

VIRTUAL TRIAL WITH AUGMENTED REALITY

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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DAFFODIL INTERNATIONAL UNIVERSITY

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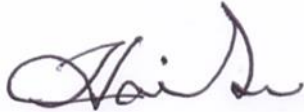
This Project titled “**Virtual Trial With Augmented Reality**” submitted by Md. Tarikul Hasan, ID: 162-15-7944; Ahete Shamul Haque Chowdhury Soumik, ID: 162-15-7716; Md. Monirul Islam, ID: 162-15-8134 and Rubel Chandra Debnath, ID: 162-15-8144 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on July 2020.

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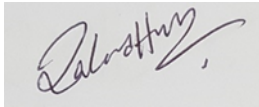
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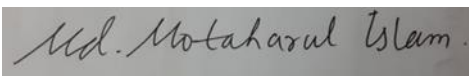
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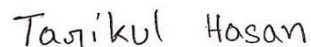
We hereby declare that, this project has been done by us under the supervision of **Ms. Afsara Tasneem Misha, Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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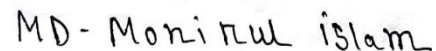


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ABSTRACT

The purpose behind this project is to present an idea of furniture or the products that we buy or order from online for decoration using the Augmented Reality (AR). People can make a virtual trial that they want to purchase by using a simple application. The report is intended to present a 3D representation of how the product would look like we set the product on our house e.g which tools will be used on this purpose, what kind of programming is needed for the 3D representation, how the customers can apply this application in their real life. Finally, this paper will give a proposal of a modern trial system specially for the online buyers to improve their buying experience as sometimes it appears, they choose a product but it doesn't look as they saw at the shop or it's not suiting with house corner. The trial system would detect the surface and then apply the product on that surface. The project is based on Augmented Reality which is basically very hard to execute. In this project we will be using most famous SDK (Software Development Kit) like A.R Core and Vuforia for the progress of the project as we mixed platform named UNITY and The language is C-Sharp. The project will be launched as an Android Application.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The Augmented Reality is very new in the sector of Education. Basically, it is used in modern or tech world where this kit is used by the software organization or developers for making better use of technology. In the past it was almost a dream for people but Now-a-days students are feeling the presence of Augmented Reality in the modern education system. The main reason of using A.R in the education sector is to develop a basic knowledge among the students about new and smart technology. With the help of this knowledge students has the opportunity to improve their skills. The main goal of the educational institutions is to make improvements of the quality of education. We are living in a modern world. In these modern days, we are witnessing a lot of changes in our day to day life which were seem to be impossible few decades ago. An online shopping website is one of them. By the invention of online shopping system people's life became a lot easier than ever before. Now they don't have to go the stores as they can easily order products from online shops.

Today development of technology is growing up very fast and the programmers have a lot of SDK (Software Develop Kit) that can make online buyers' life easier as we can now not only view the product but also trial virtually. This is where Augmented Reality came in. By the use of this sector of technology we can clear our doubts about ordering a product as we can make a realistic virtual trial just by using a mobile application.

1.2 Motivation

Let us consider a situation where a buyer wants to buy a product that he needs from an E-commerce site. It takes some time for the buyer to trust the site he got confused about the product quality. On the other hand there are some buyers who are very serious about buying products that comes in good quality. But there are some problems while doing so. The first problem is the confusion of buying products. Confusions like how will it look while using or will be suitable with the decoration of their houses. For example, a person orders a flower-vase that he saw online but have no idea how will it look in their place that he's planning to place. These confusions create problem. If we have a system that allows the users or customers to trial the product that he wants to purchase it will be very helpful for them. There are some shops that allows the product return policy but it is a lengthy process and most of the sites doesn't give this facility to their clients. For those shops who don't provide the return policy service, it is very important for them to keep the clients interesting at their shop products. So, if they have a system that can help the customers or allow the buyers to trial of their desired product with the help of technology, the clients will be more interested in their shop as the have the opportunity to experience the modern days shopping with the help of Augmented Reality. Augmented Reality is basically an advance computer technology to represent a 3D view of an object which has a little bit of application in the educational sector.

Objectives:

- See a realistic view.
- Predicting suitable product to buy for home.
- Analyze the difference between two or more products.
- Compare the best product by analyzing them.
- After seeing all products and pricing, assuring before buying that product.

1.3 Rationale of the Study

Augmented Reality is basically an advance computer technology to represent a 3D view of an object which has a little bit of application in the educational sector. With the help of Augmented Reality, we can build an application which will help us to see objects interacting in real world through some processes. Not only that without the object's presence in real world we can view that object in different angles as it provides a 3D shape. First of all, we can detect the surface with the help of AR Core which in one of the famous SDK's (Software Development Kit) and Vuforia. While using the SDK, it converts the smartphone camera into a AR (Augmented Reality) camera. The A.R camera detects the real-life surface and make the area selected for the object to take place. Then we'd put the object on that surface. It allows us to the view the object in a 3D mode like zooming in or out, scaling, rotating or even shifting.

Augmented Reality is widely used in the field of gameplay. It will not be wrong if we say it has a very bright future there. But if we widen our scope, we can also use this technology in other sectors like smart shopping fields where the customers can trial different products just by clicking the product.

1.4 Research Questions

Every research project has a critical and fundamental part which is Research Questions. It is important that it needs to be focused, cleared, has a point. Basically, the research questions are related to the research project and it needs to be answered directly through the analysis of the data. The research related questions that we will be trying throughout the research paper are given below:

- What kind of data we will be using to complete our analysis?
- How to prepare the dataset?
- Finding out the algorithm behind the analysis?

- How to compare the method with other methods in the same fields?
- Who will be the audience for the project?
- How can we become admirable to use the application?

1.5 Research Outcome

Our research is expected to provide the real-life solution of problems. Some of them are:

- Realistic view of product in 3D shape.
- Discovering product in different angles.
- Comparing results of few products.
- Define the quality by the result.

1.6 Layout of Report

Our project report is organized as follows:

- Chapter One includes the introduction of our project, project motivation, research questions, expected outcome and layout of our report.
- Chapter Two includes Literature Review, our point of view of this sector, related work, research summary, scope the problem and challenges.
- Chapter Three includes the Research Methodology
- Chapter Four includes Experimental Results and Discussion of the project worked.
- Chapter Five includes Conclusion and Future scope

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In the modern technology, ordering and buying a product is a comfortable task with the help of the online shopping website. There are various types of website that are popular for their online services, but it will be very effective and comfortable shopping if the customer can give a little trial of their ordered product for assuring that comfort. We can use a new technology called Augmented Reality (AR).

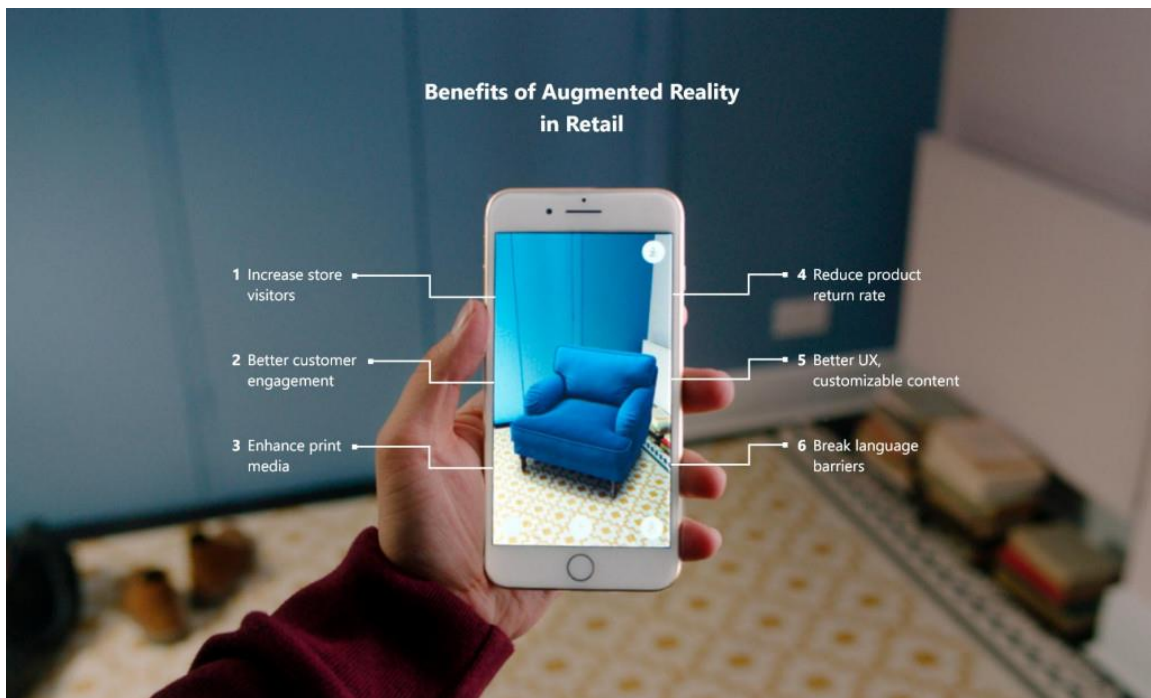


Fig 2.1: Benefits of Augmented Reality in Retail

Augmented Reality is a process of experiencing a real world experience where the real world objects are enhanced by computer generated perceptual information. It also can be said that Augmented Reality is a way of representing a real life object on a virtual platform. There are different types of techniques to represent an object.

Here the best way to represent a real life object is the augmented reality. Because on the VR(Virtual Reality) it is like representing a virtual object on a virtual platform while we can represent a real life object on a virtual platform with the help of Augmented Reality(AR).It can be applied on the online shopping website to get a better shopping experience. There are many SDK for Augmented Reality (AR). Software Development Kit(SDK) is a technological software engine in which new AR apps can be developed and created. There are different types of SDK's that are used to develop an AR app like ARKit, ARcore, Vuforia, Kudan, Easy AR etc. By using those SDK different AR based app can be built. With those SDK a virtual camera will be open, it will detect the surface and then it will put the real-life object on the virtual platform and the customers can give a trial of their ordered product.

2.2 Related work

Virtual trial room by “TryNDBuy”

This system was found in Mumbai in 2017. TryNDBuy fashions has created a software which can be loaded into fashion trials app to create a digital trial room.

Nerdiz.com

Nerdiz.com is Bangladesh's first virtual Reality Educational platform. Pradeepta Kumar Saha had come up with the idea of starting a VR education system. Currently this team has 13 students from different universities who delivers the best content through VR.

Sephora virtual Artist and Rolex

Sephora is a cosmetic company and it uses the AR technology to build an app that allows the customers to give trial of the product on their eyes, lips etc. They can try the colors on their digital face.

Dulux visualizer

Dulux visualizer is a AR based application that gives us the opportunity to try out the shade of paint for our house before we buy the color for painting.

2.3 Summary of our Research

In the research summary, we can clearly say that the research will recommend a system that can be extremely helpful for the customers and for those who are very much confused when buying a product. We collect different instructions and bring them in one platform, then we combined them together to make a better UI(User Interface).From this system we can make a trial of a product or object. Many organizations can use this technology for their customers so that they can get a overview of the object.

2.4 Scope the problem

In this scenario

- Analyze different types of datasets.
- The data's format changing problem
- Accuracy is not fully maintained.
- Higher requirement of android API.

2.5 Challenges

Challenges that we face

- Augmented Reality is very new to modern technology so that's why we don't have enough source to learn.
- As we use different types of SDK so it will not run in lower configured devices.
- It needs higher configuration device to work with AR.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The methodology is a way of gathering the data or information that contains several concepts and theory. The augmented reality process can be implemented through a platform called “Unity”. This is platform where we can perform those experiments related to Augmented Reality.



Fig 3.1: Working platform of Virtual trial with Augmented Reality.

Most of us have heard about the Unity that allows programming for gaming, drag and drop features and C# scripting. It was first launched in 2005 by Nicholas Francis, Joachim Ante and David Helgason and It was only supported mac development and deployment. However, today Unity has become the most popular engine on the market as it has expanded its operation to the windows and give the

power to publish a project on a open platform. From Android to IOS to PS4, Unity holds the reputation for being easy to pick up and implement.

3.2 Steps of the working process

The methodology is a way of gathering the data or information that contains several concepts and theory.

Player setting

Before building an application or system we need to control the application settings. We a have to set the right information for our project so that the project can run smoothly on the device's that the project will run.

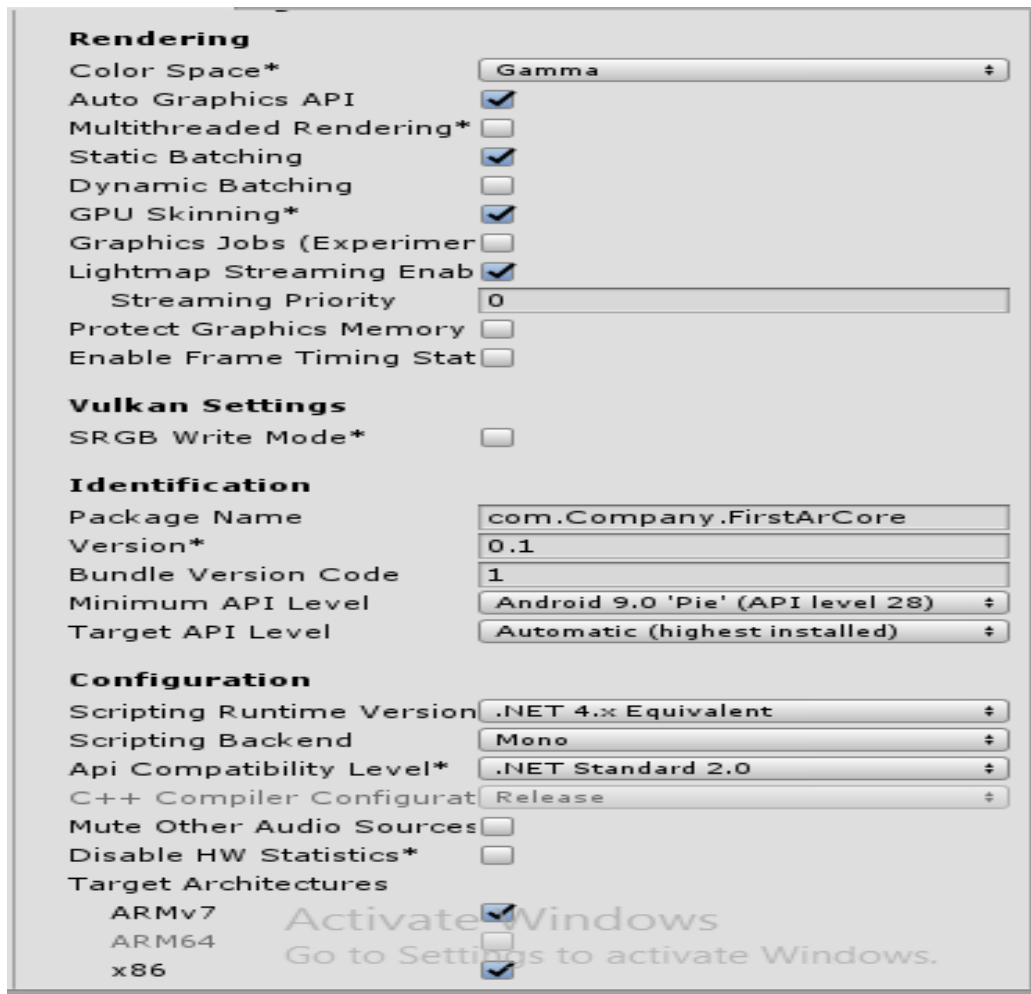


Fig 3.2.1: Player settings of the project.

The following figure represents the settings of the project. That means here we need to select API level, Package name of the Project, name the Project, which's API level the project will be supported. Here the minimum API level Android 9.0 Pie. It also shows that this project supports ArCore. this is called the player settings. So, the following figure represent the player settings of the application.

Build Settings

After the player Settings, we need to control the settings where we are building this application. This setting is also known as Build Settings.

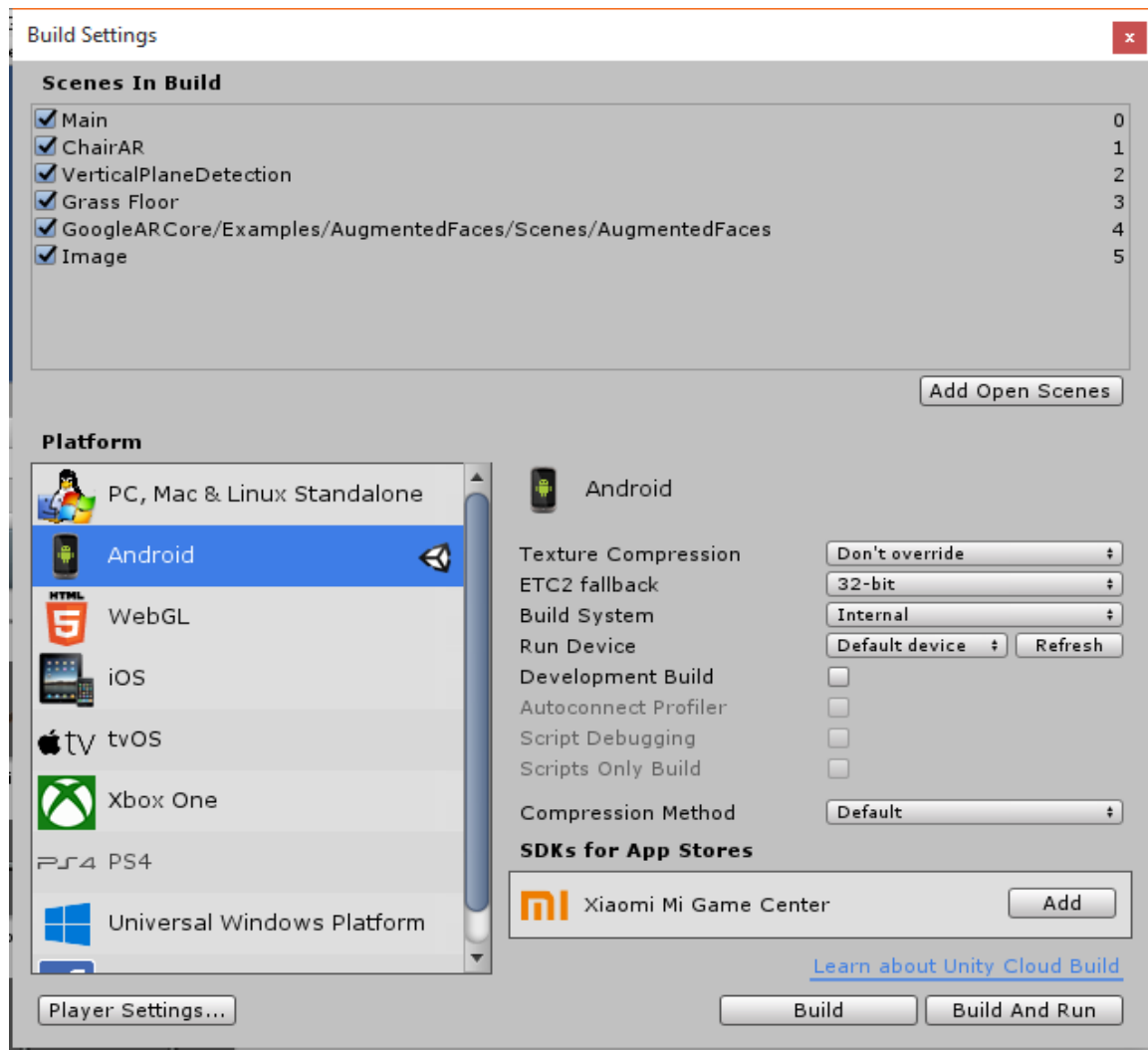


Fig 3.2.2: Build settings of the project.

The following figure represents that we have built the app in Android. As we can see there are few scenes in built. Here we have total 6 scene in that function. Here we have 6 different scene and we have combined those scenes here and we are controlling those scenes with the help of different buttons. Here scene means like getting a 3D view of the chair is a scene, grass floor is a scene, photo frame is a scene etc. We have combined all the different scene together to build an app.

Scene of an object (Chair)

We have worked in different scene. In those scenes we have imported some additional file so that the scene can run properly.

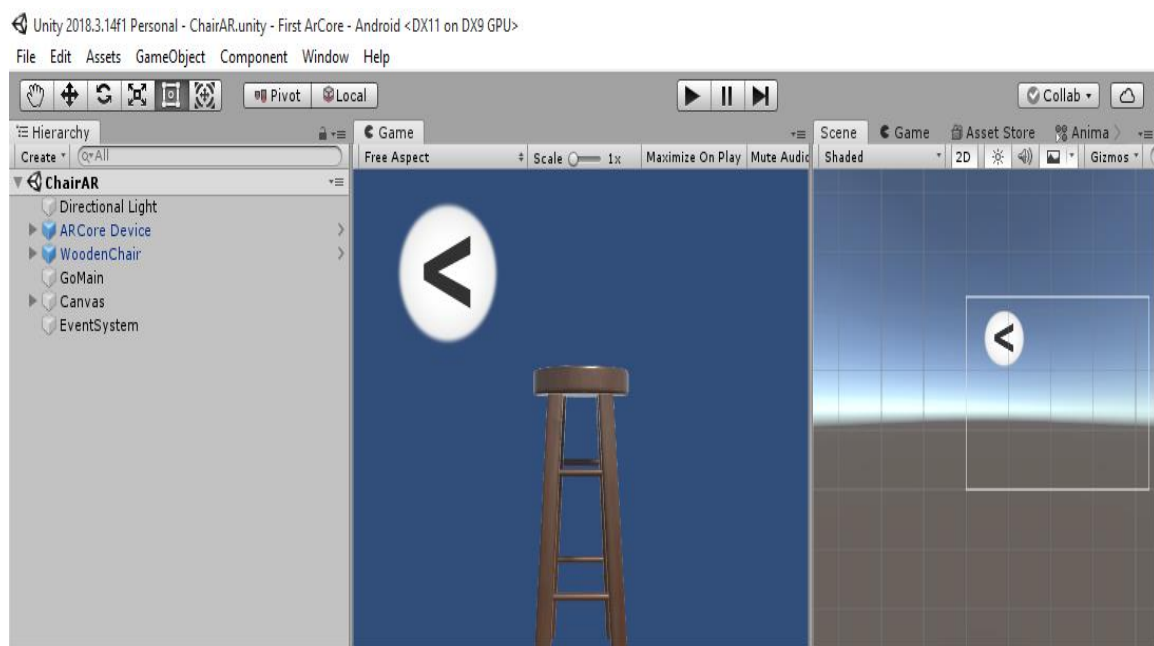
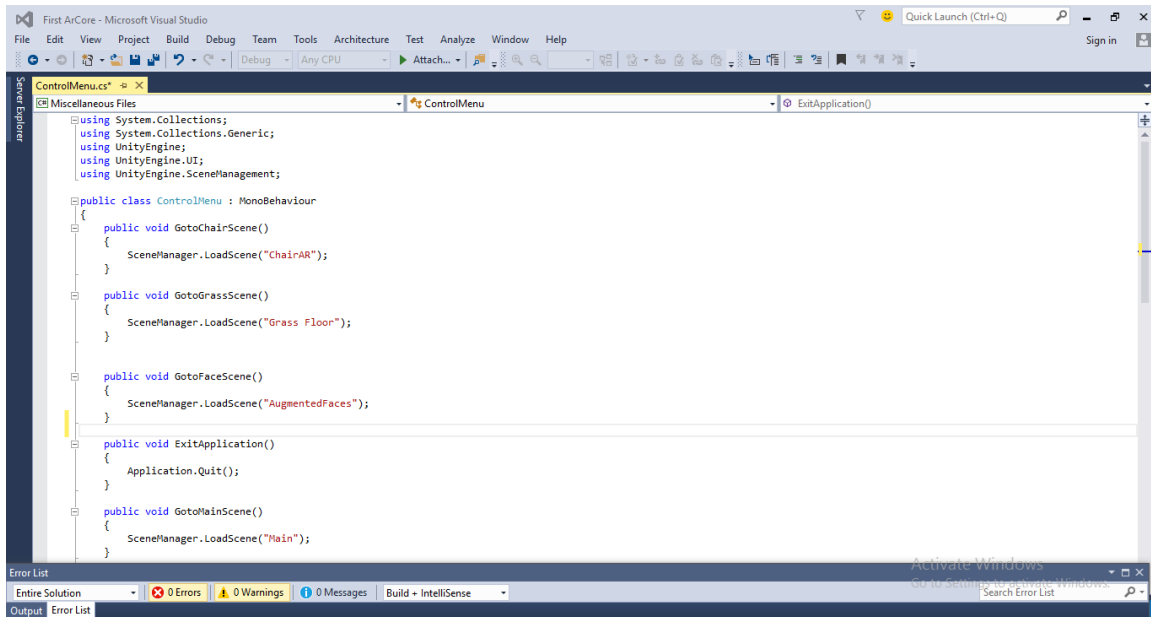


Fig 3.2.3: Scene of wooden chair.

The following figure is scene of our AR application. On the left side we have imported some file like directional light, ArCore device, wooden chair. We have a back button on the scene so that we can return to the mail file.

Main Menu file

We have to write appropriate code for implementing the application properly. We have to declare some method to complete the code.



```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.UI;
using UnityEngine.SceneManagement;

public class ControlMenu : MonoBehaviour
{
    public void GotoChairScene()
    {
        SceneManager.LoadScene("ChairAR");
    }

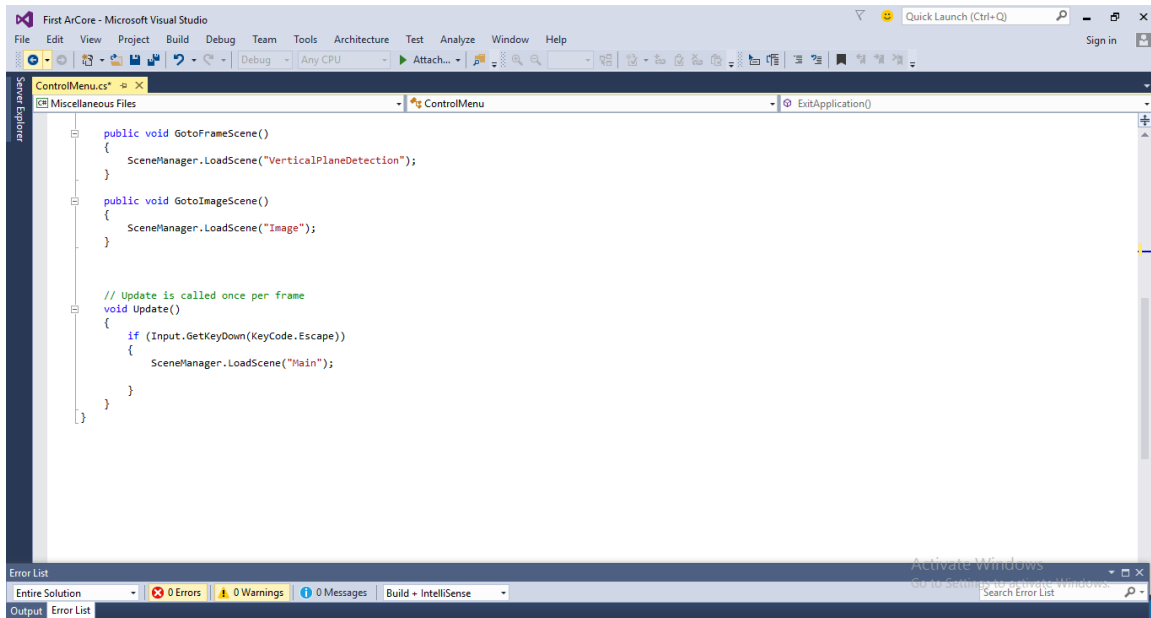
    public void GotoGrassScene()
    {
        SceneManager.LoadScene("Grass Floor");
    }

    public void GotoFaceScene()
    {
        SceneManager.LoadScene("AugmentedFaces");
    }

    public void ExitApplication()
    {
        Application.Quit();
    }

    public void GotoMainScene()
    {
        SceneManager.LoadScene("Main");
    }
}
```

Fig 3.2.4: Code for main menu screen.



```
public void GotoFrameScene()
{
    SceneManager.LoadScene("VerticalPlaneDetection");
}

public void GotoImageScene()
{
    SceneManager.LoadScene("Image");
}

// Update is called once per frame
void Update()
{
    if (Input.GetKeyDown(KeyCode.Escape))
    {
        SceneManager.LoadScene("Main");
    }
}
```

Fig 3.2.5: Code for main menu screen (continued).

The following figures are the codes for our menu buttons. We execute those buttons from these codes. We have different codes and we have set this code with different buttons. We have declared a Go to function with all codes. With this function when a user presses different buttons it will go to different scenes. There is a code for the back button so that when the user presses the back button, it will take him to the main page.

Change of size

As we are working with an object in Augmented Reality, so it will be better if we can zoom in or zoom out the object.

```
public void _PinchtoZoom()
{
    if (Input.touchCount == 2)
    {
        // Store both touches.
        Touch touchZero = Input.GetTouch(0);
        Touch touchOne = Input.GetTouch(1);

        // Find the position in the previous frame of each touch.
        Vector2 touchZeroPrevPos = touchZero.position - touchZero.deltaPosition;
        Vector2 touchOnePrevPos = touchOne.position - touchOne.deltaPosition;

        // Find the magnitude of the vector (the distance) between the touches in each frame.
        float prevTouchDeltaMag = (touchZeroPrevPos - touchOnePrevPos).magnitude;
        float touchDeltaMag = (touchZero.position - touchOne.position).magnitude;

        // Find the difference in the distances between each frame.
        float deltaMagnitudeDiff = prevTouchDeltaMag - touchDeltaMag;

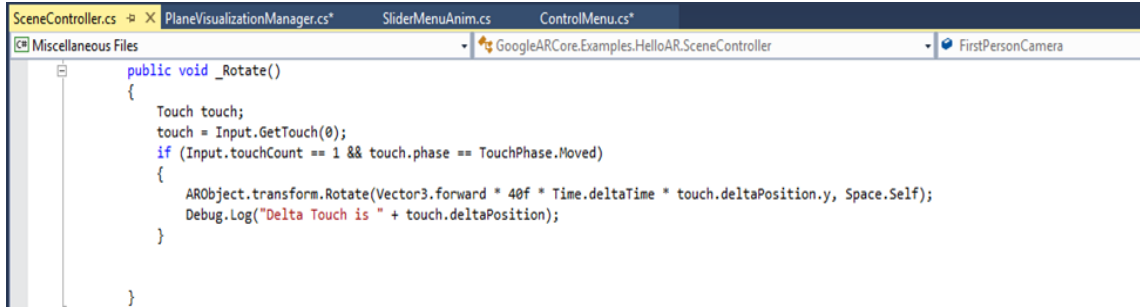
        float pinchAmount = deltaMagnitudeDiff * 0.02f * Time.deltaTime;
        ARObject.transform.localScale += new Vector3(pinchAmount, pinchAmount, pinchAmount);
    }
}
```

Fig 3.2.6: Codes for changing the size of objects.

Here a function `pinchtozoom()` is used in the code that helps the apps to control the object as the user can zoom in or zoom out the object for a better and clear view.

Rotation of object

It would be better if we can rotate the objects in different angles. Rotation of the object can produce a clear view



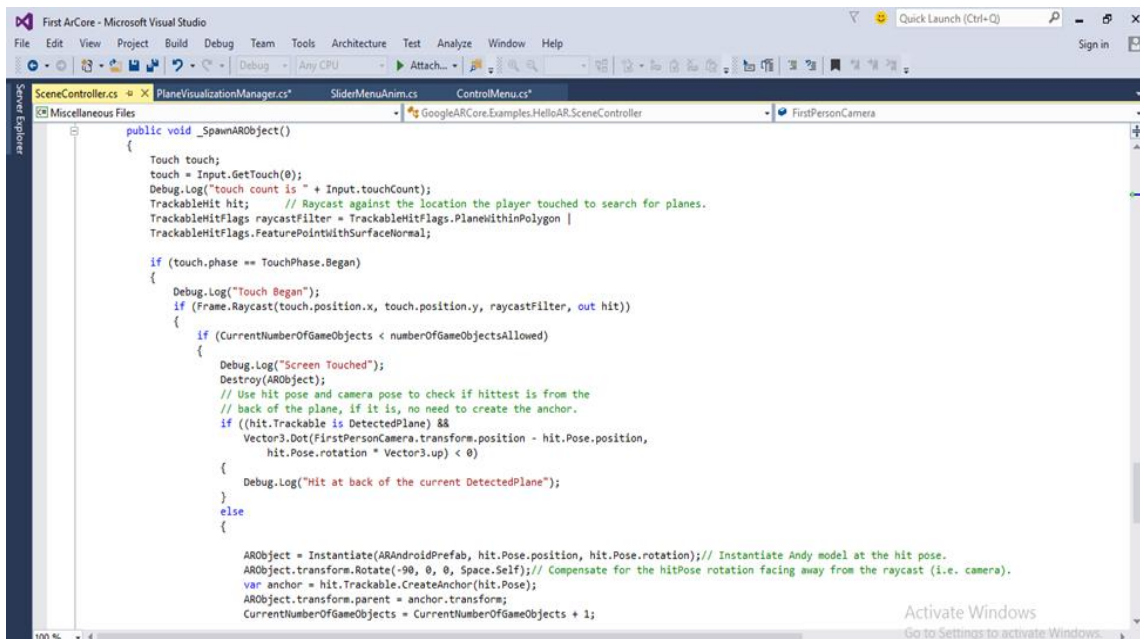
```
public void _Rotate()
{
    Touch touch;
    touch = Input.GetTouch(0);
    if (Input.touchCount == 1 && touch.phase == TouchPhase.Moved)
    {
        ARObject.transform.Rotate(Vector3.forward * 40f * Time.deltaTime * touch.deltaPosition.y, Space.Self);
        Debug.Log("Delta Touch is " + touch.deltaPosition);
    }
}
```

Fig 3.2.7: Codes for rotating the angles of objects.

Here a function Rotate has been called in the code. With this function users of this app will be able to rotate the objects.

Swap object

As we are working with an object so It is very important that object can move from one place to another.



```
public void _SpawnARObject()
{
    Touch touch;
    touch = Input.GetTouch(0);
    Debug.Log("touch count is " + Input.touchCount);
    TrackableHit hit; // Raycast against the location the player touched to search for planes.
    TrackableHitFlags raycastFilter = TrackableHitFlags.PlaneWithinPolygon |
    TrackableHitFlags.FeaturePointWithSurfaceNormal;

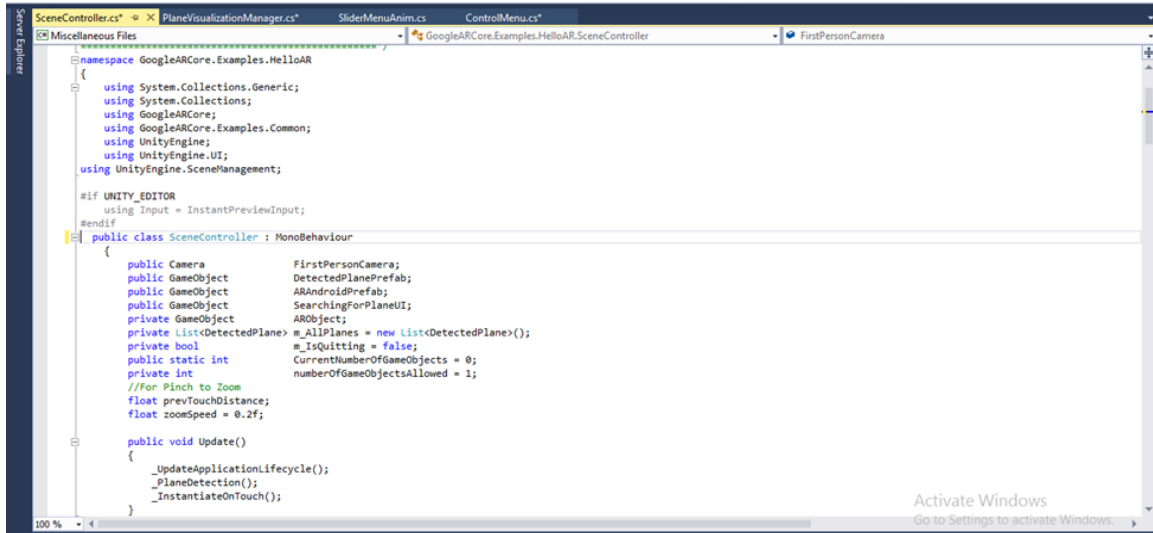
    if (touch.phase == TouchPhase.Began)
    {
        Debug.Log("Touch Began");
        if (Frame.Raycast(touch.position.x, touch.position.y, raycastFilter, out hit))
        {
            if (CurrentNumberOfGameObjects < numberOfGameObjectsAllowed)
            {
                Debug.Log("Screen Touched");
                Destroy(ARObject);
                // Use hit pose and camera pose to check if hittest is from the
                // back of the plane, if it is, no need to create the anchor.
                if ((hit.Trackable is DetectedPlane) &&
                    Vector3.Dot(FirstPersonCamera.transform.position - hit.Pose.position,
                    hit.Pose.rotation * Vector3.up) < 0)
                {
                    Debug.Log("Hit at back of the current DetectedPlane");
                }
                else
                {
                    ARObject = Instantiate(ARAndroidPrefab, hit.Pose.position, hit.Pose.rotation); // Instantiate Andy model at the hit pose.
                    ARObject.transform.Rotate(-90, 0, 0, Space.Self); // Compensate for the hitPose rotation facing away from the raycast (i.e. camera).
                    var anchor = hit.Trackable.CreateAnchor(hit.Pose);
                    ARObject.transform.parent = anchor.transform;
                    CurrentNumberOfGameObjects = CurrentNumberOfGameObjects + 1;
                }
            }
        }
    }
}
```

Fig 3.2.8: Code for swapping an object.

The following figure is the code for swapping an object. Here a function spawnARObject is called which allows the objects from one place to another.

Scene Controller

We have to control the scene so that all the scene can perform properly under one User Interface(UI).



```
namespace GoogleARCore.Examples.HelloAR
{
    using System.Collections.Generic;
    using System.Collections;
    using GoogleARCore;
    using GoogleARCore.Examples.Common;
    using UnityEngine;
    using UnityEngine.UI;
    using UnityEngine.SceneManagement;

    #if UNITY_EDITOR
    using Input = InstantPreviewInput;
    #endif

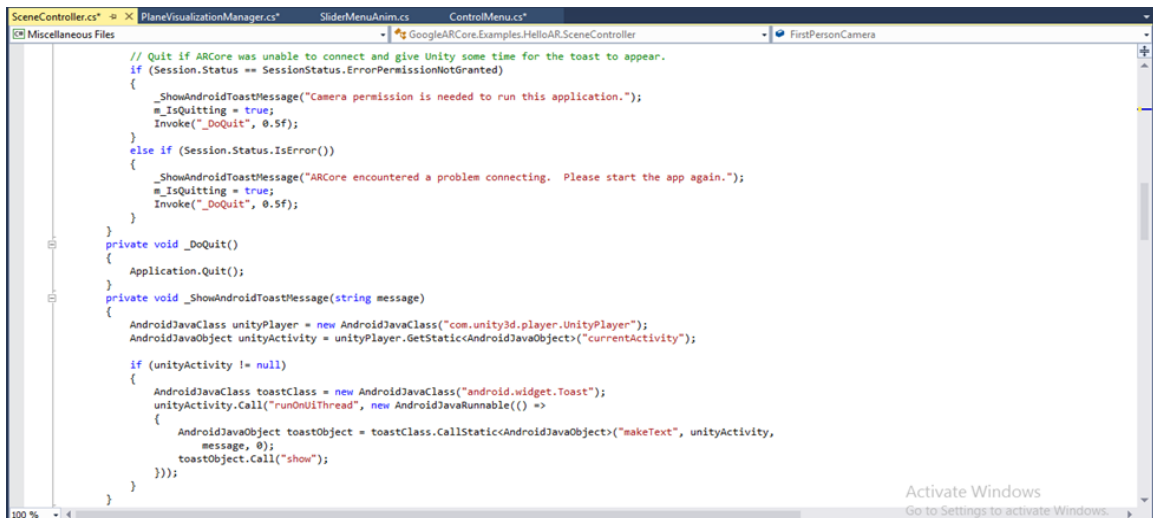
    public class SceneController : MonoBehaviour
    {
        public Camera FirstPersonCamera;
        public GameObject DetectedPlanePrefab;
        public GameObject ARAndroidPrefab;
        public GameObject SearchingForPlaneUI;
        public GameObject ARObject;
        private List<DetectedPlane> _allPlanes = new List<DetectedPlane>();
        private bool _isQuitting = false;
        public static int CurrentNumberOfGameObjects = 0;
        private int numberOfGameObjectsAllowed = 1;

        //For Pinch to Zoom
        float prevTouchDistance;
        float zoomSpeed = 0.2f;

        public void Update()
        {
            _UpdateApplicationLifecycle();
            _PlaneDetection();
            _InstantiateOnTouch();
        }
    }
}
```

Fig 3.2.9: Scene Controller.

The code to control the scene is the following code. Here in the following code we have declared some gaming object of our project.



```
// Quit if ARCore was unable to connect and give Unity some time for the toast to appear.
if (Session.Status == SessionStatus.ErrorPermissionNotGranted)
{
    _ShowAndroidToastMessage("Camera permission is needed to run this application.");
    _IsQuitting = true;
    Invoke("_DoQuit", 0.5f);
}
else if (Session.Status.IsError())
{
    _ShowAndroidToastMessage("ARCore encountered a problem connecting. Please start the app again.");
    _IsQuitting = true;
    Invoke("_DoQuit", 0.5f);
}

private void _DoQuit()
{
    Application.Quit();
}

private void _ShowAndroidToastMessage(string message)
{
    AndroidJavaClass unityPlayer = new AndroidJavaClass("com.unity3d.player.UnityPlayer");
    AndroidJavaObject unityActivity = unityPlayer.GetStatic<AndroidJavaObject>("currentActivity");

    if (unityActivity != null)
    {
        AndroidJavaClass toastClass = new AndroidJavaClass("android.widget.Toast");
        unityActivity.Call("runOnUiThread", new AndroidJavaRunnable(() =>
        {
            AndroidJavaObject toastObject = toastClass.CallStatic<AndroidJavaObject>("makeText", unityActivity,
            message, 0);
            toastObject.Call("show");
        }));
    }
}
```

Fig 3.2.10: Showing toast message.

Here in the following figure, we have written a code for showing a toast message. That means if there is an error in the app then the system will show different messages.

Button Graph

As we are working with some button's so there is some graph for this button.

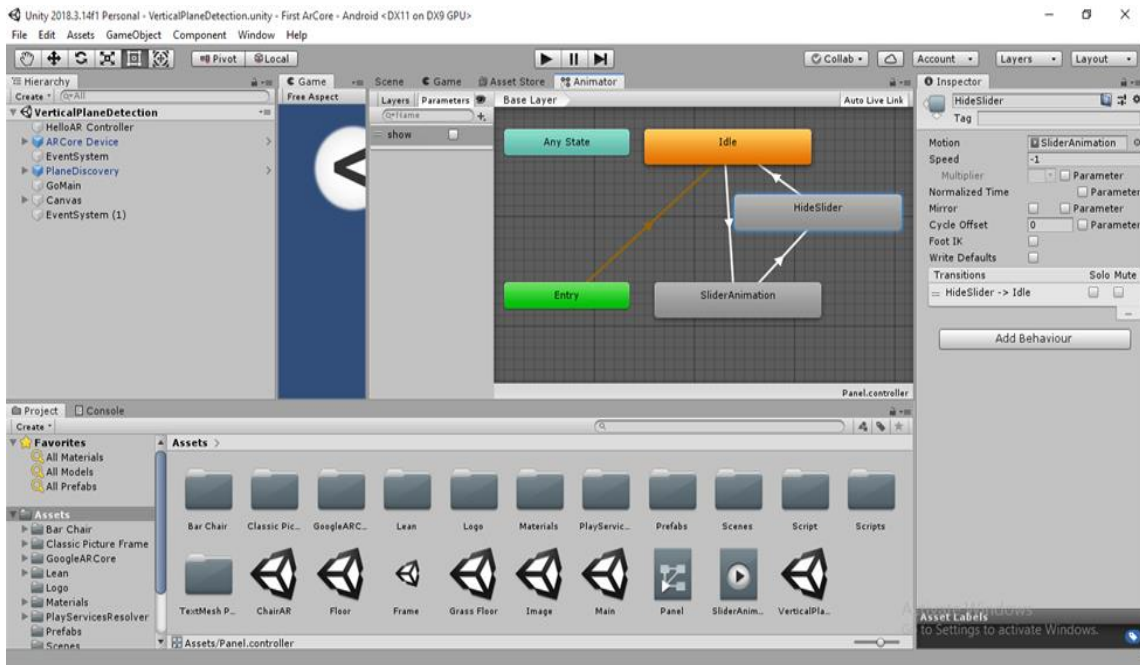


Fig 3.2.11: Button Graph.

Here in the main page of this app we have some buttons and those buttons has a slide and when we click the slide to hide and show it. The following figure is the graph of that animation.

```

using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class SliderMenuAnim : MonoBehaviour
{
    public GameObject PanelMenu;

    public void ShowHideMenu()
    {
        if(PanelMenu != null)
        {
            Animator animator = PanelMenu.GetComponent<Animator>();

            if(animator!=null)
            {
                bool isOpen = animator.GetBool("show");
                animator.SetBool("show", !isOpen);
            }
        }
    }
}

```

Fig 3.2.12: Button slide code.

As we have a animation button where if we click it will show or hide. The following figure is the code for the animation button.

Detect surface

This project is all about working with a moving object so it is very important that the AR camera can detect the surface right.

```

using System.Collections.Generic;
using UnityEngine;
using GoogleARCore;
using GoogleARCore.Examples.HelloAR;
using GoogleARCore.Examples.Common;

public class PlaneVisualizationManager : MonoBehaviour {
    public GameObject TrackedPlanePrefab;

    private List<TrackedPlane> _newPlanes = new List<TrackedPlane>();

    void Update ()
    {
        Session.GetTrackables<TrackedPlane>(_newPlanes, TrackableQueryFilter.New);

        foreach (var curPlane in _newPlanes)
        {
            var planeObject = Instantiate(TrackedPlanePrefab, Vector3.zero, Quaternion.identity,
                transform);
            planeObject.GetComponent<DetectedPlaneVisualizer>().Initialize(curPlane);
            planeObject.GetComponent<Renderer>().material.SetColor("_GridColor", new Color(Random.Range(0.0f, 1.0f), Random.Range(0.0f, 1.0f), Random.Range(0.0f, 1.0f)));
            planeObject.GetComponent<Renderer>().material.SetFloat("_UVRotation", Random.Range(0.0f, 360.0f));
        }
    }
}

```

Fig 3.2.13: Code for detecting surface.

The following figure is the code for detecting a surface. As the project work with moving object so It is very important that the camera can detect the surface. The following code help the camera to define if the surface is either a vertical surface od horizontal surface.

Common materials

There are some common materials which are the basic files for almost every code.

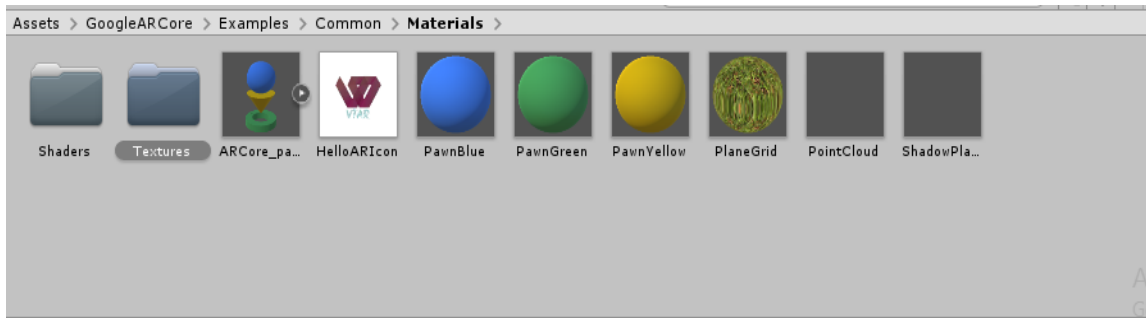


Fig 3.2.14: Common materials.

Here in the following figure, there are some common materials that we have used in all the objects of our project. We used them in different situations.

3D materials

As we want to show a 3D view of an object so we have to enter a 3D material.

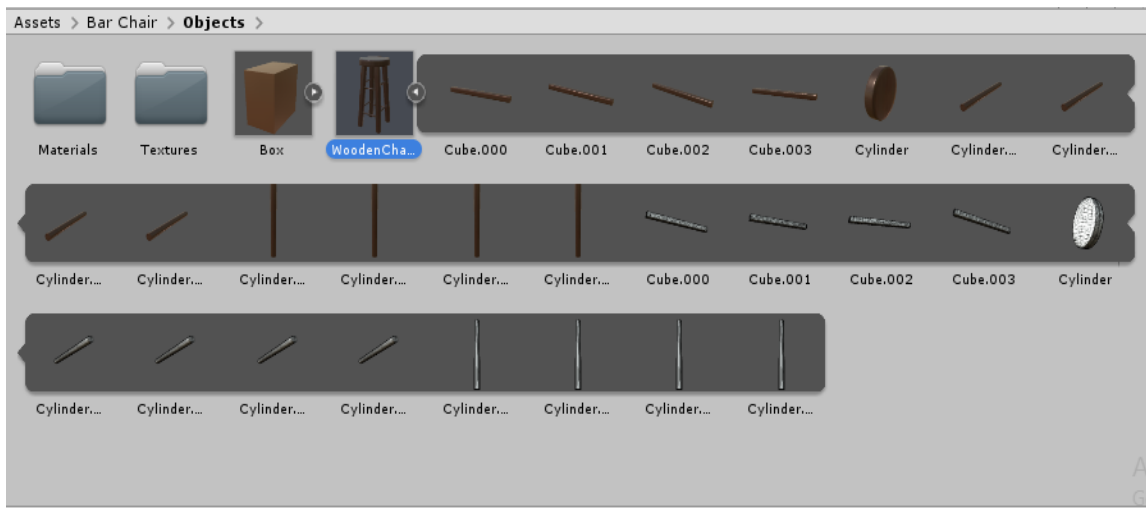


Fig 3.2.15: 3D materials for chair.

The following figure is a 3D material that we have downloaded from an assets store. This material helps to represent the 3D view of the chair.

Photoframe material

We are about to show the 3D representation of every object so we have to add the needed materials for the photo frame.

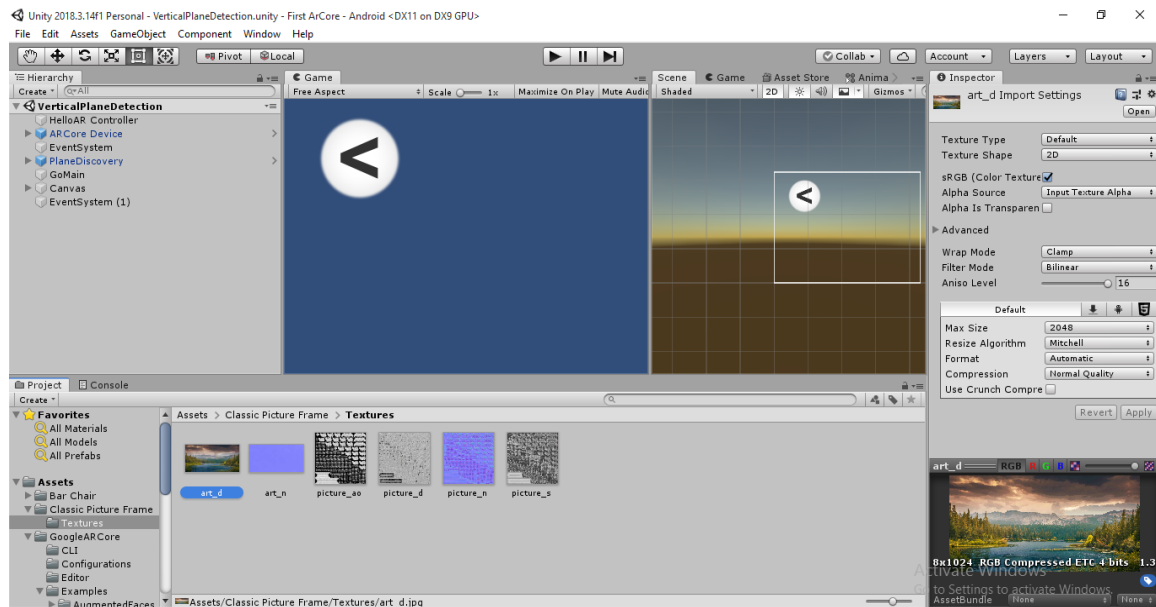


Fig 3.2.16: Photo-frame Materials.

The following figure describes which material is used in the photo frame. This helps this app to represent a 3D view of the photo frame.

Scanning pictures

There are some photos that are attached in this app that are used as the material for scanning.



Fig 3.2.17: Material for scanning.

The following pictures are used as scanning materials. We created a folder(images) and store the pictures in that folder. These images are saved in the apps as default images. If we scan those pictures then it will make a frame around those images.

Scene of the project

We are working with some objects that means we have different scene for different objects.

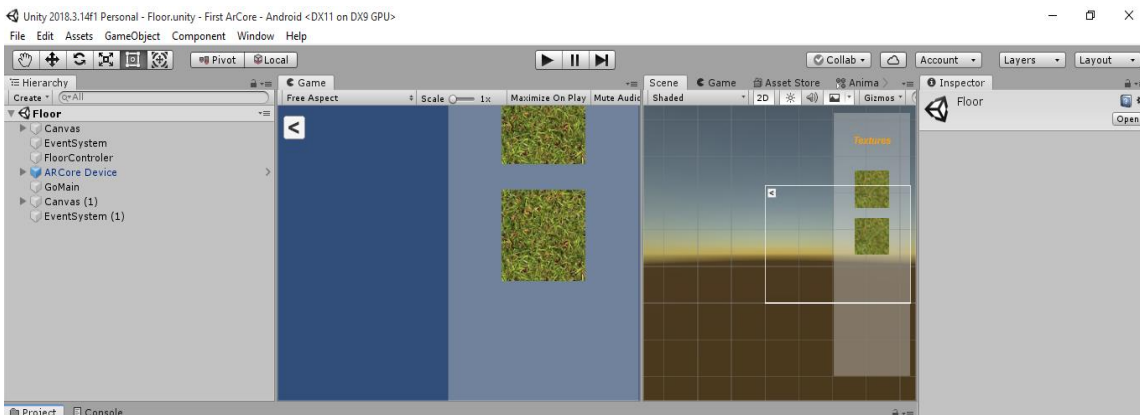


Fig 3.2.18: Scene of grass floor.

Here the following figure describes the scene for grass floor. Some of the additional file is imported which are canvas, Eventsystem, FloorController. We use a back button which allows the user to return in the main page.

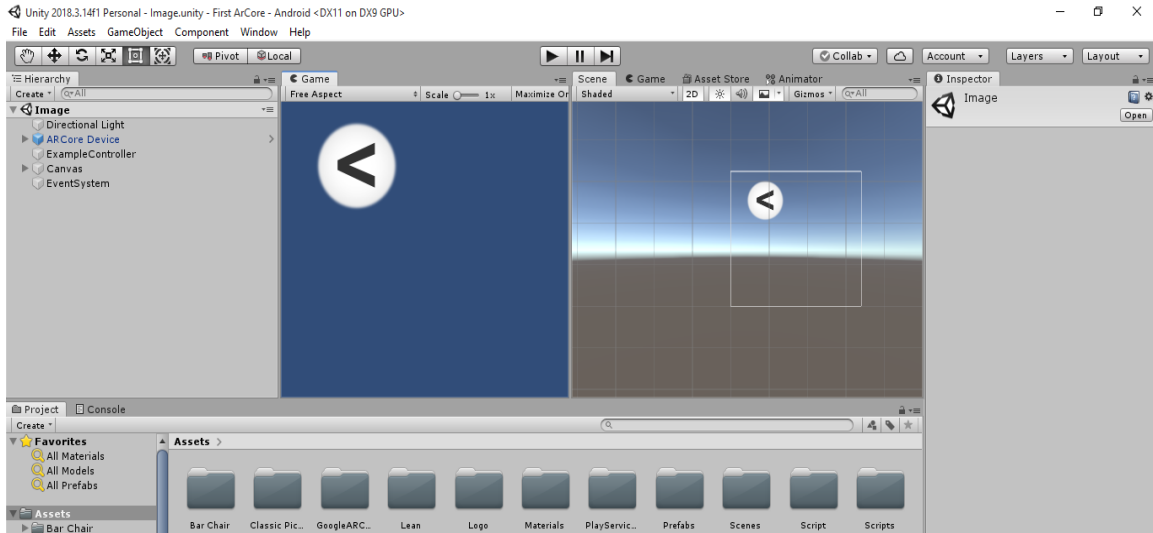


Fig 3.2.19: Scene for image scanning.

Following figure describes the scene of the image scanning. Here some of the additional files are imported for scanning which are directional light, canvas, ExampleController, EventSystem.

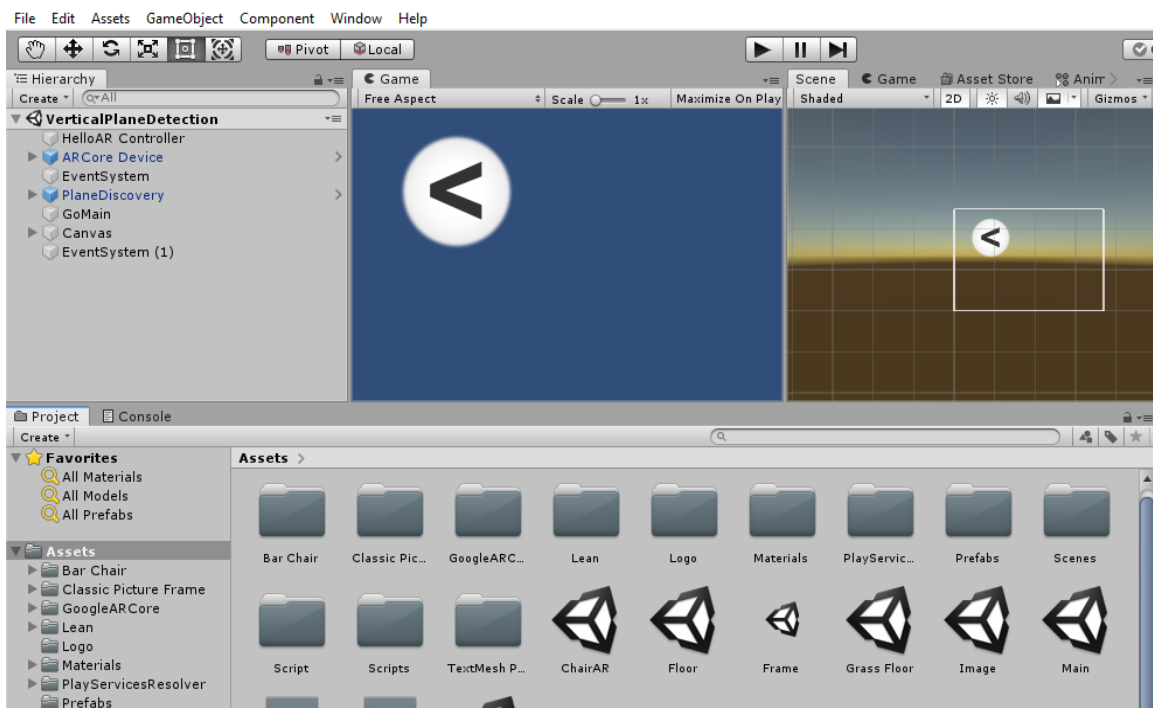


Fig 3.2.20: Detecting surface

We have added some additional file that helps the AR camera to detect whether the surface is vertical or horizontal.

3.3 Challenges

We faced huge challenges in this section of our research. We did not only face problem in the research part but also in the coding part as well. We faced a lot of problems like-

- It takes a long time to find out which work has been done before related to our project topic.
- As the Augmented Reality is very new to the modern technology, so there are not enough learning tutorials from where we can learn.
- We couldn't find any error while writing a code. That means there are no inline error detection system. We had to run the code after finishing it completely.
- As we are working in a big platform so it is very hard to implement.
- It is not applicable for all kind of devices. It needs a device that has higher specification

CHAPTER 4

EXPERIMENTAL RESULT AND DISCUSSION

4.1 Introduction

In chapter four, we will discuss the descriptive analysis of our project. Here in this chapter we will state our experimental results and the chapter will be closed with the summarization of result.

4.2 Experimental result

After assembling all parts of the project, finally we get an interface of the homescreen with a simple Menu that could me minimized with a single click

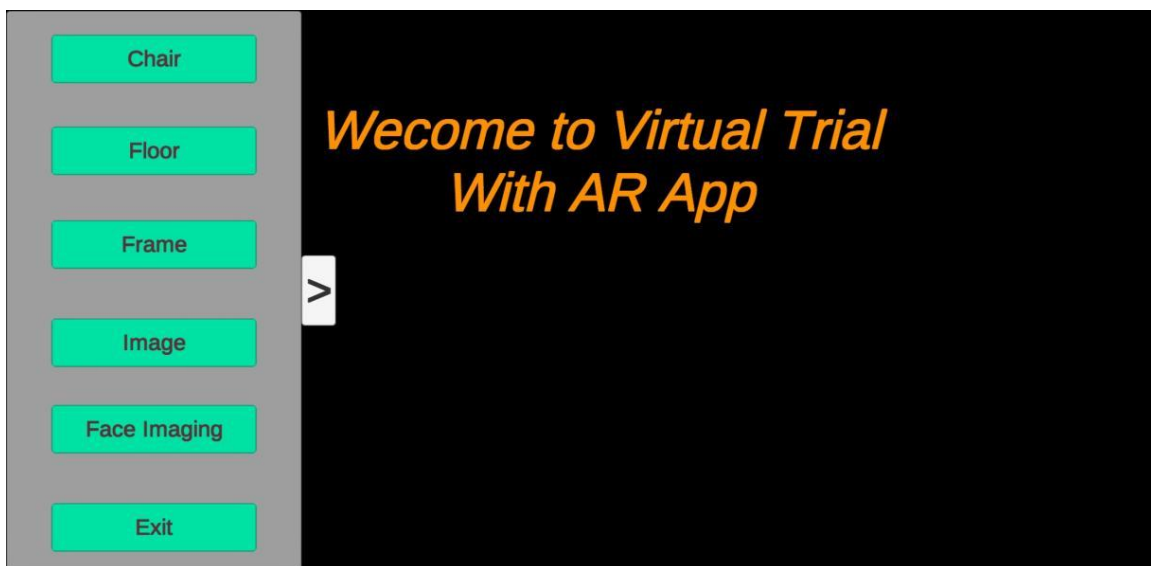


Fig 4.2.1: Interface of the application.

3D representation of Chair

In the previous chapter, we have shown the figure that contains the necessary codes and working materials for representing a 3D view of a chair and the result was as expected.



Fig 4.2.2: Location of the trial.

We found the perfect place where we can give a trial of our wooden chair. So, we have opened our application and it is trying to detect the surface to fit the chair on it.



Fig 4.2.3: Chair with Augmented Reality.

After the successful detection of the surface, the chair can now be seen in the location. Here we can see a 3D view of the following chair and we can fit the chair anywhere, we can zoom in or zoom out the chair as per our need.

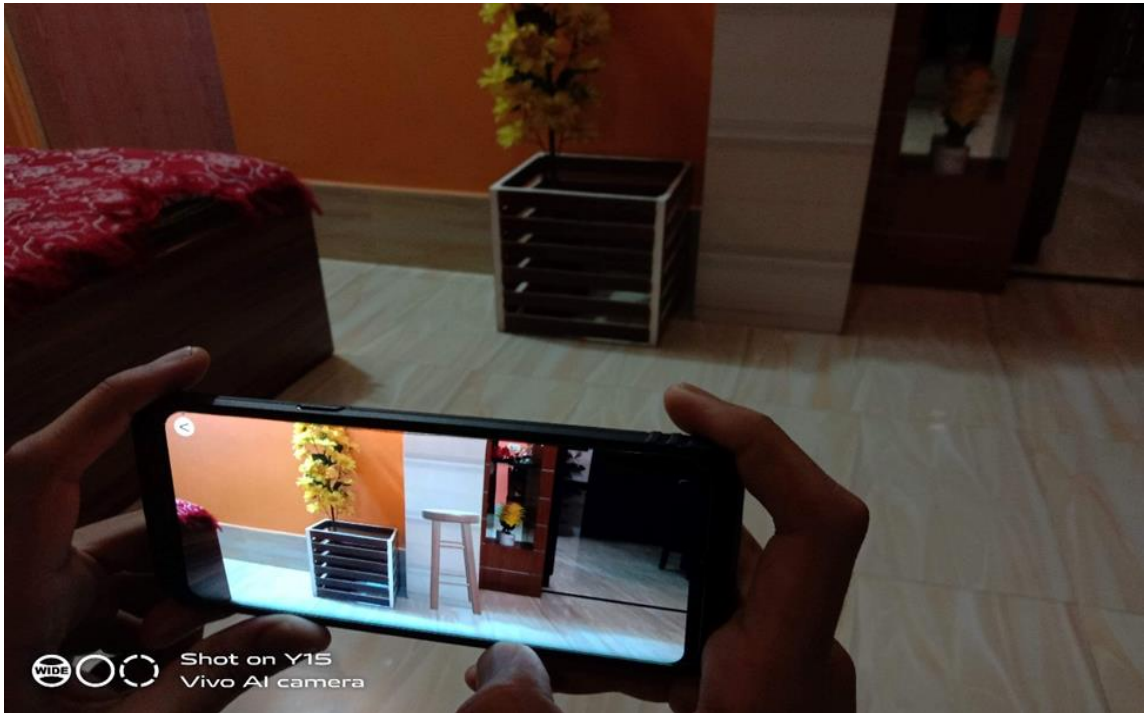


Fig 4.2.4: Camera view of the application.

This will provide a clear view of our apps as we can see there is nothing on the location but with the help of the application we can give a trial of how the chair will look like on that location.

Grass floor

In chapter three we have discussed about the implementation of the grass floor. The result was also satisfied.



Fig 4.2.5: Camera view for grass floor

Following figure describes the camera view of the function for grass floor. In this process the camera detects whether the surface is vertical or horizontal. If the surface is horizontal then it turns the floor into complete grass floor.



Fig 4.2.6: Grass floor representation

Following figure describes how the horizontal surface turn into the grass floor. If we move forward slowly then it will detect that surface too and it will cover those surfaces into a Grass floor.

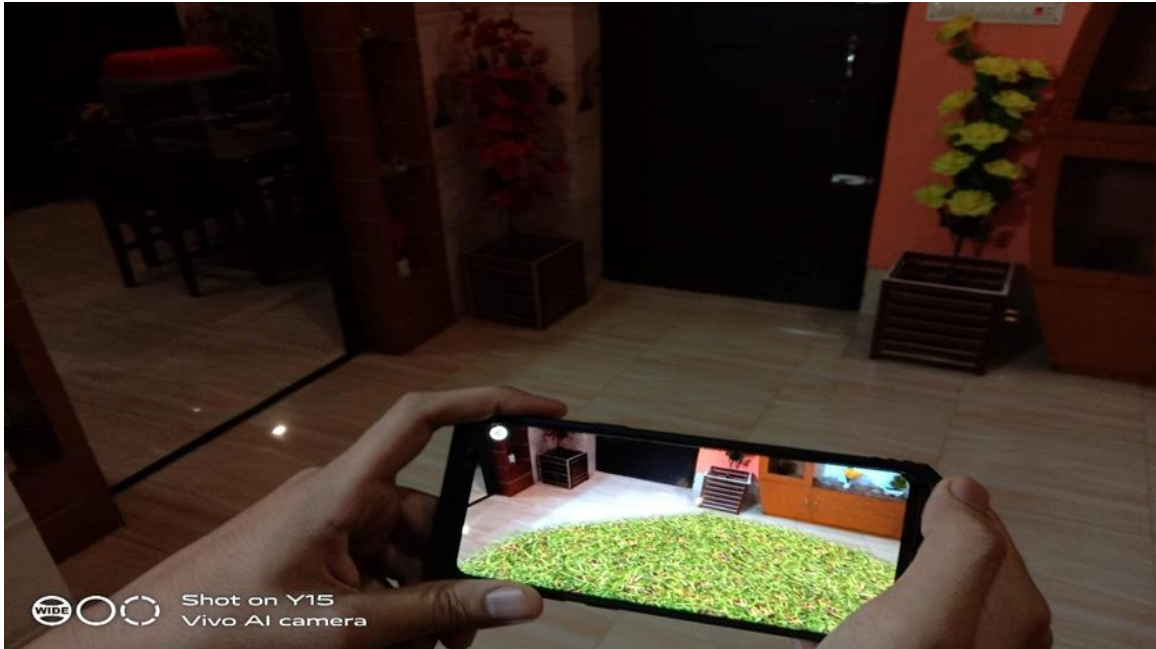


Fig 4.2.7: Camera view of the grass floor.

The following figure describes a clear view of how the app converts a horizontal surface into a grass floor.

Photo-frame

We have a code and some materials to represent a photo frame with a 3D view. User can give a trial of that photo frame.

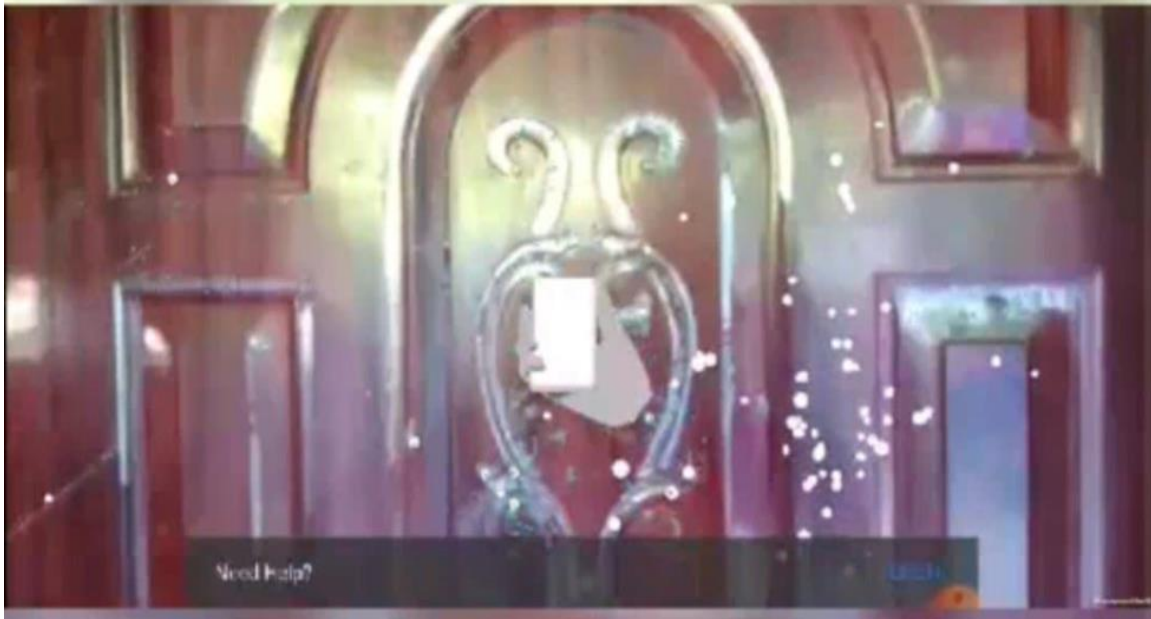


Fig 4.2.8: Camera view of the photo-frame.

Following figure describes the camera view of how the system detect a vertical surface to represent the photo-frame to the users. Here surface have to be a vertical surface and the surface background have to be bright and color as it will help the system to detect the surface correctly.



Fig 4.2.9: Representation of Photo-frame.

The following figure describes how the app will represent a 3D view of the photo-frame after the system detect a colorful bright background and a vertical surface. The user can see the photo-frame with zoom in, zoom out and from any angle.

Face Imaging

We have built a function that will open the front camera/selfie camera of the user device and will detect the face of the user or others who is standing before the selfie camera.



Fig 4.2.10: Face imaging.

After detecting the face properly our app will put a doggy emoji on the face and will remain the same until we back button is pressed.

4.3 Discussion

We have implemented some objects like trialing a wooden chair, produce a grass floor, represent a photo frame and face emoji in different ways and after the implementation was successful, we bring all of those under one platform and designed an UI to produce an APK. We have faced some difficulties to produce the following figures which represents the experimental results. But the result that was produced at the end was quite expected.

CHAPTER 5

CONCLUSION AND THE FUTURE SCOPE

5.1 Conclusion

Online shopping or buying a product is very sensitive part for any customer. Our intention is to provide a system that can help customers for their trial purpose. Now with the help of our system, a customer or buyer can give a trial of their desired product before he/she want to buy or order it. So, this system can be helpful for the customer if they are worried or confused about their product. All the pictures of the product will be stored in our system. In our system we can represent a 3D view of the customer's desired product. If a customer can have an idea of how the product will look like in his/her place then it will be very easy to choose their desired product. This will assure a better user experience for the customers.

5.2 Future Scope

This research can be implemented and further developed with the collaboration of any business institution. Because online shopping is an important part of our modern life. So, the customers will be more interested where they get more facilities. Our system can provide great facilities for the customer's as they will be more interested in online shopping. We have work with some specific product but we have plans to work with this app in a higher level such as we can create our own E-commerce site and apply this system or it can be implemented in the most popular online shopping site in Bangladesh like Daraz.com

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PLAGIARISM REPORT

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