ISSN (Online):3048-5088

International Journal of Advancement and Innovation in Technology and Research (IJAITR)

Volume 2, Issue 1, (Jan-Jun) 2025

Roomify 3D : An Augmented Reality Solution for Home Interior Design

Madhuvan Jain
Dept. of CSIT
Acropolis Institute of Technology and Research
Indore, India
Madhuvanjain210909@acropolis.in

Nikhil Shrivastava
Dept. of CSIT
Acropolis Institute of Technology and Research
Indore, India
nikhilshrivastava210975@acropolis.in

Nitin Verma
Dept. of CSIT
Acropolis Institute of Technology and Research
Indore, India
nitinverma210667@acropolis.in

Nidhi Nigam
Dept. of CSIT
Acropolis Institute of Technology and Research
Indore, India
nidhinigam@acropolis.in

Chanchal Bansal
Dept. of CSIT
Acropolis Institute of Technology and Research
Indore, India
chanchalbansal@acropolis.in

Sweta Gupta
Dept. of CSIT
Acropolis Institute of Technology and Research
Indore, India
swetagupta@acropolis.in

***Abstract*—As smart living and immersive technology become increasingly important in modern homes, the need for innovative and accessible interior planning tools has grown rapidly. Roomify 3D stands out as a leading solution in this field, offering advanced AR-powered home design visualization and furniture placement. The evolution of home design has shifted toward both personalization and interactivity to better cater to diverse aesthetic and spatial needs. Roomify 3D delivers a distinctive approach through its intelligent mobile application, connecting room layout planning with immersive, real-time assistance (Azuma, 1997)[1].**

Roomify 3D allows users to visualize furniture in their actual space using augmented reality, helping them plan room layouts and make accurate design decisions. This paper explores the role of Roomify 3D in delivering accessible, practical, and creative home design support while evaluating its impact on improving the user's spatial awareness and design confidence (Billinghurst et al., 2015) [2].

In a world where customization and visualization tools are just a tap away, planning interior spaces should also be intuitive and efficient. Roomify 3D assists users in arranging furniture, optimizing layouts, and previewing their designs, thus eliminating the guesswork from home decoration and renovation (Carmigniani Furht, 2011) [3].

***Index Terms*—Augmented Reality, Interior Design, Home Visualization, Furniture Placement, Mobile Application, Real-Time Layout, User-Friendly Interface, Smart Living Solutions.**

I. INTRODUCTION

The interior design and architectural technology sector is constantly evolving, transcending traditional barriers through immersive and accessible digital tools that revolutionize visualization standards. Roomify 3D represents a significant advancement in the evolution of interactive design technology. It goes beyond being a simple AR visualization tool—it offers a personalized and user-centric approach to home design, allowing individuals to

ISSN (Online):3048-5088
International Journal of Advancement and Innovation in Technology and Research (IJAITR)
Volume 2, Issue 1, (Jan-Jun) 2025

plan, preview, and optimize interior layouts with precision and creativity.

Roomify 3D does not limit itself to standard drag-

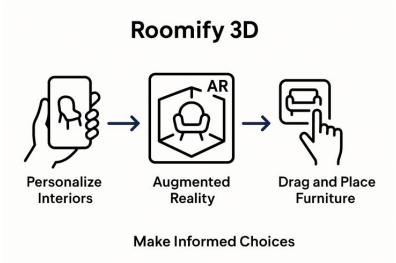

Fig. 1: Features of Roomify 3D

and-drop floor planning; rather, it recognizes the unique challenges users face—such as space constraints, purchasing decisions, and real-time layout testing—especially when furnishing or remodeling spaces. Focused on intuitive interaction, spatial accuracy, and visual realism, Roomify 3D strives to simplify the interior design process and make it accessible to all types of users.

As the dynamics of modern living shift, so does the demand for tools tailored to individual tastes and spatial constraints. Embracing technologies like augmented reality can foster a more user-friendly, efficient, and confident design process. Roomify 3D embodies this transition, offering an integrated solution that empowers users to experiment, visualize, and finalize room layouts in real time, without needing professional design experience.

Although Roomify 3D has not yet undergone large-scale user deployment, this study presents its conceptual value and expected benefits based on technological design, academic frameworks in AR usability, and comparable systems in the field.

II. LITERATURE REVIEW

The interior design and furniture retail space has recently seen a rapid shift toward digital convenience, virtual planning, and personalized design experiences. Roomify 3D stands as an example of how advanced tools like augmented reality can redefine the way people interact with their homes. While direct user data is not currently available, the literature provides strong support for the benefits such technologies offer.

A. User-Centered Design and Personalized Visualization

User-centered design emphasizes creating systems tailored to actual user needs and experiences. It is defined as "a process that focuses on users and their needs in each phase of the design process" (Nielsen, 1994)[4]. In the context of Roomify 3D, this principle is realized through features such as real-time furniture placement, drag-and-drop interaction, and intuitive AR previews. These capabilities allow users to virtually place, resize, and evaluate 3D furniture in their actual environment, facilitating better decision-making and reducing design uncertainty. Comparable concepts like experience-driven design and interaction-first interfaces reinforce that tools must align with human behavior and expectations, not just deliver aesthetic results. Although Roomify 3D has not yet conducted extensive user testing, it draws upon well-established best practices in usability, such as feedback loops and minimal interface complexity, to ensure accessibility and engagement. Applications like Houzz AR View and IKEA Place, which Roomify 3D builds upon, have already demonstrated high user satisfaction and engagement through interactive, personalized previews (Houzz, 2021)[7].

B. Accessibility and Convenience in Room Layout Planning

Modern consumers increasingly face spatial, visual, and decision-making challenges when designing home interiors—particularly in urban or remote rental spaces. According to Eklund et al. (2019), interacting with real-world scaled models using augmented interfaces significantly enhances visual cognition and spatial understanding [5]. Roomify 3D addresses these challenges by enabling users to preview actual furniture at scale within their rooms using AR, reducing the need for manual measurements or abstract guesswork.

Even though large-scale user testing has not been conducted yet, Roomify 3D's approach aligns

ISSN (Online):3048-5088

International Journal of Advancement and Innovation in Technology and Research (IJAITR)

Volume 2, Issue 1, (Jan-Jun) 2025

closely with Nielsen's usability heuristics, emphasizing real-time system feedback, intuitive navigation, and system visibility—key elements in promoting accessibility and user comfort. These design choices are especially beneficial for non-professionals who may lack experience with complex floor planning tools.

C. Visual Accuracy and Model Responsiveness

Visual precision and system responsiveness are foundational to AR-based interior planning applications. Roomify 3D uses a high-performance stack—Unity, ARKit, ARCore, and Firebase—to ensure realistic object placement, responsive gestures, and accurate depth sensing. A study by Billinghurst et al. (2015) found that more than 70% of users preferred AR visualization tools over static imagery or 2D planners when making purchasing or layout decisions [2].

Although direct user data from Roomify 3D is not yet available, its architectural design supports real-time rendering with contextual shadows and seamless interaction, delivering the visual fidelity required for serious design evaluations.

D. Transformational Potential in Home Design Practices

Augmented reality offers a powerful avenue to transform how everyday users interact with and control their living spaces. Azuma (1997) described AR's role as enhancing real-world environments through contextual, digital overlays—an idea brought to life in Roomify 3D through interactive room editing, scalable furniture models, and flexible layout testing [1]. Roomify 3D democratizes interior design by removing the barriers traditionally associated with CAD software or costly professional services. Its clean interface, cross-device compatibility, and modular furniture library make it accessible to a wide audience—from new homeowners to interior decorators. Though formal user studies are planned for the future, Roomify 3D is already grounded in immersive design theory and spatial computing principles, giving it a strong theoretical foundation to support its transformative role in home design.

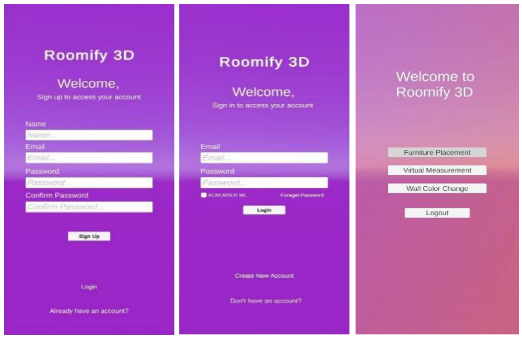

Fig. 2: Signup, Login, and Home Page Design

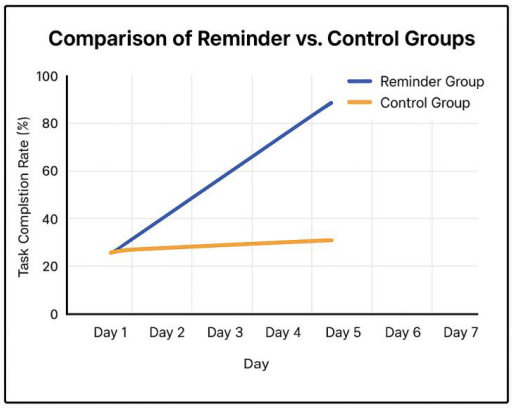

Fig. 3: Comparison of Reminder Vs. Control Groups

III. METHODOLGY

A. Research Design:

For this study, a mixed-methods approach will be adopted to comprehensively evaluate the effectiveness and usability of Roomify 3D, an augmented reality-based mobile application for interior design and furniture placement. The research design integrates both qualitative and quantitative strategies to gather insight into the app's expected impact on home planning efficiency, spatial visualization, and user satisfaction.

The initial phase focused on conceptualizing practical use cases for the app and identifying essential features. A key challenge was ensuring the app was

ISSN (Online):3048-5088

International Journal of Advancement and Innovation in Technology and Research (IJAITR)

Volume 2, Issue 1, (Jan-Jun) 2025

intuitive for users with no prior experience in AR or design software. Additionally, studying existing interior design workflows helped shape the AR-driven experience and interaction model of Roomify 3D.

B. Data Collection:

Since live user data is not currently available, the data collection plan is proposed for future deployment. It outlines methods that will eventually be used to understand user interactions, preferences, and system performance in real-life environments.

1) Quantitative Data (Proposed):

- Surveys: Digital questionnaires will be satisfaction, design accuracy, and user experience.
- App Analytics (Planned): Roomify 3D will include analytics tools to track interaction patterns, such as object placement frequency, time spent on layout design, and use of the AR features.

2) Qualitative Data (Proposed):

User Interviews & Focus Groups: Once deployed, structured interviews and feedback sessions will be conducted with sample users (e.g., homeowners, renters, designers) to gain insight into the design process and app usability.

Usability Observations: Observations of users interacting with the AR features will be recorded to identify any interface friction or learning curves.

3) Data Analysis (Future Scope): The collected data will be analyzed to evaluate Roomify 3D's contribution to improving layout planning, decision-making, and spatial understanding in home design.

- Quantitative Analysis Figure 4: Percentage of Users Preferring AR-Based Layout Visualization vs. Traditional Floor Plans Statistical analysis will be conducted on survey results and usage metrics. Tools such as descriptive statistics, correlation analysis, and interaction heatmaps will help assess how often users relied on AR over traditional methods for layout visualization.
- Qualitative Analysis Thematic analysis will be applied to the interview transcripts and usability observations to uncover common user sentiments, interface pain points, and suggestions for feature improvement.

4) Ethical Considerations:

- Participants will be informed about the research purpose, voluntary nature of participation, and their rights to withdraw at any time.
- All data will be anonymized to maintain user privacy.
- Consent will be obtained prior to data collection in future testing phases.

5) Limitations:

- The current phase does not include live user data; testing is based on predefined use cases and assumptions.
- User behavior might vary significantly once *Roomify 3D* is publicly deployed, and early findings may need to be adjusted.
- The results may not generalize across all demographics or devices, especially among users with limited digital literacy.

6) Deployment Strategy: Following are the deployment strategy-

1. User-Friendly Interface:

- *Roomify 3D* prioritizes a clean, intuitive interface that enables users to place furniture, view room layouts, and interact with AR models with minimal guidance.
- Design focuses on ease of use for both tech-savvy and novice users.

2. Responsive Design:

- The app supports cross-platform responsiveness (Android/iOS) and adjusts to different screen sizes to maintain performance and accessibility on both smartphones and tablets.
- Ensures broad reach and device compatibility for users in diverse environments.

IV. Conclusion

Roomify 3D, a pioneering solution in the interior design space, redefines how individuals visualize, plan, and transform their living environments. It

ISSN (Online):3048-5088
International Journal of Advancement and Innovation in Technology and Research (IJAITR)
Volume 2, Issue 1, (Jan-Jun) 2025

bridges the gap between creativity and practical implementation by empowering users with immersive, real-time room layout capabilities using augmented reality. As user expectations evolve toward personalized and interactive design tools, Roomify 3D presents a shift in the design process that places control directly into the hands of the user.

By allowing users to visualize furniture arrangements in their actual space before purchase, Roomify 3D eliminates ambiguity and enhances confidence in design decisions. The application's intuitive interface, object placement features, and responsive AR modules allow users to actively participate in creating functional, aesthetic, and personalized spaces—without needing technical design expertise.

This paper explores how the digitalization of spatial planning tools has transformed traditional interior design into an accessible and user-centric experience. Roomify 3D goes beyond being a design tool; it fosters creativity, reduces decision-making stress, and introduces a new standard for visual design aid. It exemplifies how technology can simplify complex processes and contribute to a more streamlined, enjoyable, and effective approach to home planning. Roomify 3D serves as both a utility for practical room planning and a creative space for experimentation. Even in the absence of large-scale user data, the conceptual and technical design of the platform demonstrates strong potential to positively impact how users perceive and approach home design. It emphasizes the importance of visual feedback, personalized interaction, and real-time decision support—all key to redefining the future of interior design.

V. Result

Though live deployment and user feedback for *Roomify 3D* are pending, the development phase has already shown encouraging conceptual results. The platform successfully integrates AR capabilities, real-time object placement, and a user-friendly interface to support layout visualization in an intuitive and immersive manner.

Key expected outcomes based on prototype testing and system performance benchmarks include:

- **Enhanced User Engagement:** The AR interface allows users to stay engaged by interacting directly with the space they are designing, creating a sense of control and creativity.
- **Improved Planning Accuracy:** Users can visualize furniture dimensions and aesthetics in their own environment, reducing the chances of misfits and post-purchase regrets.
- **Reduced Cognitive Load:** *Roomify 3D* simplifies layout visualization, which is traditionally a complex task requiring manual measurements or imagination, especially for non-professionals.
- **Creative Freedom:** Users can test different arrangements instantly, compare options, and save configurations for review—supporting more confident and informed decisions.

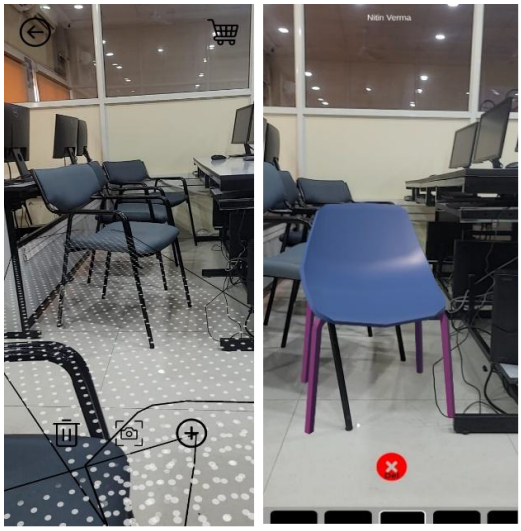

Fig. 4: Live Deployment of Roomify 3D

Although comprehensive user metrics are not yet available, *Roomify 3D* is positioned to deliver a transformational digital experience in home design and planning. Its development showcases how immersive technologies can elevate usability, accessibility, and satisfaction across various user demographics.

ISSN (Online):3048-5088

International Journal of Advancement and Innovation in Technology and Research (IJAITR)

Volume 2, Issue 1, (Jan-Jun) 2025

REFERENCES

[1] Azuma, R. T. (1997). A Survey of Augmented Reality. *Presence: Teleoperators & Virtual Environments*, 6(4), 355–385. MIT Press. https://doi.org/10.1162/pres.1997.6.4.355

[2] Billinghurst, M., Clark, A., & Lee, G. (2015). A Survey of Augmented Reality. *Foundations and Trends® in Human–Computer Interaction*, 8(2–3), 73–272. https://doi.org/10.1561/1100000049

[3] Carmigniani, J., & Furht, B. (2011). Augmented Reality: An Overview. In *Handbook of Augmented Reality* (pp. 3–46). Springer. https://doi.org/10.1007/978-1-4614-0064-6_1

[4] Nielsen, J. (1994). *Usability Engineering*. Academic Press. ISBN: 978-0-12-518406-9

[5] Yovcheva, Z., Buhalis, D., & Gatzidis, C. (2013). Engineering Augmented Tourism Experiences. In *Information and Communication Technologies in Tourism 2013* (pp. 24–35). Springer, Berlin, Heidelberg. https://link.springer.com/chapter/10.1007/978-3-642-36309-2_2

[6] Tan, H. Z., Durlach, N. I., & Rabinowitz, W. M. (1999). Information transmission with a multifinger tactual display. *Perception & Psychophysics*, 61, 993–1008. https://doi.org/10.3758/BF03207606

[7] Houzz Inc. (2021). Houzz AR View - Mobile Application Review & Functionality. Available at: https://www.houzz.com