

Implementation of Virtual Reality in Construction Industry

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Abstract—Today's scenario for the construction industry is changing day by day. Facilities and amenities requirements from customer's and clients are increasing. When the project is at its very initial stage and someone wants to buy it. That time project owner has to convince to the client about his project. Virtual tours are revolution in home construction that have enabled the delivery of high quality products, and in marketing developers had easier time showcasing the kind of product they have. With virtual tours, you can walk through the house to see what is included inside and outside all the facilities and comfort of your home. Whenever one shows interest in buying a property developer can upload previews in terms of photos and videos that can provide virtual tours. So, virtual reality is one of the best option for the convincing client about the project. Virtual reality is based on 3D technique in which VR headsets are being used for the visualization. VR technology is taking over the construction industry and in near future everyone will be giving preference to the projects that are rendered using virtual reality. so, it is time to invest in this technology to prepare for the exciting future that awaits you.

Keywords— Virtual reality (VR), Construction Industry, Augmented Reality (AR).

I. INTRODUCTION

There is the transformation in the construction industry from 20th century to 21st century in terms of technology, machinery, scale of projects and potential of the work. one of the technological tool which can prove efficient in construction is virtual reality (VR). virtual reality experienced the tremendous growth in the field of architecture, engineering and construction (AEC) industries in past few years. it was started as a curiosity and now is becoming a common trend in real estate development and construction. in fact many builders are now implementing and demonstrating the virtual reality capabilities as a part of the RFP process.

What is virtual reality?

Virtual reality is a computer simulated environment, accessed through stereoscopic goggles that include a variety of different tracking mechanism's that track the viewer's movement's in physical space, and matches those movements within the simulated 3D environment. This provides viewer with the very realistic sense and so viewer can get a powerful idea about the project.

II. OBJECTIVE AND AIM

1. Architectural design of virtual sample flat in VR app
2. Architectural design of virtual existing building in VR app

III. LITERATURE REVIEWS

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" [5]. It has many applications that can benefit a project with increased jobsite education and safety, Architectural 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. VR is broken down into desktop and immersive VR categories [8]. Desktop is displayed on

computer monitors or TVs, which is known as Cave Automatic Virtual Environment or CAVE [4]. CAVE consists of multiple monitors joined together to form a large screen that allows the user to feel a part of the virtual world Immersive virtual environment or "IVE will typically have the following features; it will surround its user, obscuring cues from the physical environment and increasing the sense of „presence“ within the IVE; provide a three-dimensional visual representation of the virtual environment; track the user's location and orientation and update the virtual scene to match the user's movements, and give the user some degree of control over the objects in it"[6]. There is great potential for improving all parts of the construction process by implementing this technology.

Virtual Reality- Due to the large amount of popularity surrounding virtual reality, Virtual reality oftentimes tends to be overlooked by the public as a whole. While this may be because of a basic misunderstanding of the topic, Virtual reality certainly holds merit in the world of construction technology, especially when it comes to educational, architectural, and field engineering processes for both students and professionals alike. Virtual reality consists of a live, imitative version of the real world – with the capacity to add certain elements to the simulated landscape. Virtual reality was initially introduced into the gaming world as an entertainment alternative, but the possibility of its educational potential are being thrust into the spotlight by architectural and engineering schools across the globe [9]. "Virtual reality (VR) creates an environment where computer generated information is superimposed onto the user's view of a real-world scene" [4].

IV. USE OF VR APP IN REAL ESTATE BUSINESS

VR is new promising technology in the construction industry and revenues from this industry are expected to reach 13 billion dollars in the year. VR importantly focus on is of access and customer experience. There are many key points in real estate that VR solves for investors and renters. These

includes buying or renting a property site unseen, virtual tours of home, envisioning fix and flips and many more. So, VR is changing the real estate world. Here are some of the benefits of implementing VR technology in real estate business:

1. Virtual touring for homes and efficient selling:

The positive impact is the use of VR for touring homes while buying or renting the properties. Revolutionary software companies can now stitch together photos and videos taken with spatiality equipment provide an interactive and 360-degree rendering of space.

Years ago, for buying any property buyer has to go on that particular site. But now with VR technology buyer can see all the properties by sitting in their office itself using VR app and VR headset. The alluring and rich VR content gives the client real feel of walking around the house or property. Many real estate brokers are using VR in marketing strategy in order to gain high selling efficiency.

2. Transparency on products/service offer

With VR technology customers or client can have a cleared idea about the specification, material, services, amenities offered in the property. With this app you can select property of your choice on the fingertip. The app provides real time stats on your phone itself such as cost, current status, contact information etc.

3. Mobility

Using VR technology you can provide your client a cleared view of your property anytime, anywhere. You can show 360-degree view of your property to the client. It gives a fulfilling experience to the client.

4. More customer reach

With the mobile application of VR technology more customer can reach to your site. Development of mobile application gives ease of access to the customer or client. There is no easier way that this to reach the potential of the customers. You can easily develop your VR app.

5. Improved brand image

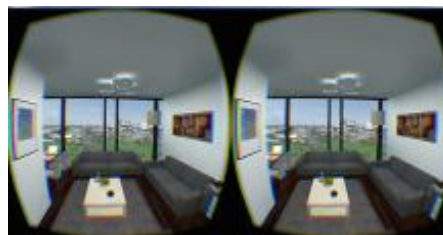
As you are providing something different and giving a lavish experience of your property to the customer on the fingertip & this will attract your customer and they can come to you again and again. In order to make search easier you will be able to scan a banner or any sort of printed material which has an integration of virtual reality in it.

V. CONCEPT OF VR APP

Views in virtual reality app can be like these,



(a)



(b)



(c)



(d)

Fig. a, b, c. Shows VR effect in cardboard view and d. Shows 360-degree view.

VI. CONCLUSION

There will be tremendous scope of VR technology in construction industry. Architects, planning engineer, marketing team can use these technology for making their work better and attracting customers. With the help of VR businesses can make shopping 100% personalized, provide exceptional service all around the world, also involves customer in product design. As a customer you can see different properties from digital catalogs from around the world, you can make faster and informed decisions. You can see the stats of that particular properties you wish to purchase in real time. As a real estate company you can showcase your schemes worldwide and stand out among the competition. VR and AR apps are currently fashionable among youth. So they can be a good advertising for any company engaged in business. So, there are clear indications of rise in VR and AR applications by construction, architecture and real estate market in the near future.

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