

FURNIT-AR : AUGMENTED REALITY INTERIOR DESIGN STORE APPLICATION

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Abstract : Furniture is something that fills the house more than people , it gives you sound sleep , support when you are back home tired from work. When you are out there purchasing a furniture for yourself or your loved ones , you always want something that looks appealing and is of the best quality as well . Purchasing something without a trial is a very common mistake that you encounter in the traditional method. But with **FURNIT AR : AUGMENTED REALITY INTERIOR DESIGN STORE APPLICATION** and with the help of Augmented Reality you can try things virtually before making any move. This project is a composition of an android application and Augmented Reality technology, with the help of the camera of your smartphone you can try out different furniture, interior design items virtually inside the android application. The project is free to download and no needs to pay a penny for it.

Keywords: Android, Android Studio, Sceneform, ARCORE, Blender, Augmented reality, GLB, GLTF 2.0

1. INTRODUCTION :

What is AR(Augmented Reality)? VIRTUAL REALITY + PHYSICAL WORLD =AUGMENTED REALITY. Augmented reality is a technology that helps you try different things the way you can try it in the real world, inside an Android application. Now speaking in the context

of purchasing furniture, lamps, cupboards etc something without which your house is a collection of horizontal and vertical walls. Even till this day, an excitement pops up when you listen your parents planning to purchase an interior design item, we all wonder what it would be like. You go to the shop find

the best piece add to a cart , book it and bring it home , but guess what ? the sofa is too big for the room or does not match the room. This is where modern technology comes into the picture, with the help of

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even before you step in the shop , with the help of your smartphone you can try this out at your house, at your own comfort . With the help of AR Core in augmented reality any interior design item can be tried virtually at your flat and this helps both the buyer and the sellers to purchase and provide the right product, something the customer wants and something that the seller has.

2. LITERATURE REVIEW:

2.1 A review of Build it better: A.R furniture android application

It shows how Augmented Reality can be used in this pandemic time in ecommerce. Buying a furniture is a big decision. Staging helps buyers make this decision more easily, as they can picture themselves living with it. 3D models of GLTF and GLB were developed using blender. The models created are in JSON format which are hosted using hosting platforms. Here, github pages are used for hosting 3D models which are then called in Android application. As soon as models are downloaded they get executed in the AR format with the help of sceneform library.

2.2 A review of Furnished: An Augmented Reality based approach towards furniture shopping

The world as we know it today, is run on technology. If servers of tech giants like google, facebook etc stop working for a few minutes, the world encounters huge losses, usually in millions. There are multiple types of technology used to run any organization, associated with its hardware and software. Yet in the world dominated by technology, we see that Augmented Reality has not been used widely in business applications. AR has been used by several organizations to create revenue from the field of entertainment, for example Snapchat and Pokemon Go, but rarely used in any business sectors like ecommerce. Furnished application is created on the basis of the fact that Augmented Reality technology is grossly underutilized in the ecommerce industry. We hope to create a more comfortable environment of AR technology platforms for the everyday user for them to inculcate the use of such technologies as a daily utility, especially for traditional users.

2.3 A review of Product Visualization using AR

In today's world with technology taking over everything and making our life easy, we should be able to perform our tasks in easier way. It is hard to visualize how the furniture item would look in our own premises and complement the already existing items in the room. This can be easily solved using Augmented Reality. Augmented reality is a field of Image Processing which deals with the combination of real world and virtual

environment. It will allow users to experience in real time, how the item will look in their room. To help customers who buy interior products online, an Application for smartphones is proposed to help them virtually see how their room will look like after purchasing the product. It uses Google ARCore for augmented reality. ARCore will take in as input, the image from the device camera. It will identify planes and then virtually overlay the 3D models of the product onto the image, and then display it in real time to the user. This will give an almost realistic experience of placing that product in users home. Products like wall paintings, furniture, accessories and electrical appliances can be placed and viewed. Intelligence within the application will make relevant suggestions to the user to help buy related items. This will help a person to decorate even an empty room from scratch. For association mining, Apriori algorithm was used to recommend products to the user. This algorithm will find the most frequently bought sets products, so that it can provide suggestions.

2.4 A review of AR in Interior Design

This paper presents associate application of increased Reality (AR) for interior style. Due to gigantic advancements in laptop vision algorithms and low cost hardware, increased reality is turning into thought. Most of the sales come from physical stores. Buying furniture from brick and mortar shops is unwieldy and time consuming. In associate AR atmosphere, the virtual furniture can be displayed and modified in real-time on the screen, allowing the

user to have an interactive experience with the virtual furniture in a real world environment. Users would be able to visualize specifically however a table would seem like in their room. When people can place an actual couch on the living room or visualize how a bookshelf would look in different color. The risk of product come back and supplying is drastically reduced . As on-line stores replace brick and mortar outlets , AR will play a vital role in the furniture sales.

This paper provides new ways an individual/enterprise could utilize AR to design interiors and this study proposes a new method for applying AR technology to interior design work, where a user will read virtual article of furniture and communicate with 3D virtual furniture information employing a dynamic and versatile program.

2.5 A review of Interior Design using AR

AR technology is often used in applications that simulate an arrangement of furniture. We here will discuss a system supported Augmented Reality for Home Decoration, which supports real-time tracking without Identification Markers, the system uses FAST corner detection. To solve this problem, this paper proposes a method that can add virtual objects to the real environment (Augmented Reality) using a camera. Augmented Reality furniture arrangement systems are useful for viewing furniture in rooms or building layouts without having to buy or move real furniture in . However, such systems often require users to physically and regularly change their viewpoint of the

physical space, which needs manual manipulation of the scene, and are often limited to 3D tablet or phone interfaces. To help address this problem, we have developed a system that automatically calculates the most suitable viewpoint to improve understanding of the room layout as a whole, and allows the user to easily transition to that viewpoint.

3. PROBLEM STATEMENT

Customers tend to purchase furniture online, but on the online portals you can only have a look at the images but you can't determine the dimensions of that furniture according to the location where you want to place the furniture. Everybody wants to try out a furniture or anything before you purchase it. Most of the times, it's not feasible to try out everything into the real world and in case of furniture, booking it, getting it delivered, using it and returning it if it doesn't suit you is very tiresome. So why not try it out virtually. With the help of

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we present to you different ways that help you lubricate the try out process. Our application helps in allowing users to view a 3D rendered model -- a virtual resemblance of the physical furniture without any interruption of the markers - which can be viewed and configured in real time using our Augmented reality application.

This study proposes a new method for applying Augmented Reality [1] technology to furniture, where a user can view virtual furniture and communicate with

3D virtual furniture data using a dynamic and flexible user interface.

4. WHAT ALL WAS USED ?



ARCore is Google's platform for building augmented reality experiences. Using different APIs, ARCore enables your phone to sense its environment, understand the world and interact with information. Some of the APIs are available across Android and iOS to enable shared AR experiences.

ARCore uses three key capabilities to integrate virtual content with the real world as seen through your phone's camera:

- **Motion tracking** allows the phone to understand and track its position relative to the world.
- **Environmental understanding** allows the phone to detect the size and location of all type of surfaces: horizontal, vertical and angled surfaces like the ground, a coffee table or walls.
- **Light estimation** allows the phone to estimate the environment's current lighting conditions.

4.1 About android studio:

Android Studio is the official Integrated Development Environment (IDE) for

Android app development, based on IntelliJ IDEA . On top of IntelliJ 's powerful code editor and developer tools , Android Studio offers even more features that enhance your productivity when building Android apps, such as:

- 4.1.1 A flexible Gradle-based build system.
- 4.1.2 A fast and feature-rich emulator.
- 4.1.3 A unified environment where you can develop for all Android devices.
- 4.1.4 Apply Changes to push code and resource changes to your running app without restarting your app.
- 4.1.5 Code templates and GitHub integration to help you build common app features and import sample code.
- 4.1.6 Extensive testing tools and frameworks.
- 4.1.7 Lint tools to catch performance, usability, version compatibility, and other problems.
- 4.1.8 C++ and NDK support.
- 4.1.9 Built-in support for Google Cloud Platform, making it easy to integrate Google Cloud Messaging and App Engine.

4.2 Database:

The models are created and the 3D models are hosted using firebase and are called in android application .The Sceneformlibrary executes the downloaded models in AR format and it also makes the application lightweight as the hosting is done on the internet.

The device shall be wireless. (It should not be tethered to a battery pack, or processing pack).

On-Board Storage:

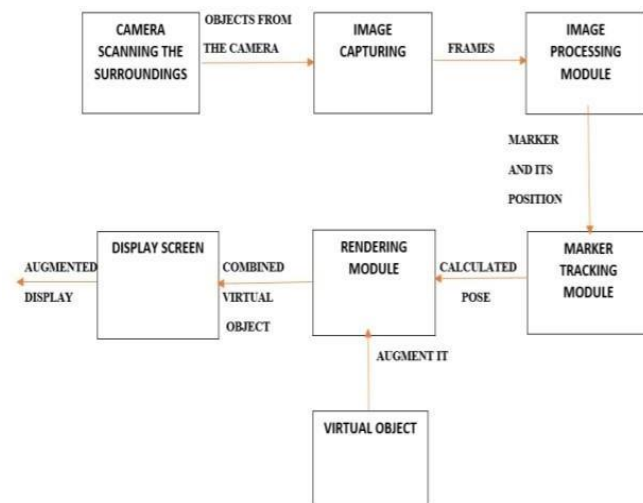
4.3 Google sceneform plugin

Now, we will be importing Google Sceneform plugin in Android Studio.

Google Sceneform plugin is a 3D framework which helps in developing ARCore apps without using OpenGL. The minimum version required is Android Studio 3.1 and above.

Sceneform makes it straightforward to **render realistic 3D scenes in AR** and non-AR apps.

5. FLOWCHART :



6. HARDWARE REQUIREMENTS

Battery Life:

Under typical use, the device battery life shall be at minimum 12 hours.

Wireless Device:

The device shall have a minimum on- board memory storage of 128Gb. The device shall support memory storage encryption, for security of the content.

Inputs/Outputs:**Eye Tracking:**

The device shall support eye tracking as a method of gaze, for software user interface commands.

Sound:

Shall be available in wired or wireless. Shall serve as hearing protection for the wearer, complying with OSHA standards.

Display:

The device shall support a minimum resolution of 1920 x1080 . The device shall support full color . The device shall deliver 120Hz refresh rate.

Visual Tracking:

The device AR objects shall be scaled and anchored to the physical world without the requirement for an image target. Note: For example, enable the use of SLAM or other environment tracking solutions.

The device AR object positioning accuracy shall be within +5mm. The device shall be able to scan QR code (of 2 by 2 inches) from a minimum of 5 feet from a + 60 degree off-axis. Note: Optical and/or software zooming maybe utilized.

7. SOFTWARE REQUIREMENTS:**Android Studio:**

Android Studio is the official Integrated Development Environment (IDE) for Android app development, based on IntelliJ IDEA .

ARCore:

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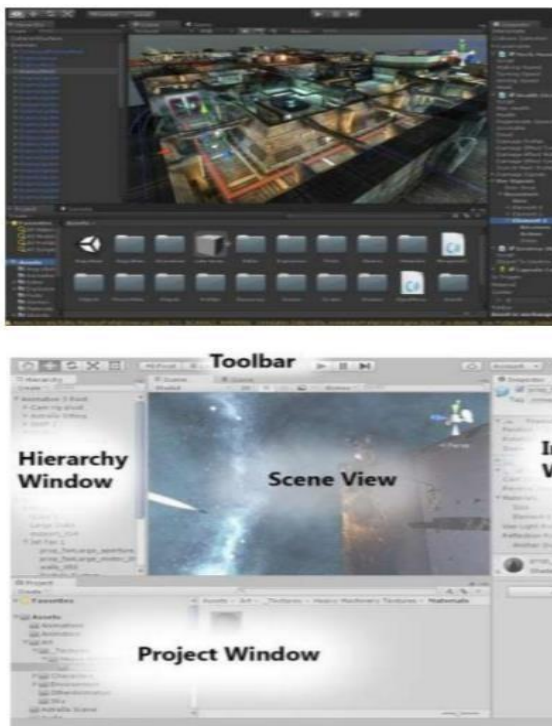
- Motion tracking allows the phone to understand and track its position relative to the world.
- Environmental understanding allows the phone to detect the size and location of all type of surfaces: horizontal, vertical and angled surfaces like the ground, a coffee table or walls.

Unity 3 D :

Unity 3 D is a “ game development ecosystem ”, it include an environment for the development of interactive 2D and 3D content including a rendering and physics engine , a scripting interface to program interactive content, a content

exporter for many platforms (desktop, web mobile) and a growing knowledge sharing community.

As shown in below figure Unity 2018.1 introduces new tools that help artists & designers tell better visual stories, new ways for teams to collaborate more productively, and more feature..



8. CONCLUSIONS :

Hence, our main motive in building this project is to provide an aid as furniture and interior design are a very important part of our house and having a virtual look at how it suits your

house with the help of AR Android based application, helps you select the right product of your choice.

9. REFERENCES :

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