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Augmented Reality For Museum Tourism Using Internet Of Things

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Augmented reality (AR) has been used in the last years as a weapon for enhancing co-operation between the real world and virtual environments. The goal of this work is to develop an android application which will raise the value of tourist on-site experience in an innovative way via AR technology. This survey will especially focus on museum tourism. Museum consisting of distinct sections faces difficulties of tourist management. If guides are not accessible this application can take place of human guide. In historical section of museum, one can scan the 2D image of object and can gain its 3D view along with its information. In music section, tourist can scan the image of singer and application will play famous melodies related to that singer. This data will be stored on the Cloud. This application is done by using well known technologies such as Unity 3D and Vuforia. Usage of such tools and technologies gives great opportunity to convert imagination into reality.

Keywords— Augmented Reality, Augmented Reality based 3D display, Augmented Reality based Music Player, Cloud Computing.

I. INTRODUCTION

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose graphic representation are augmented (or supplemented) by computer-generated sensory input such as sound, video, computer graphics art or GPS data.

Augmented reality apps are written in distinctive 3D programs that support the developer to unite animation or contextual digital information in the computer system to an augmented world "marker" in the real world. When a computing device's AR application or browser plug-in receives digital information from a known marker, it begins to execute the marker's code and layer the correct image or images.

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is also known as the computer term, Kudzi 3.0. It is related to a more general concept called mediated reality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality. By contrast, virtual reality replaces the real world with a simulated one. Augmentation is conventionally in real time and in semantic context with environmental elements, such as sports scores on TV during a match. With the help of advanced AR technology (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Information about the environment and its objects is overlaid on the real world.

This information can be virtual or real, e.g. seeing other real sensed or measured information such as electromagnetic radio waves overlaid in exact alignment with where they actually are in space. Augmented reality brings out the components of the digital world into a person's perceived real world. One example is an AR Helmet for construction workers which displays information about the construction sites.

II. PROPOSED SYSTEM

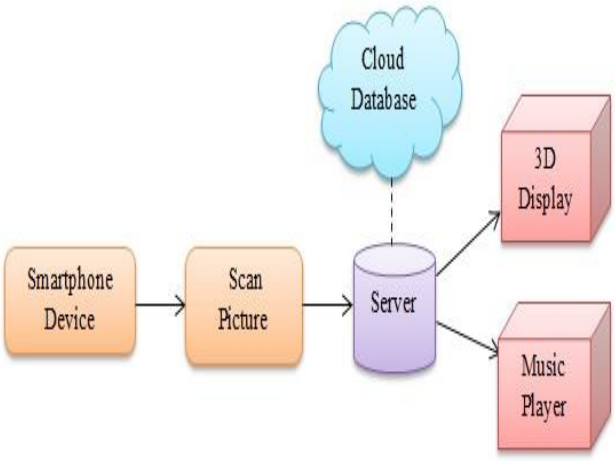

Fig.1. System Architecture

In proposed system, we have used predefined markers for recognition. As shown in above Fig.1. User scans marker image through his/her smartphone device. System will scan the marker and process to system server. All data is stored in cloud database. System server checks cloud data for corresponding visuals and displays the 3D view of available information. If user scans the marker and if its related music is available then system will start music player and play the music. If no information is available in database, then system will generate error "No information is available".

Augmented Reality (AR) is growing area in virtual reality research. The world environment around us provides a wealth of information that is difficult to duplicate in a computer. This is evidenced by the worlds used in virtual environments. Either these worlds are very simplistic such as the environments created for immersing entertainment and games, or the system that can create a more realistic environment has a million dollar price tag such as flight simulators. An augmented reality system generates a composite view for the user. It is a combination of the real scene viewed by the user and a virtual scene generated by the computer that augments the scene with additional information. In all those applications the augmented reality presented to the user enhances that person's performance in and perception of the world. The ultimate goal is to create a system such that the user cannot tell the difference between the real world and the virtual augmentation of it. It depicts the merging and correct registration of data from a pre-operative imaging study onto the patient's head. Providing this view to a surgeon in the operating theatre would enhance their performance and possibly eliminate the need for any other calibration fixtures during the procedure. In our approach we are modifying the approach to things in our daily use like using augmented reality scanning a picture and play the music associated with it and also display a 2D picture in 3D orientation just by scanning it. Program checks the availability of information into cloud database.

III. LITERATURE SURVEY

User turns on an app and points the camera at image object. Then the app captures target and recognizes it in the video area. If the recognized image matches with the image target database, specified 3D models will be uploaded and displayed on the screen [1]. Time Machine is mainly configured in two modules, the cloud database and mobile interaction module. They are connected by internet. A large scale of mosaic images of different scenic spots was collected by aperture-coded cameras. According to the sparse depth level and convolution kernel in each mosaic image, the redundant foreground information and defocus blur [2]. A PC platform 3D action puzzle game application with a game play that stimulates players think logically. "The Mechanic" game application allows player to be entertained with the challenging obstacles in the game play and heroic story that inculcate the user the virtue of perennial nobility and aligned with a specific educational setting. Data collection methods are questionnaire, literature study, and observation of similar game

application [3]. Unity 3D contains packages similar to the concept of software libraries or reusable components that can be found within other languages and development platforms. A package in Unity 3D is a container of scenes and various assets (such as scripts, models, images, and sound effects) used by the game objects within those scenes. A Unity 3D project can export a package containing any number of scenes, and each of those scenes' dependent assets will be exported to the package automatically. In turn, any Unity 3D project can import such a package and hand-select any desired scenes and assets to be imported [4]. Smartphone-based mobile AR solves challenges that past AR systems had, including inconvenience of head-mounted displays and computer backpacks as well as requirement of external data processing infrastructure. We described two versions of Calory Battle AR exergame that utilizes mobile AR as a means of visualization and interaction.

In Calory Battle AR, the player's role is to find and defuse virtual calory bombs in a real-world environment. First prototype of the game was created without a third party rendering or game engine. This led to many challenges related to 3D data processing and presentation. To solve these challenges, we designed a new version of game with the Unity3D game engine. The game development process was significantly faster and required far less programming than the first prototype development. Usability evaluation indicated that the Unity version outperformed the first prototype especially in aspects of interaction with AR content and user interface clarity. One of aspect that improved user experience is virtual buttons. They made it possible for players to have more realistic interaction by using their fingers directly. Graphical expression was also enhanced by using Unity's built-in shaders [5].

IV. MOVING FROM 2D TO 3D

Two dimensional is a concept that describes anything that composes of length and width. In two dimensional everything in the image is presented at the same distance from the viewer. But users continuously demand richer, more immersive and closer to reality viewing experiences. After the introduction of colour displays and high-definition images, 3D videos promise to be the next revolution in visual technology. The recent momentum in the production of 3D content for cinema applications is a good example that the revolution has started. Nevertheless, although many stereoscopic 3D movies have been produced recently, there is a lack of 3D video content, especially for the 3DTV industry. Moreover, 3D reproduction of conventional well-known 2D movies or TV programs is appealing for both users and content producers. Similarly, there are large no of 2D video available that exist in different compressed format.

Though 3D content provide more realistic sense to viewer, the 3D broadcasting is very less as compared to 2D broadcasting. However, 3D can be regarded as the next revolution for many applications such as television, movies, and video games. The smash hit movie "Avatar" has demonstrated great success in the use of 3D and announced the approach of the 3D era. Therefore, there is an urgent need for efficient and robust 2D-to-3D conversion. There are two types of conversion methods to convert 2D query input image/video to the 3D image for the more realistic view.

2.1 Semi-automatic method in this method human operator involvement is essential for the conversion process. The operator in this method does the work of delineating objects in the query image then placing them at suitable depth and finally correcting the errors (if any) after the final rendering. This method of conversion has been successfully used commercially by such companies as IMAX Corp., Digital Domain Productions Inc. (formerly In-Three Inc.), etc. Many films have been converted to 3D using this approach [1]. In this method due to the involvement of human operator, the speed of the conversion is less and thus the cost is more. Also, in this method human operator involvement is mandatory.

2.2 Automatic method in this method no human operator is needed for the conversion of 2D to 3D. Thus, in this method the speed of the conversion is more as compared to semi-automatic method. Also, the cost is less. The main step in the 2D to 3D conversion is to calculate the depth from a single 2D image. To perform this task, many methods are developed. Some methods use the camera to capture the photos of the same image from different angles, at different conditions, but not at the same time. On the other hand, there are some methods which uses readily available repository [1] of images to calculate the depth. And then the best match image is taken for the depth recovery.

V. TECHNOLOGY SPECIFICATIONS

5.1. UNITY 3D Unity is a cross-platform game engine developed by Unity Technologies and used to develop video games for PC, consoles, mobile devices and websites. First announced only for OS X, at Apple's Worldwide Developers Conference in 2005, it has since been extended to target 21 platforms. Unity is a cross-platform game engine developed by Unity Technologies and used to develop video games for PC, consoles, mobile devices and websites. First announced only for OS X, at Apple's Worldwide Developers Conference in 2005, it has since been extended to target 21 platforms. Nintendo provides free licenses of Unity 5 to all licensed Nintendo Developers along with their software development kits (SDKs) for the Wii U and Nintendo 3DS Family.

5.2. VUFORIA Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time. This image registration capability enables developers to position and orient virtual objects, such as 3D models and other media, in relation to real world images when these are viewed through the camera of a mobile device.

The virtual object then tracks the position and orientation of the image in real-time so that the viewer's perspective on the object corresponds with their perspective on the Image Target, so that it appears that the virtual object is a part of the real-world scene. The Vuforia SDK supports a variety of 2D and 3D target types including 'markerless' Image Targets, 3D multi-Target configurations, and a form of addressable Fiduciary Marker known as a Frame Marker. Additional features of the SDK include localized Occlusion Detection using 'Virtual Buttons', runtime image target selection, and the ability to create and reconfigure target sets programmatically at runtime. Vuforia provides Application Programming Interfaces (API) in C++, Java, Objective-C, and the .Net languages through an extension to the Unity game engine.

In this way, the SDK supports both native development for iOS and Android while also enabling the development of AR applications in Unity that are easily portable to both platforms. AR applications developed using Vuforia are therefore compatible with a broad range of mobile devices including the iPhone (4/4S), iPad, and Android phones and tablets running Android OS version 2.2 or greater and an ARMv6 or 7 processor with FPU (Floating Point Unit) processing capabilities.

5.3 CINEMA 4D CINEMA 4D is a 3D modelling, animation and rendering application developed by MAXON Computer GmbH in Germany. It is capable of procedural and polygonal/subd modelling, animating, lighting, texturing, rendering, and common features found in 3D modelling applications.

VI. FUTURE SCOPE

This system provides a user-friendly interface which would interactively receive information. As future work, increasing the image recognition accuracy rate and boost the total speed of process is the first initiative, so that the processing time required will be less. Adding feature to scan images other than predefined images will ease user to retrieve information. We will provide more interactive facilities of information retrieval and let users feel convenient.

VII.CONCLUSION

With the help of our project the customer will be able to view objects present in museum in 3D view and can listen appropriate audio. Augmented Reality (AR), an emerging Human-Computer Interaction technology, which aims to mix or overlap computer generated 2D or 3D virtual objects and other feedback with real world scenes. This new approach gives user to learn things by visualizing in real world. This system provides user friendly interface which is built on cloud architecture.

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