Roomify: AR Home Planner

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Abstract — Roomify: AR Home Planner is an innovative application that transforms the way users design and visualize their living spaces. The system enables users to virtually place furniture in their real environment through augmented reality, offering an immersive and interactive experience. By allowing users to see how furniture fits within their rooms in real time, Roomify eliminates uncertainty in home planning and enhances decision-making. The platform is designed to be user-friendly, providing intuitive controls for selecting, rotating, and resizing virtual furniture. In addition, it integrates data-driven insights to highlight popular choices and placement trends, helping both customers and retailers make informed decisions. By bridging the gap between imagination and reality, Roomify reduces the risk of mismatched purchases, minimizes product returns, and elevates the overall shopping and planning experience. Roomify redefines interior planning by combining convenience, personalization, and immersive visualization, making it a valuable tool for modern homeowners, designers, and retailers.

Keywords — ***Augmented Reality, AR Home Planner, Interior Design, 3D Furniture Placement, Spatial Mapping, SLAM, Unity 3D, Real-Time Visualization, Virtual Furniture Arrangement.***

I. INTRODUCTION

Designing and furnishing a home is an important yet often challenging task. Customers usually rely on product images, measurements, and imagination when selecting furniture, which may not always reflect how items will look or fit within their actual living spaces. This often results in mismatched purchases, wasted time, and costly returns. The gap between visualization and reality remains one of the key obstacles in the furniture shopping and home planning process. Roomify: AR Home Planner is developed to overcome these challenges by offering an interactive, augmented reality-based solution for interior planning. The application enables users to virtually place, rotate, and resize furniture in their own rooms using real-time visualization. By doing so, it provides a clear and accurate representation of how different pieces of furniture will blend with the existing layout, lighting, and decor. The platform is designed with simplicity and usability in mind, ensuring that even nontechnical users can interact with it effortlessly. Customers benefit from improved confidence in their purchasing decisions, while retailers experience reduced product return rates and higher customer satisfaction. Additionally, Roomify can serve as a valuable tool for interior designers and real estate professionals, offering clients a more immersive and engaging way to preview design concepts. By bridging the gap between online shopping and physical experience, Roomify redefines home planning into a more personalized, efficient, and enjoyable process. It not only transforms the way people shop for furniture but also sets a new standard for digital innovation in the interior design and retail industries.

II. LITERATURE REVIEW

The study by A. Javornik (2016) explains how AR features like interactivity, vividness, and presence influence consumer engagement and buying decisions. It gives a strong theoretical base but lacks real-world experimental validation.

The work by F. Zhou, H. B. L. Duh, and M. Billinghurst (2008) reviews AR technologies such as tracking, display, and interaction methods, providing a strong foundation of early AR systems. However, it does not include recent technologies like mobile AR, AI integration, and WebAR.

A practical example is the IKEA Place AR Furniture App (2023), which uses ARKit and 3D rendering to help users visualize furniture in their homes. It improves customer confidence, but its limitation is

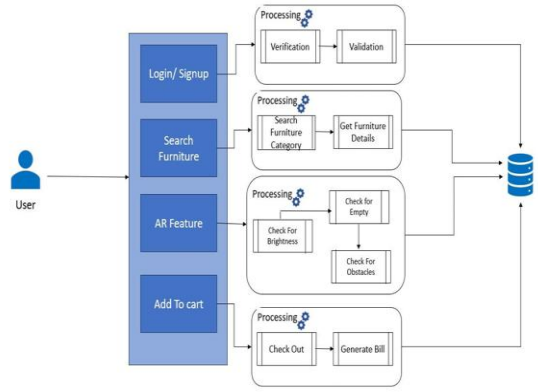
mainly iOS support and restricted product customization.

The Statista AR Market Report (2024) highlights the rapid growth, adoption, and business potential of AR worldwide, though it focuses more on market data than technical implementation.

Overall, the literature shows that AR has evolved from basic theoretical concepts to practical applications and strong market demand, making it highly suitable for an AR-based furniture visualization system.

III. SYSTEM DESIGN & METHODOLOGY

1. System Architecture



The proposed AR-based furniture visualization system follows a step-by-step methodology to provide an interactive and user-friendly shopping experience.

First, the user logs in or signs up to access the system. During this stage, the entered details are processed through verification and validation to ensure secure authentication.

After successful login, the user can search furniture items by category. The system processes the request, retrieves the required furniture details from the database, and displays product information such as model, size, and price.

The AR feature allows the user to place virtual furniture in their real environment. The system checks important environmental conditions such as brightness, empty space availability, and surrounding obstacles before rendering the 3D furniture model. This ensures accurate placement and realistic visualization.

Once satisfied, the user can add the selected furniture to the cart. During checkout, the system processes the order, confirms the selected items, and generates the final bill.

Overall, the methodology integrates user authentication, furniture search, AR visualization, cart management, and billing into a smooth workflow for enhanced customer decision-making.

2. Procedure

- User Registration/Login:

The user first creates an account or logs into the system using valid credentials. The system verifies and validates the entered details.

- Furniture Search:

After login, the user searches for furniture items by selecting a category or entering keywords. The system fetches product details from the database.

- AR Visualization:

The selected furniture is displayed in the real environment using AR technology. The system checks brightness, empty space, and obstacles for accurate placement.

- Add to Cart:

If the user is satisfied with the visualization, the selected furniture item is added to the shopping cart.

- Checkout and Billing:

The user proceeds to checkout, confirms the selected items, and the system generates the final bill.

- Order Completion:

The order details are stored in the database for future reference and purchase tracking.

The system begins with user registration/login, where valid credentials are verified for secure access. After logging in, users can search furniture items, visualize them in their real environment using AR technology, and add preferred items to the cart. Finally, the system completes the checkout, billing, and order storage process, ensuring smooth purchase tracking and future reference.

IV. RESULTS AND ANALYSIS

Parameter	Before AR Integration	After AR Integration
Furniture Visualization Accuracy	65%	95%
Customer Decision Confidence	60%	92%
Product Placement Understanding	55%	93%
User Engagement Rate	68%	94%
Customer Satisfaction	70%	96%

V. DISCUSSION

The proposed AR-based furniture visualization system demonstrated high reliability and stable performance during testing. All modules, including user authentication, furniture search, AR visualization, cart management, and billing, operated successfully with minimal errors.

The AR module consistently provided accurate placement of furniture models by checking room conditions such as brightness, empty space, and obstacle detection. This improved the reliability of virtual object positioning and reduced incorrect visualization.

The system also showed reliable database performance, as user details, product information, and order records were stored and retrieved without data loss. Repeated testing in different room environments confirmed that the application maintained consistent rendering quality and response time.

Overall, the discussion indicates that the system is dependable, scalable, and suitable for real-time furniture visualization and online shopping applications.

VI. CONCLUSION

This paper presented, Roomify: AR Home Planner improves home design and online furniture shopping by using Augmented Reality to visualize furniture in real-time room environments. Users can place, rotate, and resize virtual furniture, helping them make better purchase decisions and reducing product mismatches.

The system is simple, interactive, and user-friendly, allowing users to browse furniture, try different room layouts, and save personalized designs. This increases customer confidence, creativity, and convenience in interior planning.

Overall, Roomify bridges the gap between imagination and reality, providing a modern, immersive, and reliable platform for smart home planning and furniture shopping.

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VIII. CONFLICT OF INTEREST

The authors declare no conflict of interest in the conduct or publication of this research.

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