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MAKING COST EFFECTIVE WALKTHROUGH USING VIRTUAL REALITY

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Abstract: Virtual reality is becoming a trending technology and it is having a high technological growth. VR applications use various sensorial mediums for it's working, in-order to introduce high end devices with utilization of hardware components and to improve the quality and performance with minimum cost. In this technology we can quickly grasp its sense of real world by reducing the overhead of traditional walkthrough. In this many hardware and software tools are available in markets but, it costs too high and to operate these tools is more perplexing. The actual aim of this paper is to make walkthrough in VR more cost effective by using more affordable virtual boxes as it is easily available in the market and to reduce the financial overhead of experiencing a virtual walkthrough.

Keywords: Virtual Reality, Real Estate, Market, Head Mounted Display, Cost Effective, Performance, modeling

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I INTRODUCTION

Market of software industry has grown rapidly with a tremendous increase in new technology and portable devices being used. Though this is the case, smartphones are also being available at cheaper rate. Also smartphones supporting virtual reality through different sensors are easily available at low cost. The following paper suggests a way in which walkthrough in virtual reality can be experienced by an individual without using high end systems in an affordable manner. We are experiencing it through an untethered head mounted display and Bluetooth based remote control which is available in market at very cheap cost. User can experience the immersive feelings, as if they are actually walking in their own house or building.

II MARKET REVIEW

Market cost of Autodesk 3Dsmax application is expensive therefore newbie developers may not be able to afford this tool to develop 3D objects for virtual walkthrough. To solve this problem so that virtual walkthrough will be available for general mass of people tools like Unity 3D(personal) and Blender (which is open source and easily available) are being used. We are using untethered devices which are affordable and portable with current technologies. Tethered devices are expensive. The user of tethered device has to walk and take experience of walkthrough, but it may cause injury if the person hits the wall where an untethered devices providing cheap remote control based system which is affordable and very easy to carry anywhere.

User can remain static at one place and experience the walkthrough by using remote control access for virtual movement.

III COST ESTIMATION

The launch of several commercial VR head mounted devices, such as Google Cardboard and Oculus Rift, are enabling businesses to exploit and embrace the creative potential inherent in this innovative technology.

Client cannot afford high cost software and hardware tools because it is over budget and this problem has Caused many VR enthusiasts to restrict the use of this technology. The table 1.1 shows the software and hardware cost for developing virtual reality applications.

Table 1.1

Sr. No.	Device name	Type	Cost (Rs.)	Reference
1	Oculus rift	HMD	70,000	Amazon.com
2	Google cardboard	HMD	1000	Amazon.com
3	Samsung Gear VR Headset	HMD	4500	Amazon.com
4	Unity 3D (Personal)	Game engine	0	*unity3d.com*
5	Unity 3D (Plus)	Game engine	2375/month	*unity3d.com*
6	Adobe Photoshop	Software	1356	*adobe.com*
7	Bluetooth remote	Game Controller	500	Amazon.com
8	Blender	Open source 3d modeling	-	Bledner.org
9	3D max	3d modeling	102181	*autodesk.in*
10	V-ray	Render engine	118137	*chaosgroup.com*

IV AN INSIGHT INTO HMDs

If we look towards HTC vive in which we will get inbuilt hardware at the same time it is costly as compared to Google card board in which we will not get inbuilt hardware. We will write script for walkthrough within that we will set the position of the human movement and then wherever user looks, user starts walking in that direction. As we have smartphones containing sensors like accelerometer and gyroscope which helps to track the movement of our head. Depth perception inside an HMD requires different images for the left and right eyes. The smartphone within the HMD incorporate for positioning system that tracks the wearers head position and angle. Tracking the head movement from the perspective of the HMD allows natural interaction with content and convenient game play mechanism. The table 1.2 shows the various ways and combination in which VR applications can be developed.

Virtual Reality Box
Bluetooth Remote Control
Virtual Reality Box Internal Structure

Sr. No	Device name	Cost (Rs.)	Feasibility
1	Oculus rift + Unity 3D (Plus)	72375	Top graphics+ high Performance+ high cost
2	Google cardboard + Unity 3D (Plus) + Adobe Photoshop	4731	Good performance + Moderately high cost+ Easy to use
3	Samsung Gear VR Headset + Unity 3D(Plus)	6775	Good performance +Moderately high cost
4	Blender + Unity 3D(Plus) + Google cardboard	3375	Good performance +less cost+ Easy to use
5	Blender + Unity 3D(Plus) + Google cardboard + Bluetooth remote	3875	Average performance + slightly less cost+ Easy to use
6	Blender + Unity 3D(Plus) + Google cardboard + Bluetooth remote + photoshop	5231	High performance +slightly less cost+ Easy to use
7	3D max + V-Ray	220318	high Graphics + Good performance +Extremely high cost +Moderately easy to use
8	3D max + V-Ray + Oculus rift	295318	High Graphics + Good performance + + Extremely high cost+ Difficult to use
9	Blender + Unity 3D+ Google cardboard + Bluetooth remote	1500	Good Performance+ easy to use+ Very less cost+ controlled easily
10	Blender + Unity 3D+ Google cardboard + Bluetooth remote + photoshop	2375	Good Performance+ easy to use+ less cost+ controlled easily

V CONCLUSION

The proposed solution in this paper solves the issue of experiencing walkthrough in a cost effective manner which will be affordable for users to create virtual environment. The solution given makes use of a script instead of relying heavily on costly hardware and software.

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