ARMULTIVERSE – AR APPLICATION FOR ARCHITECTS

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***Abstract*:**

In this paper, we present an augmented reality (AR) application for viewing 3D models of buildings under construction. ARMULTIVERSE is a mobile application to view the final construction output of a building under construction in an augmented 3D format. The application is designed to improve the visualization of building blueprints and 3D model viewers by allowing users to view the building in a more realistic and interactive way. The AR application uses a mobile device with a camera and sensors to overlay 3D models onto the real-world environment. The user can navigate around the construction site and view the building from different angles and distances. This technology has the potential to revolutionize the way architects, engineers, and builders communicate with each other and their clients.

Keywords—Augmented reality, 3D models, construction, visualization, mobile device

I. INTRODUCTION

The construction industry has traditionally relied on blueprints and 3D model viewers to visualize building designs. However, these methods have limitations when it comes to understanding how the building will look and function in the real world. Augmented reality (AR) is an emerging technology that can enhance the visualization of building designs by overlaying 3D models onto the real-world environment. This paper presents an AR application for viewing 3D models of buildings under construction. Use the enter key to start a new paragraph. The appropriate spacing and indent are automatically applied.

II. RELATED WORK

There have been several studies on the use of AR in construction. For example,

[1] Developed an AR system for improving the accuracy of construction layout.

[2] Proposed an AR-based system for visualizing construction progress.

[3] Developed an AR application for enhancing communication among architects, engineers, and builders. These studies have demonstrated the potential of AR technology in the construction industry.

III. AUGMENTED REALITY APPLICATION

The AR application developed in this study uses a mobile device with a camera and sensors to overlay 3D models onto the real-world environment. The user can navigate around the construction site and view the building from different angles and distances. The application allows the user to view

BLUEPRINT OF A CONSTRUCTION WORK VS 3D MODEL:

different stages of construction, from the foundation to the completed building. The user can also interact with the 3D models, such as changing the materials or colors of the building.

IV. ADVANTAGE OF AR APPLICATION

The AR application has several advantages over traditional 3D model viewers and blueprints. Firstly, it provides a more realistic and interactive representation of the building design. Users can view the building in the context of the real-world environment and get a better sense of how it will look and function once it is built. Secondly, the AR application can be used for on-site visualization, allowing architects, engineers, and builders to make real-time adjustments and improvements. This can save time and reduce errors in the construction process. Finally, the AR application can be used for client presentations, providing a more engaging and immersive experience for potential buyers or investors.

V. TECHNICAL CHALLENGES AND SOLUTIONS

`There are several technical challenges that need to be addressed in the development of an AR application for viewing 3D models of buildings under construction. These include accurate tracking of the user's position and orientation, seamless integration of the 3D model with the real-world environment, and efficient rendering of the 3D model on mobile devices. To overcome these challenges, the AR application uses advanced computer vision algorithms for tracking and registration, as well as optimized graphics rendering techniques for efficient display on mobile devices.

VI. FUTURE DIRECTIONS

The AR application presented in this paper is just the beginning of what is possible with AR technology in the construction industry. There are several potential directions for future research and development. For example, the application could be expanded to include additional features such as augmented reality annotations, real-time collaboration, and virtual reality simulations. Additionally, the application could be integrated with other technologies such as 3D printing and robotics to create a fully immersive and automated construction process.

VII. AR DEVELOPMENT TOOL

A. Unity Game engine

The AR application presented in this paper has been developed using the Unity game engine. Unity is a popular cross-platform game engine that is widely used for developing AR and VR applications. It provides a powerful and flexible development environment, with a range of tools and features for creating immersive and interactive experiences.

B. Unity AR foundation

Unity's AR Foundation is a suite of tools and features that enable developers to create AR applications for a range of platforms, including iOS and Android. AR Foundation provides a unified API for accessing AR features such as camera input, plane detection, and object tracking, making it easier for developers to create cross-platform AR applications.

VIII. UNITY AR DEVELOPMENT

A. Advantage of unity AR development

Unity is an ideal platform for developing AR applications for several reasons. Firstly, it provides a range of tools and features that are specifically designed for AR development, such as AR Foundation and the graphics pipeline. This can save time and reduce the need for custom development. Secondly, Unity is a cross-platform engine, which means that applications can be easily ported to multiple platforms, including iOS and Android. Finally, the asset store provides a wealth of resources for developers, enabling them to create high-quality AR applications more efficiently.

UPCOMING FEATURE [ON DEVELOPMENT]

In addition to the standard features of an AR application for viewing 3D models of buildings under construction, the application presented in this paper also includes a measuring tape feature. This feature allows users to measure distances and dimensions in real-world units, providing a useful tool for on-site measurement and analysis. This feature is in development stage and will be added to the final product.

B. Future of unity AR development

Unity is constantly evolving, with new features and tools being added all the time. There are several potential directions for future research and development in the area of

Unity and AR development. For example, Unity could be further optimized for mobile devices, improving performance and reducing battery consumption. Additionally, new features could be added to AR Foundation, such as support for hand tracking or object recognition.

IX. CONCLUSION

In conclusion, the use of Unity in the development of the AR application presented in this paper provides a range of advantages, including access to powerful tools and features, cross-platform compatibility, and a wealth of resources through the asset store. Although there are still technical challenges to be addressed, the potential benefits of Unity and AR technology in the construction industry are significant, and there are several exciting directions for future research and development.

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