



VRCopilot: Authoring 3D Layouts with Generative Models in VR

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Category

Software

Software & Content

MOSS - Michigan Open Source Support

Accessible Technologies/Blind Accessibility

Accessible Technologies/Motor Accessibility

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OVERVIEW

VRCopilot is a virtual reality (VR) authoring system that combines generative AI models and intuitive spatial interfaces, enabling rapid, creative design of 3D layouts.

- **Core Features:** Offers multimodal creation (natural language + direct manipulation) and intermediate representations to facilitate seamless human-AI collaboration in 3D design.
- **Market Opportunity:** Reduces manual labor and technical barriers, empowering architects, game developers, and interior designers to quickly generate diverse, high-quality layouts in VR.

BACKGROUND

Designing 3D spaces is crucial in industries like architecture, gaming, and education, driving innovation and immersive experiences globally. Current VR authoring tools rely heavily on the manual placement of 3D models—a process that is time-consuming, limits creative exploration, and requires technical expertise. With the rise of generative AI (e.g., models that generate text, images, music, and now 3D layouts), there is growing interest in automating and enhancing digital content creation. Despite progress, most generative AI tools still operate on traditional 2D screens, and few enable effective co-creation in immersive VR environments. This gap represents a substantial market opportunity, as trends point toward increasingly immersive workflows, demand for faster iteration, and democratization of design through easier-to-use tools.

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INNOVATION

VRCopilot transforms immersive 3D design by integrating generative AI directly into VR, allowing users to create room layouts with both hands-on spatial manipulation and spoken instructions. Unlike traditional tools, VRCopilot analyzes the designer's progress and suggests smart scene completions and alternatives, which the user can select, modify, or reject. Its multimodal approach combines pointing, dragging, and natural language for granular control—users can, for example, verbally request a “minimalist wooden chair” while pointing to its location. For structured planning, users can prepare wireframe-like intermediate representations (“boxes” labeled as ‘bed’, ‘table’, etc.), laying out the skeleton of a space before requesting detailed AI-driven completion. VRCopilot's human-AI co-creation empowers users to generate more diverse, functional designs with lower effort and increased creativity, overcoming the bottlenecks of tedious manual placement, limited idea exploration, and steep learning curves of legacy design tools.

ADDITIONAL INFORMATION

DEPARTMENT/LAB: [Computer Science and Engineering/ Anhong Guo](#)