Survey on Implementation of Virtual Reality in XD Based Environment

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Abstract-*It is a virtual reality based concept in which application has been created it is used in a virtual reality environment for virtual tours which has been increasingly recognized as an alternative to traditional real life tours for university campuses. The proposed concept hold three steps of processes. The photographic images will be created using image acquisition followed by selection of tools which can be operated using bluetooth and then quality of virtual reality will be analysed using fuzzy logic. The virtual reality of a campus can be viewed by the user with the help of a VR headset and smartphone. This virtual reality for campuses can be used for both indoor and outdoor navigation. The outcome of virtual reality will be interfaced with the computer to check the responses of the field experiments.*

Keywords-VR Headset, Fuzzy Logic

I. INTRODUCTION

The project is about survey on virtual reality. The concept is to make an application for PITS regarding campus tour which can be implemented using VR Headset. Some places in PITS will be taken in a panaromic view. For ex, if a person is viewing a place in VR Headset on left side, that position will be having some sensor values. So each and every position in photo will be having some sensor values.

II. LITERATURE SURVEY

Many types of virtual reality (VR) systems allow users to use natural, physical head movements to view a 3D environment.

In some situations, such as when using systems that lack a fully surrounding display or when opting for convenient low-effort interaction, view control can be enabled through a combination of physical and virtual turns to view the environment, but the reduced realism could potentially interfere with the ability to maintain spatial orientation. One solution to this problem is to amplify head rotations such that smaller physical turns are mapped to larger virtual turns, allowing trainees to view the entire surrounding environment with small head movements. This solution is attractive because it allows semi-natural physical view control rather than requiring complete physical rotations or a fully-surrounding display. However, the effects of amplified head rotations on spatial orientation and many practical tasks are not well understood. In this paper, we present an experiment that evaluates the influence of amplified head rotation on 3D search, spatial orientation, and cyber sickness. In the study, we varied the amount of amplification and also varied the type of display used (head-mounted display or surround-screen CAVE) for the VR search task. By evaluating participants first with amplification and then without, we were also able to study training transfer effects. The findings demonstrate the feasibility of using amplified head rotation to view 360 degrees of virtual space, but noticeable problems were identified when using high amplification with a head-mounted display. In addition, participants were able to more easily maintain a sense of spatial orientation when using the CAVE version of the application, which suggests that visibility of the user's body and awareness of the CAVE's physical environment may have contributed to the ability to use the amplification technique while keeping track of orientation. [1].

Virtual tours supply information via multimedia, giving users the impression they are navigating locations and experiencing them in real time. Successful tours provide an experience such as visiting the actual location. This is accomplished by using characteristics which realistically represent the place, giving a uniform environment which makes the virtual and real one almost indistinguishable. Characteristics such as: exact imagery or representation of objects, accurate layout, major land marks, available facilities, interactivity and the ability to freely navigate in the virtual environment. Virtual touring can be used for more than just the novelty of visiting places remotely in a digital environment but it also can be used as a medium for promoting facilities through engaging and immersive interactive experience. For a site such as university campus, potential students and visitors in particular, often struggle with the layout of facilities and spend a lot of time lost. Satellite navigation systems have successfully assisted with this issue for many years now, alongside other technological advancements such as Google Maps (google.maps.com). These solutions however, only work in the open air environment; there is still need for a solution for Interior navigation.

The advancement of game technologies have now made it possible to create realistic, highly interactive environments at an affordable and relatively quick production time. This paper investigates into the use of game engines to develop a highly interactive virtual campus tour application. There is a discussion into the approach taken and the challenges faced with this solution to the navigation and exploration of interior of buildings. Section II describes the common virtual campus tour solutions that are currently in use by most of the UK Universities[2].

Navigation systems have been widely used in outdoor environments, but indoor navigation systems are still in early development stages. In this paper, we introduced an augmented reality-Based indoor navigation application to assist people navigate in indoor environments. The application can be implemented on electronic devices such as a smartphone or a head-mounted device. In particular, we examined Google Glass as a wearable head-mounted device in comparison with handheld navigation aids including a smartphone and a paper map. We conducted both a technical assessment study and a human factors study. The technical assessment established the feasibility and reliability of the system.

The human factors study evaluated human–machine system performance measures including perceived accuracy, navigation time, subjective comfort, subjective workload, and route memory retention. The results showed that the wearable device was perceived to be more accurate, but other performance and workload results indicated that the wearable device was not significantly different from the handheld smartphone. We also found that both digital navigation aids were better than the paper map in terms of shorter navigation time and lower workload, but digital navigation aids resulted in worse route retention. These results could provide

Empirical evidence supporting future designs of indoor navigation systems. Implications and future research were also discussed.

On the machine side of indoor navigation systems, the most important goal is to achieve accurate localization. Compared with outdoor cases, indoor navigation faces a lot of technical challenges such as non-line-of-sight conditions, high attenuation and signal scattering, greater concentration of physical impediments, transitory environment changes, and higher demand for accuracy. To address these challenges, different technologies have been introduced with various levels of accuracy, cost, and scalability. In order to find a suitable navigation technology for a particular application, designers need to align the performance parameters to the requirements of the users[3].

Virtual Reality (VR) has come up as a pinnacle ofthe ground breaking advances in computing power through developments in fields of electronics, software and mobile computing. It has been a topic of significant research and studies in recent years, given that 2016 is widely predicted to be the year where VR finds acceptability and affordability in main stream consumer market. VR systems were first introduced to target entertainment and gaming, but numerous research and studies have shown its importance in educational purposes. There is a great potential in Virtual Reality Environments to serve as teaching aids in complementing and improving the education process. In spite of that, it is held back due to their bulky systems, complex setups and high cost, which limit their usage in versatile scenario. This study is being taken up to devise a solution that can address these problems using portable and simple VR setup with affordable hardware. The system used here takes help of Google's 'Cardboard' platform to provide the structure for Head Mounted Display while the display is provided by any smartphone that can be put inside the frame. This setup, other than being very easy to operate, is extremely cost effective and portable at the same time.

This study aims to measure the feasibility of using the above mentioned VR system to improve the teaching process and the effect of this system on learning outcome. Through our experiments we intend to establish that such a setup is preferred by students for regular usage and improves their cognitive learning and participation.

Traditional education has always been language-based,conceptual and abstract creating a distance from practical learning, which results in a lack of deep and robust understanding of the subject matter. The revised Bloom's Taxonomy of Educational Objectives identify six levels of hierarchy in cognitive expertise, ranging from 'Remembering' at the low end, to 'Creating' at the high end. Common teaching processes are rarely found to address more than the first three levels of this hierarchy.[4].

Visualizing and working with large scale scientific image data can benefit greatly from advances in consumer Virtual Reality and game development tools, but presently only limited applications have leveraged these. We present a set of techniques for mapping scientific images and data manipulation tasks into virtual reality applications with an emphasis on short development time and high quality user experience. Existing techniques often require large teams todevelop applications that suffer in quality or require extensive development time. Using off the shelf Virtual Reality hardware and freely available development tools we present a set of techniques for making immersive and interactive data visualization and manipulation applications. We demonstrate these techniques with a series of Virtual Reality apps to produce high quality immersive applications in incredibly short periods of time.

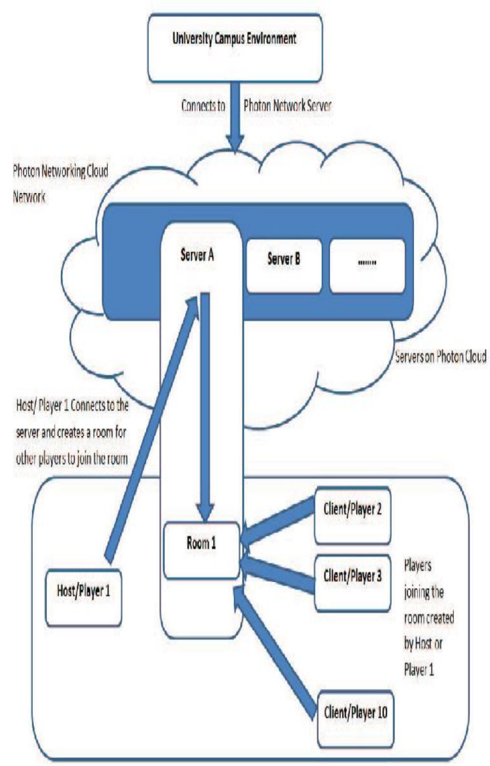
These applications show large datasets and extracted high level information geared towards image understanding. We illustrate that these techniques can be integrated into existing data acquisition, image processing and machine learning work flows. With these techniques we hope to encourage future development of scientific applications for emerging Virtual Reality platforms.

VR presents new methods for not only observing data, but new means of interacting and manipulating data in 3D. The Unreal Engine supports a wide array of peripherals, and common locomotion schemes. Standard keyboard and controller inputs work with no need to configure anything. These schemes are relatively intuitive and users with any experience with games can operate the controls with minimal instruction. Motion controls allow for even more natural interaction and manipulation of 3D data. With motion controls like those of the HTC Vive, users can physically grab and move meshes in the VR application just as they would grab a real object. This allows users to do things like view a region on the globe by spinning it, or looking closely at a specific part of the map by bringing it close to their face. This control scheme is now supported by a free plugin in the Unreal Engine, making it easy to implement.[5].

The use of a collaborative virtual reality environment for training and virtual tours has been increasingly recognized an as alternative to traditional real-life tours for university campuses. Our proposed applications hows an immersive collaborative virtual reality environment for performing virtual online campus tours and evacuation drills using Oculus Rift head mounted displays. The immersive collaborative virtual reality environment also offers a unique way for training in emergencies for campus safety.

The participant can enter the collaborative virtual reality environment setup on the cloud and participate in the evacuation drill or a tour which leads to considerable cost advantages over large scale real life exercises. This paper presents an experimental design approach to gather data on human behaviour and emergency response in a university campus environment among a set of players in an immersive virtual reality environment. We present three ways for controlling crowd behaviour: by defining rules for computer simulated agents, by providing controls to the users to navigate in the VR environment as autonomous agents, and by providing controls to the users with a keyboard/ joystick along with an immersive VR head set in real time. Our contribution lies in our approach to combine these three methods of behaviour in order to perform virtual evacuation drills and virtual tours in a multi-user virtual reality environment for a university campus. Results from this study can be used to measure the effectiveness of current safety, security, and evacuation procedure for campus safety.

The quick evacuation of occupants in a building and movement of people in threat situations are very critical to save lives. It is readily discernible that during such crises an evacuee is most likely not to think clearly and logically which can result in a disorganized evacuation leading to injuries, confusion, and even death. This paper focuses on Modelling simulating evacuation drills in real time in a multi-user environment.



A multi-user environment is developed by connecting users to a configured Photon server. Photon is areal-time multiplayer game development framework which has server and cloud services. [6].

(VR) will be a profoundly disruptive technology in the same way as the Smartphone and the Internet. Like the Smartphone, VR uses anew interface format (a head-mounted display and hand controllers) to provide much more intuitive and natural access to a computing device. Much like the Internet, it allows a new kind of worldwide communication but this time with a natural human experience that will be nearly indistinguishable from standing face to face or in a group. The combination of these two capabilities, along with a price point similar to the first smart phones, suggests that we will see an adoption curve similar to that of the Smartphone, with a majority of worldwide Internet users making daily use of VR in the next seven to ten years.

VR technology has been demonstrated multiple times inprior years, in ways that were nearly as compelling as the currently available Oculus Rift, HTC Vive, and Samsung Gear VR devices. The big difference this time has been driven by the intense competition in the Smartphone market to reduce the size and cost of orientation sensors and high-resolution displays to finally make these research devices available for consumers.

The same advances have made light weight wireless handheld controllers that track the motion of the hands and/or fingers with very high accuracy possible. Another factor that has changed is Internet speed and latency. One-way Internet transmission times, even half-way around the world, are now short enough to allow two people to talk face to face as digital avatars without being able to detect the delay, making communication completely natural. This level of interaction had to wait for Internet speeds and routers to reach their current levels of performance, which are now close to the limits set by the speed of light. [7].

Just recently, the concept of augmented and virtual reality (AR/VR) over wireless has taken the entire 5G ecosystem by storm, spurring an unprecedented interest from academia, industry, and others. However, the success of an immersive VR experience hinges on solving a plethora of grand challenges cutting across multiple disciplines. This article underscores the importance of VR technology as a disruptive use case of 5G (and beyond)harnessing the latest development of storage/memory, fog/edge computing, computer vision, artificial intelligence, and others. In particular, the main requirements of wireless interconnected VR are described followed by a selection of key Enablers; then research avenues and their underlying grand challenges are presented. Furthermore, we examine three VR case studies and provide numerical results under various storage, computing, and network configurations. Finally, this article exposes the limitations of current networks and makes the case for more theory, and innovations to spearhead VR for the masses. [8].

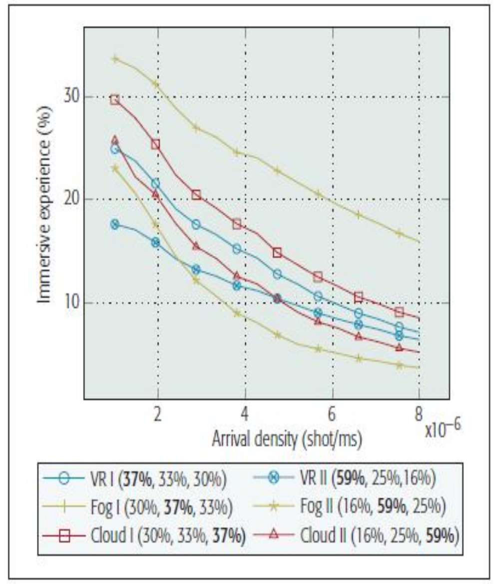


Figure .Evolution of the immersive experience

with respect to the load, with different configurations of VR, fog, and cloud-centric computations: VR I (Cvr = 2 □3.2 GHz), VR II (Cvr = 1 □3.2GHz), Fog I (Cfg = 256 □4 □3.4 GHz, Lwi =1024 Mb/s), Fog II (Cfg = 16 □4 □3.4 GHz,Lwi = 256 Mb/s), Cloud I (Ccl = 1024 □4 □3.4GHz, Lba = 512 Mb/s), Cloud II (Ccl = 128 □4 □3.4 GHz, Lba= 16 Mb/s). The triple given in the legend represents the percentage of tasks computed at the VR devices, fog base stations, and cloud, respectively.[8]

Some universities and schools have offered virtual courses to their students as part of their official curriculum. Online learning is a coherent approach for contemporary education; however, some studies show it has some weaknesses that could be addressed to enhance its potential. In this paper, we argue how virtual reality improve online learning in some aspects, such as giving students the sense of presence in an immersive world, and bringing a new way to interact with colleagues and Teachers when they are not in the same place. We also discuss the role of WebVR as an open platform to bring new possibilities to explore virtual reality worlds in education.

Distance learning is an educational model used for decades, such as books and lessons sent by mail post early in 70’s.

However, the progress of information technology and the spread of Internet access have created a new milestone for distance learning. Nowadays, many official curriculums from universities and schools use virtual classes to mitigate the distance problem, making them available to a wider audience, even reducing costs. In Brazil, the Ministry of Education has allowed universities to explore virtual classes, at a maximum of20% of their curriculum, in traditional undergraduate courses. It is worth mentioning that some non-traditional under graduate courses have their curriculum 100% online.

Fig. Screenshot of students' Google Cardboard screen

Blended learning is a potential approach to align teaching perspective with new generation of students as well as creating a more inclusive educational model. [9].

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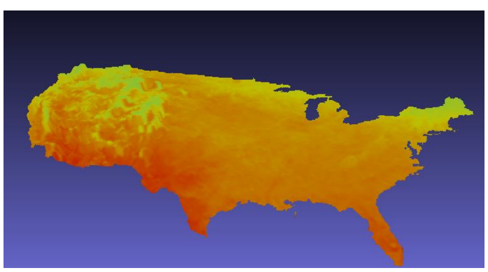

Fig: The generated model of the conterminous USA

We demonstrate these techniques with a series of Virtual Reality apps to produce high quality immersive applications in incredibly short periods of time. These applications show large datasets and extracted high level information geared towards image understanding. We illustrate that these techniques can be integrated into existing data acquisition, image processing and machine learning workflows. With these techniques we hope to encourage future development of scientific applications for emerging Virtual Reality platforms.

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III. CONSLUCTION

In this paper are analysis of different type of virtual reality and the concept is to make an application for PITS regarding campus tour which can be implemented using vicer mount.

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