AR Based Product Visualisation for Online Shopping

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Abstract— The augmented reality (AR), is nothing but combining the both real world and the artificial environment using computer vision technology. The most recent handheld devices are able to providing an artificial world around us. The most developments in AR algorithms have also play major role for its expansion. This project aid us to get a clear aware of that how a new product will fit in our room or a place, we don't need to close our eyes to imagine it. With using our Android mobile, we can plainly open AR application to saw the products, and after that we need to select one product that we need, and we need to wait until the product 3D model gets downloaded after the download finished, the camera will open on your smart phone and now you can fix the product anywhere you need to fix. It will decrease the return rate and also it will save the time to make decision. So finally it will improve the shopping experience on the user.

I. INTRODUCTION

AR and its related devices are technology that are major contributed thing in the e-commerce world. The proposed project is that development of an AR Based product preview for online shopping, The AR application can provide the information about the products that which cannot be explained in 2D form of images and simple wordings. This AR app is using the SLAM algorithm to detect the flat surface, first we need to select the product form the list of available products, then the application will download the 3D model, after the download is competed from the cloud the application is detecting the flat surface then, after detection of plan surface, it ask the user that where you need to place the product, if the user selected the place, then the product 3D Will be live in AR view.

So using this application we can be visualize the products in our own environment and also they can found their own convenience before purchase of the product. By virtualizing the product using the AR, customers can select or choose the product very easily. Shopping online with augmented reality is very useful for the customer to understand about the product clearly. With using the AR application we can attract the customers, can get to new customers, and also can decrease the return expenses and more.

Here, we created an AR based product visualisation system for online shopping it can be used in any android devices, to make this application we are using a Unity game engine. This app is connected with File Transfer Protocol Server (Google Drive) to issue the product 3D models and also to provide other files that required to it.

The sections that we are going to discuss given below.

II. RELATED ACTIVITY

Here, we are going to discuss about the activities that related to the area of this project.

[15] At 2014 a team designed a products display systems on a 360-degree photo AR to simulate a real-world environment where this product used to give a idea to the customer, that how the product will look in their real-environment. But this product have used only 2D images so the customer can see only one side of the product.

[16] In 2021, a web-based product display system was created using MFC and OpenGL library and used a camera to capture a real word and an open VRMLP to render the 3D models into that environment. But, because of the web-based nature, it has limitations on processing power and rendering quality.

[17] In 2021, an augmented reality-based product display was created using the unity3D and AR core plugin to create a high-resolution AR view, with real-time object manipulation. But all the products which are available for AR view should be prepacked into the application. So, this application has limitations on number of products and huge file size.

[14] In 2016, a marker-based augmented reality is created with FLAR Toolkit library, which is a web-based library, so it is more access to users, but users have to talk a hard copy of marker to use this product and also due to its web-based nature it lacks the performance and some platforms dependent features

[18] In 2020, a comparison between Marker-based and marker-less Augmented Reality was done. They concluded that marker-less augmented reality serves better when it comes to e-commerce

III. PROPOSED PROJECT

Here, we created an AR based product visualisation system for online shopping it can be used in any android devices, to make this application we are using a Unity game engine. This app is connected with File Transfer Protocol Server (Google Drive) to issue the product 3D models and also to provide other files that required to it.

Objective:

a) This application will enhance the shopping experience of the customer.

b) It will infuse the distance between the online shopping and offline shopping.

c) This will bring the better understanding about the product to the customers. Product details like size, colour, and design and more.

Novelty:

a) The AR application has the product limitations because the existing system is the offline mode application. So that application have to be update the product list and it have to be updated.

b) But our project is connects to the database so, it removes the number of product limitations and also limited size of product.

IV. APPROACH

Here we are going to discuss about the approach of this project,

1. SYSTEM DESIGN AND ARCHITECTURE

The given fig 1.1 shows the architecture of our proposed project, first the used will open the augmented reality application by clicking on it. And the application will show the list of products that which all are available in the application. And the customer need to choose the product which they want.
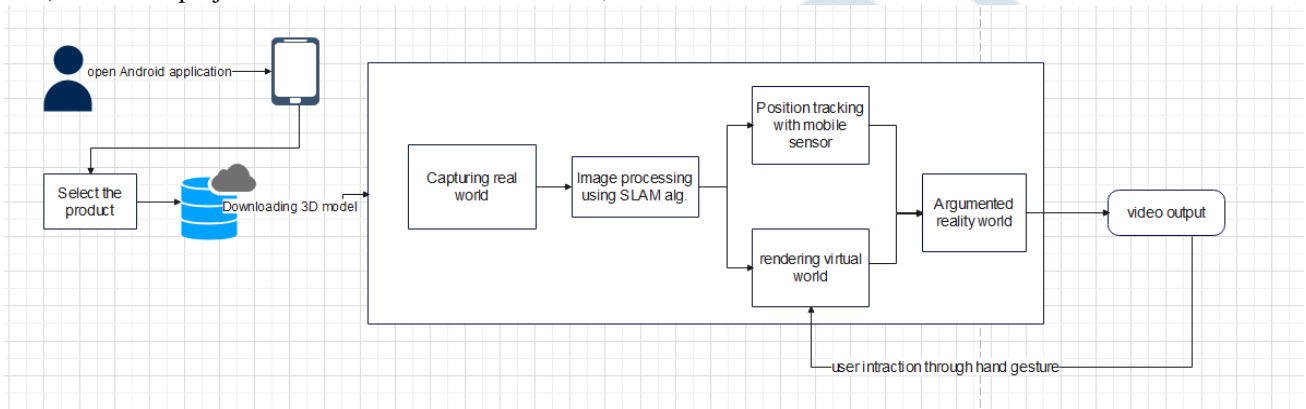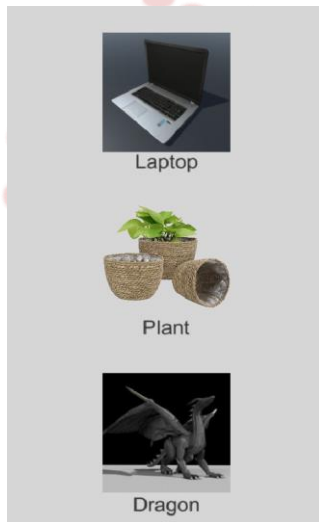

Fig – 1.1 Architecture Diagram

Fig 1.2 Selection of product

Fig 1.3 Downloading screen

In the fig 1.2 shows the list of product that available in the application the user can select the product which they want to visualize, this process is known as product selection.

After the selection of the product the 3D model of the selected product will start downloading from the server.
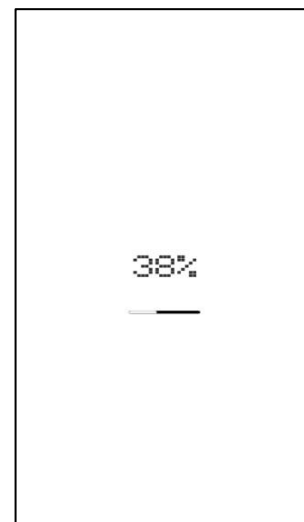
Given fig 1.3 shows the download screen of the 3D model. Once the download is completed the application will open the camera and it will start scanning the real world and found the flat surface using the SLAM algorithm. AR mostly used the SLAM (Simultaneous localization and mapping) algorithm.

It uses the data from both the sensors of gyroscope and accelerometer.

Using the input data it just detecting the flat surface of the real-world.

Fig 1.4 AR visualisation screen

Fig 1.4 shows that how the AR visualisation screen will be.

The user can fix the any flat surface of the real environment, that where the user or customer needed. It can be view each and every part of the product clearly.
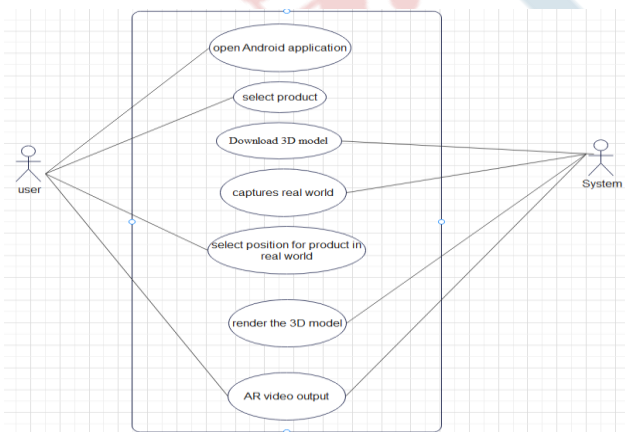
2. USECASE DIAGRAM

Fig 1.5 Use Case Diagram

Given fig 1.5 shows the use case diagram, first the user will open the application and after application is open the user will select the product which they want and after the selection of the product, the system will download the 3D model of the product from the server. After the download is completed the mobile camera will get open and it will capture the real world and it will found the flat surface using the SLAM algorithm.

After the detection of the flat surface it will show the points in the available places. Now the user need to select the position of the product to place it in the real world.

Then, the system will render the 3D model of the product in the real world virtually.

V. RESULT

This application is allow the user to virtualize any e-commerce products in an AR view. After the user select the product, the application will download the 3D model of that selected product from the FTP server.

And the user can handle the 3D model using a hand gesture to move and rotate the product to get the better understanding about the product.

Fig 1.6 Google 3D view

Google 3D animal is a web based AR app that is used to project the animal in our mobile or a device screen, it is used to bring the AR experience to the users. But because of the hardware usage constraints web-based AR application have less quality and lacks to provide some features.
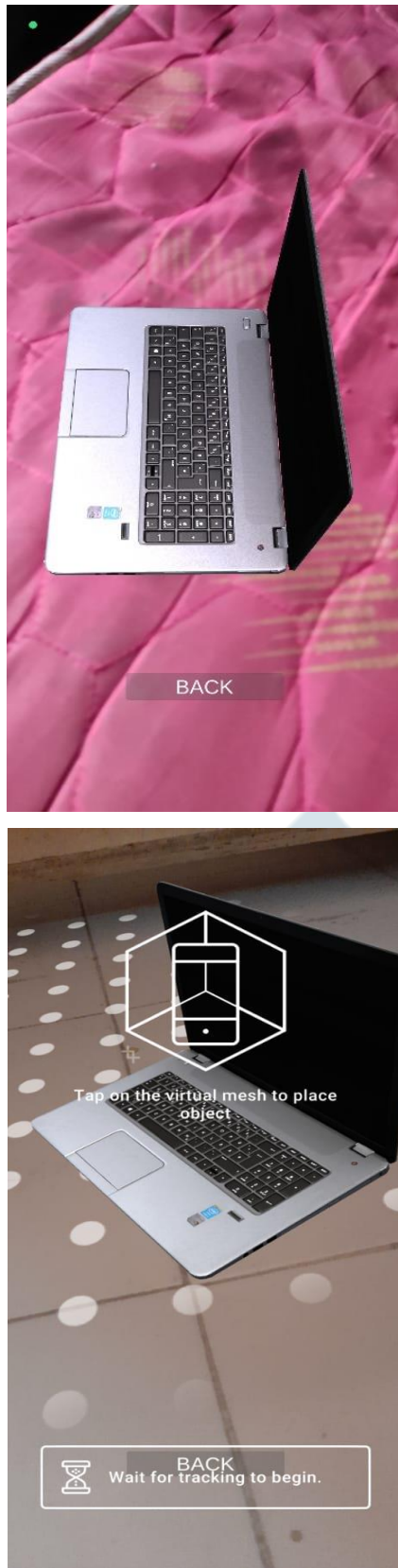
The above images are the screenshots of the output from this project, this is an android application this is created with using the game engine (unity3D), native Android application can access the device Graphics Process unit (GPU) directly. As a result, using a native Android application connected with FTP server will improve the product preview quality and overall shopping experience.

VI. CONCLUSION

Rapid growth in mobile technology and its significant increase in processing power opens a new possibility to support augmented reality applications. This takes us to next-generation e-commerce shopping using augmented reality. By providing a better view and perspective, this application helps users to make a better decision on whether they should buy the product or not. So, it will significantly reduce the return rate of the product. Augmented Reality applications require higher performance power, but Web-based AR applications have less quality and poor performance because of limited memory and limited computing capabilities. Hence by creating an android application using a game engine like unity3D the quality of the rendered 3D model and performance is significantly higher.

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Fig 1.7 Output of This Project

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