VR–Based Architectural Visualization for Residential Villa Design

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Abstract

This paper presents a virtual reality (VR) system developed to visualize the architectural and interior design of a residential villa using an immersive 3D environment. The system enables users to explore the villa's exterior and interior spaces interactively, supporting realistic navigation, object interaction, and enhanced spatial perception. Architectural plans were converted into a 3D model and implemented in Unity, with C# scripts controlling movement, object behavior, lighting, and environmental elements to create a coherent virtual experience. The solution allows architects, clients, and designers to evaluate space layout, aesthetics, and functional flow before construction, reducing design errors and improving decision-making. Results demonstrate that VR provides a more intuitive understanding of architectural design compared to traditional 2D drawings or static 3D renders, offering a powerful tool for modern architectural visualization.

Keywords

Virtual Reality, Architectural Visualization, Unity 3D, Villa Design, 3D Modeling, Interactive Environments, Immersive Simulation.