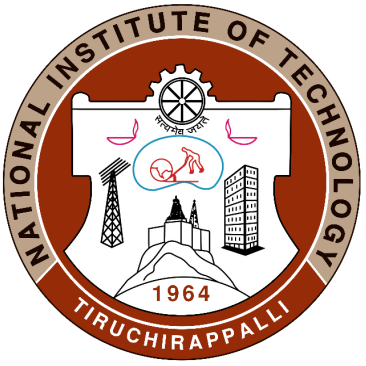

CSPE51

Augmented and Virtual Reality

Department of Computer Science and Engineering, Section A
National Institute of Technology, Tiruchirappalli

PROJECT REPORT

Virtual Reality Application on Real Estate

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BTECH Third Year, Semester V

PROBLEM STATEMENT

The Real Estate Industry is constantly evolving in the commercial landscape post-pandemic. With technology digitalising multiple sectors across the global market, the real estate process finds itself revolutionised to become more efficient and customer-centric. With virtual visits, improved accessibility through data analysis, and sustainable spaces as some of the trends shaping this sector, it is clear that Virtual and Augmented Reality applications play a significant role in this transformation. One of the many promising avenues for such applications, VR in Property Showcases and Listings aids clients in convenience and comfort and eases their experience in such a physically arduous, time-consuming and expensive process. With a particular emphasis on the 3 I's that govern any VR application - Imagination, Immersion and Interaction - we designed an Application to enhance the experience of Property and Interior Showcases.

DESIGN

The main design goal of this application is to reimagine both the ease and convenience of property viewings for both customers and owners. With an emphasis on immersion and interaction, the app provides a comprehensive, interactive and virtual walkthrough of the given residential complex and its interior. The application workflow can be broken down into:

a. Customers can walk on the residential building complex map in first-person view. As they come across buildings, they have the option to view the site's available listings and features.
b. Upon selecting the building to view, the features menu is displayed with sample images of the interior design and a button to view the interior in VR mode.
c. Customers can now view the interior of the available apartment as they would in real life with the aid of a first-person view.

By allowing users to choose where they wish to move within the property, a more interactive virtual tour is created and presented, thus increasing the efficiency of showing the property with added marketing benefits. Furthermore, since a person witnesses their possible house inside this virtual 3D tour, they start perceiving it as their own, thereby maximising the odds of a fruitful trade.

TOOLS USED

We constructed the application primarily using Blender (Geometry Nodes), Unity Photoshop, and C# Scripting.

a. **Blender** was used to make the map of the residential complex, i.e. the buildings, the interior design and the road, using geometry nodes from scratch.
b. **Unity** was used in constructing the app's UI and the virtual environment with the implementation of the first-person view and navigation across different scenes.
c. **Photoshop** was used to create assets for the various screens and UI elements etc., from scratch.
d. **C# Scripting,** in conjunction with Unity, was used to make all the functionalities for the environment objects.

LINK TO GITHUB REPOSITORY

ARVR-Project Github Repository

Instructions for Execution

a. git clone https://github.com/GauravN0910/ARVR-Project.git
b. Download Unity Version 2021.3.11f1
c. Open Project on Unity Hub
d. Run the Start Screen Scene.

DEMO VIDEO AND SAMPLE TEST CASE

a. Blender Asset Demo
   Group 19 - Blender
b. Unity Environment Demo
   Group 19 - Unity

DIFFERENCE FROM EXISTING APPS

Existing VR Property Showcase Apps rely on **guided visits** that resemble conventional promotional videos but are essentially fully virtual or in the form of 360-degree videos. Users only need to sit back and watch as they find themselves ushered through different parts of the building with the aid of audio or even visual commentary. As such, only a panoramic camera is required to capture the building without the need for programming or rendering of 3D assets and is, therefore, very easy to make. In contrast, our application focussed on **interactive visits** that let users have complete freedom of movement within the map and interaction with different elements of the environment. Creating such tours is arguably more complicated, with both sophisticated rendering of 3D objects and programming coming into play, which is compensated by the added appeal, efficiency, immersion and interaction for the clients and owners, buyers and sellers. Our app reduces this process's overall time-consuming and expensive nature for the customer. Additionally, real estate agents can showcase the interior and exterior designs, customising them according to their client's needs and hence improving the marketability of that particular apartment listing etc.

CONTRIBUTIONS

Gaurav Narayanan

Map/Environment Development, Implementing all Movement & Navigation functionalities using Unity and C# Scripting

Mercia Melvin Perinchery

Display Screens, Buttons and Navigation functionalities using Unity and C# Scripting

Nishith Eedula

Creating Blender Building & Interior assets (from scratch), Environment Detailing (shaders, materials, textures and shadows)