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Augmented Reality in Real Estate: Enhancing Property Visualization and Customer Experience

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Abstract: The research deals with the technology Augmented Reality (AR) in the field of real estate. As technology advances, Augmented Reality is becoming more prevailing in many of the sectors. Real estate is one of the sectors. The field of augmented reality applications for real estate is very vast. For the Real Estate sector, Augmented Reality opens up an abundance of new business prospects. Augmented Reality (AR) holds enormous ability for revolutionizing the Real Estate sector. The real estate developers faced a common challenge which is the time-consuming process of physically touring properties with potential buyers, often lacking fascinating resources to make a lasting impression. So, AR aims to tackle this problem by developing a user-friendly mobile application that enables virtual 3D exploration of every aspect of a property. Users can seamlessly view properties without the need for physical visits, empowering real estate developers to diversify their marketing strategies and offer buyers a memorable and immersive home experience. The AR based real estate application converts 2D floor plans into 3D structure which improves the property exploration and offers users with informative virtual tours.

Keywords: Augmented Reality (AR), Real Estate, 2D Floor Plan, 3D Model.

1. INTRODUCTION

Augmented reality (AR) is a collaborative experience by enhancing the real-world environment with computer-generated digital contents. AR comprises of basic attributes like real-time interaction, an aggregation of real and virtual worlds and precise 3D registration of real and virtual objects. Augmented reality (AR) enhances the elements of the real world by overlaying computer - generated sensory input, like graphics, onto a live, direct, or indirect view of the physical environment. Augmented reality (AR) includes overlaying visual, auditory, or other sensory information onto the real world to intensify one's experience.

The use of augmented reality (AR) is expanding immensely in every field. It has enormous assurance for upgrading the selling and purchasing experience in the real estate sector. The ability of AR in real estate is very vast. It enhances property discovery, facilitates more informed decision-making. Through the usage of augmented reality in real estate, it makes the home showing process more efficient and interactive. The traditional methods of presenting and visualizing real estate properties through photographs, 2D floor plans, or static descriptions are being augmented by interactive, immersive, and highly informative experiences which is made possible by AR. The fusion of real estate and augmented reality is not just a trend; it's a transformative shift that promises to enhance the efficiency, engagement, and overall experience for all stakeholders in the real estate market.

AR can give assistance to real estate developers to expand their marketing methods and give clients a more outstanding home experience. By utilizing this technology, buyers can view at every corner of the house just virtually and see what suits their requirements, thus helping out buyers to make decisions more quickly with more precise information, resulting in less uncertainty and reduced buyers' contrition. With AR, innovators can more influentially share their vision with their audience. Real estate agents can help underdeveloped spaces catch their buyers' attention. And architects can walk clients through fascinating insights of finished projects well ahead of all the walls have been built.

2. LITERATUE SURVEY

"Augmented Reality for Real Estate" -

The purpose of the research paper is to integrate augmented reality (AR) technology into the real estate industry to revolutionize property visualization and marketing strategies. AR offers the potential to transform the way potential buyers interact with property listings by providing immersive experiences that go beyond traditional 2D images or videos. The paper focused on various AR applications and platforms currently used in the real estate sector, highlighting their benefits in enhancing property viewing. Additionally, the paper examines the challenges and limitations associated with implementing AR in real estate, such as technological barriers and user adoption issues. At last, future directions and opportunities for further research and development in this rapidly evolving field are discussed, emphasizing the potential of AR to reshape the real estate landscape and improve the overall customer experience [1].

"Augmented Reality in Real Estate Using Unity 3D" -

The goal of this paper was to identify the technology Augmented Reality (AR) that overlays digital information or virtual objects onto the real world, viewed through a smartphone, tablet, or AR glasses. In the circumstances of real estate, AR has the capability to revolutionize the way properties are showcased and marketed to potential buyers. Unity 3D is a popular game development platform that has also been widely adopted for creating AR applications. It provides tools to create immersive and interactive experiences, making it well-suited for developing AR applications in various domains, including real estate [2].

"Augmented Reality Apps for Real Estate" -

The main discussion in this paper is about the potential of augmented reality (AR) apps in the real estate industry. It explores various applications of AR apps, including property search, furniture visualization within a space, and location-based information retrieval. The article also acknowledges challenges, such as the lack of geo-coding for all properties. Overall, it suggests that AR apps hold promise as valuable tools for both real estate professionals and consumers [3].

3. NEED OF THE STUDY:

Traditional methods of real estate properties, such as static images, videos, and 2D floor plans, have long been the norm. However, these methods often fail to provide potential buyers or renters with a comprehensive understanding of the property. This limitation can lead to uncertainty and hesitancy in decision-making. The shortcomings of traditional methods are evident. Static images and videos can only offer a limited perspective of the property, often failing to convey spatial relationships effectively. Similarly, 2D floor plans, while informative, may not adequately illustrate the flow and layout of the space, leaving users struggling to visualize themselves within it. Augmented reality (AR) technology emerges as a promising solution to address the gap between traditional marketing methods and evolving consumer expectations. By superimposing virtual elements onto the real-world environment, AR offers immersive and interactive experiences that go beyond the limitations of static images and videos.

4. RESEARCH METHODOLOGY

4.1 Block Diagram

The system architecture diagram explains the structure and components of the augmented reality (AR) application developed for Real Estate visualization. The architecture is designed to facilitate coherent interaction between the various modules and ensure optimal performance and user experience.

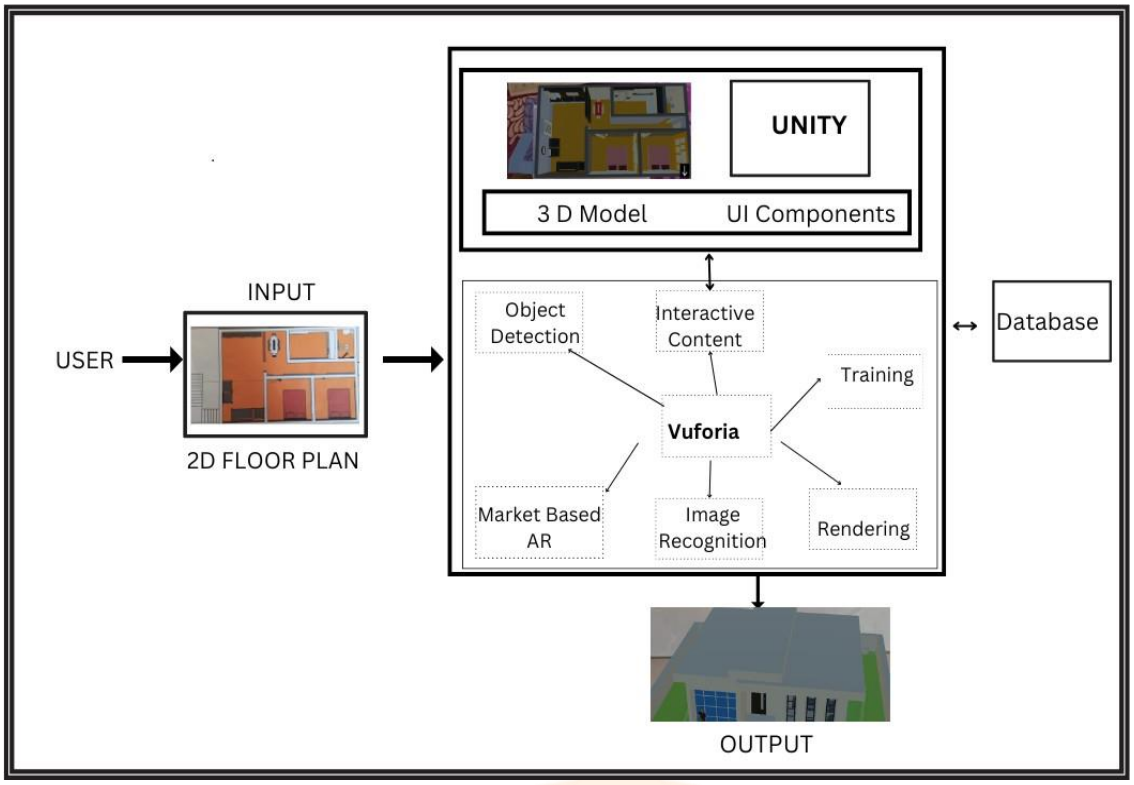


Fig. System Architecture Block Diagram

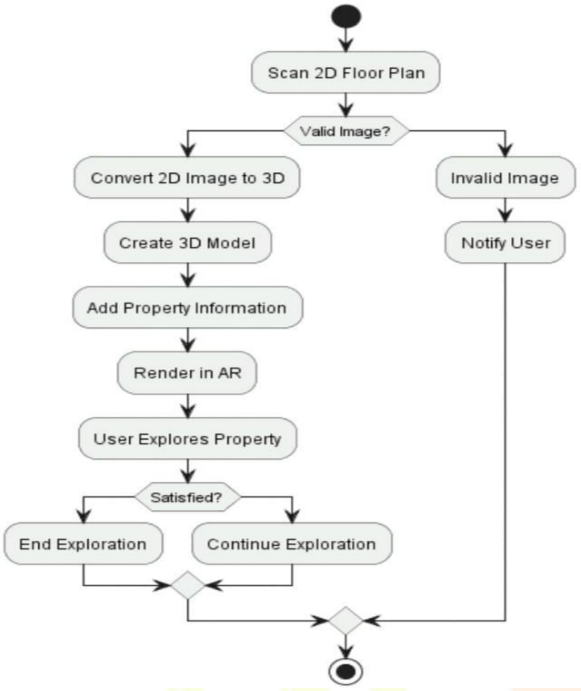
4.2 Software Used

The methodology contours the step-by-step process we followed to create the application and assess its effectiveness. By detailing the methods and techniques used, we aim to provide a clear understanding of how our research was conducted.

1. Unity - The UNITY engine has the ability to produce 2D, 3D, virtual reality and augmented reality games and other collaborative experiences. Unity is a prominent platform for developing AR and VR applications. It supports major AR and VR devices, making it a preferred option for creating immersive experiences, simulations, training applications and interactive storytelling. Unity's cross-platform capabilities, a vast asset store, and an active developer community make it a versatile tool for creating a wide range of applications.
2. Vuforia - Vuforia is a mobile-based augmented reality software. Vuforia finds "feature points" in the target picture and uses the findings to compare the features in the target image with the receiving frame from the camera. Vuforia correlate images captured by a camera to a predefined reference image. Vuforia has a built-in Object Scanner tool through which all objects are scanned. Vuforia scans high-contrast patches, curves, or edges that will not vary considerably when viewed from multiple angles. If the image has absence of adequate feature points, it will most likely not be detected properly. As a result, the foremost goal is to have a large number of feature points that can serve as a form of anchor for object recognition technology.

3. AR Frameworks - Interaction with ARKit (iOS) and ARCore (Android) for AR rendering. Augmented reality (AR) frameworks are used for the development of AR applications and experiences. These frameworks offer the essential tools, libraries and resources for creating interactive, digital overlays in the real world through the camera view of a device.

4.3 Flow Chart



Step 1: The user logins in the app.

Step 2: The admin verifies the user information.

Step 3: The user takes the input a 2D floor plan and scans the floor plan with the help of device camera.

Step 4: After scanning, the validation of the floor plan is been checked.

Step 5: During validation, if the floor plan is valid then a 3D Model for the respective 2D floor plan is been generated.

Step 6: The user can view the property from any angle.

Step 7: The cost and the material required for the property will be estimated.

Step 8: This process ensures an enhanced and collaborative user experience while viewing the property.

5. RESULTS

Scene 1 – Main Menu

The app menu provides easy access to various features, including scanning 2D plans, browsing property listings, viewing walkthroughs, and accessing contact information.

fig:1 main menu

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Scene 2 – 2D to 3D Conversion

The "Scan 2D Plan" button initiates the scanning process, allowing users to capture 2D floor plans and generate 3D models of properties.

fig2: target image

fig3: target image

fig4: target image

fig5: target image

Scene 3 – Property Listings and Details

The property listings section displays different properties available for viewing, along with cost estimations and material requirements for property construction.

fig 6: property listing

fig 7: property details

Scene 4 – Walkthrough

Users can access walkthrough videos of properties to explore the interior and exterior spaces in detail.

fig 8 – walkthrough

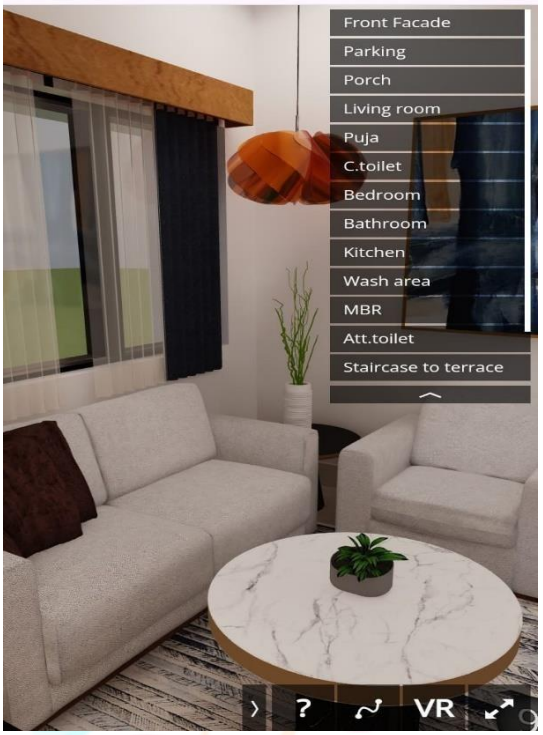

fig 9 – property walkthrough

Scene 5 – Contact Details

The "Contact Us" section provides users with contact information, allowing them to reach out for inquiries or assistance**.**

6. CONCLUSION

In conclusion, the AR app in real estate is a promising tool that has the potential to redefine how we interact with real estate properties. It introduces a new level of engagement, personalization, and efficiency to the real estate market, benefiting buyers, investors, real estate professionals, and urban planners. As technology continues to advance, this app serves as an innovative step forward in the real estate industry, offering a glimpse into the future of property exploration and evaluation. For real estate professionals, the app offers an innovative tool for property presentation and marketing. Real estate agents and property developers can engage clients with virtual property tours, making it easier to communicate the potential of a property. Interior designers and architects can use the app to bring their design visions to life, and investors can evaluate properties with greater precision.

7. REFERENCE

[1] International Research Journal of Engineering and Technology (IRJET) Volume: 09 Issue: 01 - Jan 2022 – AUGMENTED REALITY FOR REAL ESTATE.

[2] Veronika Lang, Peter Sittler (2013). Augmented Reality Apps for Real Estate. (Mag.FH Veronika Lang, Institute of Real Estate, University of Applied Sciences Vienna, Währinger Gürtel 97, 1180 Vienna.

[3] Satya Pavan Vanka (2022). Augmented Reality In Real Estate Using Unity 3D.

[4] Rankohi, S., Waugh, L. Review and analysis of augmented reality literature for construction industry. Vis. in Eng. 1, 9 (2013).

[5] N.R. Raajan, S. Suganya, M.V. Priya, Sruthi V. Ramanan, S. Janani, N.S. Sarada Nandini, R. Hemanand, S. Gayathri, Augmented Reality Based Virtual Reality, Procedia Engineering, Volume 38, 2012.

[6] R. Aggarwal and A. Singhal, "Augmented Reality and its effect on our life," 2019 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence), 2019, pp. 510-515, doi: 10.1109/CONFLUENCE.2019.8776989.

[7] Huang, Yetao & Liu, Yuanan & Wang, Yongtian. (2009). AR-View: an Augmented Reality Device for Digital Reconstruction of Yuangmingyuan. 3 - 7. 10.1109/ISMAR-AMH.2009.5336752.

[8] Kaufmann, Hannes. (2003). Collaborative Augmented Reality in Education.

[9] 19. SANNA, Andrea; MANURI, Federico. A Survey on Applications of Augmented Reality. Advances in Computer Science : an International Journal, [S.l.], p. 18-27, jan. 2016. ISSN 2322-5157, 13 Jan. 2022.

[10] Adegoke, O.J., Arnab, S., Dong, H., Brotherton, J.A., & Bradford, D. (2017). VR-CEP: A framework to support the adoption of virtual reality for customer experience platforms in the construction industry. 15th International Conference on Construction Applications of Virtual Reality.

[11] Joshi & Siddharth (2021). Virtual reality in real estate: Evaluating customer experience and its effect on purchase intention. International Journal of Housing Markets and Analysis.