**Virtual House Using Augmented Reality & Cost Estimation**

**Siddhi Patil1, Mrunali Udata2, Shital Konale3, Vaishnavi Dhale4, Prof. M.B.Chougule5**

Department of Computer Science And Engineering

1,2,3,4,5 Brahmdevdada Mane Institute of Technology, Belati, Solapur, India.

[***Abstract*** **Augmented and virtual technologies both play vital roles in the construction industry. Augmented technologies, however, have a higher benefit when compared to virtual. The two technology types are discussed; with their similarities and differences explained. The past, present, and future is described. Some benefits to using augmented technology are discussed. The drawbacks are mentioned, with the way to correct them detailed.**](https://www.ijert.org/cfp)

[***Keywords: Augmented Reality, Virtual Reality, Construction Industry, Scheduling, Safety***](https://www.ijert.org/cfp)

## [INTRODUCTION](https://www.ijert.org/cfp)

[Throughout the 20th century and beyond, the United States has seen monumental changes in a wide variety of aspects. In our regard, there has been a huge transformation in the construction industry. Through building bigger and better things, the industry has revolutionized means and methods [1,2,3,4,5].In addition, in order to overcome shortage of competent workforce, the construction industry has taken advantage of technology to better recruit and retain new workers in construction career[6,7,8]. One of the technological tool employed by the construction industry is called Virtual Reality, in which a three- dimensional, computer generated environment can be explored and interacted by a person. Augmented Reality shares the same concept, but rather than to interact in a non-existing environment (virtual reality), augmented reality uses existing environment while implementing virtual elements to appear as if both are together at the same time [9]. The purpose of this review is to explore the changes in the construction industry that are resulting from augmented and virtual technology.](https://www.ijert.org/cfp)

In an era where technological advancements continue to reshape every aspect of our lives, the realm of home design stands on the cusp of a revolutionary transformation. Imagine a world where the boundaries between imagination and reality blur seamlessly, where designing your dream home becomes an immersive experience accessible at your fingertips. Welcome to the future of home design - welcome to the Virtual House with Augmented Reality and Cost Estimation.

In this groundbreaking innovation, cutting-edge technology converges to offer homeowners, architects, and interior designers an unparalleled platform to visualize, customize, and estimate the cost of their dream homes with unprecedented accuracy and realism. Gone are the days of static blueprints and costly design iterations; instead, welcome a dynamic, interactive journey where your vision comes to life in real-time.

## [LITERATURE REVIEW](https://www.ijert.org/cfp)

[Virtual reality is an exciting innovation slowly being implemented into the construction industry. Virtual reality or VR is “a computer generated simulation of three- dimensional (3D) environment, in which the user is able to both view and manipulate the contents of that environment” [10]. It has many applications that can benefit a project with increased jobsite education and safety, design improvement and communication with involved parties from the owner down to the laborer, and help to exceed owner‟s expectations and lower project costs.](https://www.ijert.org/cfp)

The convergence of augmented reality (AR) technology with home design has opened up new avenues for architects, interior designers, and homeowners alike. This literature review aims to explore the existing research and advancements in Virtual House applications, focusing on the integration of AR and cost estimation features.

VR and AR offer immersive experiences that allow users to visualize and interact with virtual environments. Research by Dawood et al. (2013) highlighted the potential of VR in improving design communication, coordination, and stakeholder engagement in construction projects.AR, on the other hand, overlays virtual elements onto the real-world environment, providing contextually rich information to users.Studies by Dunston et al. (2017) emphasized the benefits of AR in enhancing on-site decision-making and field engineering processes in construction projects.

Cost estimation plays a critical role in the home design process, ensuring that projects remain within budget constraints. Research by Zhang et al. (2019) explored the integration of cost estimation algorithms into Virtual House applications, enabling users to receive real-time cost feedback based on design decisions. Cost estimation features in Virtual House applications promote financial transparency, allowing homeowners to make informed decisions about design options and material selections.

Virtual House applications leverage AR technology to provide users with immersive experiences in visualizing and customizing their future homes. Research by Li et al. (2021) demonstrated the feasibility of integrating AR into home design platforms, enabling users to overlay virtual furniture and finishes onto their physical space. AR-based Virtual House applications offer benefits such as increased design creativity, improved decision-making, and enhanced client engagement.

## [FINDINGS](https://www.ijert.org/cfp)

[Virtual House Using Augmented Reality and Cost Estimation offer new and exciting benefits to the construction industry being discussed in following paragraphs.](https://www.ijert.org/cfp)

**Enhanced Visualization and Design Communication:** AR technology allows users to visualize virtual elements, such as furniture, finishes, and architectural details, overlaid onto their physical environment. This immersive experience enables homeowners, architects, and designers to better understand how design choices will look and feel in real life, facilitating more informed decision-making and improved design communication.

**Real-time Cost Estimation:** Integrating cost estimation algorithms into Virtual House applications provides users with instant feedback on the financial implications of their design decisions. By dynamically adjusting design parameters and material selections, users can explore various options while staying within budget constraints. This real-time cost estimation feature promotes financial transparency and empowers users to make cost-effective choices throughout the design process.

**Streamlined Design Iterations:** Virtual House applications enable users to iterate on designs rapidly and efficiently. By visualizing design changes in real-time using AR, users can quickly assess the impact of modifications on both aesthetics and costs. This iterative approach accelerates the design process, reduces the need for costly revisions, and ultimately leads to more satisfying outcomes for homeowners and clients.

**Improved Collaboration and Client Engagement:** AR-based Virtual House applications facilitate collaboration among stakeholders by providing a shared platform for design exploration and feedback. Clients can actively participate in the design process, offering input and preferences in real-time. This collaborative approach fosters greater client satisfaction, as their vision for their dream home is accurately translated into the virtual environment.

**Optimized Resource Allocation:** By integrating cost estimation features into Virtual House applications, resources can be allocated more efficiently. Users can prioritize design elements based on their cost implications, ensuring that budget allocations align with project priorities. This optimization of resources helps to minimize waste and maximize the value of the construction project.

## [CONCLUSION](https://www.ijert.org/cfp)

[Augmented technology has rapidly advanced over the past two decades, emerging as a vital tool complementing virtual technology. It provides users with real-time insights into their surroundings, offering a dynamic view of construction processes and final project outcomes. This capability is particularly valuable in Virtual House applications, where users can visualize and interact with virtual elements overlaid onto their physical environment, facilitating informed decision-making and enhanced design visualization.](https://www.ijert.org/cfp)

[One of the key benefits highlighted in the review is the ability of augmented technology to improve safety training effectiveness. By providing real-time views of job site situations, augmented reality enhances hazard awareness and reduces the risk of on-site accidents. This aspect is crucial in the construction industry, where safety is paramount, and effective training can mitigate potential risks.](https://www.ijert.org/cfp)

[Despite its promising potential, augmented technology faces challenges and barriers, including technological limitations and adoption hurdles. However, these barriers are gradually being overcome through continuous advancements in technology and increasing acceptance among users. With each generation becoming more tech-savvy, augmented reality is poised to play an increasingly critical role in construction practices.](https://www.ijert.org/cfp)

[Looking ahead, the review suggests a bright future for Virtual House applications leveraging augmented reality and cost estimation features. As augmented technology continues to evolve, these applications are expected to revolutionize the home design process. They offer users unprecedented levels of visualization, customization, and cost transparency, empowering homeowners, architects, and designers to create personalized and cost-effective designs that exceed expectations.](https://www.ijert.org/cfp)

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