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AUGMENTED REALITY FURNITURE

Akanksha Hake, Dhanashri Ghadge, Shravan Chavan, Swapnali Bhagat, Prof. A.T. Bhosale
BTech in Computer Engineering BTech in Computer Engineering BTech in Computer Engineering BTech in Computer Engineering Assistant Professor
PESCOE, Phaltan

Phaltan Education Society College of Engineering Phaltan, dist-Satara, India

Abstract: In early days if we users wanted to buy a furniture objects without visiting the shops it was possible but it was not possible to check how the object actually looks in home structure. Now in our proposed system, it is possible for user to buy the furniture objects sitting in the home without visiting the shops. The main purpose of the “Furniture Layout Application Using Augmented Reality” is to develop an android application for trying different furniture in virtual way using a mobile which supports AR camera. The application will eliminate the human efforts by physically visiting the furniture store which is very time-consuming activity. Besides, this it might be easier to use this technique in Online shopping as an option for user to try out the furniture items in their room they are thinking to buy and allow user to visualize the room how it will look after placing furniture in it. User can try out multiple combinations virtually, without physical movement of furniture items. Our motivation here is to increase the time efficiency and improve the accessibility of furniture try on by creating furniture augmented reality application. This system will help the customer to view the furniture object virtually in real environment before buying the object. Due to this system customer will come to know how his home structure would look after buying the furniture object. This system would let the user to try multiple combination of object virtually without physical movement of furniture objects. These will help the buyer to determine how to setup furniture in home structure.

Index Terms - Augmented Reality, Marker Detection, Rendering

I. INTRODUCTION

Augmented reality has been a hot topic in software development circles for a number of years, but it's getting renewed focus and attention with the release of products like Google Glass. Augmented reality is a technology that works on computer vision-based recognition algorithms to augment sound, video, graphics and other sensor-based inputs on real world objects using the camera of your device. It is a good way to render real world information and present it in an interactive way so that virtual elements become part of the real world. Augmented reality displays superimpose information in your field of view and can take you into a new world where the real and virtual worlds are tightly coupled. It is not just limited to desktop or mobile devices. As the customer purchases various types of furniture through online, but in online it shows only photo and cannot be determined size in room. Even though there are certain applications present which are based on augmented reality they are not suitable for live processing and takes more time to process the area and some are fixed to a particular image plane. So, to overcome that we can use this application to check whether the furniture is adjustable or not which can be placed in the customer living area like home or office using augmented reality images.

II. LITERATURE SURVEY :

[1] Santosh Sharma, Yash Kaikini, Parth Bhodia, Sonali Vaidya has proposed technique named “Marker less Augmented Reality based Interior Designing system”, which uses Markerless Augmented Reality as a basis for enhancing user experience and for a better perception of things. It has advantage of no need of markers in the surface area and disadvantage is Object is aligned with camera so that it moves as we move a camera.

[2] Snehal Mangale, Nabil Phansopkar, Safwaan Mujawar, Neeraj Singh has proposed technique named “Virtual Furniture Using Augmented Reality”[2] which is a web based application where user, have to place the marker in a room where they want to try out furniture items. The user’s webcam will be on and through the webcam they will capture the live feed of the room. Application captures the image and passes through predefined marker detection algorithm. Algorithm is based on image processing techniques using color and other properties as the input to detect the marker.

[3] Khushal Khairnar, Kamleshwar Khairnar, Sanket kumar Mane, Rahul Chaudhari has proposed a technique named “Furniture Layout Application Based on Marker Detection and Using Augmented Reality” to develop an application where user have to place the marker in a room where he want to try out furniture items. The user’s webcam will be on and through the webcam he will capture the live feed of the room. Then application search the marker using fiducial marker detection algorithm.

III. AIM AND OBJECTIVES:

- Ease and simplify the furniture ordering process for users and increase the level of orders.
- Provide an AR feature to enable user to experience the furniture in real world.
- Help users find the right furniture by providing them with real time measurement.

IV. EXISTING SYSTEM:

Traditional Methods Of Designing Include Advising And Assisting Customers Who Have Relied Upon A Combination Of Verbal Explanations And 2d Drawings Through Online Shopping Application. However, This Medium Of Approach Clearly Restricted To The Limit Of Explanations Provided To Customer For The Particular Placement Of A Furniture And Makes Him Less Efficient And Confused To Buy The Furniture. The Main Drawbacks In The Mediums Of Existing System Are: Static View Of Design Which Is Unable To Convey. Cannot Determine The Furniture Will Fix To Our Needs. Information Like Height And Breadth Cannot Be Known.

V. PROPOSED SYSTEM:

With the approach of augmented reality application, this can be easily achieved. Interior designing is a field where augmented reality has not been able to get its grip to it fullest. People today are well versed with the technology and are operating smartphones which support AR. Thus, the concept of creating a furniture layout-based application brings the designer step closer to being technologically advanced. The proposed system uses Marker-less Augmented Reality as a basis for enhancing user experience and for a better perception of things. Marker less tracking is a method of positional tracking – the determination of position and orientation of an object within its environment. This is a very important feature in augmented reality (AR), making it possible to know the field-of view and perspective of the user - allowing for the environment to react accordingly or the placement of augmented reality content in accordance with real world. While marker-based methods of motion tracking use specific optical markers, marker-less positional tracking does not require them, making it a more flexible method. It also avoids the need for a prepared environment in which fiducial markers are placed. The basic premise of the proposed system is to overlay digital 3D models on top of real things using a camera. This Application will use AR supported mobile phone to scan the living area and display the augmented furniture object to check whether it adjusts or not and that helps in better choosing of the right furniture for our need. Mapping of 3D model onto the smartphone screen takes place which decides the dimensions of the model which is then rendered and displayed onto the screen .

✚ Working :-

Augmented reality starts with a camera-equipped device—such as a smartphone, a tablet, or smart glasses—loaded with AR software. When a user points the device and looks at an object, the software recognizes it through computer vision technology, which analyses the video stream. The device then downloads information about the object from the cloud, in much the same way that a web browser loads a page via a URL. A fundamental difference is that the AR information is presented in a 3-D “experience” superimposed on the object rather than in a 2-D page on a screen. What the user sees, then, is part real and part digital.

✚ Algorithm:-

- Step 1: Start
- Step 2: splash screen
- Step 3: Home Screen
- Step 4: Object Detail screen
- Step 5: Augmented Reality camera start
- Step 6: Object placement on surfaces

VI. Design

1. Sequence Diagram

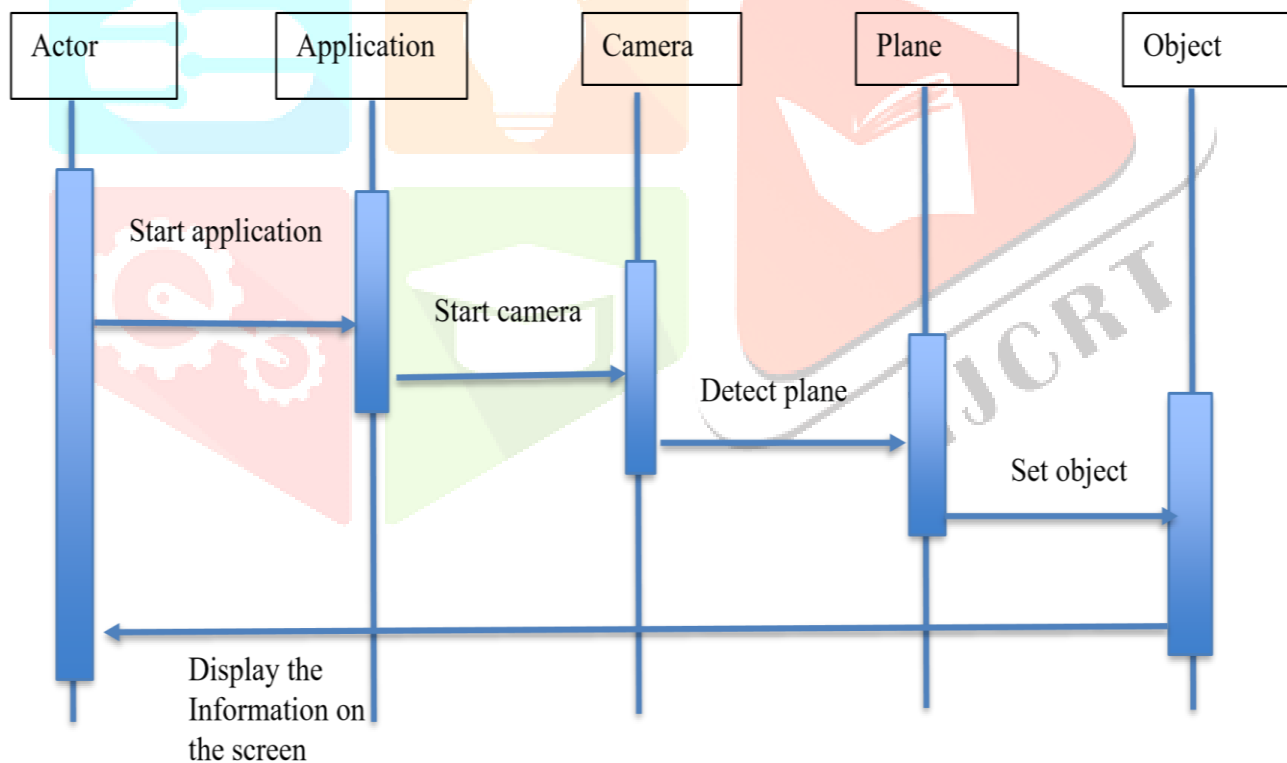


Fig. Sequence Diagram

2. Data Flow Diagram

DFD Level 0 :

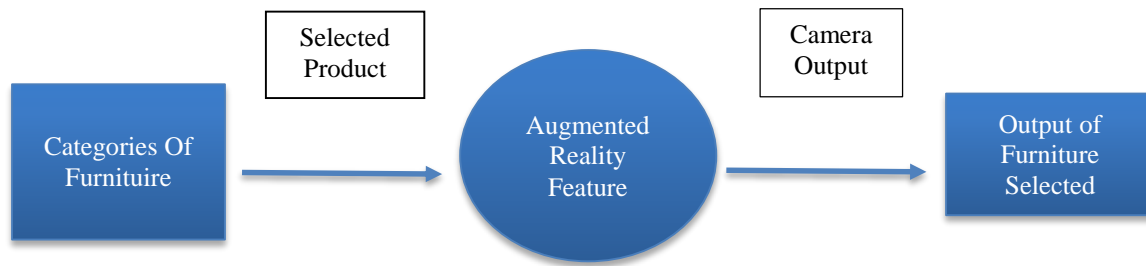


Figure : DFD level 0

DFD level 1:

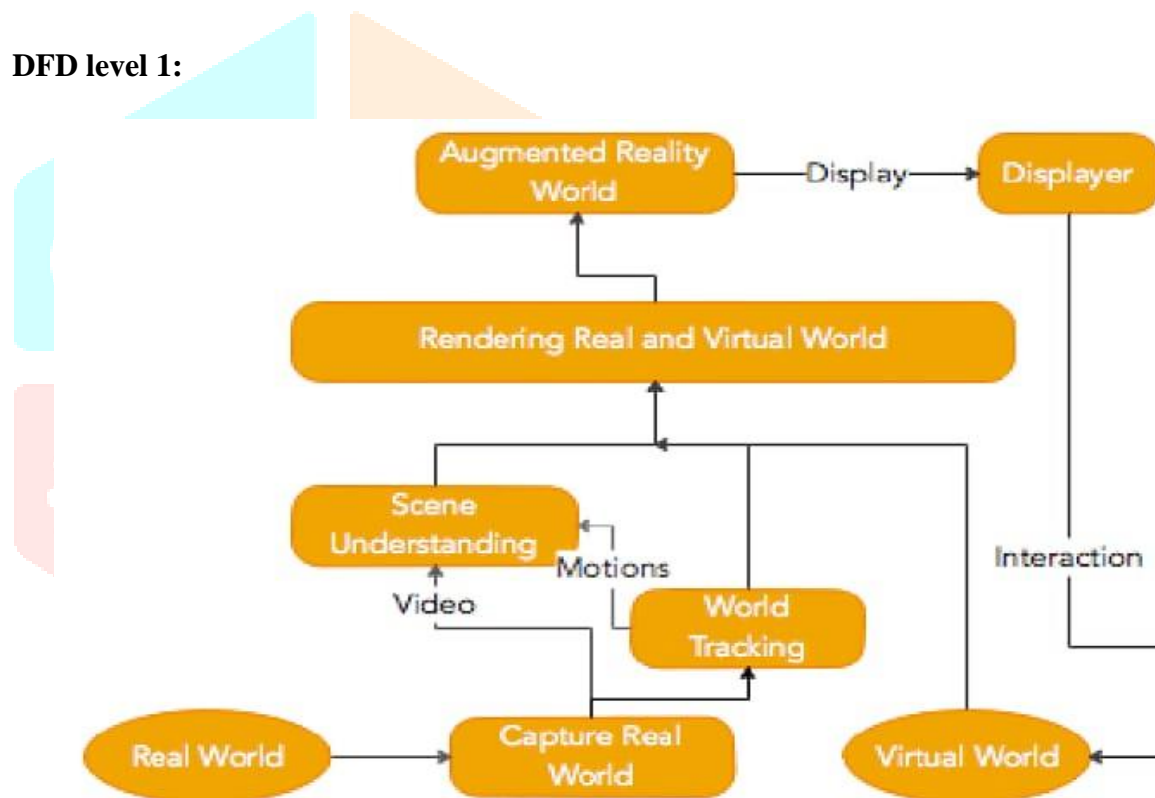


Figure : DFD level 1.

3. Use Case Diagram

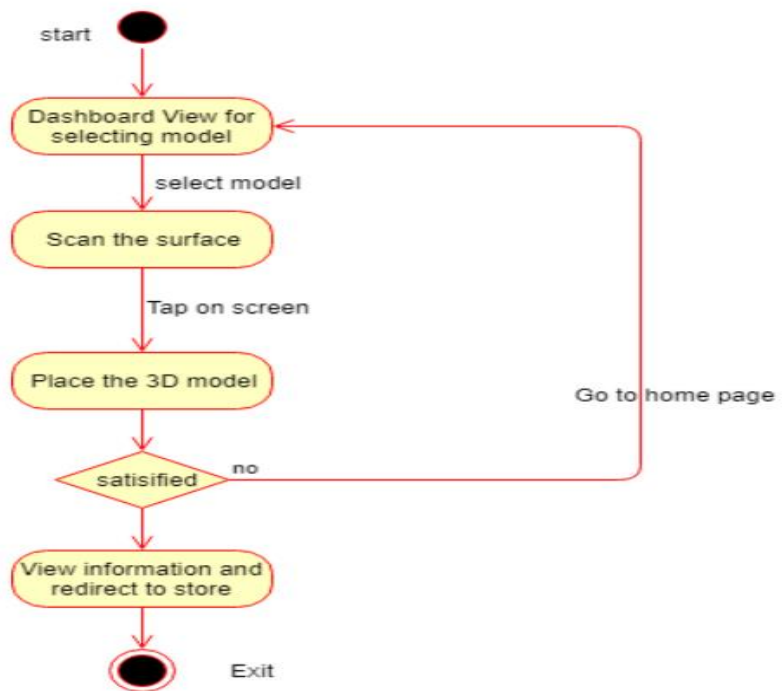


Figure. : Use Case Diagram

4. Gantt Chart :

	JULY 2023	AUG 2024	SEPT 2024	OCT2024	NOV 2024
Task Name					
Topic Selection	█				
Literature Survey	█				
Requirement Gathering		█			
Communication		█			
Planning			█		

Figure : Gantt Chart 1

	JAN 2024	FEB 2024	MAR 2024	APR 2024	MAY2024
Task Name					
Design	█				
Coding		█			
Construction		█			
Testing			█		
Real World Testing			█		

Deployment					
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Figure :Gnatt Chart 2

VII. METHODOLOGY:

Modules Under Proposed System are:

▶ AR FOUNDATION:

It is a cross platform AR Plugin by Unity which is used to develop the app on both platform Android and Ios.

- Real world trackable features
- Scale Handling

▶ AR CORE XR PLUGIN:

ARCore is a platform for building Augmented Reality (AR) apps on mobile devices. Using different modules, makes it possible for a user's device to observe and receive information about its environment, and interact with that information.

AR Core, also known as Google Play Services for AR, is a software development kit developed by Google that allows for augmented reality applications to be built.

SUPPORTED FEATURES:-

- Efficient background rendering
- Horizontal Planes
- Depth Data
- Reference point
- Hit Testing

ALGORITHMS :

▶ SLAM Algorithm:-

SLAM stands for simultaneous localization and mapping (sometimes called synchronized localization and mapping). It is the process of mapping an area whilst keeping track of the location of the device within that area. This is what makes mobile mapping possible. This allows map construction of large areas in much shorter spaces of time as areas can be measured using mobile robots, drones or vehicles. SLAM systems simplify data collection and can be used in outdoor or indoor environments.

▶ Visual SLAM:-

Visual SLAM, also known as VSLAM, calculates the position and orientation of a device with respect to its surroundings while mapping the environment at the same time, using only visual inputs from a camera.

Feature-based visual SLAM typically tracks points of interest through successive camera frames to triangulate the 3D position of the camera, this information is then used to build a 3D map.

Software and Hardware details Software Requirements

- Operating system : Android 8.0 or more Tools
- Android Studio
- Flutter

Hardware Requirements

- RAM Capacity: Min. 4GB
- Graphics Card: 1 GB
- Accessories: Smart phone with AR support

VIII. Further Work :

The purpose of online AR solutions is to provide users with unique product experiences and information without having to visit physical stores. The main advantage of online solutions consists in trying out products in any chosen surrounding and supporting users with multiple object selection at one time.

While working on this project, we gained a lot of knowledge about augmented reality and mobile application development. E-commerce is an essential part of today's business activities, but it lacks a number of critical capabilities. Our efforts ensure that online shopping is both cost-effective and profitable for both businesses and consumers. Augmented reality technology has a lot of scope of development in the future. Stable and faster working of the functionality would be seen in the future. Photorealistic and advanced rendering: Although many AR applications just require basic visuals like wireframe outlines and text labels, the ultimate goal is to make virtual objects indistinguishable from real ones. This must be done in real time, without the need for artists or programmers to intervene manually. In order to complete this task, new image-based rendering strategies must be considered.

AR in all senses:

The primary focus of research has been on improving visual perception. In the end, appealing AR settings may necessitate the use of other senses as well touch, hearing, etc.

IX. Design Details :

when assessing large furniture and products with high economic values, consumers often end up going to physical stores in order to acquire a more multifaceted understanding of the product in order to minimize risk. The popularity of mobile devices and the advent of immersive technology such as AR (augmented reality) are believed to provide new opportunities for increasing multimodality, richness of information and place independency of retail.



In our AR furniture app we have given a simple UI AR core feature so that the user will get a good reaction of what is going wrong if there is less light our screen will show that light is less if it can't find proper surface it will show try different surface as shown in figure.

Fig.1: surface screen-1

In this figure you will see that after detecting the surface user will get to set the size of the object according to their area
And set the object in their space after checking that user can buy the object accordingly.



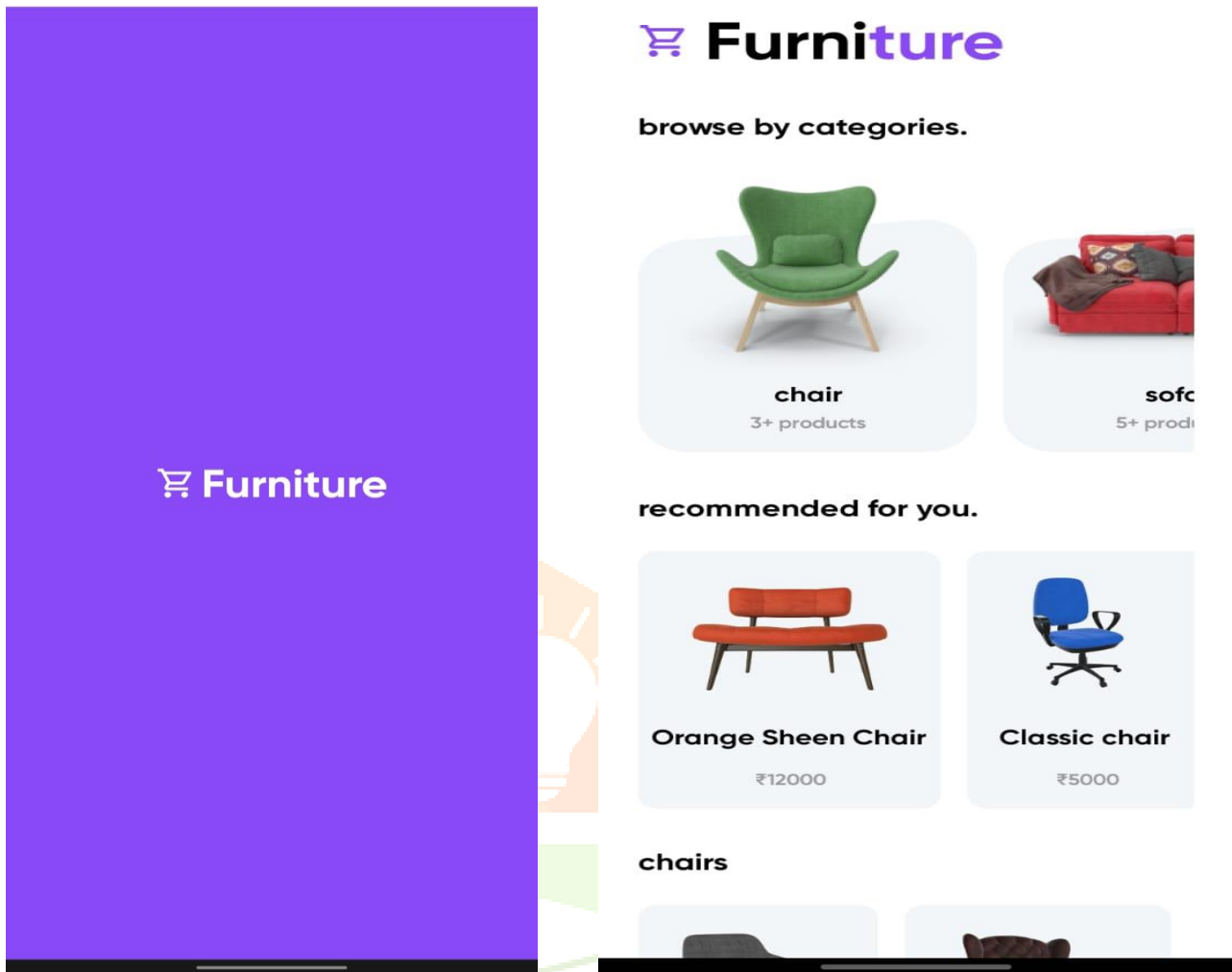
Fig.2: Surface screen-2

The application's initial stage will be identical to that of any other e-commerce site. Amazon, Flipkart, and eBay, for example. When a user chooses a product that he or she likes and uses the augmented reality function, the 3d model for that product is retrieved from the database. The AR system will begin detecting the plane and displaying a marker on the detected plane. Once the model has been retrieved from the database.

The 3d model will be spawned in the location of the marker once the user clicks it. After that, the user could scale or rotate the model to his or her preference. The application uses Google's AR Core to implement these augmented reality features using flutter for e-commerce application development.

X. RESULT AND DISCUSSION:

1. Home page:-



chairs



Modern Chair
₹10000



Manchester Chair
₹8000

sofas



Velvet Sofa
₹8000



Leather Sofa
₹60000

home decors



Modern Pot



Lamp



chair

modern chair

from

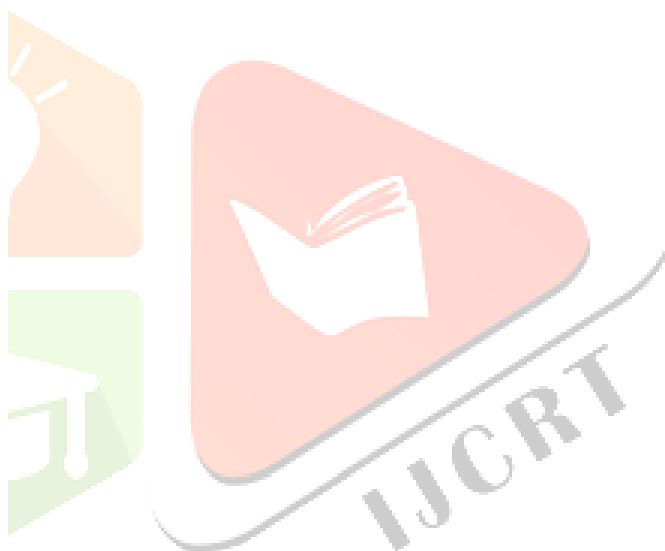
₹ 10000



Modern Chair

this modern chair is an elegant and functional piece of furniture. it is suitable for family visits and parties with friends and perfect for relaxing in front of the tv after hard work.

view into your house.



2: 3D model of chair:-

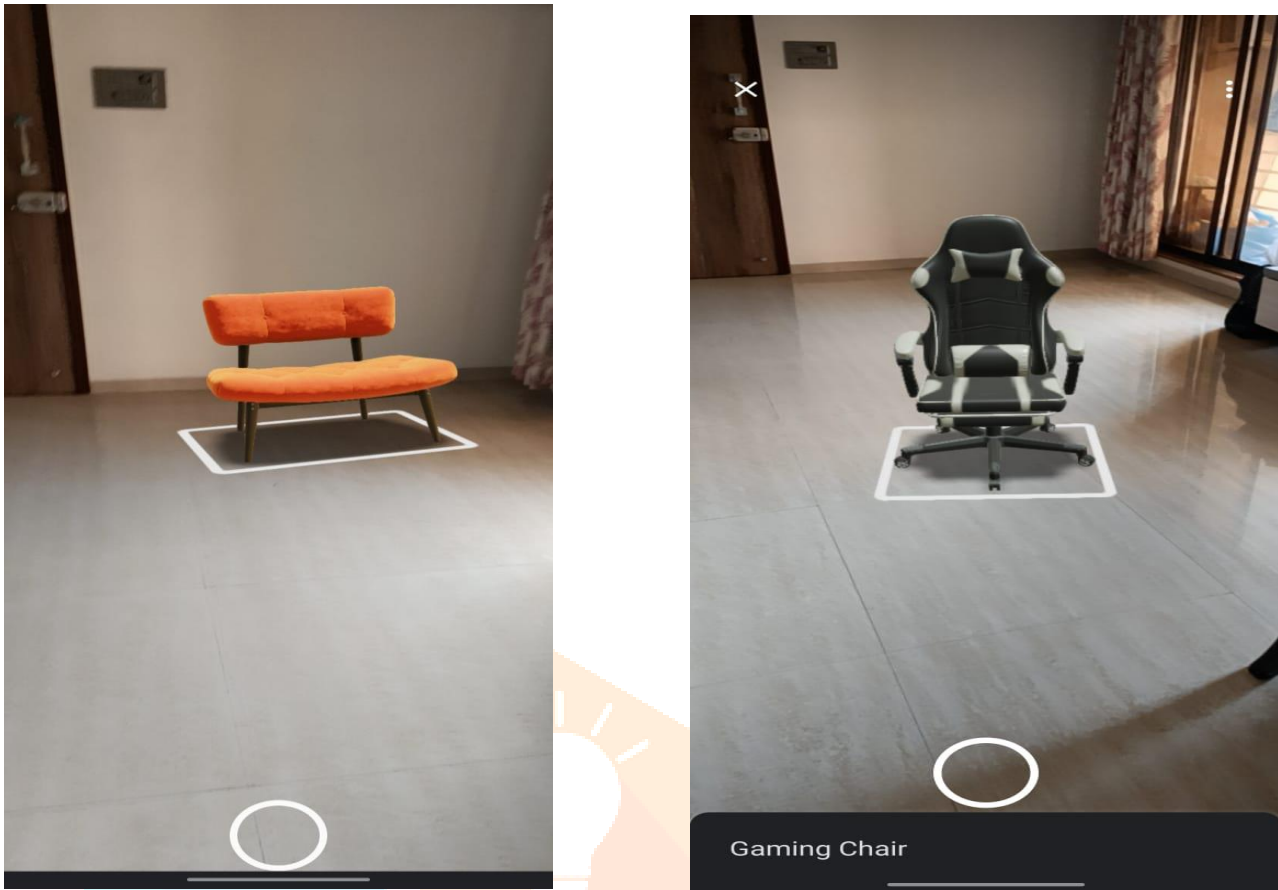


Fig..2:model of chair

3: 3D model of sofa:-



Fig 3:model of sofa

XI. Conclusion :

The main objective of this “Furniture Layout Application Using Augmented Reality” is to analyse the use of augmented reality to render the furniture model in real world. Augmented reality technology that allows the customers to decide and interact the furniture with the real world, offering new possibilities for furniture online shopping. It helps the customer to view and understand the furniture for his requirements. Due to this customer will come to know how their home structure would look after purchasing and placing the furniture object with multi-colour option. These helps the buyer in determining how to setup the furniture in their home structure.

Augmented reality support for furniture help in creating many new opportunities for future research to anticipate new ideas in the field of online shopping as customer will get benefit with these types of applications and gives a better understanding and decision making for purchasing a furniture in an efficient way.

Augmented reality is new evolving technology in the field of computer science and will make us much more helpful than the traditional technologies.

XII. ACKNOWLEDGMENT

It is opportunity of immense pleasure for us to present the paper on project “Augmented Reality Furniture” expressing our gratitude to all those who have generously offered their valuable suggestions towards the completion of the project. We take the privilege to express our sincere thanks to Mr. A.T.Bhosale, our project guide, for providing the encouragement and much support throughout our work. We are deeply indebted to Mrs. S.D. Mohite (Project coordinator), Mr. Hipparkar A.A. (Head of Department) and Dr. N.G. Narve(principal) and the entire team in Computer Department. They supported us with scientific guidance, advice and encouragement. They were always helpful and enthusiastic, and this inspired us in our work.

XIII. REFERENCES :

1. <https://www.iosrjournals.org/iosr-jce/papers/Conf.16051/Volume-1/9.%2042-46.pdf?id=7557>
2. Elizabeth Carvalho, Gustavo Mações, Isabel Varajão, Nuno Sousa and Paulo Brito. (2011, Nov.). Use of Augmented Reality in the furniture industry. Presented at Center for Computer Graphics. [Online]. Available:
3. https://www.researchgate.net/publication/236863499_Use_of_Augmented_Reality_in_the_furniture_industry
4. Billinghamurst, M. (2002) “Augmented reality in education” in New Horizons for Learning, 2nd ed., vol.3, New York: McGraw-Hill, 2010, pp. 123-135.
5. <https://www.irjet.net/archives/V2/i7/IRJET-V2I780.pdf>