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Prototyping and content creation for Web Virtual and Augmented reality.

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Abstract—Virtual and Augmented Reality has been used widely for creating static content to a dynamic immersive experience. But to create such form of content requires knowledge in 3D as well as programming, which makes it harder for people in other domains such as industrial designer, real estate, teacher's and professor's to generate their own content. This project will deal with all those aspects by providing a simple GUI desktop editor which can be used by anyone with zero programming experience to create their own Virtual and Augmented reality content, users are provided with feature's such as GUI editor, local server resource sharing, integrated HTC vive and oculus rift support and uploading to the cloud.

I. Introduction

The creation of 3D content for any platform is a tedious process, which involves basic knowledge in 3D programming as well as knowledge regarding those specific platform itself for example desktop, mobile, and other VR/AR platforms need a native application to display such content. The distribution of such platform consist of a downloading and installation process of the application itself causing each source of content to be present on the user's computer.

In the current system designers and engineers can use tools such as blender and cinema4D to render their 3D content but in order to display in application it will be difficult for them to export there 3D models. Support for different formats is also not provided in all of native applications to render 3D scenes too. Implementation of use cases such as 3D image viewer, 3D video, real estate showcase, educational purpose etc.

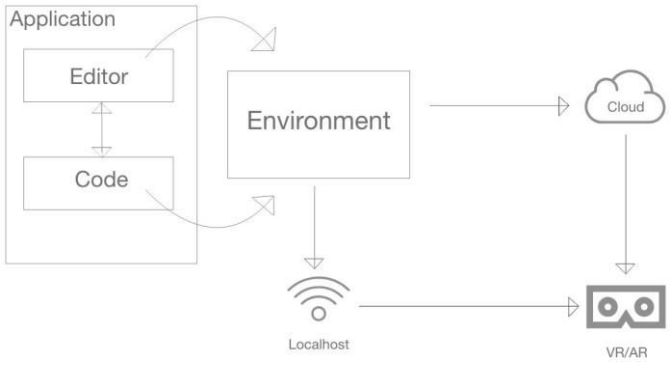

Fig. 1. Architecture Diagram

The proposed system consists of a cross platform desktop application which provides a 3D GUI editor which provides an interactive workspace which provides ease to the user. A code editor is also been provided which can be used alternatively by the users, the editor consists of basic HTML code using a 3D framework AFRAMEJS. With the ease and consistency of Aframe code it makes it easier for developer to make their own interaction.

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II. Present Model

Alexander Cardoso .[1] has implemented a working plat-form of an electric substation control center, where each sub-station is integrated with a supervision system, data acquisition and control center of a real electric energy company. The issue with a 2D model is that it isn't intuitive enough. The 3D aspect can provide a deeper immersion and intuitive interactions in order to support not only for training purposes, but also for real time application.

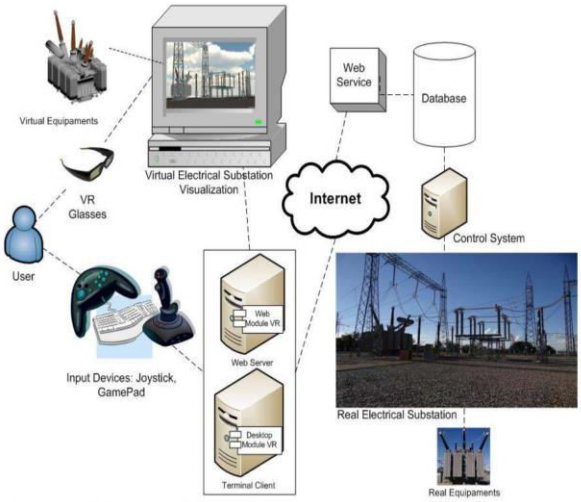

Figure 2: Schematic layout of the demonstration.

Fig. 2.

Aman S. Mathur .[2] made an immersive experience using hand interaction software running on PC integrated devices which presents a training environment where trainees are asked to perform simple and complex tasks such identification of organs to performing an actual incision.

M.K.D Coomans .[3] brought the issue in the design process involved in conventional CAD design system, for early con-ceptual design it doesn't provide a clear picture. The current limitations of current CAD systems for supporting design pro-totyping, and postulate the potential of functionally dedicated, task related, CAD modules in virtual reality as a means to

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Figure 1: The set-up used- Oculus Rift, Razer Hydra and a laptop

Fig. 3.

provide a unique form of a knowledge-based, visual design support environment for design prototyping support. Exploring Virtual reality as a potential design prototyping environment in which prototypes of designs can be constructed, communicated and visually evaluated at a high level of verisimilitude.

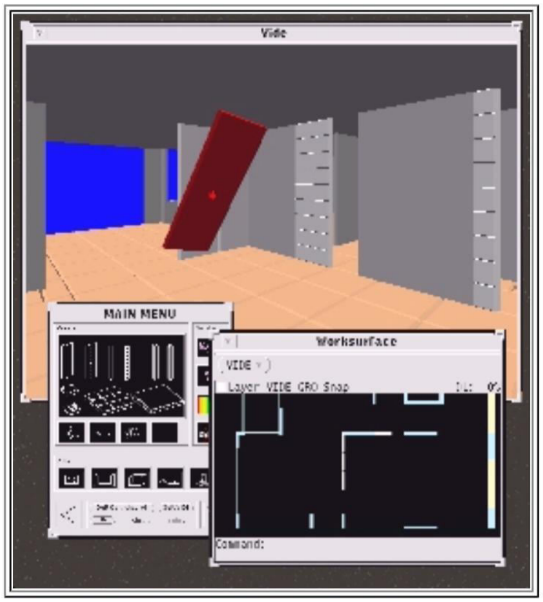

Figure 4: VIDE interface.

Fig. 4.

Dr. Abhishek Seth .[4] Produced the idea of virtual reality in assembly planning, in a product design process assembly planning is an important component where a well design as-sembly consist of factors such as assembly time and sequence, tooling and fixture requirements, ergonomics, operator safety, and accessibility, among other process, but with the existing tools to support virtual assembly relies on representation of the geometry of parts and fixtures and evaluation of clear-ances and tolerances of use simulated human mannequins to approximate human interaction in the assembly process. With virtual reality the integration of natural human motions into computer aided assembly planning becomes possible allowing a better evaluation of an assembler's ability to manipulate and assemble parts and result in reduced time and cost for product design.

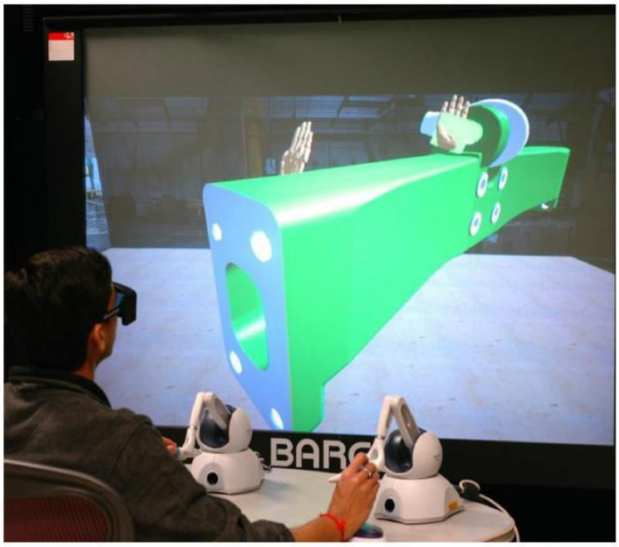

Fig. 8 Dual-handed Haptic Interface in SHARP

Fig. 5.

Steven Feiner .[5] Introduced the idea

Andries .[6] compares the conventional desktop graphics with that of a VR environment and explains how a participant in a VR environment feels that he or she is directly manipulat-ing active objects in the environment. The author states about the various features of VR workspace being multi modal, par-allel and responsive than conventional desktop environments and believes that VR systems are sufficiently beyond desktop systems because of a more compelling experience of being immersed in a synthetic and responsive environment. VR is proved to be superior yet it requires more resource demands than that of a normal desktop such as rapid update rates and minimal lag and ability to handle multiple input devices and human participants in parallel.

Nadia et al .[7]explains about the various techniques for integrating virtual human into virtual and real time environ-ments. It presents the concept of avatars and autonomous virtual actors, and the various techniques used create and animate them. The author explains the concepts of behavioral animation, crowd simulation, intercommunication between virtual humans, and interaction between real humans and autonomous virtual humans. It covers the usage of Virtual Hu-man technology in Virtual Heritage, Social Phobia, Training, and Health Emergency.

Mario et al .[8] has outlined a CAD and VR system independent workflow for an automated model complexity reduction, animation and kinematic mechanism adoption. It is achieved by defining light weighted system light weighted system interfaces and showing solution concepts for each area

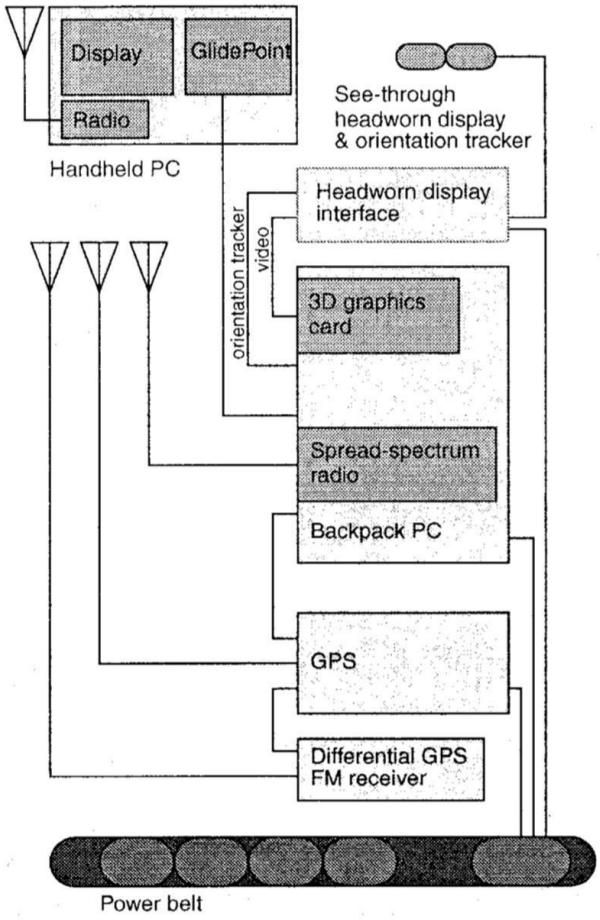

Fig. 6.

of the conversion problem. The research also explains that workflow for converting CAD into VR is extremely complex and is too costly to utilize. Thus, the inhibition threshold for the utilization of VR technology by Small and medium enterprises can be lowered only by simplifying this workflow by automating the conversion process.

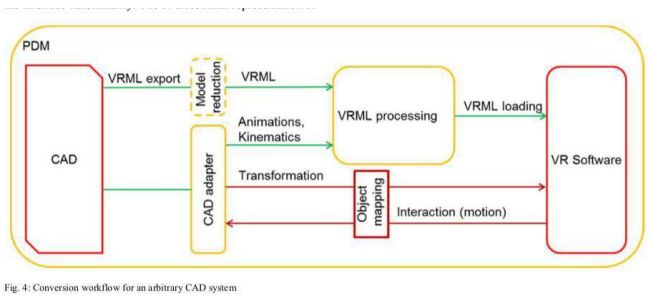

Fig. 4: Conversion workflow for an arbitrary CAD system

Fig. 7.

M.K.D Coomans .[9]constitutes a frame for the integration of partial taxonomies of human computer interaction that are found in the literature. It tells about the rising attention about VR in both scientific and business community. It implies that the availability of larger amounts of worldwide information raises the problem of how to use this data efficiently. It regards VR as the most promising solution for the problem of the amount of information. The author explains how users no longer have to shift their
attention from what they want to do.

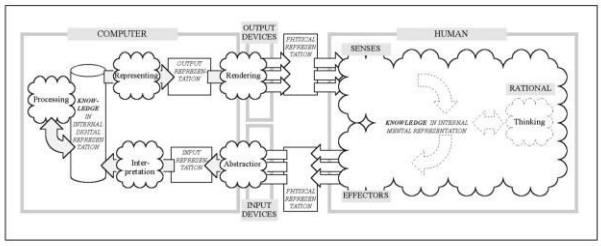

Figure 1—A decompositional model of human-computer interaction

Fig. 8.

Steve .[10]discusses the various advancements and failures faced by VR in the modern day environment. The research tells us about the generation of a great deal of interest ranging from respectable research and investment to outright hype. It also points out the failures that are dealt with VR as it is claimed that it was not as useful as expected. The interest is particularly based on inherent three-dimensional structure of virtual reality both in terms of display and interaction. The useful interface provided by application design in virtual has proved to be different from the design in context of three-dimensional computer graphics.

III. PROPOSED MODEL

This App lets anyone to create a VR/AR applications. You don't need specialized programming or 3D graphics expertise to get started. You can create, edit, and publish applications with a web browser using the editor. The App makes it easy to design scenes that immerse your users in 3D, life like surroundings that are populated with 3D objects and animated characters. You can import 3D objects and select from pre-loaded scene templates. The code editor consist of the editor scene and the live 3D scene, any edits in the code editor will directly reflect changes back to the scene editor itself. The code editor consist of HTML code of a library called Aframe.js. Aframe is based on HTML component system where when each component gets parsed in to a specific JavaScript code to display the 3D scene. The publishing system consist of option, the first is that a user can serve and share their VR/AR content over localhost server to a LAN network where each device present on the network can access it and the second option is the cloud import service where the user can upload their VR/AR scenes on the cloud, a unique URL will be generated which they can share with other users too. It will be supporting all the major 3D formats currently used as industry standard like .obj, .gltf and collada models. As the application will be viewed on a web browser it will automatically have all the support from the browsers from android, ios, windows, macos, linux, magic leap and playstation VR the issue of accessing a content by downloading and installing it on a specific native environment

will be removed as the application itself will be served on a

web interface and can be accessed with the URL.

IV. Conclusion

From the analyses of the above implementations it can be concluded that the implementation of virtual and augmented reality is widely used in different industries such as industrial design, education etc. For content creation there is the need for a one step solution to for users in the design field as well as the development field.