Projected Virtual Reality Technology In Hotel Management

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Abstract. Virtual Reality (VR) and Augmented Reality (AR) with its exceptional qualities fascinate numerous researchers and professionals to involve in develop- ment of new standards and applications. The applications of VR and AR are pre- cisely proven their quality exclusively during the process of planning, marketing, education, and tourist sport preservation. Virtual Reality has been become as the important role of human computer interactions and it has the great power to target a large amount of the applications, such as in hotel marketing management, mil- itary, medical field etc. In this project, the VR with wireless combined and ap- plied research on the virtual reality technology in the hotel management. The designed VR projector model is projects the name of the dishes in the table such as idly, dosa, coffee, etc. by simply touching on the visible light dishes names itself, it's considering as ordering of the touched dish items by sending the cor- responding sync value to the kitchen with the help of buzzer sound and mentioned with table number. Such that they can prepare and make ready for the ordered dish to the respective tables.

Keywords: Hotel Management, Virtual Reality technology, WSN, Buzzer.

1. INTRODUCTION

Virtual Reality (VR) and Augmented Reality (AR) are considered as the common world-building future technology of 21st Century. The simulation of human senses with the digital images, immerse the sense that partly admits the VR/AR as another real version of reality. VR and AR are employed for the generation of rigid three dimen- sional (3D) interactive visual experiences for all applications. At the International Tourismus-Börse 2017 (Europe), the VR/AR contents were demonstrated by several tourism technology providers, illustrating the sightseeing locations. These generations are sort of organizations that provides gratification in responsibilities from destination, customers and hospitality providers, and some grants a Content Management System (CMS) to travel agencies that they may utilize to design their private VR for the consumers. The virtual reality is most opted technology that suits well for the hospital- its and tourism industries for its most salient effect of pretending the human sense by providing interacting three-dimensional environments and provides a belief of being present in a virtual world. The simulation results of VR can depict any virtual tourist

locations that were created and controlled by the 3D imageries of the computer. The user on utilizing the VR, pretends to be in the virtual environment and the VR is con- sidered as the communicating element between the user and the virtual environment. As per Grand View Research Inc report on May 2017, the VR industry is anticipated to earn 692 billion US dollars by 2025 and the VR industry will be widened from tourism development and more applications. VR is attracting the concentration of leading tech- nical tycoons like Google, Microsoft, Face book, HTC and had developed their indi- vidual model of VR Head-Mounted Displays (HMDs). AR is an amalgamation of the environment of real world and the virtual world, to supply data to the users portrayed in the implicit environment. To picture, a user can view an art or a system in the original environment; grasp the smart computing device before the target point, to visualize the additional useful information associated with it, thus known as augmenting reality. The additional information of the painting could be about the painter and the techniques employed in painting whereas the additive information about the machine is to view the sectional view and to replace the damages part of the machine. AR technology is a highly revolutionizing one that makes possible for a tourist to plan and preview the desired location; he is willing to visit from the place where actually he is present. In addition, the tourist can also access additive information like hotels, restaurants, places to navigate using the AR technology. This eases the tourist to navigate easier and to plan for the tour before ever starting the journey. This is made possible by downloading and accessing the app in our mobile device. The first ever AR enables Smartphone was launched in the marker on 2009, to provide the features of travel supervision, and amusement to substantial locations via the computing camera.

The striving mobile application developed specifically for tourism was "Tus- cany+" which is an "interactive, real-time guide" with an aim for improvise the tourist familiarity. The interactive real time guide provides better experience and this is made possible by the AR technology by adding a layer to the digital enhancements over the real-life scenario. The Virtual Reality is defined as the simulated environment of a 3D image that interacts with the user with special computing equipment. It is a virtually created environment which could replicate the "real" world. The term Virtual -Reality is associated with an American Computer Artist, Myron Kruege and the french artist Antonin Arnaud, he who proposed the phrase during the presentation of his theatre shows which could be virtually communicated to the audience and has been recorded during the year 1939. The first virtual reality equipment was developed by Morton Heilig in the later 1950s, which endeavoured to understand the concept of virtual real- ity. This had created the Sensorama machine that has a motion-controlled seat, embed- ded with 3-D motion-controlled images along with the additional factors of smell, sound including the wind speed. Thus, the applied virtual reality technology is based on the hotel management. Numerous implementations of interactive facades have inac- curate detections and were employed a non- portable camera for sensing the environ-ment. This proposed system employs RGBD sensor in place of camera to overwhelm the pitfalls of imprecision detection caused by the poor decree employing the regression analysis method. The execution of Touchless touch plane utilizing the VR involves complex calibration with non-satisfactory results. It is not easiest process to install the wall mounted button in the particular location and the notable drawback is the non- easier changing button labels and its types. The UX is improved when there is a devia- tion in the location of installations, changing labels and its types. Thus, the applied virtual reality technology is based on the hotel management. The virtual reality yields an advantage of hotel booking, site seeing, navigation and improves the tourism domain exponentially.

2. RELATED WORKS

The universally accepted definition of VR is real time simulation of the environment with the simulation of computer aided 3D environment. The VR has a capacity of ease navigation and provides interaction between the machine and the user [1]. The three predominant factors to characterise virtual reality are:

- Visualization, through which the user can view the virtual environment through computing device.
- Immersion, the physical explanation of virtual substance around the environment.
- Interactivity which is the quantity of direct on knowledge, usually attain using sensors [2].

Driving dual common terms identified in the VR research are Virtual Environ- ments (VE) and Virtual Worlds (VW) and narrated the performance of VR as the user being immersed in a virtual environment. The phrase is used in their study [3] on the development of tourism education by employing virtual environments. Moreover, the structure of the study narrates the characterizing concepts of VR. The VR being a non- technical term, the research ranges widely milder [4], to the most immersive form of VR- virtual worlds [3]. Implicit environment are narrated to be tenacious, open 24/7, and empowering people stewarded by avatars (a personal representative in the three dimensional format) for design, operate, and communicate among the user and ma- chine. [5][6]. At present, the most effective virtual world programs are Second Life, an internet-based virtual world where avatars socialize, interface, and build their individ- ual virtual locations [7]. Founded in 2003, Second Life claims 36 million inhabitants with more than 1 million existing users monthly. For the past 1 decade, the activities within the virtual world economy doubled to USD 3.2 billion [8]. The growth in popu- larity of virtual worlds has not gone unrecognized in the tourism industry in the leading countries like Sweden, Maldives, Estonia, Kazakhstan, Serbia, and Italy. These coun- tries have virtual embassies adjacent to hospitality organizations like Starwood, Hyatt, STA, and Crowne Plaza in the Second Life virtual world [9]. Genuine tourism sections range from re-creations of Paris' Eiffel Tower and Arc de Triomphe de l'Éʹtoile to Kenya's Maasai Mara villages which avatars can explore, wander throughout and com- municate with users [10]. Much like reality, the social character is noticeable, where the avatars have the capability to progress to these demonstrations in groups and com- municate with other avatars present at the site. The tourism education is exchanged in Second Life, with The Hong Kong Polytechnic University's School of Hotel and Tour- ism Management organizing a virtual campus on the platform (Penfold, 2009). This is exciting due to procuring land to establish places like embassy and campuses with the virtual background that necessitate the earning of revenue. In place of infinite sandbox, Linden Lab represents acquiring places related to leasing location in data servers, with adequate location makes more revenue expenditures. This means that these organiza- tions, educational institutions, and supporting objects of tourism to review the perfor- mance and revenue to be valuable asset. This indicates the augmenting significance of virtual environment in the tourism industry and research results persists to be insuffi- cient [11].

3. PROPOSED SYSTEM

The Human-Computer Interaction (HCI) or Human-Machine Interaction (HMI) is a study of relationship between the user and a system. The user generally refers to the human being whereas the

system refers to any type of machine that includes computers, Smartphone or any computing device. The system is not only restricted to the hardware, but extends to software that acts as an interface between the user and the system. The software used here were special purposed and were designed to perform a particular task and in addition, the software acts as a communication language that the machine can understand. The HCI interface has a simple visible part which is very small like a home button in a smart phone, whereas the real backend panel extends larger similar to a control panel board of an aircraft. This complex panel board is minimized for the user-friendly model and the design must concern about the usability user-friendliness. The block diagram of the propose system is given in figure 1.
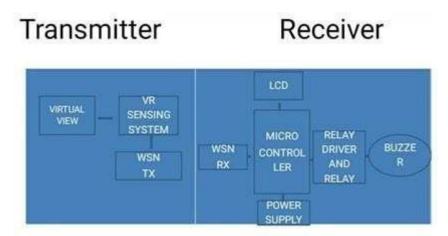

Fig. 1. Block diagram for proposed system

In this project, a 1-D VR technology based on hologram model is used to command the concerned devices. The Virtual Reality technique is used to diffract light rays into dig- ital image and comprises of both the material used for encoding and the resulting digital image which is referred to be a clear view digital image. A holographic image can be viewed in the projector screen by passing the laser through the VR. Typically, the VR is a light field recorded in the photographic pattern, which can be visualized with nor- mal eyes without the aid of any special lenses or glasses[12]. Dynamic Vision Sensor (DVS) identifies the materialistic variation of illumination and possess the rapid reaction time when correlated with the tradition sensors that works on frame-oriented principle and also distinguishes the static brightness per of each and every digital frames[13]. The pro- posed system is a design of concurrence sensing employing the Dynamic Vision Sensor (DVS) to investigate the object by evaluating the spatial data of the reflection of the excessive light origin which will be displayed on the screen. Besides, the proposed model employs the pattern recognition method the performs time domain analysis of the reflection for bypassing the false concurrent identification added through the exter- nal faulty recognition sources like external light sources, noise and air. The Multi- Touch sensing method, which is are purposely designed for LCD displays to overcome the effects of e expensive displays. RGBD sensor have a capability to overcome the pitfalls of inefficiency in identifying the pattern in moderate resolution regression ex- amination and thus list of items will be displayed on the screen so that it satisfies the customer. Numerous implementations of interactive covering have numerous inaccu- racies in detection are the motionless camera have been used for sensing purposes. The practice of a projectable scratch surface employing a VR is known as the Touch less Touch with complex calibration functions and poor results for repetitive trials exam- ined. In this project, the VR with wireless combined and applied research on the virtual reality technology in the hotel management. The designed VR projector model projects the name of the dishes in the table by simply touching on the visible light dish names itself, it's

considering as ordering of the touched dish items by sending the correspond- ing sync value to the kitchen and mentioned with the table number. The modules are summarized as:

3.1   Vr Mounting Module

VR Mounting module is capable to install the entire structure on VR, a light, the rigid and movable stand for mounting the camera was described. The devices are to be placed firmly in a particular location to prevent the risk of falling down during the motion.

3.2   Device Integration Module

The device is programmed to project and display the interactive screen on detecting human in a predefined radius of area. On detecting the human in the coverage radius, the display has a drift from operating as a motion VR so that the projector can display the interactive screen for the operating user.

3.3   Calibration Module

The calibration of the settings is needed to position the VR Projector at a certain circle of a radius in a line such that the property of projection plane and user is to be visible. The programme instructs a user to enable the multiple endpoints of the projection so that the food could be ordered automatically, and the order will be sent directly to the kitchen for respective tables.

3.4   Testing VR module

A huge area is drafted to the tiny extended area, where the false detection of the user may occur due to improper assumptions. This parameter holds predominant to avoid false detection that covers the fast movement of the cursor for a small displacement of the user's hands and thus this process will become a tedious process.
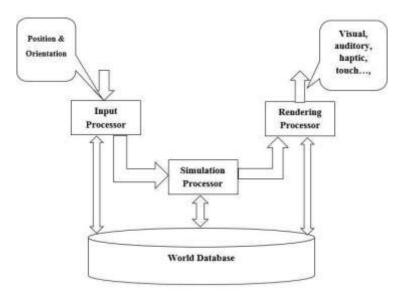The system architecture is illustrated in figure 2.

Fig. 2. Architecture of VR System

The components of the proposed system are:

a) **Input Processor**

The main function of the input processor is to accept the input information from the user and to coordinate the data to the rest of the system. Thus, input is based on the previously collected information.

b) **Simulation Processor**

The simulation processor carries the input data to the entire necessary task through the bus with a target of simulating the code that is pre-programmed to map the real world's actions to the virtual world actions. This method, overcomes the limitation of low-res- olution image or data from being processed so that to avoid obtaining the false results. The regression-based method is a simpler and practical method and is proved to be more accurate than the existing methods.

c) **Rendering Processor**

Where the original view is interacted with the virtual view and result produce a virtual reality world were human and computer are interacted to each other and produce the output based on the user needs. This process is said to be a rendering process as shown in figure 3.
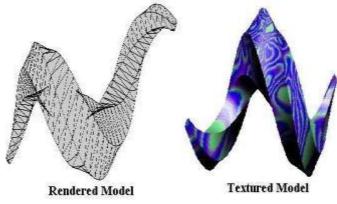

Fig. 3. Rendered model

d) **World database**

The world database is a repository of related objects that stores the scripts and described actions related to those scripts. The world database is a location, where all the details are collected for the execution of programme and for future references.

4. IMPLEMENTATION RESULTS

This section presents the implementation results of the proposed system. Figure 4 and 5 depicts the system layout and components of the system. Whereas, figure 6 shows the VR display on the table.
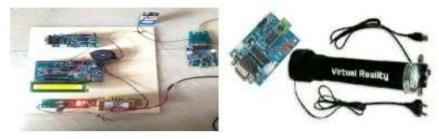
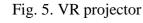Fig. 4. System layout   Fig. 5. VR projector

Fig. 6. VR display on the table

In this project, the VR with wireless combined and applied research on the virtual real- ity technology in the hotel management. The designed VR projector model projects the name of the dishes in the table by simply touching on the visible light dishes names itself, it's considering as ordering of the touched dish items by sending the corresponding sync value to the kitchen and mentioned with the table number.

5. CONCLUSION

The proposed system named Image-Projective WALL mounted Buttons was designed for the purpose of employing the system in rescue purposes. This system comprises of a projector and RGBD sensor, and VR Projector. The Regression-based touch identifi- cation which is proved to be more accurate and robust method than the existing models is implemented such that the model is employed as a communicating model between the human to the system. This interface accepts the user input and in turn provides the machine response to the user. The analysis of the proposed model proves that it over- comes the pitfall of handling low resolution data. A system named Image-Projective WALL mounted Buttons is designed and tested for applying the system in rescue pur- poses. It consoled of a RGBD sensor and VR Projector along with the Regression-based touch detection so as to perform as a communication device for the human to the ma- chine. The regression-oriented model is more robust and precision free performance along with the user friendly and simple to handle mechanism. The model is constructed to overcome the disadvantage of handling own resolution data. The utilization of RGBD sensor thrives the performance of the system due to depth sensing property and provides the detailed information in per-pixel basis.

6.   REFERENCES

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