location to create and collected images and information of the selected location. We created its 3D land using its height map using the GIS plugin in Blender and sometimes we used a Height Mapper.

Also, we created all the models required for the models in Blender and also, we imported some free models available on the internet to save time. In the second phase, we shifted our work in unity and exported all the models from blender to unity and designed the scene for the Location we selected and created the complete environment for it. We wrote a script for the HMD controller and imported the sdk for VR compatibility.

Added scripts for the movement of the head and selections of the scenes and location. We created a menu for a simple UI. Since the models consumed a lot of storage, we bundled them and uploaded them on the cloud and pleased an empty object as a substitute and loading script and models key to

load it from cloud so that it can be loaded only when the scene is opened to make the application light and smooth. In the fourth phase (testing phase), the work of each component of the application designed was tested and is integrated into a system. Finally, in the last phase (deployment phase), we deploy the application we developed.

## VII. CONCLUSION

The earth moon explorer is a VR based mobile application which can mainly focus on travelling, tourism, education purpose. It is a virtual reality-based project made using 3D modelling and animation. The technology used in this project are Unity mainly for animation, C# (programming language used in 3D modelling) and Blender (to make 3D models).

VR allows people to experience the world like they never have before. This project can help in saving travelling time. It leads to experience of VR in day-to-day life. The best part of it is, it can help the physically disabled person to explore who cannot travel the world. Virtual reality gives people the ability to go places across the world and outer space, from the South Pole to the Moon.

This capability is already being used in school to enrich lesson plans and is taking seniors' minds to places that their bodies won't allow them to go anymore. It turns out that adventure is just a VR headset away. As the famous saying goes, "no risk, no reward", but virtual reality could be changing that. People can ride roller coasters, go skydiving, and even bungee jump, all with VR. Virtual reality takes the risk of possible death due to injury out of the equation, while still providing the user with the adrenaline rush, they are seeking. the advancement of modern technology has led to new innovations in the tourism sector called virtual traveling. The technology used is the internet,

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