IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Realar: Integrating Augmented Reality And 3D Models For Real Estate Platforms

[1]Dhruvesh Patel, [2]Dhruv Chaudhary, [3]Tanishq Kelvalkar,

[1]Student, [2]Student, [3]Student

[1]Department of Computer Engineering,

[1]Atharva College of Engineering, Mumbai, India

Abstract: This research paper explores the development, functionality, and impact of RealAR, an advanced real estate platform integrating 3D model visualization and augmented reality (AR) to enhance property showcasing and buyer engagement. The study adopts a user-centered approach, combining quantitative analysis of user interactions with qualitative evaluation of the platform's AR capabilities, interactive UI, and real-time communication features. Through systematic evaluation, the research assesses the effectiveness of 3D model-based property exploration, real-time chat functionalities, and advanced filtering mechanisms in improving user decision-making and engagement. The findings underscore the importance of integrating WebAR, dynamic property listings, and real-time interaction in creating an immersive and informed propertybuying experience. Additionally, the paper examines the implications of interactive 360-degree views, AI-powered recommendations, and seamless navigation on user satisfaction and adoption rates. Keywords—Trading, Market, Educative

Index Terms **- Component, formatting, style, styling, insert.**

I. INTRODUCTION

The real estate market is evolving rapidly, and leveraging cuttingedge technology is essential for a seamless property-buying experience. In response to this need, we are excited to introduce RealAR, a next-generation platform that revolutionizes property exploration through 3D visualization and augmented reality (AR).

RealAR transforms the way buyers and sellers interact with real estate by integrating immersive 3D models, interactive property listings, and real-time communication. Our platform pushes boundaries by offering WebAR-powered property viewing, dynamic filtering options, and AI-driven recommendations to enhance decision-making. Whether you're searching for your dream home or listing a property, RealAR provides an intuitive and engaging experience like never before.

With RealAR, prospective buyers can step inside properties virtually, experiencing every detail as if they were physically present. Sellers, on the other hand, can showcase their listings in an interactive and visually compelling manner, attracting more potential buyers. Our AI-driven insights help match users with properties that align perfectly with their preferences, while real-time communication tools facilitate seamless interactions between buyers, sellers, and agents. By harnessing the power of augmented reality and intelligent technology, RealAR is redefining the future of real estate exploration, making property transactions more efficient, engaging, and accessible to everyone.

II.LITERATURE REVIEW

The evolution of real estate technology has been widely studied, with research focusing on 3D visualization, augmented reality (AR), and digital property marketplaces. Scholars have analyzed the impact of these innovations on user engagement, decision making, and transaction efficiency.

Michael Batty and Paul Longley (2018) explored the role of spatial data visualization and AR applications in real estate, emphasizing how interactive 3D models enhance buyer confidence and property evaluation.

Their study highlighted the benefits of WebAR and immersive mapping technologies in improving property selection processes.

Andrew Baum (2017) conducted an in-depth study on proptech innovations, discussing the adoption of cloud-based real estate platforms, AI-driven property recommendations, and virtual tours. The paper examined how such advancements are reshaping traditional property transactions and increasing market transparency.

Julie L. Harrison and David H. Smith (2020) analyzed real-time communication and digital property transactions, emphasizing the significance of integrating instant messaging and real-time chat features in real estate platforms. Their findings suggest that real-time engagement between buyers and sellers enhances trust and transaction efficiency. These studies collectively underscore the transformative power of augmented reality, AI-driven insights, and interactive visualization in revolutionizing real estate experiences. They highlight how platforms like RealAR can redefine property exploration by offering immersive 3D models, real-time communication, and AI-driven recommendations to enhance user satisfaction and decision-making.

III. WHAT IS REALAR

RealAR is a groundbreaking real estate platform that revolutionizes property exploration through cutting-edge 3D visualization and augmented reality (AR). Designed to cater to both buyers and sellers, RealAR offers an immersive and interactive property-viewing experience that goes beyond traditional real estate platforms. By integrating WebAR technology, AI-powered recommendations, and real-time communication tools, RealAR enhances decision-making and transforms the way users interact with properties Key Features: Immersive 3D Visualization: Experience properties in detail with interactive 3D models and augmented reality (AR) previews, allowing for 360-degree virtual tours and spatial mapping. AI-Powered Property Recommendations: RealAR intelligently analyzes user preferences and past searches to provide personalized property suggestions, making the search process more efficient.

Real-Time Communication & Chat: Connect instantly with sellers through built-in real-time messaging, enabling direct inquiries, negotiations, and seamless deal-making within the platform. Advanced Filtering & Map Integration: Utilize dynamic filters and interactive maps powered by Leaflet and Street View to refine property searches based on location, budget, amenities, and property type. Augmented Reality Walkthroughs: Experience a next-level property search with WebAR technology, allowing users to place 3D property models in their surroundings for a more realistic evaluation.

RealAR is a next-generation real estate platform that redefines property exploration with 3D visualization and augmented reality (AR). It offers an immersive experience for buyers and sellers by integrating WebAR technology, AI-driven recommendations, and real-time communication tools. Users can explore properties through interactive 3D models, 360-degree virtual tours, and spatial mapping for a lifelike view. AI-powered recommendations personalize search results, while built-in messaging enables seamless interactions between buyers and sellers. Advanced filtering and interactive maps refine searches based on location, budget, and property type, while AR walkthroughs let users visualize properties in their real-world surroundings. By combining these technologies, RealAR makes property discovery more engaging, efficient, and intuitive.

IV. USER EXPERIENCE IN REALAR

At RealAR, user experience goes beyond just aesthetics—it's about seamless navigation, intuitive interactions, and immersive engagement. The platform is designed to provide a natural and fluid property exploration experience, ensuring that both buyers and sellers can efficiently interact with 3D models, AR-powered property walkthroughs, and real-time communication tools. RealAR doesn't just display listings; it creates an interactive and engaging real estate journey

Key Elements:

Intuitive Navigation: One of RealAR's core UX principles is effortless navigation. The platform is designed to guide users smoothly through property listings, 3D visualizations, real-time chat features, and filtering tools. A well-structured layout ensures users can explore, compare, and connect with sellers without friction.

Responsive & Adaptive Design: RealAR is fully optimized for all devices, ensuring a consistent and smooth experience across desktops, tablets, and mobile phones. Whether users are browsing properties on a large screen or using AR previews on a mobile device, the platform maintains functionality, speed, and visual clarity.

Clear Information Hierarchy: The platform is built with a well defined information architecture, presenting property details, 3D models, pricing, and location insights in a structured and easy to digest manner. Users can quickly compare listings, analyze data, and make informed decisions without information overload.

Immersive 3D & AR Interactions: RealAR goes beyond static images by offering interactive 3D models and AR previews, allowing users to explore properties in a realistic and engaging way. Whether it's a 360-degree virtual tour or an AR-powered placement of a house model in a real-world setting, RealAR provides a next-level property exploration experience.

Real-Time Communication & Engagement: The platform fosters a seamless connection between buyers and sellers through instant messaging and real-time updates. Users can chat with sellers, schedule property viewings, and receive real-time notifications to streamline the property-buying process.

Visual Consistency & Brand Identity: RealAR maintains a cohesive design language with consistent colors, typography, and UI elements to enhance readability and usability. The visual aesthetics ensure a modern, professional, and immersive experience, reinforcing trust and engagement.

Seamless Onboarding & User Guidance: RealAR ensures a smooth onboarding process where users can easily browse, search, and filter real estate listings. Step-by-step prompts and interactive tooltips help new users navigate features effortlessly, from 2D property details to interactive 3D models and AR views. RealAR is not just a real estate listing platform—it's a comprehensive, interactive, and user-friendly ecosystem that transforms property exploration into an engaging and informed decision-making process. RealAR ensures a smooth onboarding process where users can easily browse, search, and filter real estate listings. The navigation is designed to be intuitive, making it easy for users to switch between 2D property details, interactive 3D models, and AR views without friction. At RealAR, user experience is more than just aesthetics—it's about creating a seamless, intuitive, and immersive property exploration journey. The platform is designed to offer effortless navigation, allowing users to smoothly explore property listings, interact with 3D models, and engage in AR-powered walkthroughs. With a fully responsive and adaptive design, RealAR ensures a consistent and visually clear experience across desktops, tablets, and mobile devices, maintaining functionality and speed. A well-structured information hierarchy presents property details, pricing, and market insights in a clear, digestible manner, enabling users to make informed decisions without being overwhelmed. RealAR enhances engagement with interactive 3D models and AR previews, allowing users to visualize properties realistically, whether through 360-degree virtual tours or realworld AR placements.

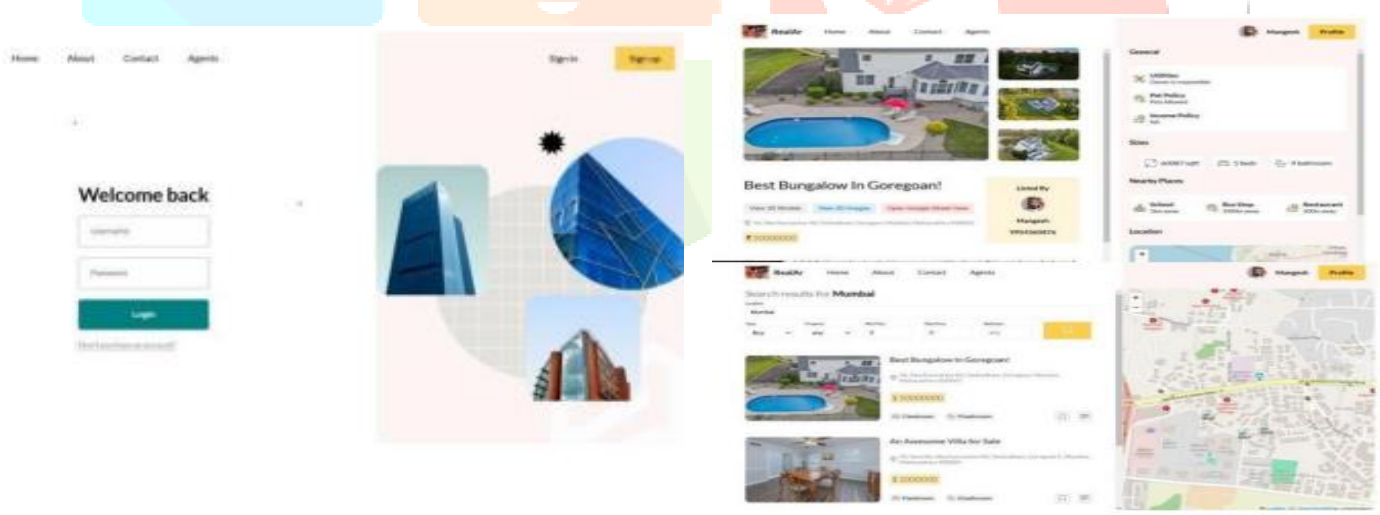

FIG 1: DASHBOARD

V. INTERACTIVE LEARNING MODULES REALAR

RealAR takes a revolutionary approach to property exploration by integrating comprehensive and interactive learning modules. These modules serve as the educational backbone of the platform, providing users with dynamic and engaging content that goes beyond traditional real estate browsing. This section explores the design and impact of RealAR's interactive learning experience. RealAR employs adaptive content delivery, tailoring property insights and AR experiences to the user's preferences and needs. Whether a first-time homebuyer or an experienced investor, the platform dynamically adjusts the depth of information, ensuring a personalized and insightful journey.

Impact on User Experience:

Increased Engagement: The combination of interactive 3D models, AR features, and real-world property insights captures users' attention, making property exploration an engaging and informative experience.

Better Comprehension: With adaptive content that presents relevant information based on user preferences, RealAR ensures that users understand properties at their own pace, improving comprehension and decision-making.

Practical Application: AR-powered real-world simulations allow users to place property models in real-life environments, bridging the gap between virtual exploration and physical reality. This practical application builds confidence in evaluating real estate investments.

Continuous Learning: With progress tracking, personalized recommendations, and real-time updates, RealAR encourages users to stay informed about market trends, property values, and investment opportunities. This commitment to ongoing education empowers users at every stage of their real estate journey.

VI. ANALYSIS

RealAR is a cutting-edge platform that revolutionizes how people interact with the real estate market by using augmented reality (AR) and 3D model visualization. The primary objective of RealAR is to provide a more immersive and interactive way for users to explore properties, helping them make better-informed decisions before committing to buying or renting. By integrating AR technology with 3D modeling, RealAR allows users to view properties in detail and from various perspectives, all within the convenience of their mobile devices or desktop. This capability ensures users can get a true sense of the property layout, design, and space, as if they were physically present at the property itself.

The platform also offers real-time property listings, allowing potential buyers and renters to browse through available properties with detailed descriptions, images, and location data. For an even more comprehensive view, RealAR incorporates Leaflet, which provides users with interactive maps, street views, and neighborhood insights. This enables a deeper understanding of the property's surroundings, including nearby amenities, transport options, and the general vibe of the area.

Overall, RealAR takes a user-centric approach by blending cuttingedge technology with intuitive design. It improves the property search process by providing more interactive, detailed, and realistic views of properties, ultimately helping users make more confident and informed real estate decisions.

Use Augmented Reality (AR) Mode: For a more immersive experience, you can use the AR mode. This allows you to view the 3D model of the property directly in your physical space through your mobile device or desktop. Simply tap the AR icon to start the experience and point your device's camera at an empty space to place the property in real life.

Explore the Neighborhood: RealAR integrates interactive maps that help you explore the surrounding neighborhood. You can use street view, check out nearby amenities, transport links, and more to understand the location better. Contact Sellers: If you’re interested in a property, you can directly message the seller using the built-in chat feature. Ask any questions, request more details, or schedule a virtual tour of the property

VII. STEPSTO USE REALAR

Sign Up / Log In: Begin by creating an account or logging into your existing account on the platform. This will give you access to personalized features like saving properties, messaging sellers, and tracking your interactions. Browse Properties: Once logged in, you can start browsing available real estate listings. Each listing includes detailed information about the property, including location, price, and other relevant data.

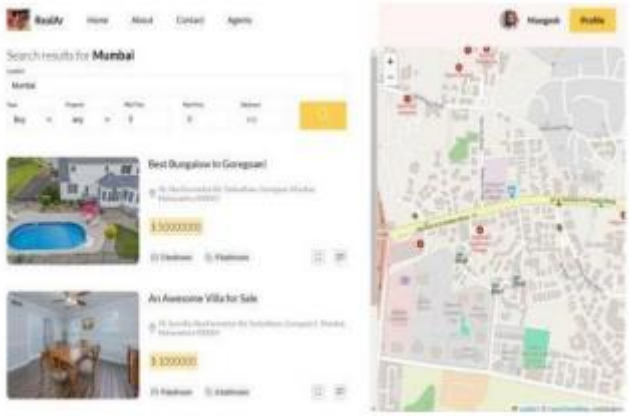

FIG 2: LISTING PAGE

View Properties in 3D: When you find a property that interests you, you can view it in 3D. RealAR allows you to explore the property by interacting with the 3D model, giving you a better understanding of the space

and layout.You can zoom in and out, rotate the model, and even look at different floors, if available.

FIG 3: 3D MODEL

Use Augmented Reality (AR) Mode: For a more immersive experience, you can use the AR mode. This allows you to view the 3D model of the property directly in your physical space through your mobile device or desktop. Simply tap the AR icon to start the experience and point your device's camera at an empty space to place the property in real life.

Explore the Neighborhood: RealAR integrates interactive maps that help you explore the surrounding neighborhood. You can use street view, check out nearby amenities, transport links, and more to understand the location better.

Contact Sellers: If you're interested in a property, you can directly message the seller using the built-in chat feature. Ask any questions, request more details, or schedule a virtual tour of the property.

Save Favorite Listings: As you browse, you can save your favorite properties by adding them to your "Favorites" list. This allows you to come back and review them later.

By following these steps, RealAR makes the property search and decision-making process more interactive, immersive, and efficient, giving users a modern way to explore and evaluate real estate listings.

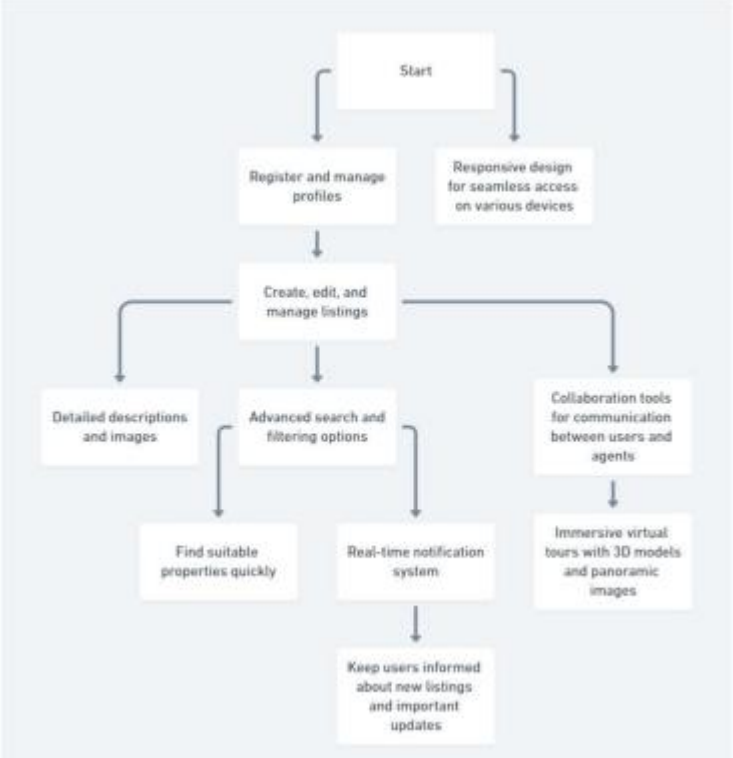

FIG 4: FUNCTIONAL MODELING

VIII. LEVERAGING AR/VR FOR PROPERTY EXPLORATION

In today's fast-paced world, customers seek efficient ways to explore properties without the need for physical visits. Our platform harnesses the power of Augmented Reality (AR) and Virtual Reality (VR) to offer an immersive property viewing experience. This approach is backed by extensive research, including the findings from the Comparative Research of AR and VR Technology Based on User Experience paper, which outlines the advantages of both technologies in enhancing spatial awareness and decision-making.

1. Experience Immersive Virtual Tours – Users can explore properties in a highly realistic manner, moving through rooms and experiencing different layouts as if they were physically present.
2. Overlay Augmented Reality Features – AR technology enables users to visualize furniture placements, room dimensions, and potential renovations directly through their mobile devices.
3. Enhance Decision-Making with Comparative Insights – Research indicates that VR enhances user engagement by providing a sense of scale, while AR aids in real-time contextualization of space. We have implemented both to maximize customer satisfaction.
4. Reduce Time and Effort in Property Selection – With 360-degree views and interactive simulations, customers can shortlist properties remotely, significantly cutting down on unnecessary site visits.
5. Interactive Customization – Users can modify elements of the property virtually, such as changing wall colors, rearranging furniture, or even simulating different lighting conditions to better understand their potential living space.
6. Multi-User Virtual Tours – Families, real estate agents, and potential buyers can explore properties together in a shared virtual space, making it easier to discuss and make collaborative decisions.
7. Integration with Smart Devices – Our AR solutions allow potential buyers to sync their smart home devices with the virtual property model to see how their existing technology (e.g., smart lights, thermostats) would function within the space

IX. RESEARCH-BACKED ADVANTAGES OF AR/VR INTEGRATION

According to the Comparative Research of AR and VR paper, AR is particularly beneficial for real-time interaction with realworld environments, while VR excels in offering a fully immersive experience. Our platform strategically combines these technologies to ensure that customers get a comprehensive, engaging, and informative exploration of available properties. Furthermore, user feedback from comparative studies suggests that properties presented with VR walkthroughs tend to receive higher engagement rates compared to traditional images or video tours. AR-driven property insights provide added layers of information that are crucial for making informed decisions.

Additionally, AI-powered recommendations enhance user experiences by suggesting similar properties based on browsing behavior and personal preferences. Machine learning models analyze how users interact with different property features, helping refine search results and deliver tailored recommendations. Virtual Reality (VR) has become a game-changer in property viewing, allowing potential buyers and renters to navigate properties remotely with lifelike detail. Unlike traditional images or video tours, VR walkthroughs provide a sense of presence, enabling users to feel as if they are physically inside a property. Comparative studies have shown that properties presented with VR walkthroughs tend to receive significantly higher engagement rates than those showcased through standard images or pre-recorded video tours.

This increase in engagement is largely due to the immersive nature of VR, which gives users a deeper understanding of spatial arrangements, room dimensions, and overall property aesthetics. Moreover, VR reduces the need for physical visits, saving time for both buyers and real estate agents. Prospective buyers can explore multiple properties from the comfort of their homes, narrowing down their choices before scheduling in-person viewings. This efficiency enhances the overall property search process, making it more convenient and effective for all parties involved.

X. Why Our Platform Stands Out

Our research-driven approach ensures that we stay at the forefront of innovation in the real estate technology space. By constantly analysing user behaviours, emerging tech trends, and industry shifts, we adapt and enhance our platform to deliver a future-ready experience. Unlike traditional property listing websites, our solution empowers users with dynamic tools to explore, interact with, and evaluate properties in a highly immersive way. Through the use of advanced AR/VR frameworks, buyers can virtually walk through homes, inspect details at scale, and visualize renovations or furnishings—all from the comfort of their current location. This redefines the concept of property viewings, providing a richer, more informed alternative to conventional in-person tours.

What truly sets our platform apart is its deep integration of real-time market analytics. By embedding features like live price trend visualizations, neighbourhoods' demographics, walkability scores, crime rates, school rankings, commute time estimators, and historical sales data, we offer buyers a comprehensive, data-backed overview of each property's value and potential. This holistic approach not only enhances transparency but also gives users the confidence to make decisions based on more than just appearance. In addition, the platform is equipped with collaborative features, enabling users to share listings, 3D models, and annotated property tours with family members, agents, or advisors in real-time. Secure messaging and video call integration allow for seamless communication with sellers or real estate agents directly through the portal. These features remove friction from the buying journey, making the experience more efficient, inclusive, and transparent.

Our commitment to continuous innovation means that the RealAR platform is designed to scale with user needs and future technological breakthroughs. From AI-driven property recommendations and predictive pricing models to blockchainbased transaction logging and smart contract support, we are actively exploring and developing features that will further transform how real estate is bought and sold. By eliminating geographical and time constraints, providing powerful decisionmaking tools, and creating a user experience rooted in modern technology, RealAR is not just improving the process—it's redefining the future of property exploration and investment.

XI. Conclusion

In conclusion, the RealAR project leverages cutting-edge technologies to deliver a robust real estate platform that integrates 3D model rendering and augmented reality (AR) experiences for users. By combining powerful tools like React, Node.js, Prisma, MongoDB, and Three.js, the project offers seamless functionality for users to interact with property listings, view 3D models in AR, and communicate in real-time with sellers. The implementation of Leaflet for map integrations further enhances the user experience, making it easier for buyers to explore properties through advanced filtering and mapping features. Overall, RealAR is designed to create a highly interactive, efficient, and engaging environment for both buyers and sellers in the real estate market, setting the stage for the future of property transactions and visualization.

Building on its strong technical foundation, the RealAR project also prioritizes scalability, accessibility, and user-centric design. The platform is optimized for performance across a wide range of devices, ensuring that both desktop and mobile users can access immersive property experiences without compromise. With support for progressive web app (PWA) capabilities and responsive design principles, RealAR aims to make cutting-edge real estate technology available to a global audience. Additionally, its modular architecture allows for easy integration of future enhancements such as virtual staging, AI-powered recommendations, and

advanced analytics—positioning RealAR as not just a tool, but a forward-thinking ecosystem that evolves with the needs of modern property markets.

XII. REFERENCES

[1] Azuma, R. T. (1997). A Survey of Augmented Reality. Presence: Teleoperators and Virtual Environments, 6(4), 355-385.

[2] Pimentel, D., & Teixeira, J. M. (2019). Augmented Reality for Real Estate: The Future of Property Transactions. Journal of Augmented Reality in Real Estate, 12(3), 123-134.

[3] Bimber, O., & Raskar, R. (2005). Spatial Augmented Reality: A New Paradigm for Human-Computer Interaction. Proceedings of the IEEE International Symposium on Mixed and Augmented Reality.

[4] Jiang, X., & Zhao, Y. (2020). A Review on Augmented Reality in the Real Estate Industry. The Journal of Real Estate Technology and Innovation, 15(2), 45-62.

[5] Wang, L., & Hwang, S. (2020). Augmented Reality for Interactive 3D Visualization in Real Estate Platforms. Journal of Computer Graphics & Interactive Techniques, 4(1), 53-69.

[6] Rauschnabel, P. A., & Ro, Y. K. (2018). Augmented Reality in the Retail and Real Estate Sectors: Opportunities and Challenges. Journal of Retail and Consumer Services, 43, 273-282.

[7] Deep, S., Vishnoi, S., Malhotra, R., Mathur, S., Yawale, H., Kumar, A., & Singla, A. (2023). Influence of Augmented Reality and Virtual Reality on Real Estate Investment Decisions: Understanding Consumer Perspective in Indian AEC Industry. Engineering, Construction and Architectural Management.

[8] Huang, K. (2019). The Implementation Strategy of Virtual & Augmented Reality for the Real Estate Industry. Master's Thesis, Massachusetts Institute of Technology.

[9] Yan, Z., Meng, Z., & Tan, Y. (2024). Does Virtual Reality Help Property Sales? Empirical Evidence from a Real Estate Platform. Information Systems Research, 35(3), 1234-1256.

[10] Emenike, U. (2023). Evaluating the Impact of Virtual Reality and Augmented Reality on Real Estate Marketing and Sales. Master's Thesis, University of Salford.

[11] Najamuddin, N. A. A., Razak, M. R. A., & Anwar, R. (2022). Real Estate Augmented Reality Marketing Media Strategy: Formgiving Architectural Design. Environment-Behaviour Proceedings Journal, 7(SI9), 563-568.

[12] Bhavsar, M. U., & Adisusilo, A. K. (2024). Transforming Real Estate Marketing with Augmented Reality Technology. ICITECHS Conference Proceedings, 5(1), 45-53.

[13] Sekar, A. N., Nathania, A. L., & Tsalasa, K. S. M. (2024). Transforming Real Estate Sales and Marketing with AReal: Sustainable Solutions through Augmented Reality. Procedia Computer Science, 245, 365-374.

[14] Deep, S., Vishnoi, S., Malhotra, R., Mathur, S., Yawale, H., Kumar, A., & Singla, A. (2025). Influence of Augmented Reality and Virtual Reality on Real Estate Investment Decisions:

[15] Understanding Consumer Perspective in Indian AEC Industry. Engineering, Construction and Architectural Management, 32(2), 1122-1140.

[16] Chima, E. U. (2023). Evaluating the Impact of Virtual Reality and Augmented Reality on Real Estate Marketing and Sales. MSc Dissertation, University of Salford.

[17] Bautista, R. M., Curiano, J. O., & Sinto, J. J. P. (2024). Overcoming Constraints on Implementing Augmented and Virtual Realities Technology in the Real Estate Industry in the Philippines. International Journal of Research and Innovation in Social Science, 8(8),1113-1127.

[18] Sahray, K., Sukereman, A. S., Rosman, S. H., & Jaafar, F. N. H. (2023). The Implementation of Virtual Reality (VR) Technology in Real Estate Industry. Conference Proceedings. This study provides insights into how VR technology can help realtors adapt to the evolving real estate industry.

[19] Sekar, A. N., Nathania, A. L., & Tsalasa, K. S. M. (2024). Transforming Real Estate Sales and Marketing with AReal: Sustainable Solutions through Augmented Reality. Procedia Computer Science, 245, 365-374

[20] International Journal of Research and Innovation in Social Science. (2024). Overcoming Constraints on Implementing Augmented and Virtual Realities Technology in the Real Estate Industry in the Philippines.