AUGMENTED REALITY FOR INTERIOR NAVIGATION

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Abstract: Navigation System is very much essential for en-route assistance, indoor positioning etc. We have used Unity 3d framework and OpenSceneGraph to develop the AR based mobile application. The application can be run on smart phones. We have developed an application that helps in indoor localization and assists users that need help navigating within the indoor structure. This application has a very simple and user friendly UI. In this, we have focused on building an indoor navigation application which uses augmented reality to assist people in navigating at complex buildings and also making a cloud platform from where the administrator of a particular building can be able to modify and manage the navigation path.

Index Terms - **Android Studio, Mobile Apps, Augmented reality, AR for interior designing.**

I. INTRODUCTION

Augmented reality (AR) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology. AR can be defined as a system that fulfills three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.

Augmented Reality (AR) is often mistaken with Virtual Reality (VR). The main difference between the two is that while Virtual Reality replaces the entire real environment with an artificial one, Augmented Reality is applied in a direct view of an existing real environment and adds elements like sounds, videos, or graphics onto it.

AR Indoor Navigation is a next-generation solution for indoor navigation. Shopping malls, airports, and other large spaces can be difficult to navigate. Paper maps and other solutions have failed to help, leaving visitors feeling lost and confused. Our solution enables you to provide your visitors with a next-generation indoor navigation experience, by leveraging new technologies such as AR and AI.

In the summer of 2016, the gaming industry experienced a worldwide revolution with the release of Pokémon Go, the best AR game of its time. With the introduction of Augmented Reality technology on a platform so accessible to the public, combined with the franchise that has the largest fan base on the planet, the game instantly went viral. The public - players could be seen walking, detached from everything around them, staring down at their smartphones as if it contained another dimension they had temporarily escaped into.

II. Existing system

Augmented Reality (AR) makes the real- life environment around us into a digital interface by putting virtual objects in real-time. Augmented Reality uses the existing environment and overlays new information on the top of it unlike virtual reality, which creates a totally artificial environment. Augmented Reality can be seen through a variety of experiences. Recent developments have made this technology accessible using a Smartphone which led to development of wide Varity of augmented reality apps.

III. Proposed system

The aim of this project is to present a simple and cost- effective indoor navigation system. The proposed system uses the existing built-in sensors embedded in most of the mobile devices to detect the user location, integrates with AR technology to provide user an immersive navigation experience. In this project, an indoor navigation mobile application was developed and tested. The development demonstrates the usage of IndoorAtlas which enables indoor positioning through technology fusion to detect user's position and obtain the route to destination, and ARCore to display AR guidance using the computed route. Surveys were carried out to gauge the efficiency of the method and to gather the feedback from the participants. The architecture of the method and the demonstration of the application is presented[1].
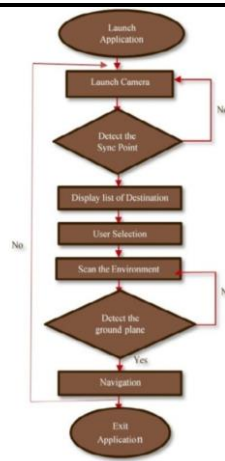
Figure 3.1. Proposed System

3.1.SYSTEM CONFIGURATION PROCESS

The entire AR process takes place into three main steps as shown in figure3.2

Figure3.2.Simulation process

The first step, recognition requires sensors and cameras to recognize an object or space in the real world. Sensors are gathering data regarding interactions of the real world users such as head movements, directions, dimensions, and coordinates/locations. Tracking software determines the place of virtual object/media into real-world 3D space by running algorithms. The depth sensors help to detect the depth perception and 3D modeling technologies for rendering. The mixing of the virtual world with real world takes place in the optical devices or AR are simulating devices using the combiners, advanced processing powers of AR hardware, and capabilities of AR software by running AR algorithms.

IV.LITERATURE SURVEY

We can use AR (augmented reality) technologies, which can interpret the movement of the device in 3D space only thanks to sensors in the device and analysis of the image from the camera. Because we do not need any additional hardware or technology. Localizing the phone in indoor space with the best accuracy is essential for the application, which was developed to track user position. It was also essential to make the application easy to install and use for the user. Therefore the ARK it technology, which is available on all newer iPhones and iPads with an A9 chip or newer and with iOS 11. The same application would be possible to create on Android phones with AR Core framework because both frameworks can provide data about movement in space. AR frameworks analyze the camera image and data from sensors to evaluate the movement of the device in space.

DongHyun Youm, SangHyun Seo and Jung-Yoon Kim Designed and developed a location-based augmented reality[2]. Describe the current situation of and future prospects for AR technology and identifying location-based AR development methods, problems, and improvements. In addition, this paper presents efficient development methodologies including design guidelines, tools, and interfaces in AR applications. This will enable the improvement of understanding of user experience in mobile AR applications.

Haosheng Huang and Georg Gartner Surveyed on Mobile Indoor Navigation Systems[3]. In this paper, they proposed an evaluation framework which combines the key aspects of indoor navigation for investigating mobile indoor navigation systems. This system employed infrared technology for tracking a user's current location and uses this location to forward phone calls to a telephone close to the user. Based on this evaluation framework, we give a comparison and analysis of the current mobile indoor navigation systems, and identify some challenges which require further research and development. But after arriving at a destination by using outdoor navigation services, a pedestrian always needs to enter the building (indoor) and requires indoor navigation.

Pavel Masek propose a ARKit as indoor positioning system[4]. He describes the possibilities of indoor space mapping and user movement tracking using augmented reality technologies. one way to use data from accelerometer, gyroscope, and magnetometer sensors. Based on this idea was developed technology to following user high-precision movement in interior space without the necessity to use other technologies.

V.RESULTS

Once the application is installed, user will see the home page in which there are different object after clicking on one object user will see the object information as shown in figure 5.1.
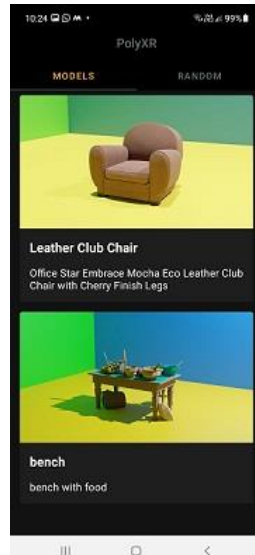

Figure5.1.Home page

Once the home page is displayed, user have to click on it then it will take us to the proper result page as shown in figure 5.2
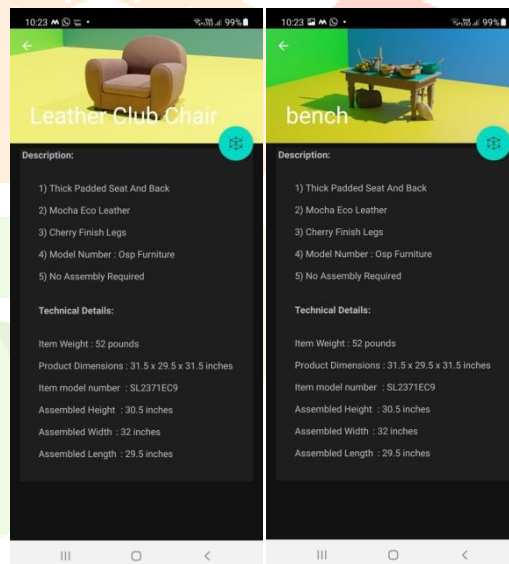

Figure5.2.Object information

After clicking on the object it will detect or scan the plain surface and display the object on the plain surface as shown in fig. 5.3

Figure5.3.Object

VI.CONCLUSION

This paper proposes a new marker based augmented reality application for Windows Operating System which will help to combine virtual objects with the real time contents. The main advantage is use of lowcost devices as compared to costly HMD devices. Our study has shown that the use of Augmented Reality has the potential to become an effective tool to deliver Interior designing objects. AR technology provides an attractive and new way to complement and enhance traditional teaching and learning materials

VII.FUTURE SCOPE

Augmented reality is as of now is augmenting the versatile gaming market. Since first experience with the tech customer market, augmented reality has performed at a high speed and beaten gauges unfailingly. Alluded to related to VR regularly, AR is a historic innovation that utilizes projected pictures through a cell phone screen to copy an item existing in a 3D space that it doesn't have in all actuality.

VIII.REFERENCES

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