

# Department of Information Technology

## NBA Accredited

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UNIVERSITY OF MUMBAI

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A Project Report on  
**Campus Walk-through Using VR**

Submitted in partial fulfillment of the degree of  
Bachelor of Engineering(Sem-8)

in  
**INFORMATION TECHNOLOGY**

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# 1. Project Conception and Initiation

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# 1.1 Abstract

Virtual campus acts as an interactive walk-through application that is based on Virtual Reality. This paper explains all phases of building the virtual campus starting from requirement gathering to building the final application, which includes other phases such as modeling, texture mapping, and scripting. This Virtual Reality application can be used by the institute to introduce students, newcomers, to the campus with a Virtual Model of the college and make them familiar with the facilities available. It will provide a real-life walkthrough of the campus while being stationary with VR ready devices. It uses Blender for preparing 3d models, unity 3d to prepare the structural model, and adding user interaction to an application through scripts and Google VR plugins.

# 1.2 Objectives

- To provide an interactive walk-through of college.
- To provide users with an actual feel and experience as there are visiting the campus in real life.
- Displaying correct information about facilities and providing a navigation system to the user for efficient virtual roaming.
- Using teleporting technique for virtual roaming other than controllers to avoid motion sickness.

# 1.3 Literature Review

- Gilson Giraldi et al. (2016), This paper has represented the basics of virtual reality and describes its application, how to interact with 3D computer-generated worlds. Also discussed virtual reality applied to scientific, visualization, medicine, and engineering and main perspectives of virtual reality and presents various virtual reality devices like Head mounted Displays, VR glasses, Crystal Eyes, Data glove, Cyber puck, explain various VR system like Cave immerse Desk, Infinity wall, Collaboration VR system.
- Xue-qin Chang et al. (2016), This paper describes web 3d technology as a system based on virtual reality, which can be implemented by the method of system engineering design. This system is a simulation of real-life campus of college where students can attend class virtually, do activities and make friends. The teacher can take lectures, can review the work of students and also can take an online test.

- Jorge Martin Gutierrez et al. (2016), This Paper explains the various applications of virtual reality. It has explained how virtual reality can be implemented in various sectors like tourism, medicine, industry, video games, or education. As in educational institutions, virtual technology can benefit to teach content that is impossible to visualize in a physical classroom. It has also explained how these virtual technologies will break the boundaries of visualizing and implementation of formal education.
- Chris Christou (2015), This paper describes the key features of VR that allows multi-sensory interaction within the visualized space and explain the various technologies that can be used to visualize and provide interaction in the Virtual world.

# 1.4 Problem Definition

- To create a Virtual Reality application for the institute to introduce students newcomers to the institute with a Virtual Model of the college and make them familiar with the facilities available.
- To provide a real life walk-through of the campus while being stationary with VR ready devices.



## 1.5 Scope

If a student wishes to visit college to see the facilities during Pandemic, they would be unable to do so. They won't be able to experience anything on their own as a result of this. All of this will be possible with our system because the student will be able to take a virtual tour of the college.

# 1.6 Technology stack

## **Software Requirements:**

- Unity 3D
- Blender :-
  - Texture Mapping- UV Mapping
  - Rendering Engine- Eevee and Cycles

## **Hardware Requirements:**

- VR Headset
- VR Controllers

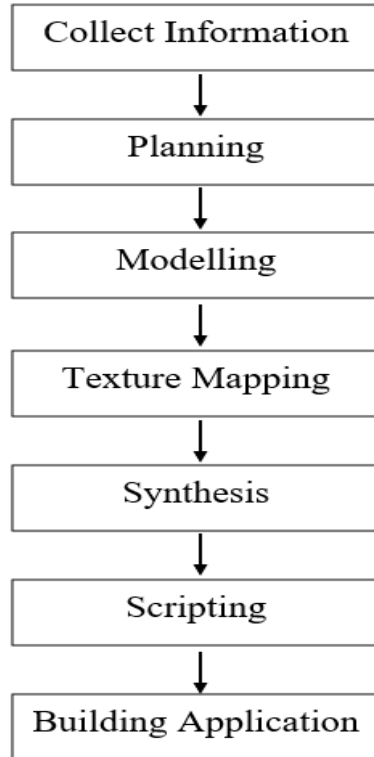
# 1.7 Benefits for environment & Society

- This Application can be used anywhere and anytime without the need of commuting to the actual place , thus saving energy and time.
- Also this can be beneficial for people willing to take admission in the college and getting to know the amenities during pandemic.
- A clear idea of the infrastructure can be obtained through virtual reality visualisation which would be helpful for infrastructure reference in the future.

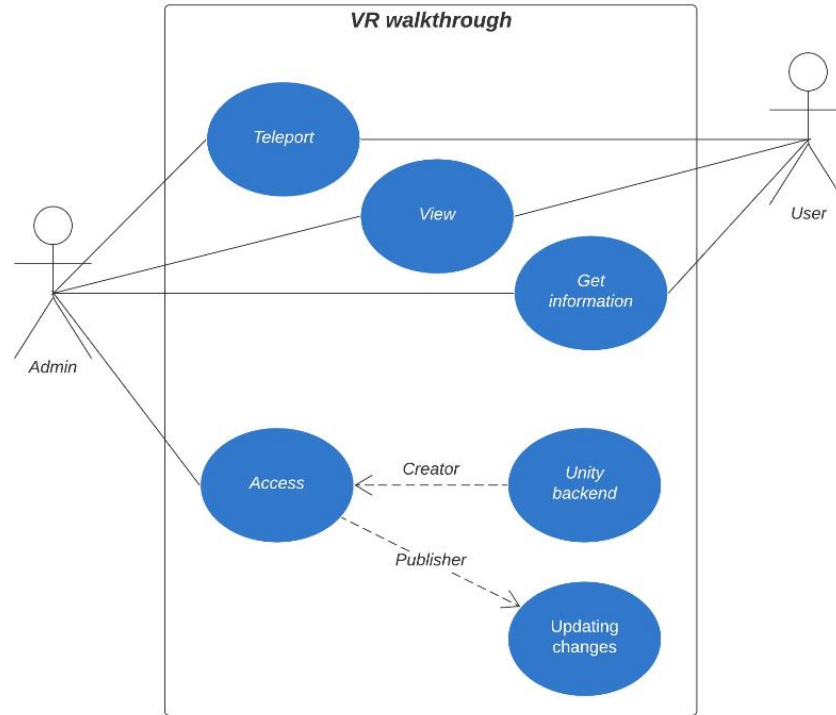
## 2. Project Design

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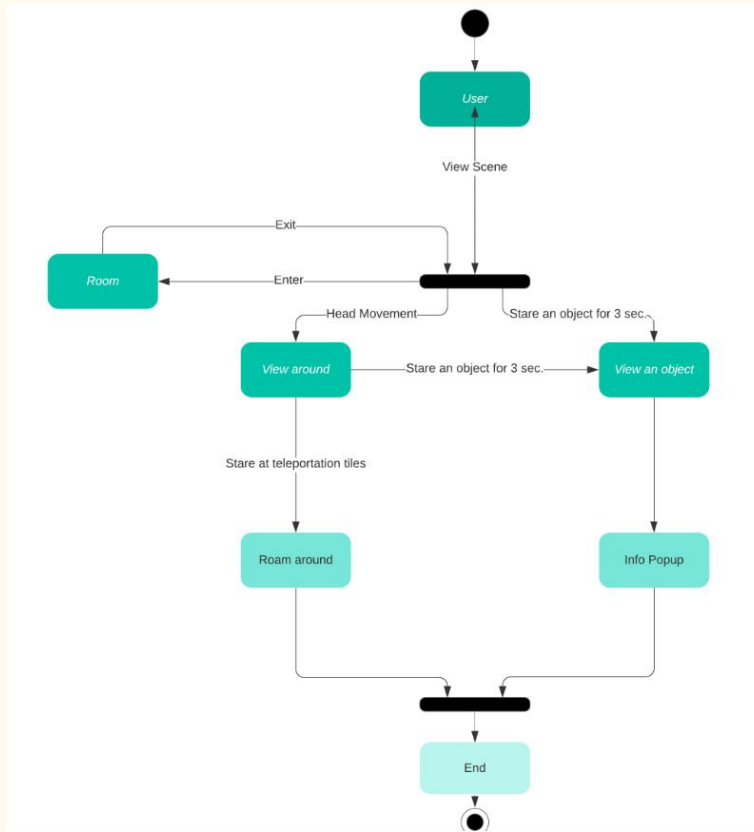
## 2.1 Design(Flow Of Modules)



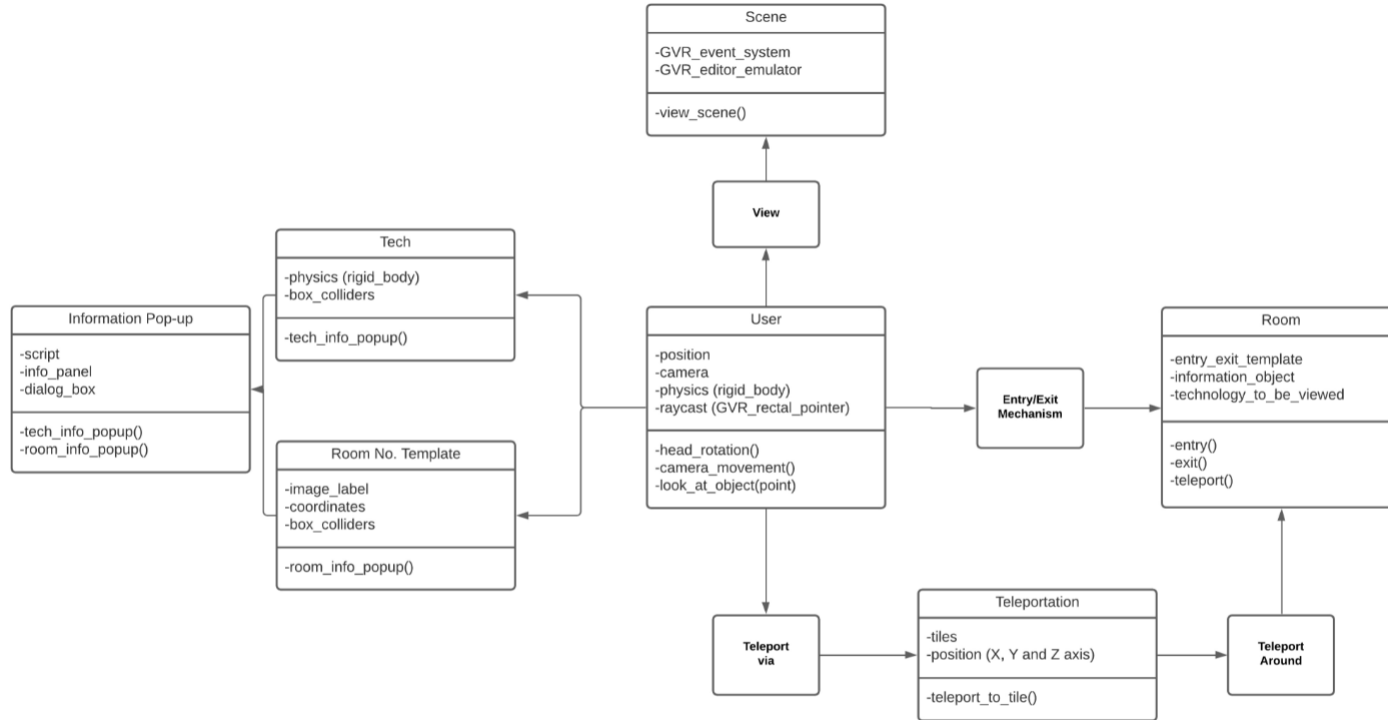
## 2.2 Use Case Diagram



## 2.3 Activity diagram



## 2.4 Class Diagram





# 3. Implementation

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- Head Movement.
- Teleporting.
- Specification of technology.
- Information of Room.
- Entry Exit Mechanism.
- VR Gaze.

# 4. Testing

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Test No.	Test Name	Expected Result	Actual Result
1.	Head movement	To look X-Y-Z Direction	Successful
2.	Head rotation	To move 360 degrees	Successful

Table 5.1: Test Case 1: Basic Functionalities

Test No.	Test Name	Expected Result	Actual Result
1.	App Scalability	Assets to be stored on cloud	Assets on collab cloud
2.	Load asset	Assets to be loaded for cloud	Assets on local machine
3.	Teleport	From Tile to Tile	Successful
4.	Tech info popup	In form of dialog box	Successful
5.	Room no info	In form of dialog box	Successful
6.	Entry/ Exit Room	By using door mechanism	By using teleportation

Table 5.2: Test Case 2: Main App Functionalities

Test No.	Test Name	Expected Result	Actual Result
1.	Detect tech object	Detect on Raycast	Successful
2.	Detect room no plate	Detect on Raycast	Successful
3.	Detect teleporting tiles	Detect on Raycast	Successful

Table 5.3: Test Case 3: Detection Functionalities

Test No.	Test Name	Expected Result	Actual Result
1.	Texture	To be loaded properly	Successful
2.	Info display canvas	In form of dialog box	Successful
3.	Gaze Pointer	Point of detection	Detecting object successfully

Table 5.4: Test Case 4: UI Functionalities

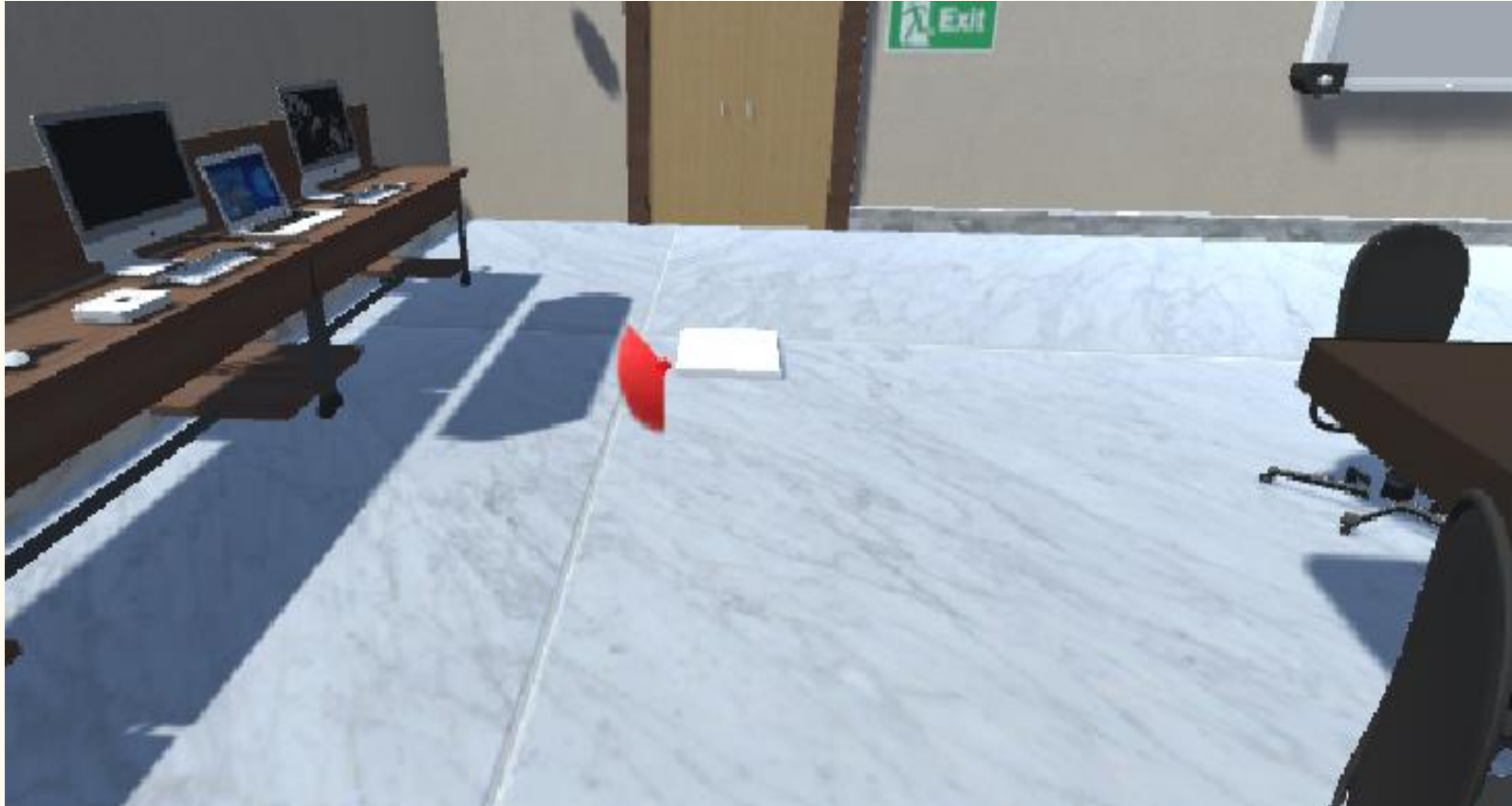
# 5. Result

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**Scene of room 317**



**Implemented the teleporting tiles to teleport around the scene to provide a real life walk-through.**





**Implemented the information panel popping up on seeing on a specific object in a scene.**



**Implemented the entry and exit mechanism to enter and exit a room in scene.**



## 6. Conclusion and Future Scope

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# Conclusion

By just sitting at one place in reality the user can have experience of virtual roaming through this VR application. This application has provided interactive walk-through through various interaction mechanisms which include teleporting technique for virtual roaming other than controllers to avoid motion sickness, displaying information on pointing to a particular object, entry and exit mechanism to enter and exit a particular room. Also learned modeling technologies like Blender and unity 3d and about various prefabs and scripts of Google VR plugins. Through this application, users can get information about the facilities provided by college and experience college campus as they are visiting it in real life.

# Future Scope

In addition to this, we can also add more features to our application like security in terms of authentication and we can also add an animation of tour guide which will guide us in our whole tour. An artificial intelligence system could also be implemented so if the user has some questions regarding college, it could be answered by this system.

# References

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# Paper Publication

We have submitted our paper in three conferences that is Springer ICTIS 2021, IEEE ICSCCC 2021, and Springer ICACDS 2021.



**Thank You**

