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Using Augmented Reality and Artificial Intelligence for E-marketing

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Abstract - Online shopping has become one of the major trends today, there is no doubt that people are adapting this new way of purchasing goods with a rapid pace. But what this kind of shopping experience lack is interaction with the products. This often leads to delivery of products which are far from one's expectation. This problem can be solved by Augmented Reality. By building a platform where populous can view 3D model of products we can not only make e-shopping realistic, but we can also give a technological touch to the field of advertising thereby revolutionizing it. Augmented reality is an interactive experience of a real-world environment in which computer-generated perceptual information is used to augment the items in the real world, sometimes spanning many sensory modalities such as visual, aural, haptic, somatosensory, and olfactory. AR is defined as a system that combines real and virtual worlds, allows for real-time interaction, and allows for accurate 3D registration of virtual and real items. Mixed reality and computer-mediated reality are two phrases that are increasingly familiar with augmented reality. 3D-Advertisement means with the help of 3D objects like a 3D model of mobile phone or air conditioner we can map and advertise the product. The mapping is the mode from which the product will be spawned in the virtual environment and this will be accomplished via Artificial intelligence. Without using the same mapping AI will help determine how exactly the product will be spawned in the virtual environment.

Keyword – AI, AR, 3D-Modelling, Haptic, Vuforia, Object detection.

I. INTRODUCTION

Motivation - If a customer wants to buy a product and if he/she can't visit the store to experience the product which he/she wants to buy or is considering to buy, it creates a problem. To overcome this problem we are making an interactive application by which they can experience the product from their home.

There are very few applications which do the same, but they tend to focus only on a single product and have only one mode, for example- If a customer wants to buy a mobile phone and wants to see whether the mobile is giving the look-and-feel that the customer is expecting, then he can use AR feature to spawn the 3D model of the mobile into real world. Thus able to experience the physical features of the phone. The applications which are already in use do the same work but mapping of an object is not good and also they've limited resource.

Problem Statement in context:

We want to make online shopping experience more dependable where people can get a better grasp of physical features of the product. Furthermore, we want to make advertising livelier.

Online shopping has become one of the major trends today, there is no doubt that people are adapting this new way of purchasing goods with a rapid pace. But what this kind of shopping experience lack is interaction with the products. This often leads to delivery of products which are far from one's expectation. We want to devise a software that can eliminate this problem by establishing interactive advertisement.

For this purpose, we are going to make use of Augmented Reality. By building a platform where populous can view 3D model of products we can not only make e-shopping

realistic, but we can also give a technological touch to the field of advertising thereby revolutionising it.

II. LITERATURE SURVEY

Study [1] We have research paper named "Pokémon Fight Augmented Reality Game" as our main paper.

In this paper, how the concept of AR can be used is mentioned. They proposed a model of Pokémon

Game in AR, where they are using Unity Engine and Vuforia Plugin for the same.

Study [2] from the paper whose title is "Projects using AR-toolkit" from author is Michael Haller.

From this paper we learn how to use AR-toolkit. In this paper they present Music AR as a first application

Study [3] For mapping purpose we choose third paper named "Environment Mapping for Objects in real world".

We use this paper for understanding how the virtual world objects are mapped in real world environment.

Study [4] Next paper we choose for how the mapping Algorithm will be required for hand and motion tracking for better results. It is for interactive mobile Augmented reality system for image and hand motion tracking.

Study [5] How to rotate, resize and move AR objects is given in the paper titled "Design and Implementation for Interactive Augmented Broadcasting System".

Study [6] Augmented Reality Applications-We study many real time applications of AR like Agmenty, UniteAR, AR-watches, etc. But in every application, there are certain limitation so we tried to overcome this limitation in our project.

III. FINDINGS

After searching for applications of augmented reality related to advertisement we didn't come across any applications. But there were few applications whosedomain was not specifically advertisement but they were
using AR to represent product in real world environment. After using those application, we came across several points that they were lacking. Here is what we found:

Sr. No	Application Name	Disadvantage	Advantage
1	Agmenty	1. Augmented Reality is not supported on all devices. 2. Products are only related to interior designing	1. Shows pricing for all kind of interior products 2. Live chat option available 3. Directly connect sellers and buyers.
2	Pepperfry	1. Mapping of AR model is not proper. 2. Application is for furniture and related products only.	1. Directly connect sellers and buyers. Basically, a furniture shopping platform. 2. Products are segregated into various departments.
3	ARWatches	1. Watches are the only products.	1. Mapping is good. 2. Product can be seen in the form of 3D model.
4	Houzz	1. Products are related to interior designing only. 2. Mapping is not good. AR model cannot be seen from different angles.	1. Pricing for allthe products is shown. 2. Has a social media kind of feel?
5	UniteAR	1. Shows all kind of AR models but doesn't show pricing. 2. Limited products (cannot call an advertising platform). 3. Building an AR model is complicated.	1. User can create their own AR models.

4. ***IV.*** **ARCHITECTURE**

DESIGN

Input:

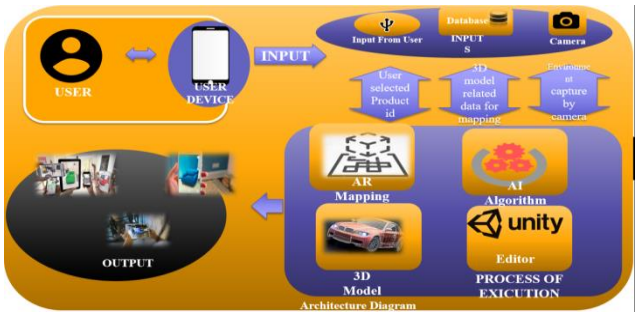
- User selected product id
- 3D model of product that user selected which consist of its dimensions and other mapping related information
- The surrounding capture by the camera

Output:

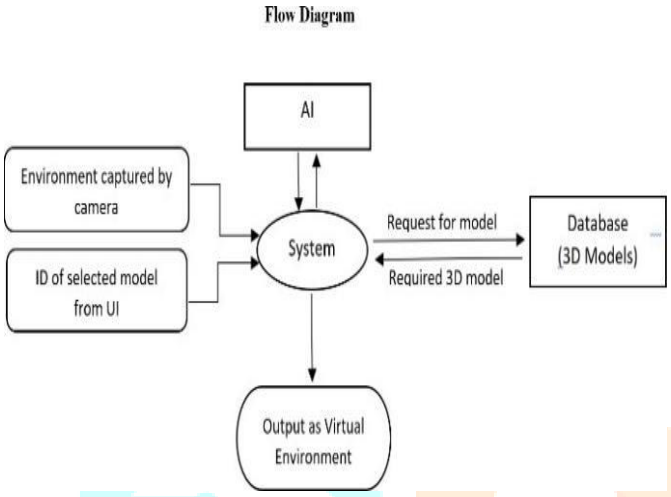
- A virtual environment of user selected product
- The view of product by all sides using Augmented reality

Processing:

- AI Algorithm (for effective mapping)
- AR mapping (for visual effect)
- 3D model
- Unity (Editor)



V. FLOW DIAGRAM



VI. WORKING

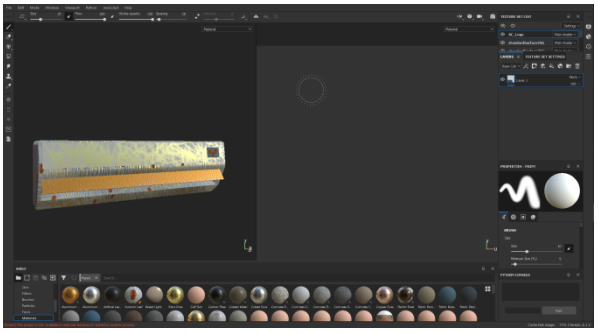
As seen in the flow diagram the execution starts with a camera capturing the environment, but, the application begins by displaying a range of categories of products. This range includes categories such as : **Electronics, Furniture, Home Appliances, and Stationary**. These are the categories that have been added to the collection so far, we are planning on adding more in the future.

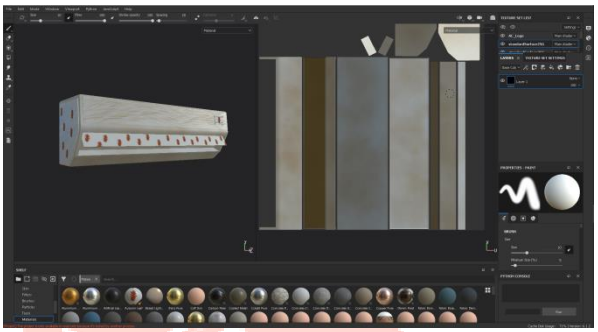
By clicking on the categories one can surf through various products which come under that specific type. By clicking on the product tab that one wants to view they can access a list of similar products which belongs to different brands, have different specification and have price variations.

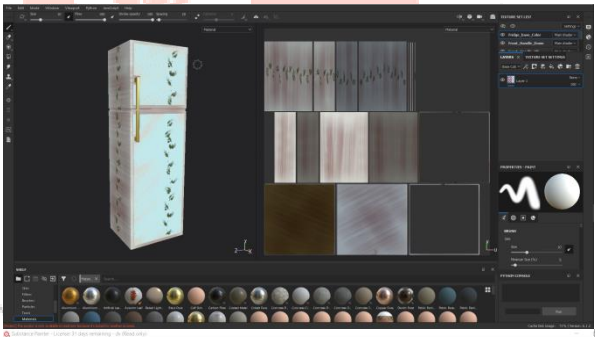
Moving forward with a specific item of a specific brand, one can see all the features of that particular item in the description box. By clicking on the AR view button users can view the 3D model of that item in a real-time environment. This takes place in a sequential manner as shown in the flow diagram. After clicking on the button, the product id is sent to the system, along with the product id the result of the AR compatibility script is sent to the system. In the meantime, the camera of the device captures the environment. The system feeds its input to the AI model where it uses the parameters: Unique ID, Output of AR compatibility script to determine the most suitable type of mapping technique. Durin g th is, the 3D model is fetched from the database, and using the mapping technique suggested by the AI model it is incorporated in the real world.

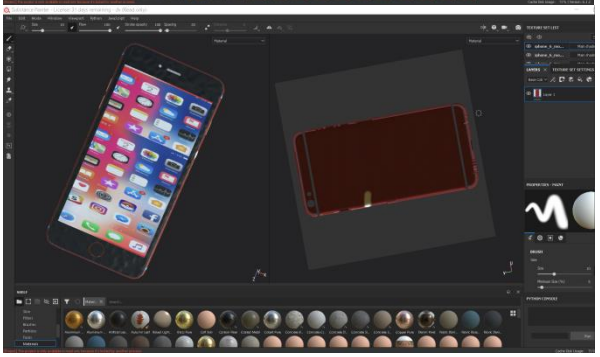
VII. PROJECT IMPLEMENTAION

The model creation phase of project implementation is as shown below. For the model creation, software like **unity engine, maya, and the blender** was used.



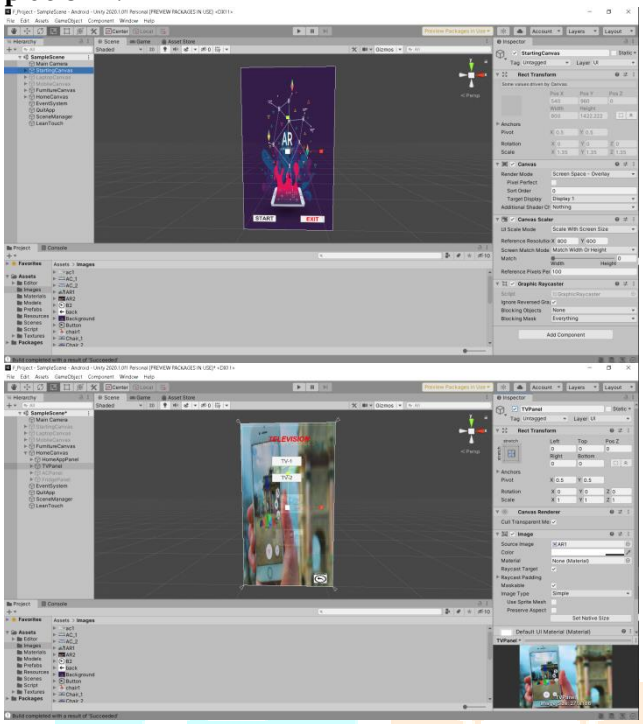




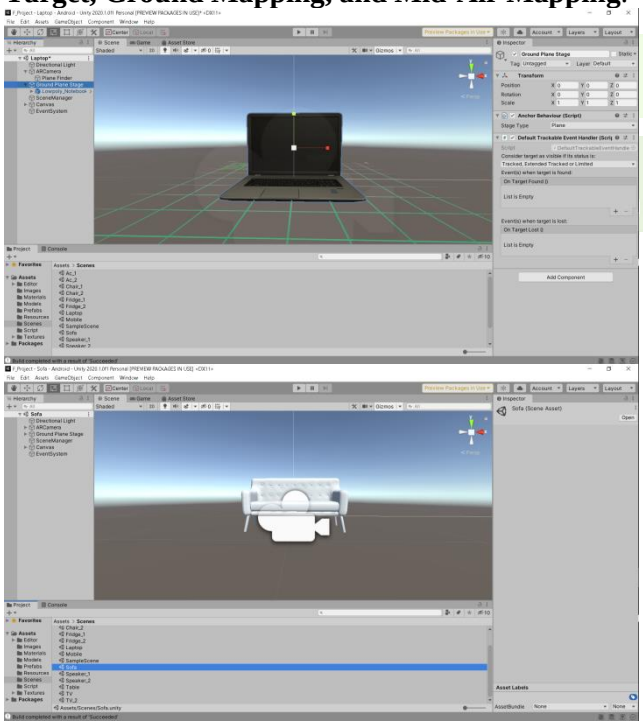


Almost the entire project was made using the unity engine. The UI was also developed using the same

engine and then deployed on the **android platform**. Along with the UI, we have also used API to provide up-to-date information on the products. This API was created by using node.js and deployed on the **Heroku platform**.



Using the **Vuforia Engine**, AR features were implemented. Vuforia can be imported into the unity engine. This particular engine allows us to use **Image Target, Ground Mapping, and Mid-Air Mapping**.



VIII. RESULTS

The outcome of the project is a fully functional application for android users. Users can surf through different items and view their 3D models using the most suitable mapping technique.


LAPTOP
LAPTOP-1
LAPTOP-2


AR View
11th Generation Intel ® Core ™ i5-1135G7 Processor (8MB Cache, up to 4.2 GHz)
Windows 10 Home Single Language, English.
Intel® Iris® Xe Graphics with shared graphics memory.
8GB, 8GBx1, DDR4, 3200MHz,512GB M.2 PCIe NVMe Solid State Drive available with Windows 10 Home or Windows 10 Pro –


LAPTOP
Back
vuforia

IX. CONCLUSION

In the recent event of pandemic, the economy all over the world was hit by a major blow. One of the main reasons behind this was the lockdowns ordered by the government of different nations. Due to this, markets were shut down and people weren't able to get their hands on the new products that arrived during this period, which in turn made it difficult for the public to make their decision about the purchase of the product. To deal with this problem this paper discussed the building of an application that uses the basis of augmented reality to represent the product in a real world environment using its 3D models, thereby, making it easy for the customer to take a proper decision for their purchase. By using such an application people can view a variety of products from their home without necessarily going out.

X. FUTURE SCOPE

Though the application allows the user to view the physical features of the product, it is not a complete "one-stop shop" platform. It only gives a detailed description of the product and displays its 3D model without giving any purchase option to the user. This application can be made much more efficient by inclining it towards e-commerce. This will not only make it a complete application, but also it will be convenient for the customer. Along with this, improvinguser experience by making the better user-interface andadding different categories of products is also the main focus.

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