Research on 3D modeling techniques for creating interactive 3D web applications

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Abstract: This study investigates techniques for constructing 3D models and developing interactive 3D web environments. The research addresses the growing demand for immersive online experiences by exploring the complete pipeline from model creation to web deployment. A methodology is proposed that integrates photogrammetry and manual modeling using Blender to generate high-fidelity 3D assets, optimized for real-time rendering. These assets are then exported and integrated into a web-based platform using the Three.js library, enabling interactive manipulation, rotation, and user-driven navigation directly within a standard browser. The study evaluates the effectiveness of this workflow through a case study, assessing model fidelity, loading performance, and user interaction responsiveness. Results demonstrate that the proposed technique successfully balances visual quality with web performance constraints, producing functional interactive 3D scenes without requiring proprietary plugins. This research contributes a practical framework for developers and designers seeking to implement accessible 3D visualization on the web, with potential applications in e-commerce, education, and digital heritage preservation.

Keywords: 3D modeling, Web3D, interactive web, 3D reconstruction