



Prepared By :
Amro Amir 20183711
Mahmoud Mohammed 20182987
Ahmed Tarek 20192634
Mahamoud Khaled 20182049
Omar Abdelhamid 20184818
Amr Mohammed 20182624

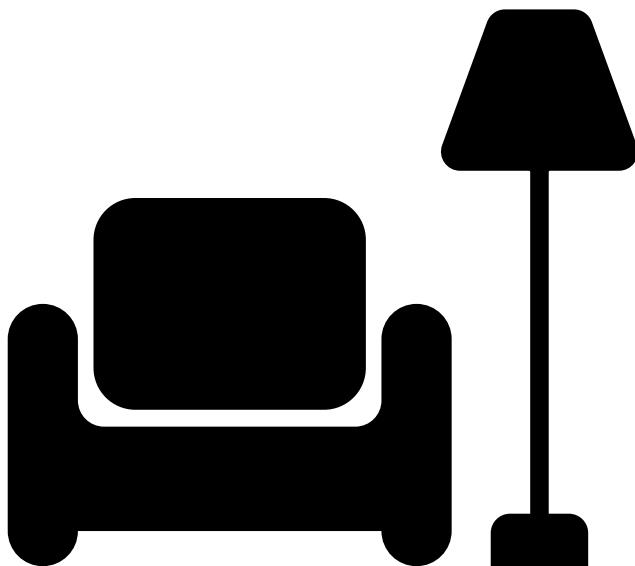
Supervised by:
Dr.Heba Hamdy



SCAN ME

CHAPTER :

ABSTRACT



Acknowledgment

We express our sincere gratitude to all those who made this journey possible, enabling us to gain invaluable experience in real-time project design and analysis. We extend our heartfelt thanks to the graduation project unit for providing us with essential information and guiding us through the implementation of our educational knowledge into a practical project. We are immensely grateful to Allah for the blessings bestowed upon us, and we would also like to acknowledge the unwavering support of our parents. Lastly, we would like to convey our deepest appreciation to **Dr. Heba Hamdy** for her constant encouragement and support throughout this project's lifetime.



Abstract



Our groundbreaking application, InterioPro, seamlessly integrates virtual reality (VR), augmented reality (AR), and 3D environments to revolutionize the world of interior design. Users can effortlessly create immersive virtual models of rooms, enabling clients to explore and customize designs with remarkable realism. Through AR, users can overlay virtual furniture and decor onto their physical space, visualizing the perfect design before making any changes. Our advanced 3D environments offer accurate measurements and precise material selection, bringing designs to life with stunning detail. Experience the future of interior design with InterioPro, empowering professionals and homeowners to make informed decisions and achieve extraordinary results.



Problem

The user is having difficulty designing in a short period of time, and the cost of the design may be higher than expected. The user may have difficulty visualizing the outcome in real-world environments. The user is unable to change his design immediately.



Solution

- 1 Simplify the design process by focusing on essential elements and prioritizing functionality over intricate details to save time and reduce costs.
- 2 Utilize virtual reality or augmented reality tools to visualize the design in real-world environments, helping overcome difficulties in envisioning the outcome.
- 3 Create a flexible design that allows for future modifications and iterations, ensuring adaptability without the need for immediate changes.

Our Vision



InterioPro: Effortlessly create virtual interiors on Oculus headsets and smartphones.
Easily explore layouts, customize elements, and bring your vision to life. Empowers designers and homeowners with accessible and dynamic design experiences

Our Mission

1

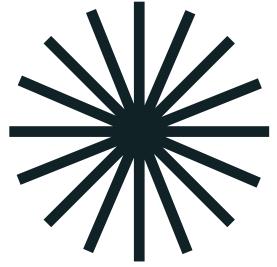
Simplify design: InterioPro's mission is to simplify the design process for virtual interiors, making it accessible and user-friendly for both designers and homeowners.

2

Explore and customize: InterioPro empowers users to effortlessly customize virtual spaces, unlocking endless design possibilities.

3

Bring visions to life: By providing a platform where users can effortlessly bring their design visions to life, InterioPro aims to inspire creativity and enable the realization of stunning interior designs.



About InterioPro

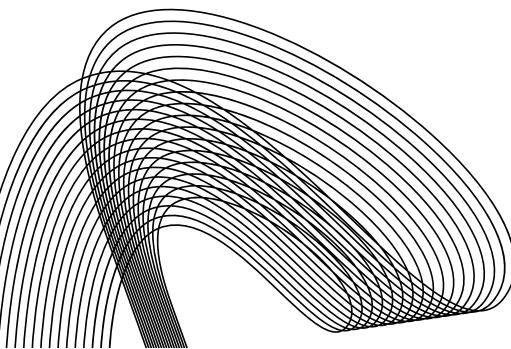
InterioPro is a versatile app that simplifies the process of creating virtual interior models for design purposes. With InterioPro , you can easily explore different layouts and visualize your dream space with incredible detail.

Whether you're a designer or a homeowner, InterioPro empowers you to bring your interior design ideas to life with ease.

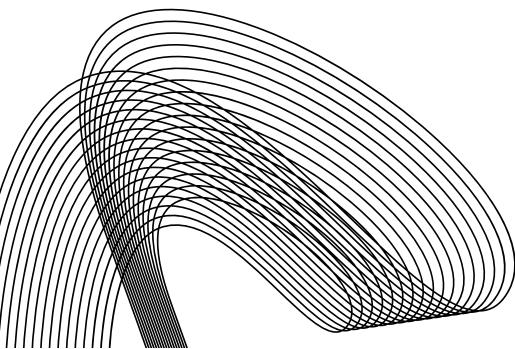


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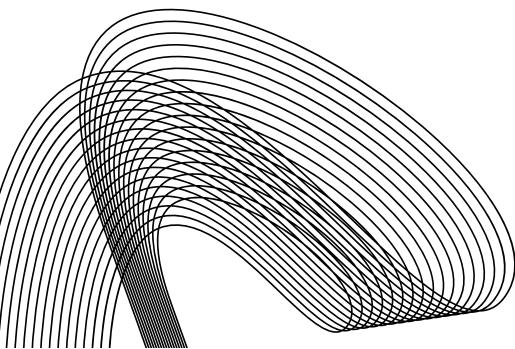
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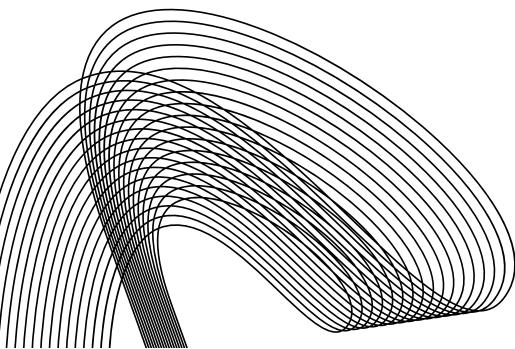
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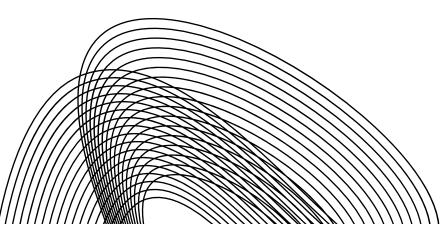


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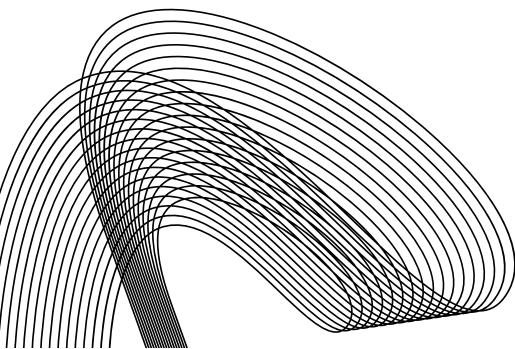


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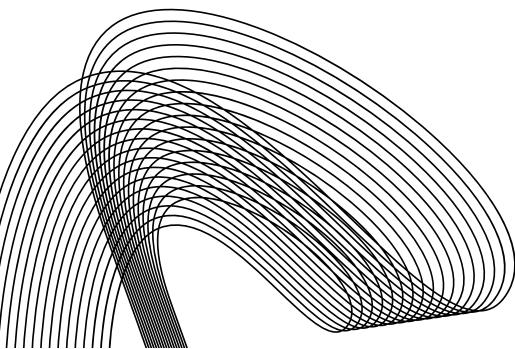
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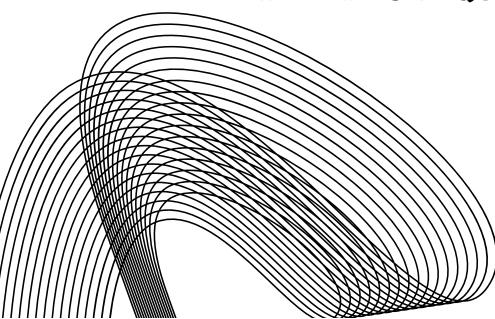


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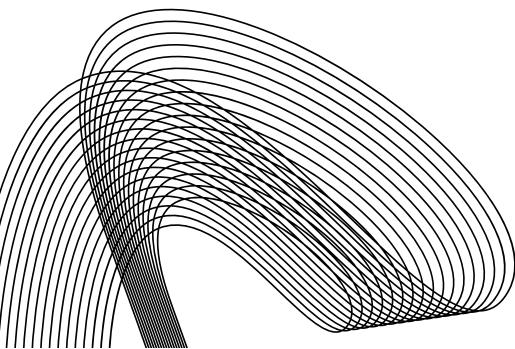


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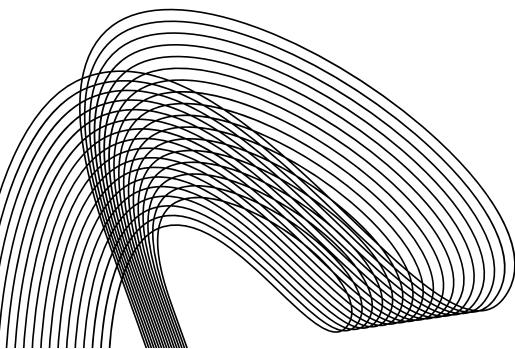


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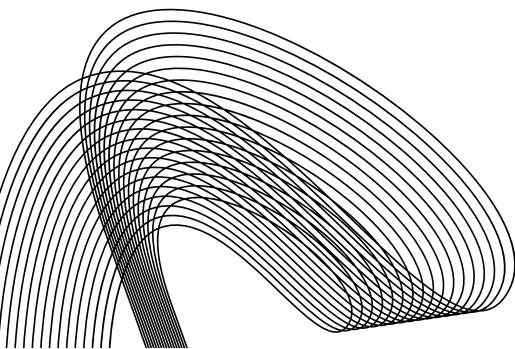


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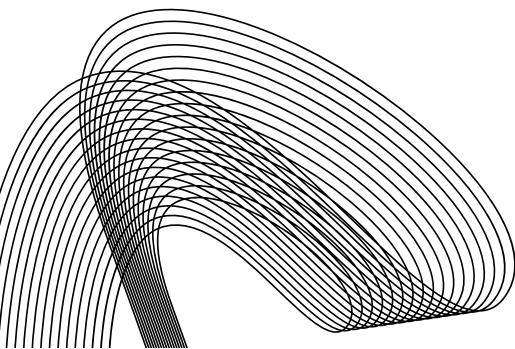
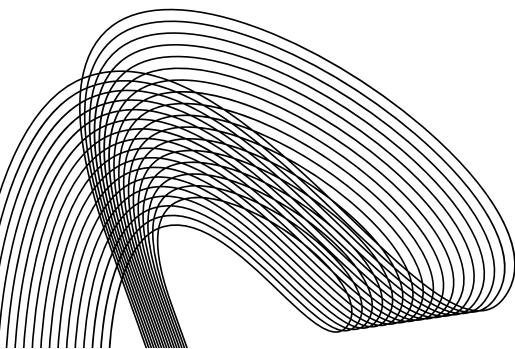
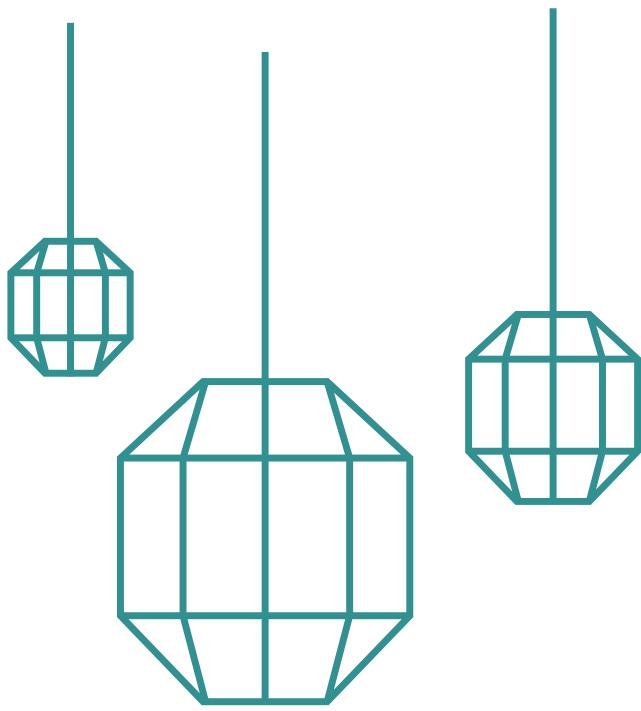


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CHAPTER 1: INTRODUCTION

Chapter 1 :

1.1 Introduction :

Step into a world of limitless design possibilities with an advanced platform that simplifies the process of creating virtual interior models. Explore various layouts, customize every element, and immerse yourself in stunning 3D environments that bring your vision to life. Whether you're a design professional or a homeowner, this innovative solution empowers you to effortlessly visualize and create your dream space with incredible detail.

1.2 Problem Definition :

The user is having difficulty designing in a short period of time, and the cost of the design may be higher than expected. The user may have difficulty visualizing the outcome in real-world environments. The user is unable to change his design immediately.

1.3 Introduced Solutions :

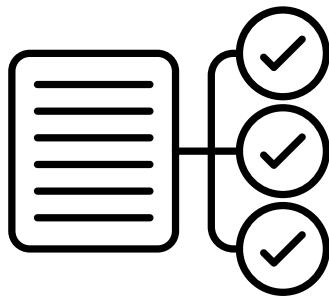
The app assists users in taking decisions on their own without the assistance of the company. The app assists users in keeping their budgets to a bare minimum. The app enables the user to experience the reality of the design in the room. The app has many categories that provide users with a variety of options in real-time.

1.4 Target Environment :

WORK ON ANDROID

1.5 Deliverables :

- Proposal
- Requirement Analysis Document
- Prototype
- Software Design Document
- Implementation
- Conclusions & Future Work



1.6 Competitors :

1.6.1 Home Plane3D Interior Design App

limited target on 3D and 2D without considering AR and VR

Figure 1.1 Shows competitor's app with limited aims that only work in 3D.



Figure 1.1
Interior Design Using HomePlane3d

1.6.2 Interior App

It is just interior design samples that cannot be edited in the design.

Figure 1.2 Shows competitor's app with only interior design samples and no editing.



**Figure 1.2
Interior Design App Only Showing Samples**

1.6.3 Room Planner Home Design 3D

Large space 1.5 GB - No VR or AR Only 3D constructing an empty room and placing models in it

Figure 1.3 Shows competitor's app with only 3D Construct and large size app

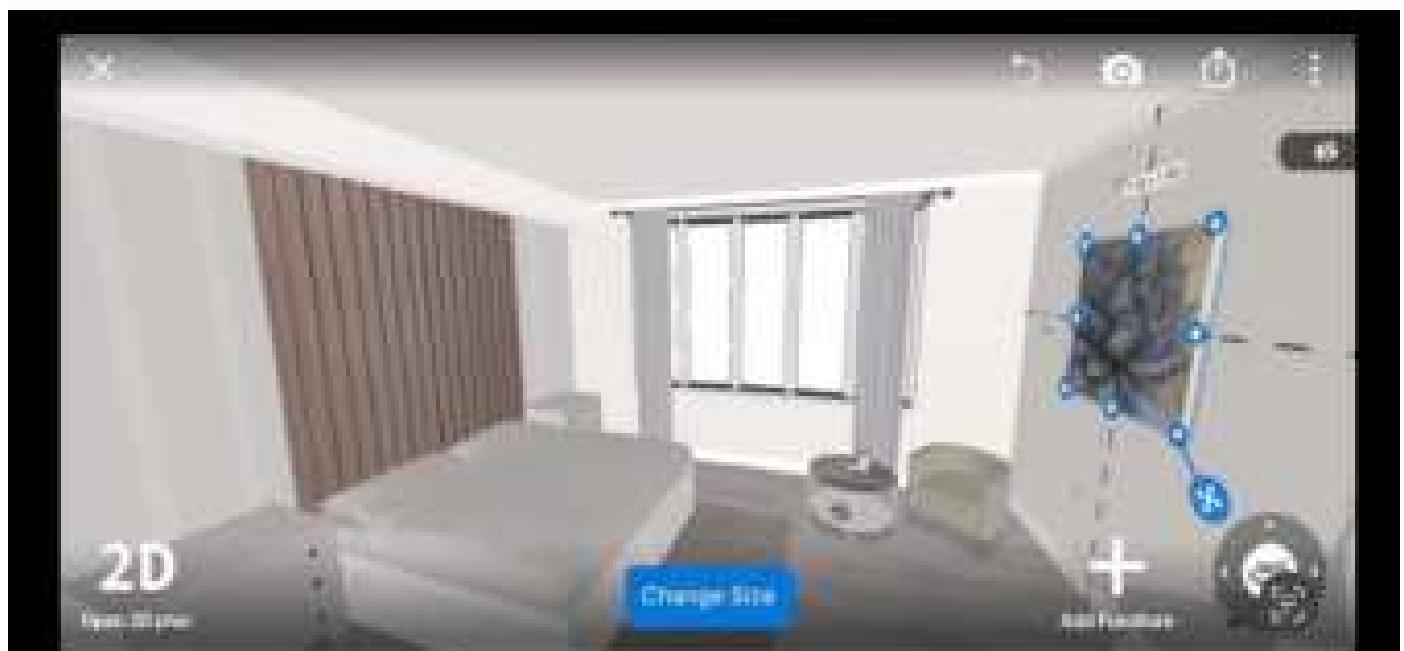


Figure 1.3
Only a 3D environment is used in the Room Design App.

1.6.4 Planner5D

All of the features of a 3D environment app, but no VR or AR.

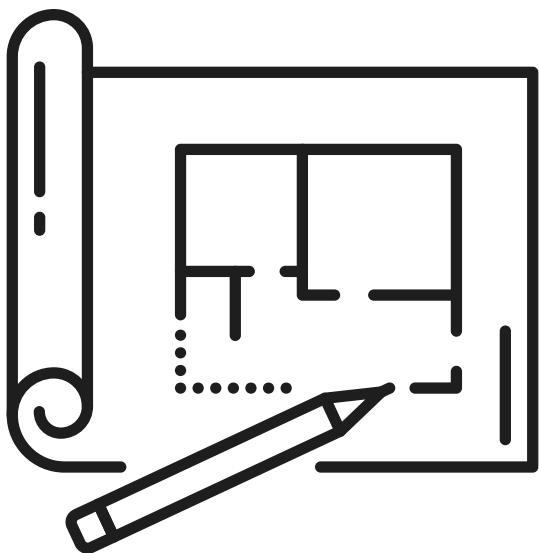
In addition, a subscription must be paid to gain access to any model.

Figure 1.4 Shows competitor's app with only 3D Environment and a subscription must be paid



Figure 1.4
Only utilising 3D in Planner 5D for Samples

CHAPTER 2: SYSTEM ANALYSIS



Chapter 2 : System Analysis

2.1 User Analysis :

The users' permitted age range is 18 to 60, and they must have some knowledge of today's technology. After each page the user enters, a notice will display asking whether they need help, and there will be tutorial videos to assist them and make the application easy to use.

2.1.1 Personas :

Figure 2.1 shows personas for two people that are hooked but lack time.

Ibrahim 49/EXECUTIVE/CAIRO, EGYPT

DESCRIPTION
IBRAHIM is an executive at the local offices of a international medical company. he earns a salary of \$50,000 per year. he has children at University. he's both style & price conscious.
IBRAHIM is updating the furniture at the 4 bedroom family home. The update in furniture is following the slow remodelling of the house now that his kids have left for university.
"I now have the time & resources to express my individual style in our home."

"Now have the time & resources to express my individual style in our home."

Sarah 39/DOCTOR/GIZA, EGYPT

DESCRIPTION
SARAH is an doctor at the international Hospital. She earns a salary of \$90,000 per year. She has children at school. She's likes modern style and trends.
SARAH is updating the furniture every 6 month. Give me something to assemble, I won't look at the directions, I'll try to figure it out by myself. It's why I love Ikea furniture.
She loves to browse style guides online. She uses Pinterest to gather her design ideas.
"Every mind is a room packed with modern furniture."

"Every mind is a room packed with modern furniture."

Figure 2.1
Personas for two different cases that demonstrate the need for design

2.2 Task Analysis :

The system is an interior design tool that helps users choose and create their own designs from a wide collection of models by utilizing VR, AR, or 3D Environment technology.

The method also supports users if they want to choose a piece of furniture but are unsure if it will fit or if its color fits the room's hue and other pieces of furniture in the room.

The application helps users complete all of these tasks in a very short period of time, without the need for users to wait or waste time, and at no expense.

2.2.1 TASK HIERARCHY:

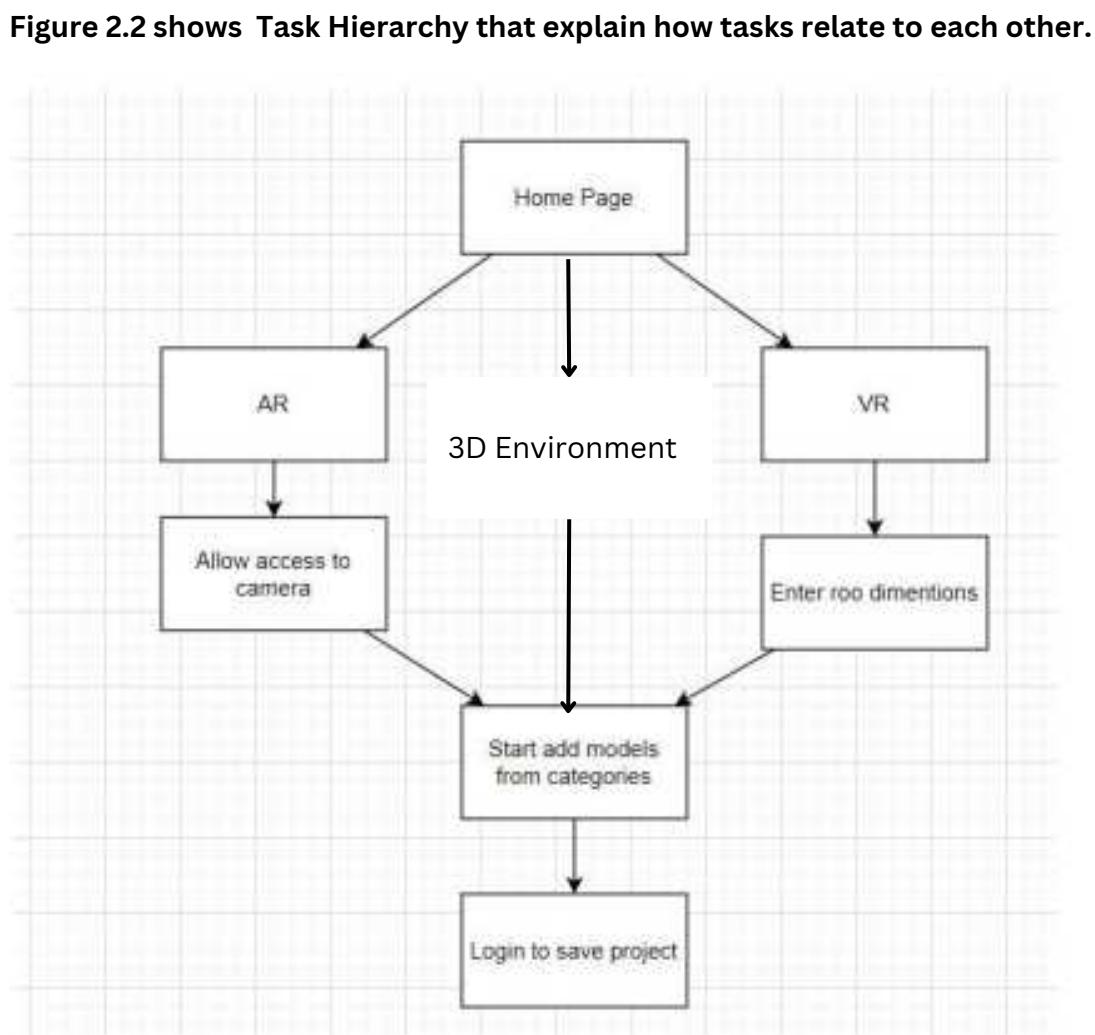


Figure 2.2
The Task Hierarchy depicts the applications of three different technologies.

2.3 User requirements :

- The tutorial is available to the user at any time.
- When the notification 'allow access to camera' appears after selecting AR, the user must give access to the camera by tapping the allow button.
- The user must be able to log in using a unique username and password.
- Users can sign up for or sign in using their Google account.
- The user can exit the system.
- The user can scan his or her room to create his or her own decoration.
- To sign up, the user must choose an 8-character password and enter their name, email, password, and phone number.
- To begin his design, the user can drag models from the list and place them in his room.
- If the user wishes to delete a model, he can drag it to the trash bin.
- The user can request technical assistance by pressing the require help button, which will link them to their contacts and email list.
- By selecting the icon Hire an Expert, the user can request the services of an expert designer.

2.4 System requirements :

2.4.1 Functional requirements :

- All system actors must use a valid username and password to log in.
- The system prompts them to sign in using their Google account or by entering their email address and password.
- The system provides an option for all actors to log out.
- The system shall alert the user by issuing an AR camera access request.
- The system gives model categories for room design.
- To assist users, the system delivers tutorial videos that may be accessed by tapping the ? button.

2.4.2 Non-functional requirements :

- Only the administrator has the ability to add new categories to the system by updating new versions.
- Only the administrator has the ability to delete categories from the system by updating new versions.
- Admin can only add new categories by upgrading new versions.
- Admin can only modify categories by updating new versions.
- Admin can only delete categories by updating new versions.

2.5 Use Case Diagram :

Figure 2.3 shows Use Case Diagram which show user's interactions with the app

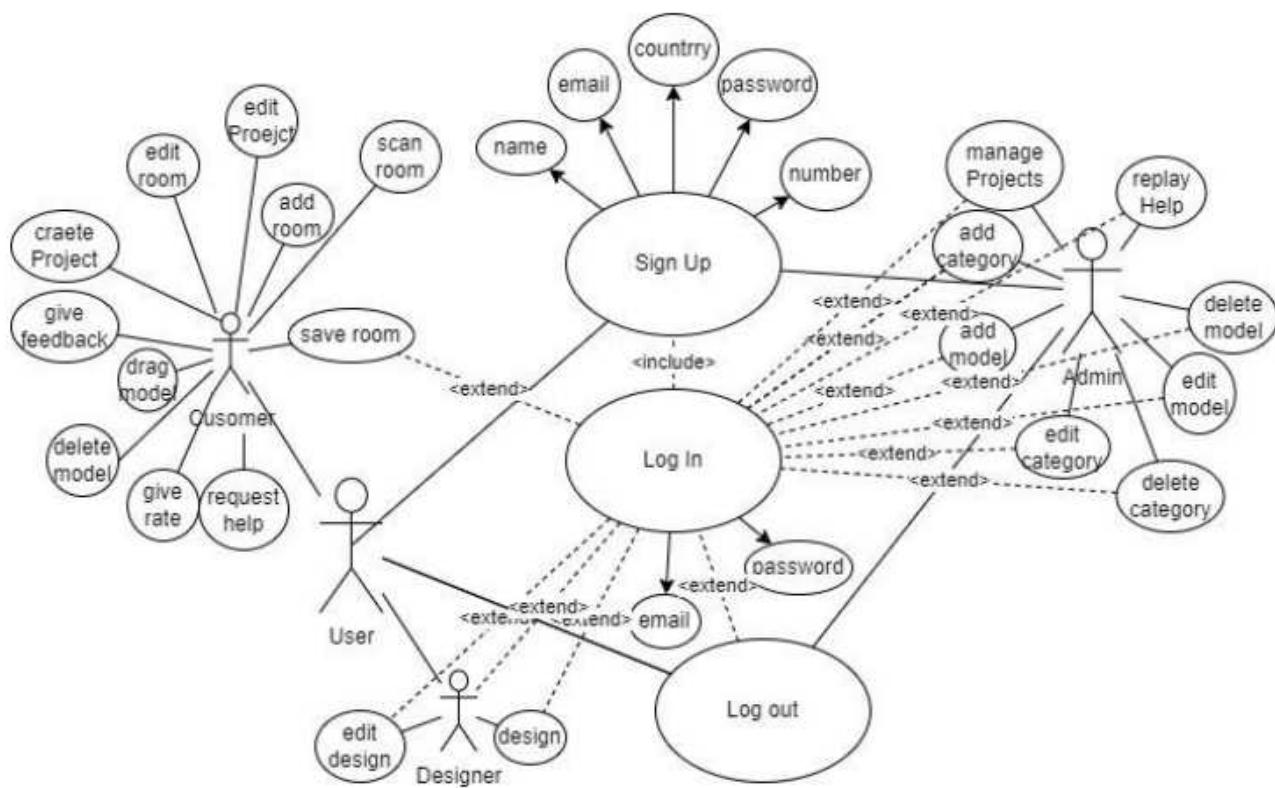


Figure 2.3
Use Case Diagram Explains The Relations Between all App Actors

2.6.1 Register use case

This table shows the Register process for all app actors

Table 2.1: "Register Table"

Use Case ID	1
Use Case Name	Register
Actor	All Application actors
Precondition	All actor launch Application
Input Data	Name, password, email, Phone number, country and actor type
Description	All System user actors will enter the Name and Password, Phone number and country and Email and job title (User, Admin, Developer) the actor will press Register after verification run successfully with Email or Number.
Response	Added new Actor
Comments& Exception	If enter same actor name and email, gives a warning to actor To enter another name.

2.6.2 Register use case

This table shows the Login process for all app actors

Table 2.2: "Login Table"

Use Case ID	2
Use Case Name	Login
Actor	All Application actors
Precondition	The successfully Registered
Input Data	Email and password
Description	All System user actors will enter the Email and password, the actor will press login after that verification run successfully. the actor can enter the application and can enjoyed the function funded. Also, if the Email and password enter error (not true) you can enter the password 3 time only .and if you can't enter you should flexed password and try again in the next time.
Response	Login successfully
Comments& Exception	-

2.6.3 Log out of the use case

Shows Log out the use case Table

Table 2.3: "Log out Table"

Use Case ID	3
Use Case Name	Log out
Actor	All Application actors
Precondition	The successfully Log in
Input Data	-
Description	All System user actors will log out from the system
Response	Log out successfully
Comments& Exception	-

2.6.4 Add model use case

Shows Add model use case Table

Table 2.4: "Add Model Table"

Use Case ID	4
Use Case Name	Add model
Actor	Admin
Precondition	The successfully login
Input Data	Model
Description	The admin Open the Application and click on the Add model button and put the model and write dimensions (if necessary)
Response	Model has been Added successfully.
Comments& Exception	--

2.6.5 Remove model use case

Shows Remove model use case Table

Table 2.5 " Remove Model Table"

Use Case ID	5
Use Case Name	Remove Model
Actor	Admin
Precondition	The successfully login
Input Data	---
Description	The admin Open the Application and click on the Remove model button
Response	Model has been Removed successfully.
Comments& Exception	-----

2.6.6 Edit model use case

Shows Edit model use case Table

Table 2.6 " Edit model Table"

Use Case ID	6
Use Case Name	Edit Model
Actor	Admin
Precondition	The successfully login
Input Data	-----
Description	The admin Open the Application and click on the Edit model button and edit model. (If have any bug or Anything wrong)
Response	Model has been Edited successfully.
Comments& Exception	--

2.6.7 Add category use case

Shows Add category use case Table

Table 2.7 " Add category Table "

Use Case ID	7
Use Case Name	Add Category
Actor	Admin
Precondition	The successfully login
Input Data	Add Category name
Description	The admin Open the Application and go to categories and click on the Add Category and write category name.
Response	Category has been Added successfully With Name.
Comments& Exception	-----

2.6.8 Edit category use case

Shows Edit category use case Table

Table 2.8 " Edit category Table "

Use Case ID	8
Use Case Name	Edit Category
Actor	Admin
Precondition	The successfully login
Input Data	-----
Description	The admin Open the Application and go to categories and click on the Edit Category and can be edit any date in category.
Response	Category has been Edit successfully.
Comments& Exception	-----

2.6.9 Remove category use case

Shows Remove category use case Table

Table 2.9 " Remove category Table "

Use Case ID	9
Use Case Name	Remove Category
Actor	Admin
Precondition	The successfully login
Input Data	-----
Description	The admin Open the Application and go to categories and click on the Remove Category and choose what category want to remove.
Response	Category has been Removed successfully.
Comments& Exception	-----

2.6.10 Replay Help use case

Shows Replay Help use case Table

Table 2.10 " Replay Help Table "

Use Case ID	10
Use Case Name	Reply Help
Actor	Admin
Precondition	The successfully login
Input Data	-----
Description	The admin shall reply the user problem requests from services
Response	Be sure that we will try to solve your problem as soon as possible
Comments& Exception	-----

2.6.11 Manage Project Use Case

Shows Manage Project Use Case Table

Table 2.11 " Manage Project Table "

Use Case ID	11
Use Case Name	Manage Project
Actor	Admin
Precondition	The successfully login
Input Data	-----
Description	The admin shall solve the project technical problems
Response	Be sure that we will try to solve your problem as soon as possible

2.6.12 Create Project Use Case

Shows Create Project Use Case Table

Table 2.12 " Create Project Use Table "

Use Case ID	12
Use Case Name	Create Project
Actor	User
Precondition	The successfully login
Input Data	-----
Description	The user <u>create</u> projects to start his own design
Response	Project will create successfully and the user start to design
Comments& Exception	-----

2.6.13 Add VR room use case

Shows Add VR room use case Table

Table 2.13 " Add VR room Table "

Use Case ID	13
Use Case Name	Add Room using VR
Actor	User
Precondition	The successfully login
Input Data	-----
Description	<p>The customer opens the application after successfully login</p> <p>And go to home page and click on design and click on</p> <p>VR and fill the dimensions room,</p> <p>After submit.</p>
Response	<p>The camera will launch for design his room</p> <p>And the room has added.</p>
Comments& Exception	-----

2.6.14 Scan Room Use Case

Shows Scan Room Use Case Table

Table 2.14 " Scan Room Use Case "

Use Case ID	14
Use Case Name	Scan Room using AR
Actor	User
Precondition	The successfully login
Input Data	-----
Description	The system ask user for access grantee for camera to scan his room
Response	Access guarantee for camera then the user scans his room to design
Comments& Exception	-----

2.6.15 Drag model use case

Shows Drag model use case Table

Table 2.15 " Drag mode Table "

Use Case ID	15
Use Case Name	drag model
Actor	Customer
Precondition	Add room or scan room
Input Data	drag models on room
Description	The customer can take the model from the list to his room after Adding his room.
Response	Room with Models
Comments& Exception	-----

2.6.16 Remove model use case

Shows Remove model use case Table

Table 2.16 " Remove model Table "

Use Case ID	16
Use Case Name	Trash model
Actor	User
Precondition	drag model
Input Data	-----
Description	User selects the object then drags it to the trash can.
Response	Message has been Removed successfully.
Comments& Exception	-----

2.6.17 Save room use case

Shows the Save room use case Table

Table 2.17 " Save room Table "

Use Case ID	17
Use Case Name	Save Room
Actor	User
Precondition	Add Models
Input Data	-----
Description	The User click on Save your Room to save all of models added after login successfully
Response	Massage Your Room has been Saved successfully.
Comments& Exception	If response (Error) probably one of the models added wrong.

2.6.18 Edit room use case

Shows Edit room use case Table

Table 2.18 " Edit room Table "

Use Case ID	18
Use Case Name	Edit room
Actor	User
Precondition	Save Room
Input Data	-----
Description	The User click on edit your Room to edit all of models added after login successfully
Response	Massage Your Room has been edited successfully.
Comments& Exception	If response (Error) probably one of the models added wrong.

2.6.19 Request help use case

Shows Request help use case Table

Table 2.19 " Request help Table "

Use Case ID	19
Use Case Name	Request Help
Actor	User
Precondition	-----
Input Data	-----
Description	If User have any problem or any question how to do this Will press on button (Need Help).
Response	Open Need Help Page.
Comments& Exception	-----

2.7 Main Scenario :

When the user first launches the app, the app tutorial begins. Following that, the user can either begin creating his room or view further tutorials on the following page. The user will have the option of two technologies: "3D Environment" or "AR with capturing the user room or VR with a Separated App but the Same Idea ."

2.8 AR Scenario :

Following the main scenario, when the user clicks "AR," a popup message displays asking the user to enable the application's access to the camera. The camera will open with category icons, and the user can choose the item he requires from the categories to complete the interior design.

2.8.1 Assistance Scenario (Related To AR) :

Following the main scenario, when the user clicks "AR," a popup message displays asking the user to enable the application's access to the camera. The camera will open with category icons, and the user can choose the item he requires from the categories to complete the interior design.

2.9 VR Scenario :

When launching the VR app in Oculus Ques 2 and selecting "VR app is separated from the 3d Environment app and the AR," The user will be directed to an Ui with two types of rooms: planned rooms and empty rooms. After selecting a category, you will be presented with a variety of rooms to choose from. The system will generate the user room utilizing VR Technology in a matter of seconds. A popup message prompted the user to put on the VR Glasses and begin creating his room with the icon from the category. If the user wishes to save or add the project to their favorites list.

2.9.1 Assistance Scenario (Related To VR) :

Following the VR scenario:

The user is unable to understand and input his room dimensions, so he requests assistance via the help icon, and the app displays a tutorial with the necessary information to understand how to fill out the form.

2.10 3D Environment Scenario :

Similarly, when the user selects the "3D Environment" option, they will gain the ability to furnish various rooms. The user will have free movement controls while being seated in their bed, allowing them to navigate and arrange items within the virtual space."

2.10.1 Assistance Scenario (3D Environment) :

The user is unable to understand the movement and adding technic, so he requests assistance via the help icon, and the app displays a tutorial with the necessary information to understand how to fill out the form.

CHAPTER 3: DESIGN



3.1 Prototype:

3.1.1 Login Prototype: the user enters his username and password

Figure 3.1 shows Login prototype with fields to write username and password and Login button

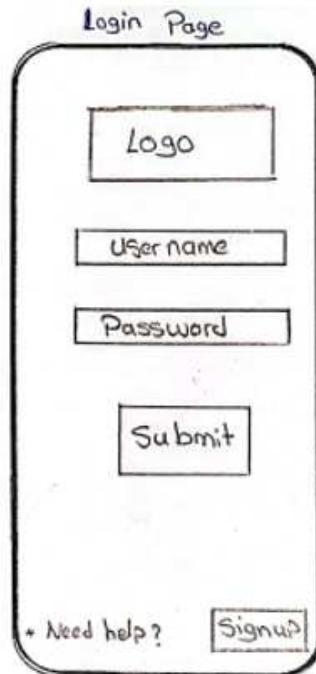


Figure 3.1
Login Prototype Design

3.1.2 Sign-up Prototype: the user enters his personal information to sign up

Figure 3.2 shows Signup page with Requirements Field to signup with a signup button

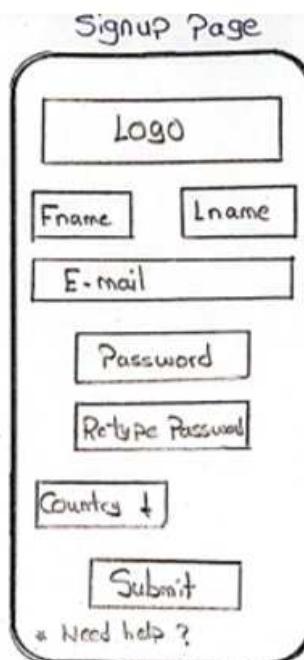
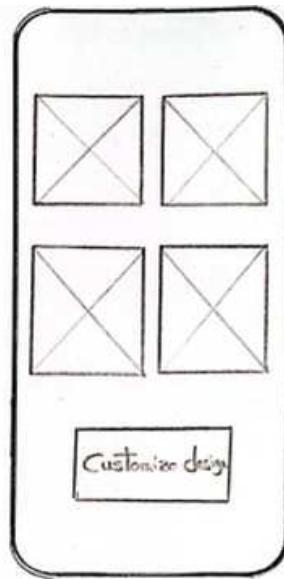


Figure 3.2
Signup Prototype Design

3.1.3 3D Environment Request Prototype: the user Requests a 3D Environment

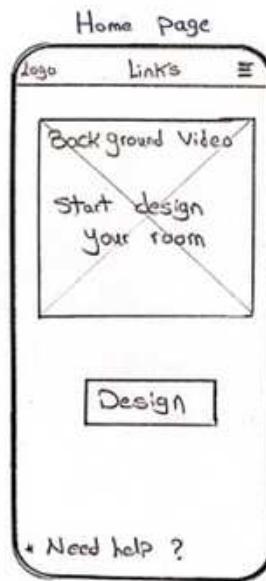
Figure 3.3 shows Request 3D Environment Design With A Button To Start viewing the rooms



**Figure 3.3
3D Environment Request Prototype**

3.1.4 Home page prototype: the home page

Figure 3.4 shows home page with a tutorial video helps the user to understand the app and design button to start designing



**Figure 3.4
Home Page Prototype**

3.1.5 AR Prototype: AR page

Figure 3.5 shows Prototype page video tutorial for AR and 3D Environment

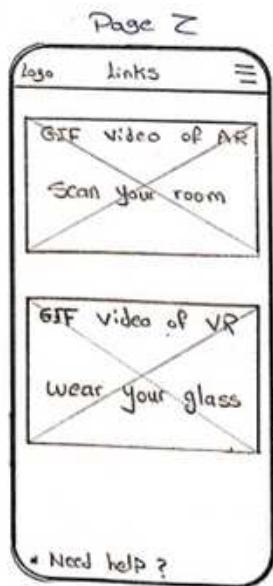


Figure 3.5
Page AR Page Prototype

3.1.6 AR request Help: the user Requests an AR design Help

Figure 3.6 shows User Request Help for designing his room in AR and 3D Environment

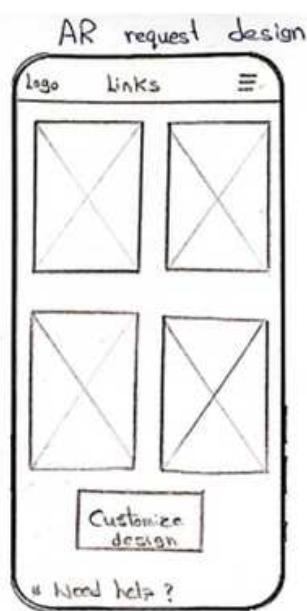


Figure 3.6
AR Request Help

3.1.7 Dimension form Prototype: the user enters the room type and dimension

Figure 3.7 shows Prototype page for generating room for 3D Environment

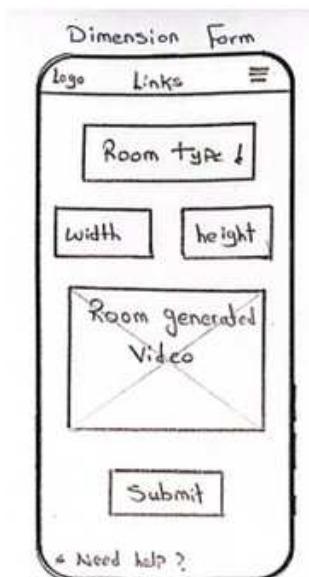


Figure 3.7
Dimension Prototype

3.1.8 3D Environment page Prototype: the user starts using the 3D features

Figure 3.8 shows Prototype page Where the user start to design in his 3D Environment

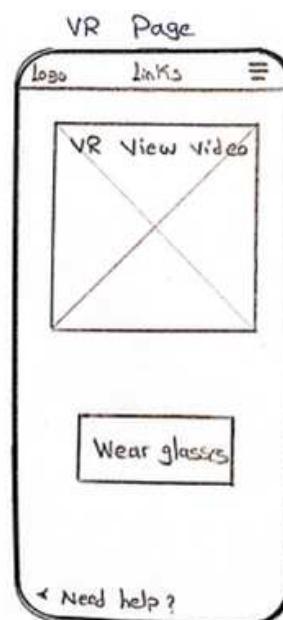


Figure 3.8
3D Environment Page

3.1.9 Scan room Prototype: the user scans his room

Figure 3.9 shows Prototype page for accessing camera request in AR

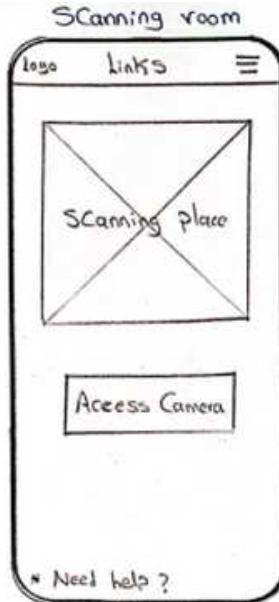


Figure 3.9
Scan Room Prototype

3.1.10 Phone camera view Prototype: the view of the camera

Figure 3.10 shows Prototype for phone AR View with a 2 button and the menu slider

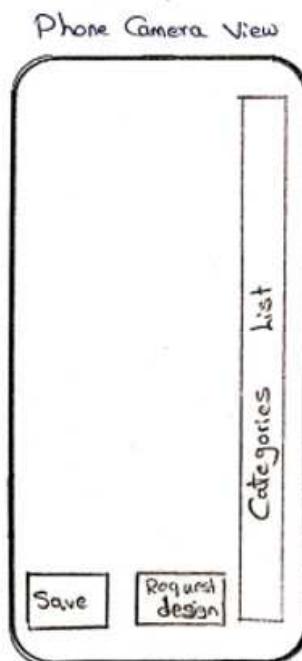


Figure 3.10
Phone Camera View

3.2 Class Diagram:

Figure 3.11 shows the relationships between the Users, and describes what those objects do and the services that they provide.

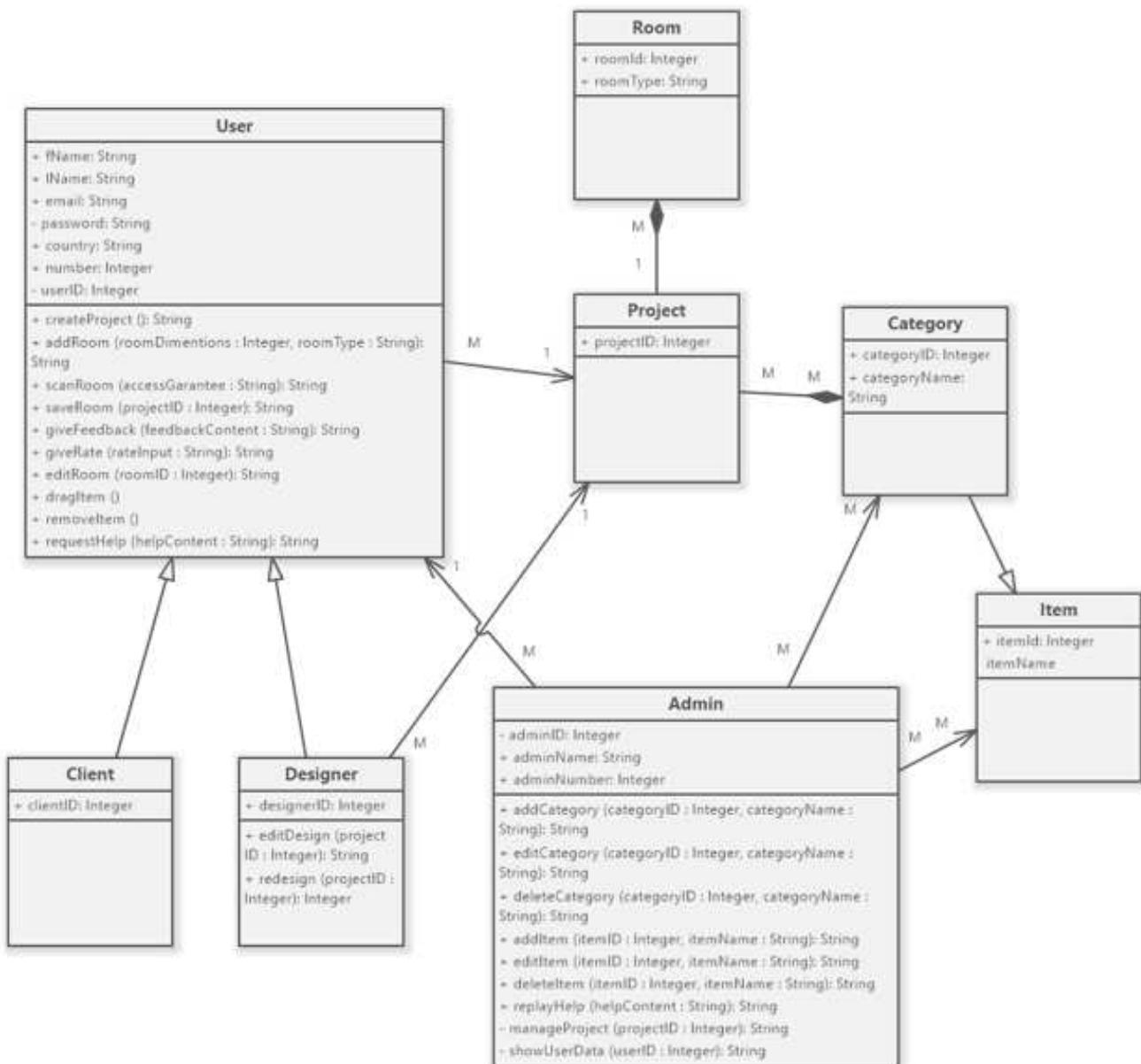


Figure 3.11
Class Diagram Explain the Relations and the access of each

3.3 Sequence Diagram

3.3.1 Login

Figure 3.12 shows the structure of login in the app

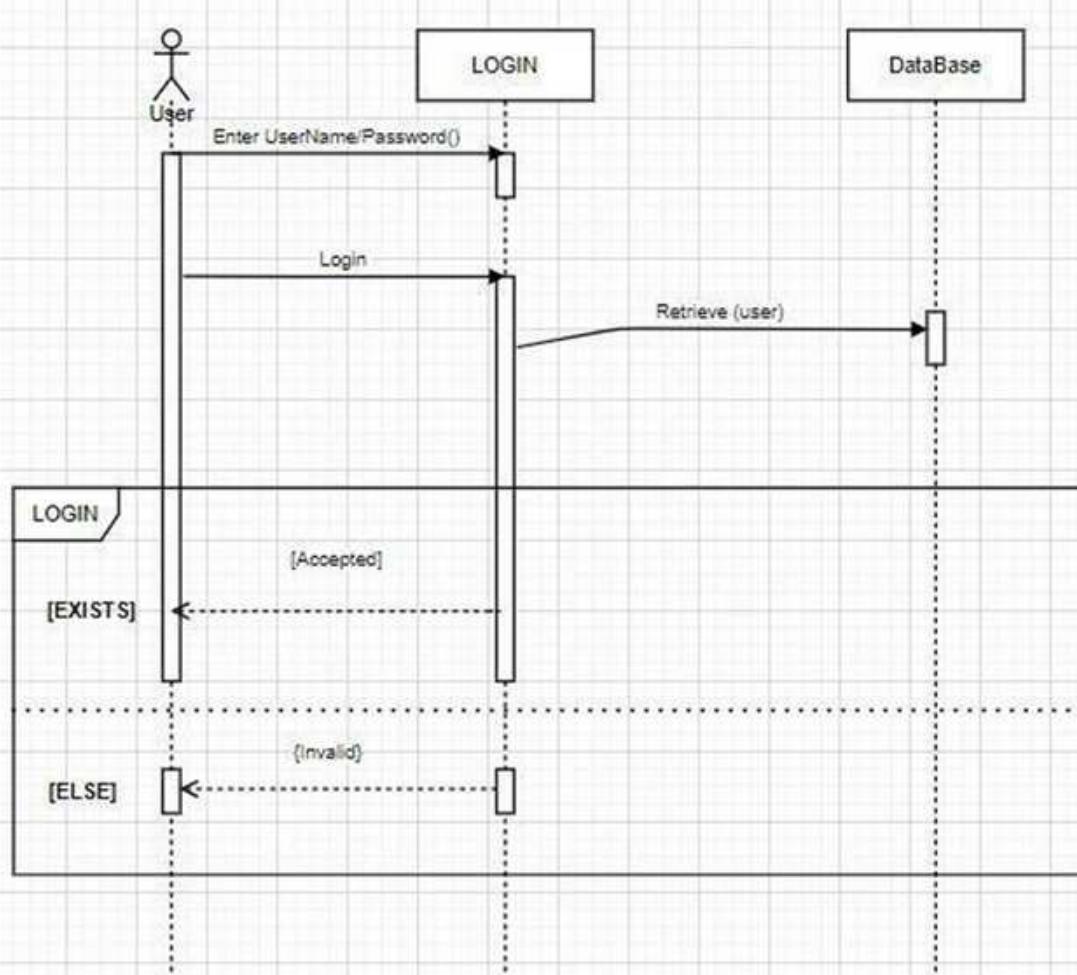


Figure 3.12
Sequence Diagram Login

3.3.2 SignUp

Figure 3.13 shows the structure of Signing up in the app

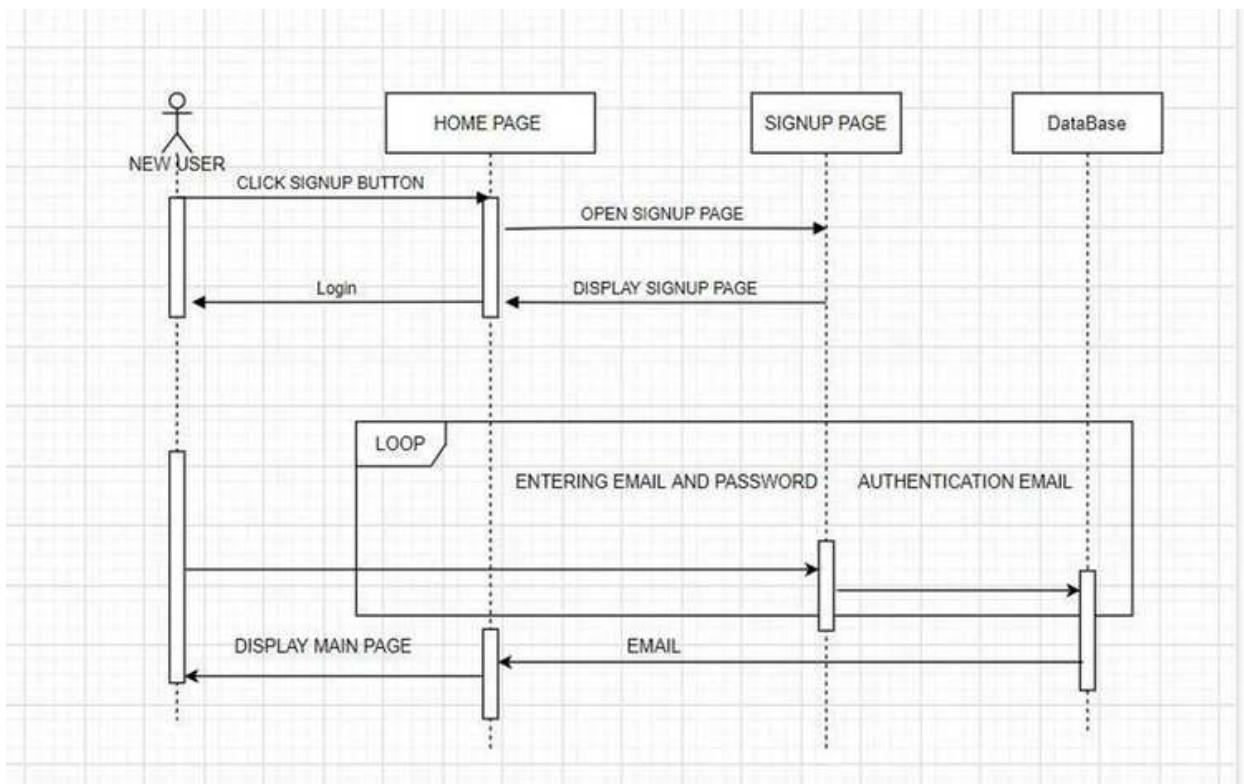


Figure 3.13
Sequence Diagram Signup

3.3.3 Logout

Figure 3.14 shows the structure of logout in the app

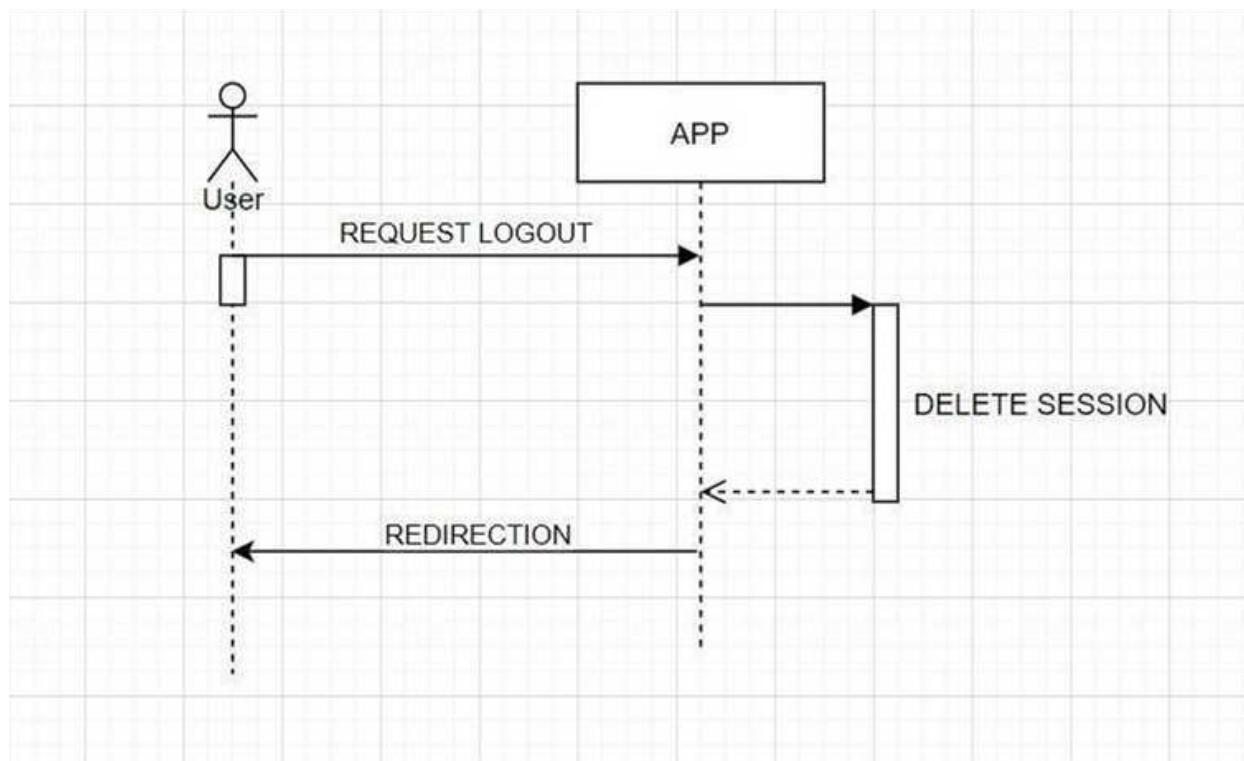


Figure 3.14
Sequence Diagram Signup

3.3.4 Admin Add Category

Figure 3.15 shows the structure of Admin adding category in the app

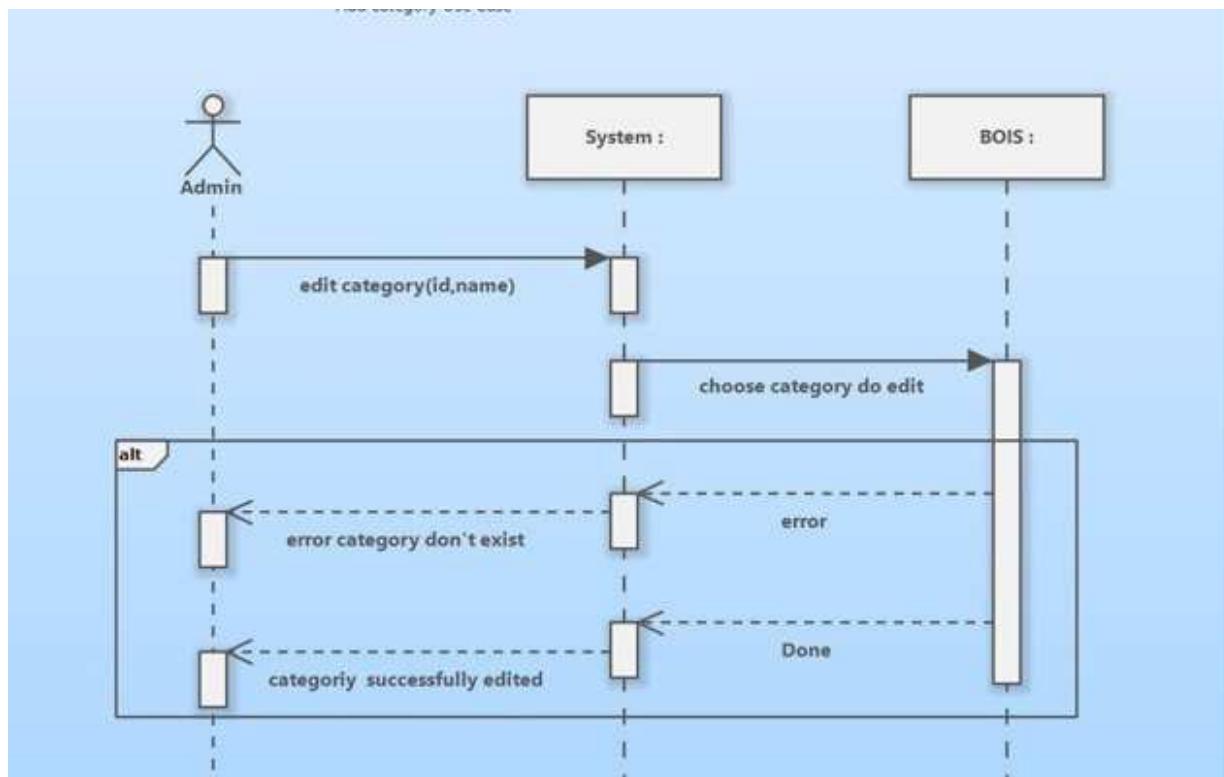


Figure 3.15
Sequence Diagram Admin Add Category

3.3.5 Admin Delete Category

Figure 3.16 shows the structure of Admin Deleting category in the app

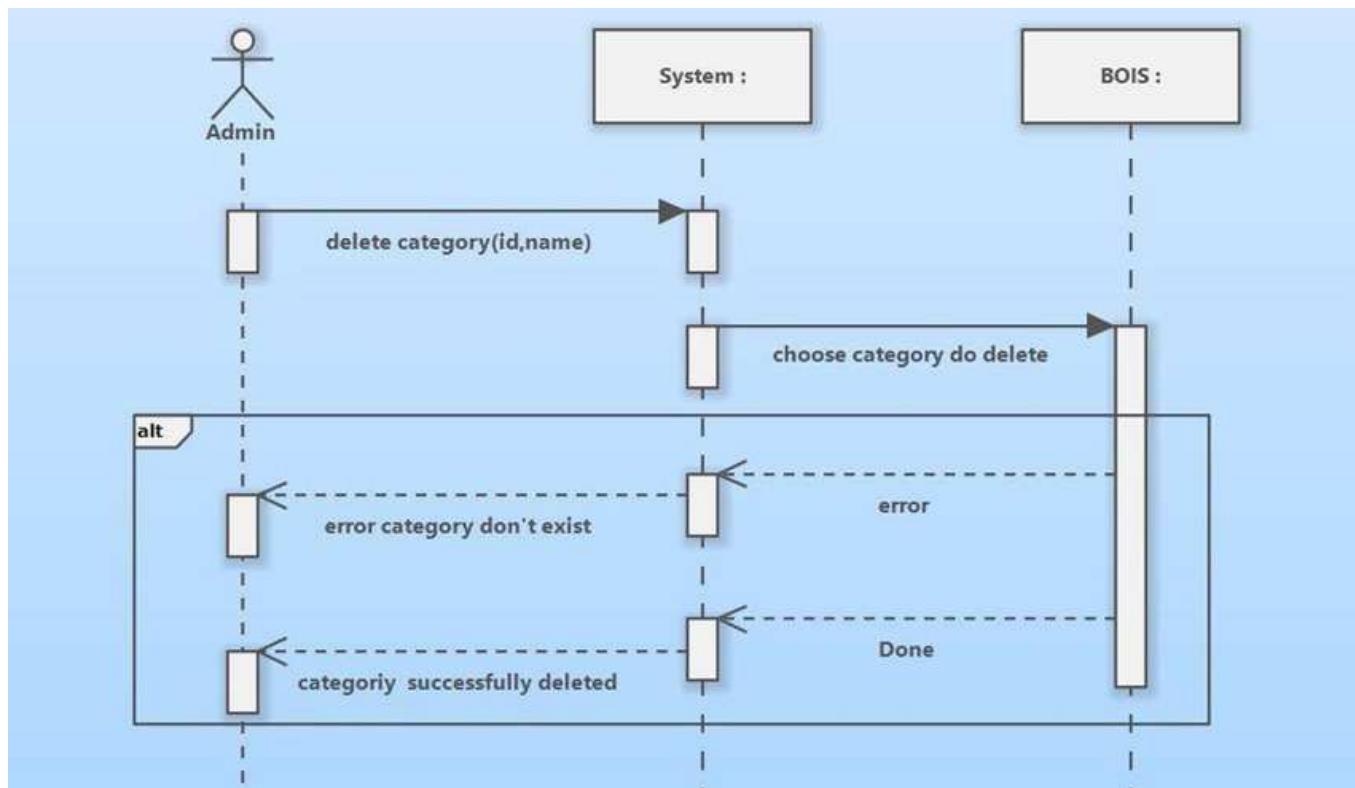


Figure 3.16
Sequence Diagram Admin Delete Category

3.3.6 Admin Edit Category

Figure 3.17 shows the structure of Admin editing category in the app

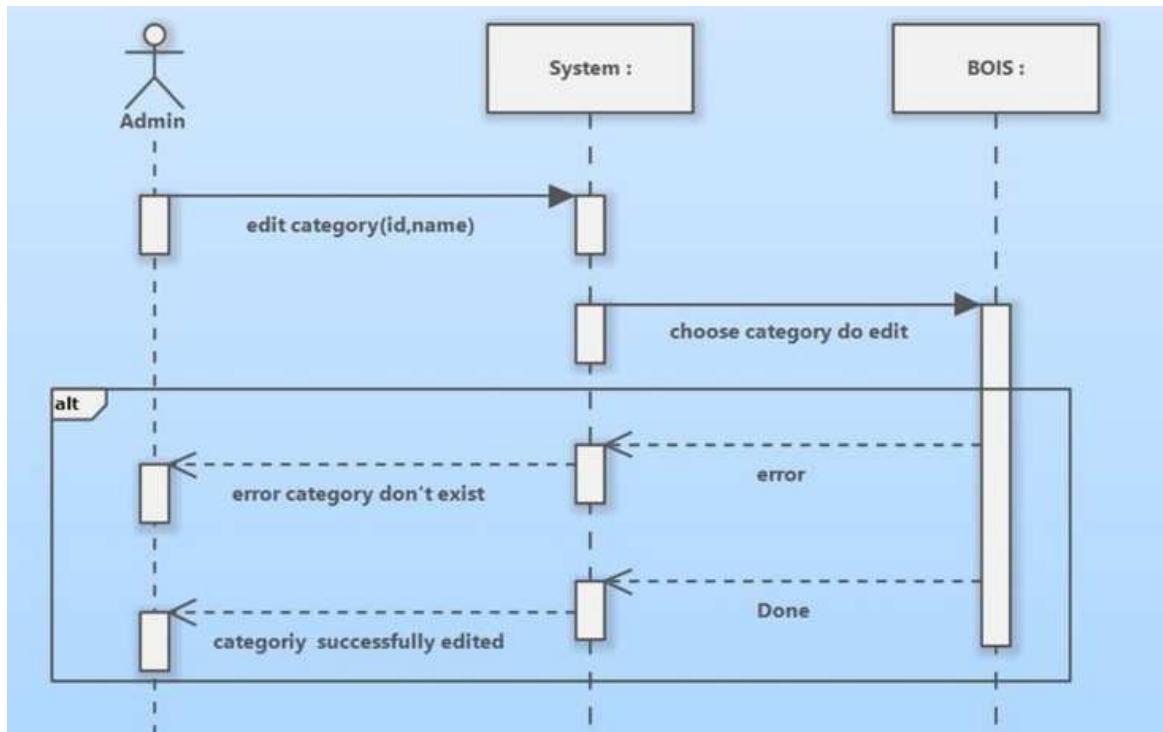


Figure 3.17
Sequence Diagram Admin Edit Category

3.3.7 Admin Manage Project

Figure 3.18 shows the structure of Admin Managing Project in the app

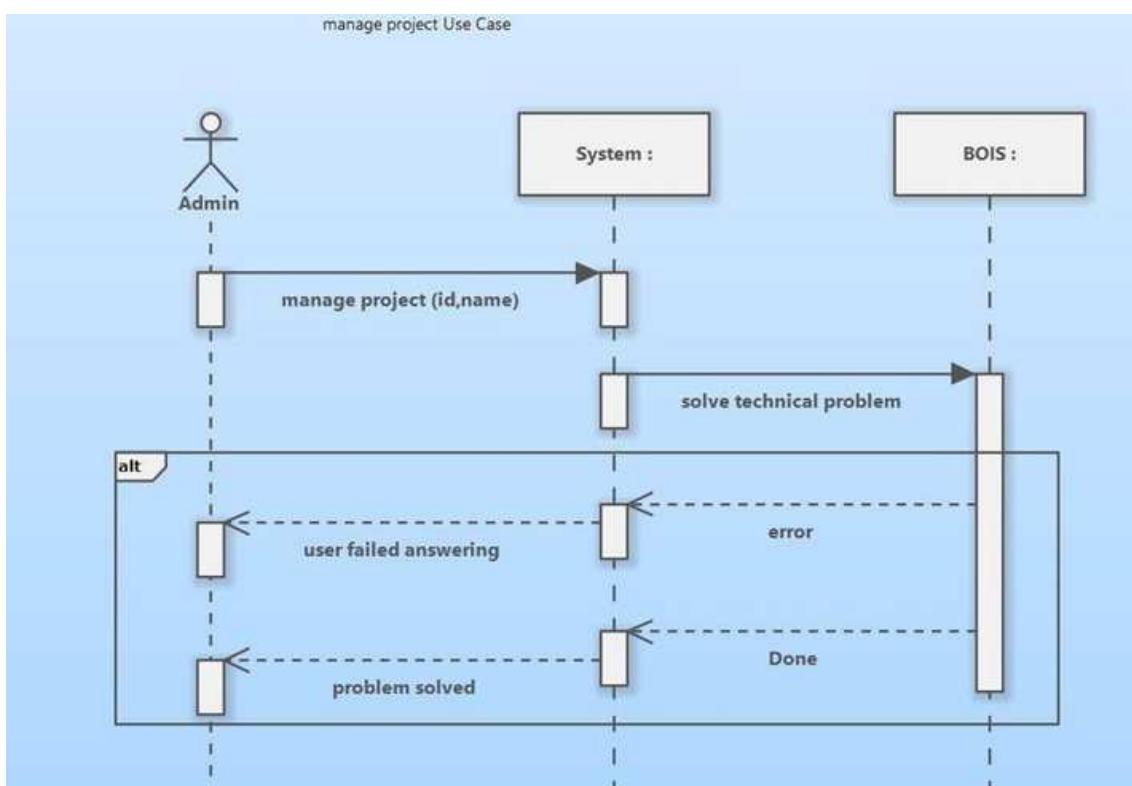


Figure 3.18
Sequence Diagram Admin Manage Project

3.3.8 Admin Add model

Figure 3.19 shows the structure of Admin Add Model in the app

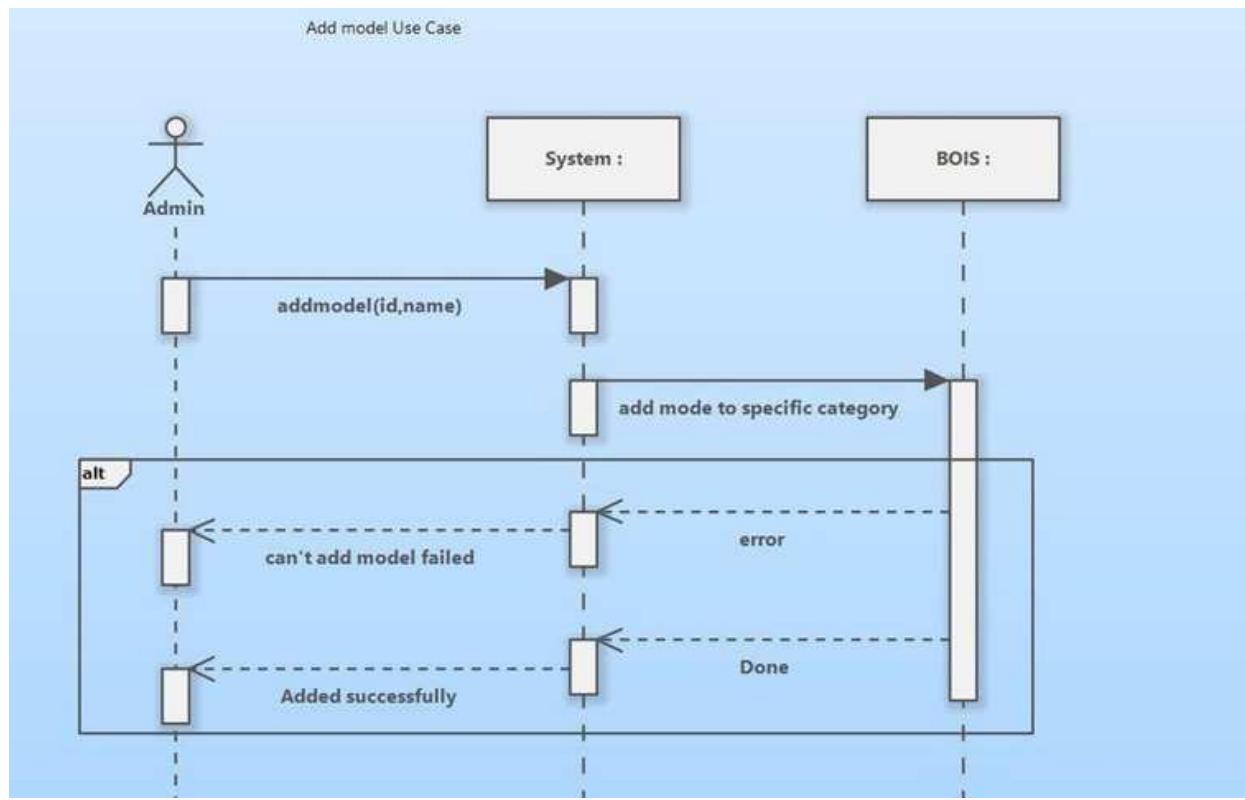


Figure 3.19
Sequence Diagram Admin Add Model

3.3.9 Admin Delete Model

Figure 3.19 shows the structure of Admin Delete Model in the app

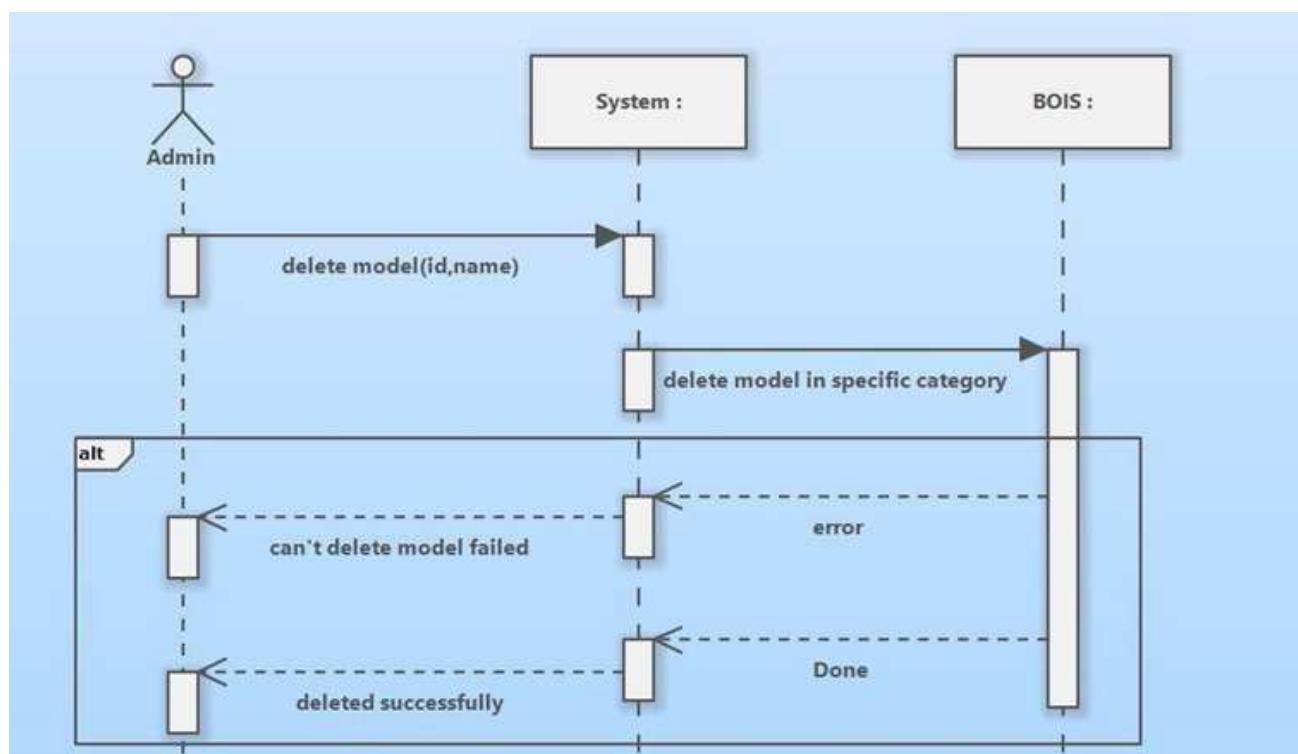


Figure 3.20
Sequence Diagram Admin Delete Model

3.3.10 Admin Edit model

Figure 3.21 shows the structure of Admin Edit Model in the app

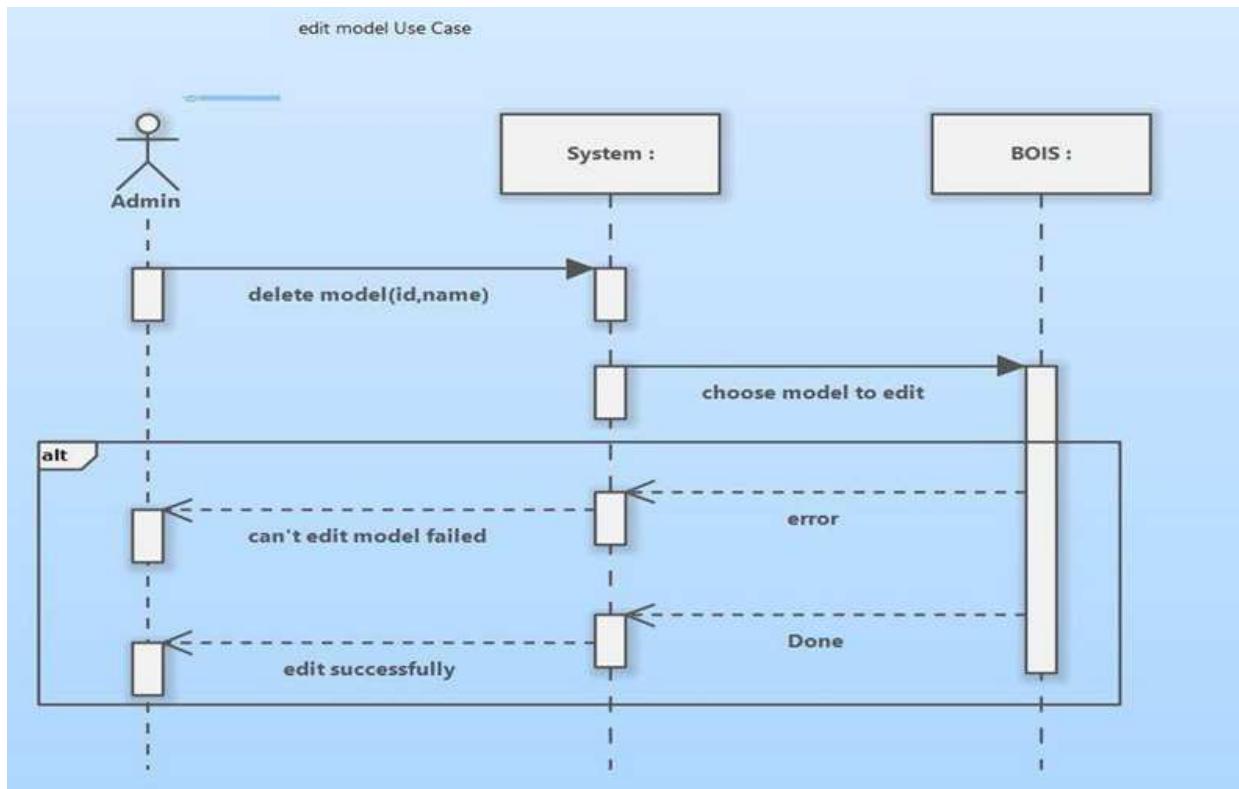


Figure 3.21
Sequence Diagram Admin Edit Model

3.3.11 Replay Help

Figure 3.22 shows the structure of Replay Help in the app

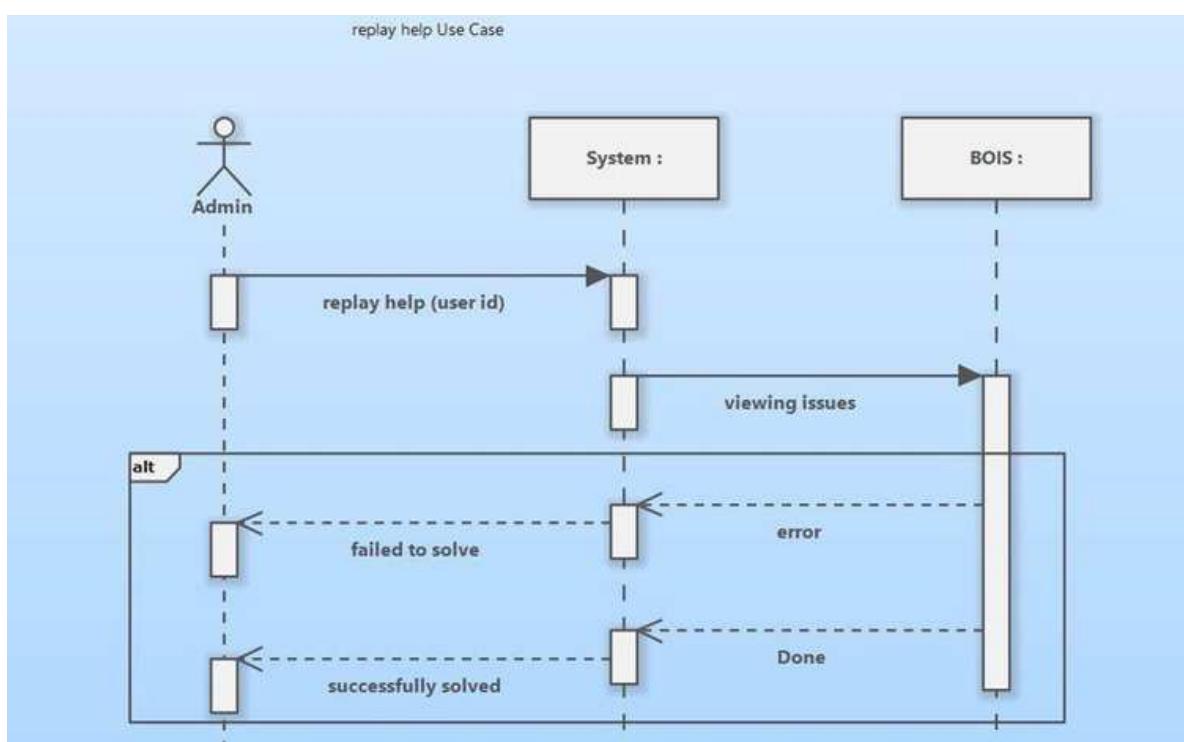


Figure 3.22
Sequence Diagram Request Help

3.3.12 User Add Room

Figure 3.23 shows the structure of User Add Room in the app

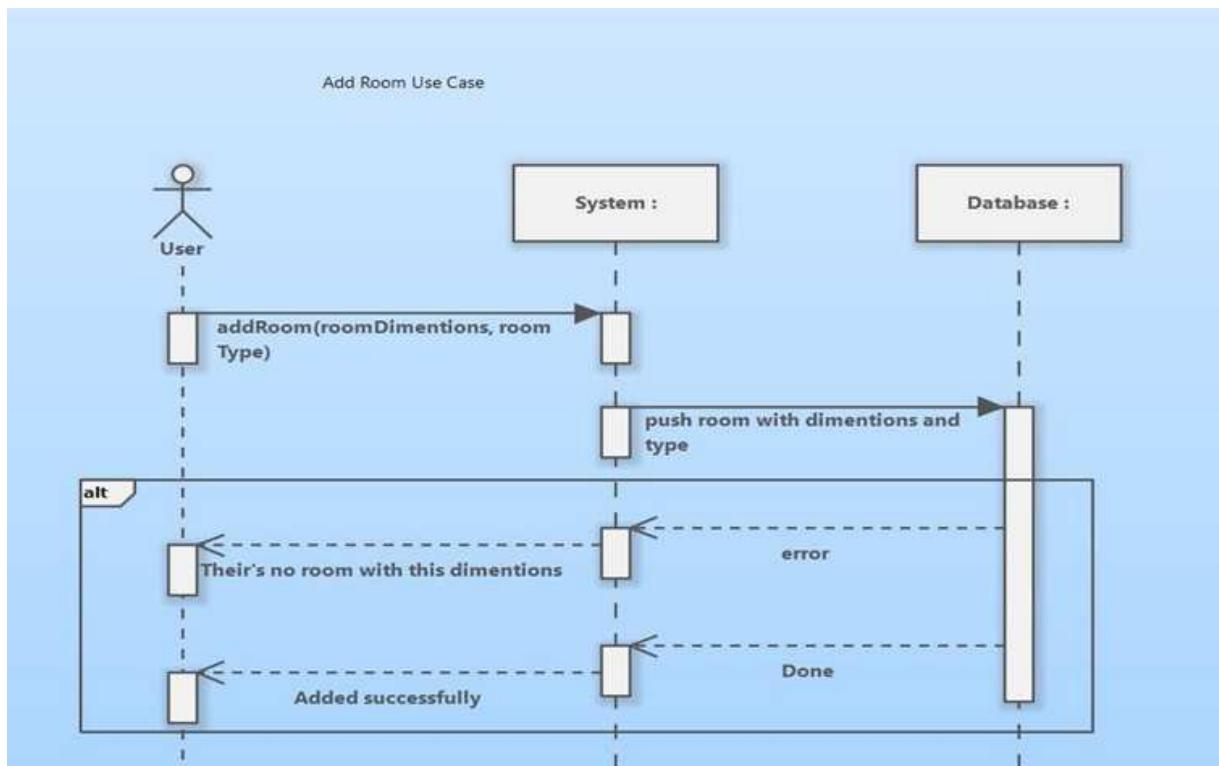


Figure 3.23
Sequence Diagram User Add Room

3.3.13 User Create Project

Figure 3.24 shows the structure of User Create Project in the app

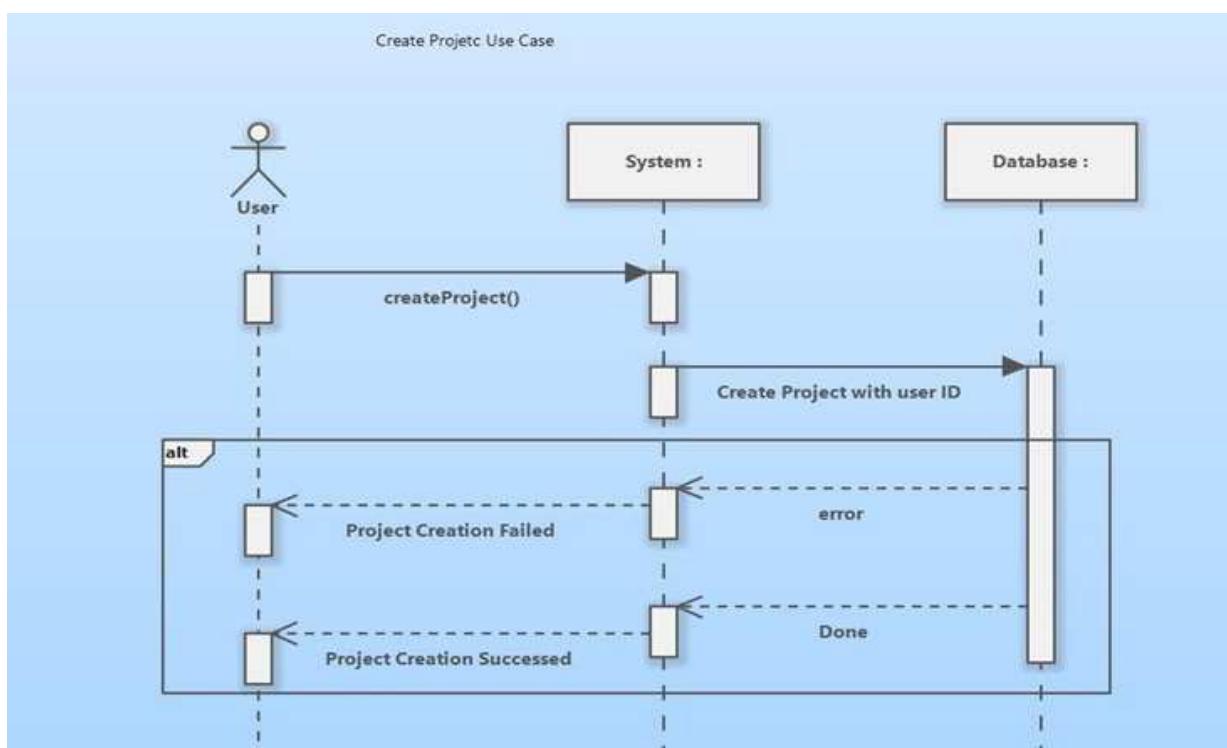


Figure 3.24
Sequence Diagram User Create Project

3.3.14 User Drag Item

Figure 3.25 shows the structure of User Drag Item in the app

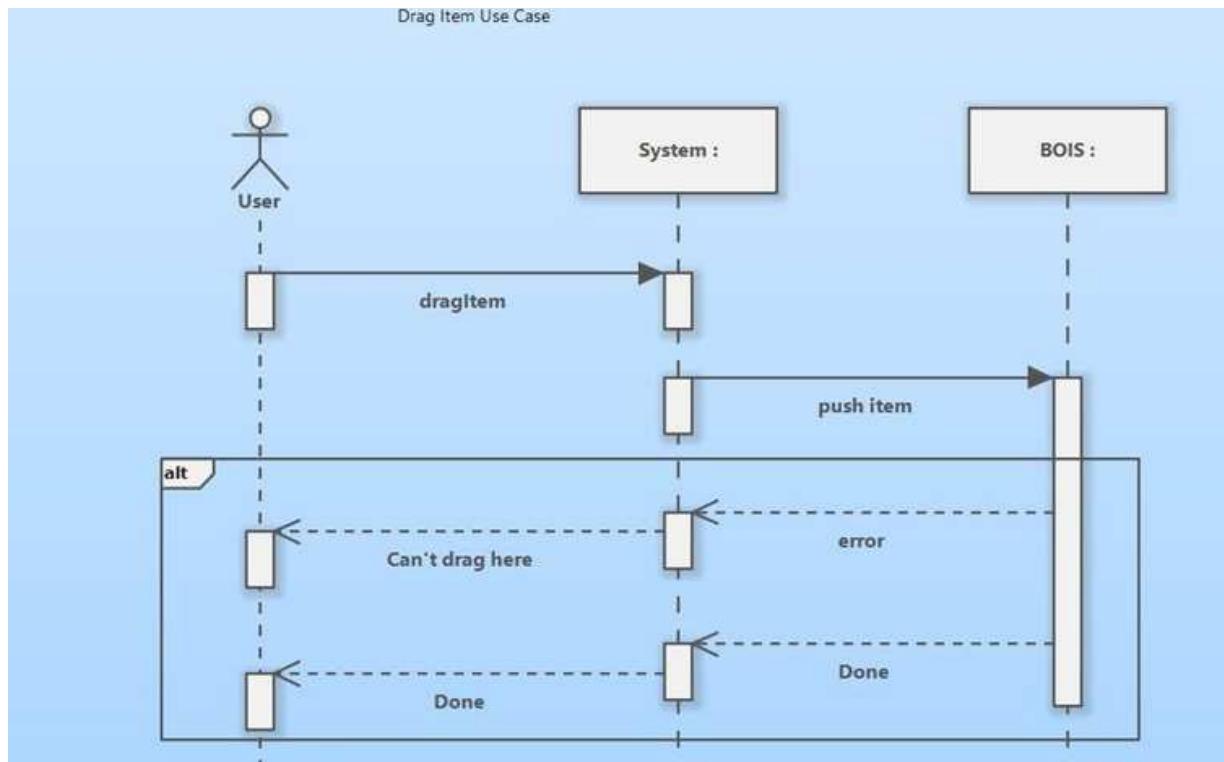


Figure 3.25
Sequence Diagram User Drag Item

3.3.15 Trash Item

Figure 3.26 shows the structure of Trash Item in the app

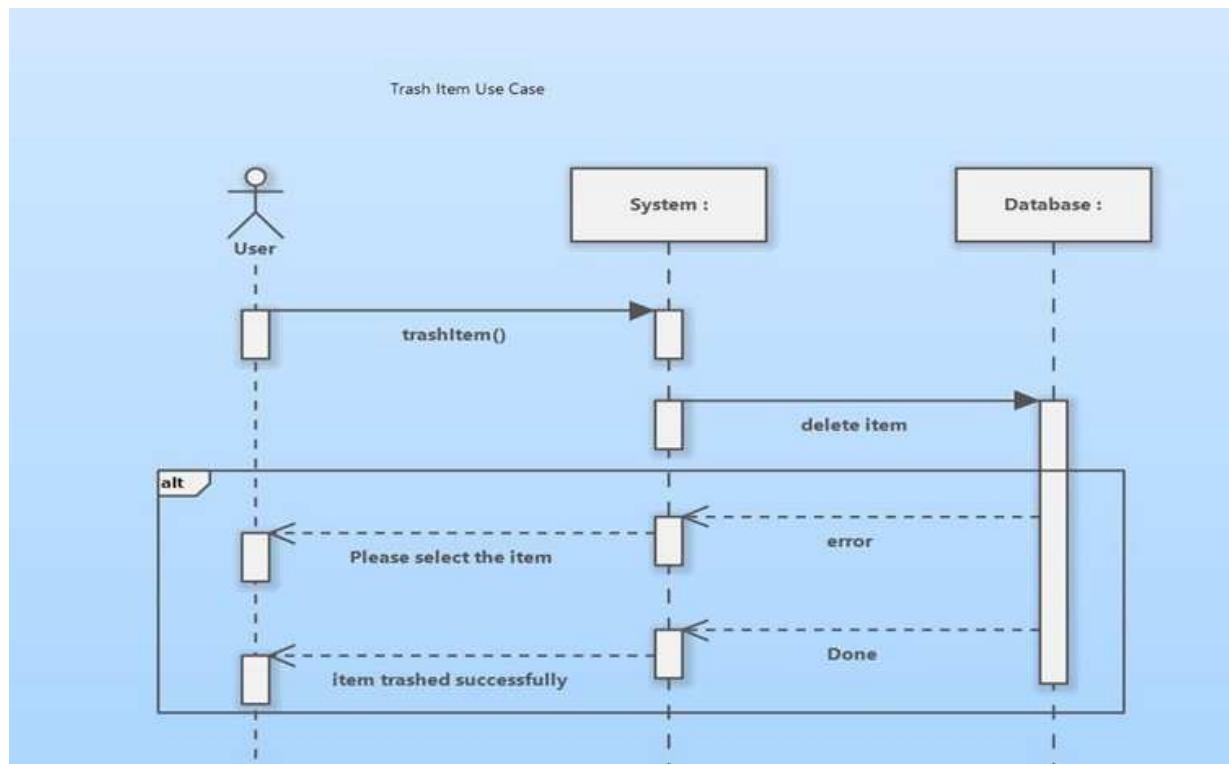


Figure 3.26
Sequence Diagram Trash Item

3.3.16 User Scan Room

Figure 3.27 shows the structure of Scanning Room Using AR With access the camera in the app

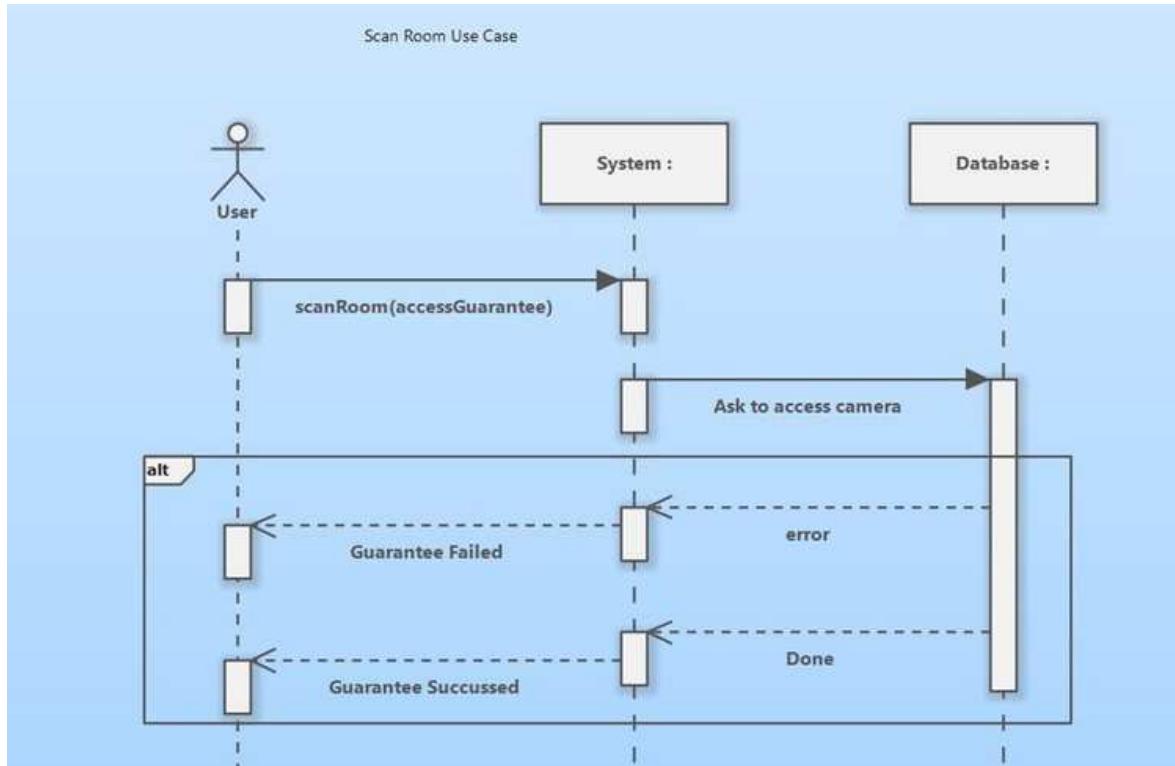


Figure 3.27
Sequence Diagram User Scan Room

3.3.17 User Save Room

Figure 3.28 shows the structure to save the project of the user in the app

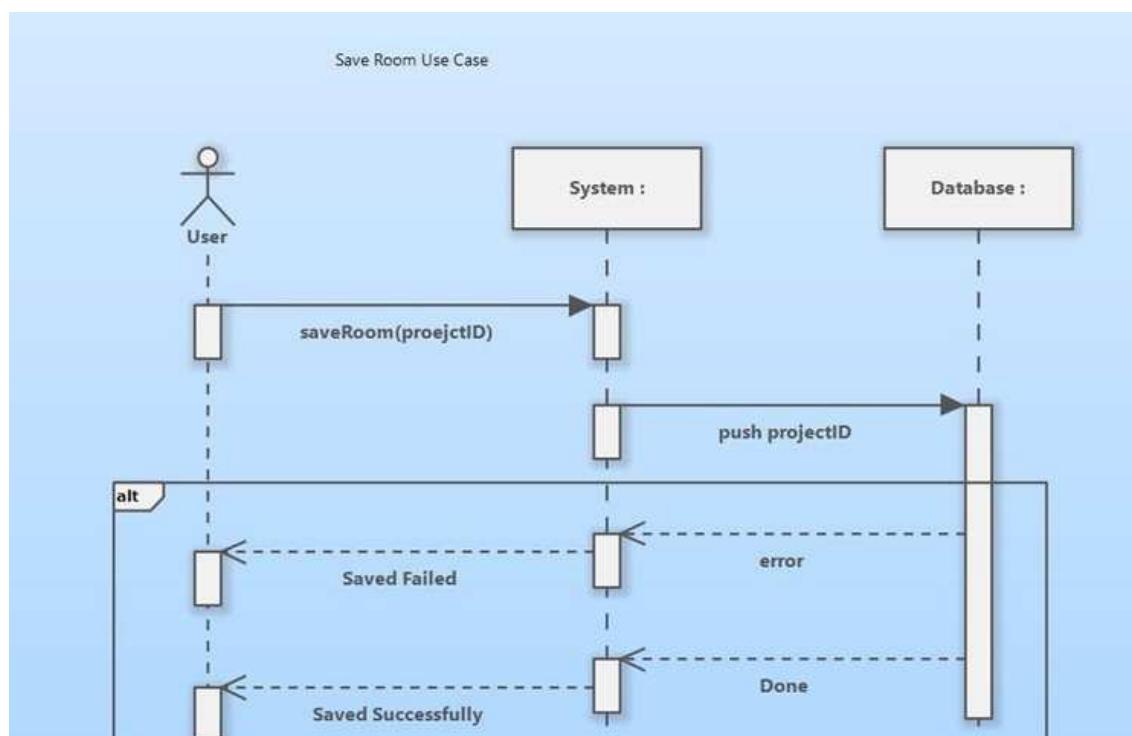


Figure 3.28
Sequence Diagram User Save Room

3.3.18 Designer Redesign

Figure 3.29 shows the structure to Redesign a Project that is already designed

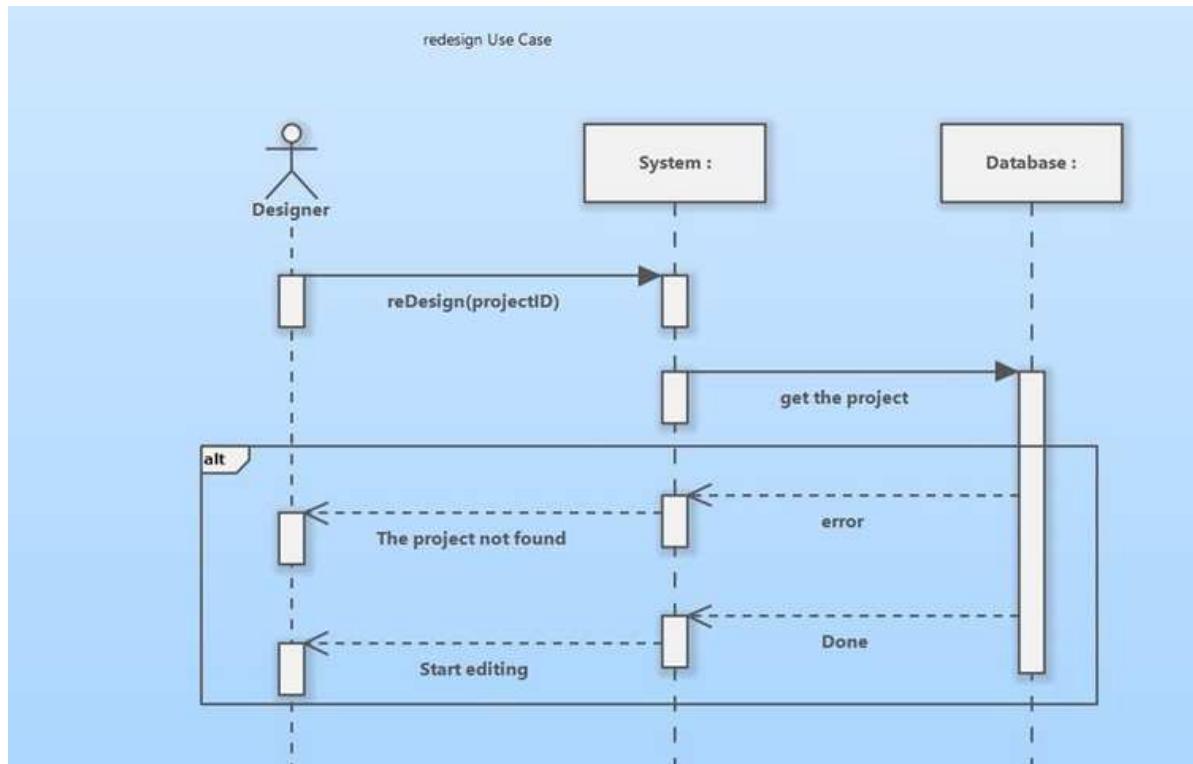


Figure 3.29
Sequence Diagram Designer Redesign

3.3.19 User Request Help

Figure 3.30 shows the structure that the user can ask for help

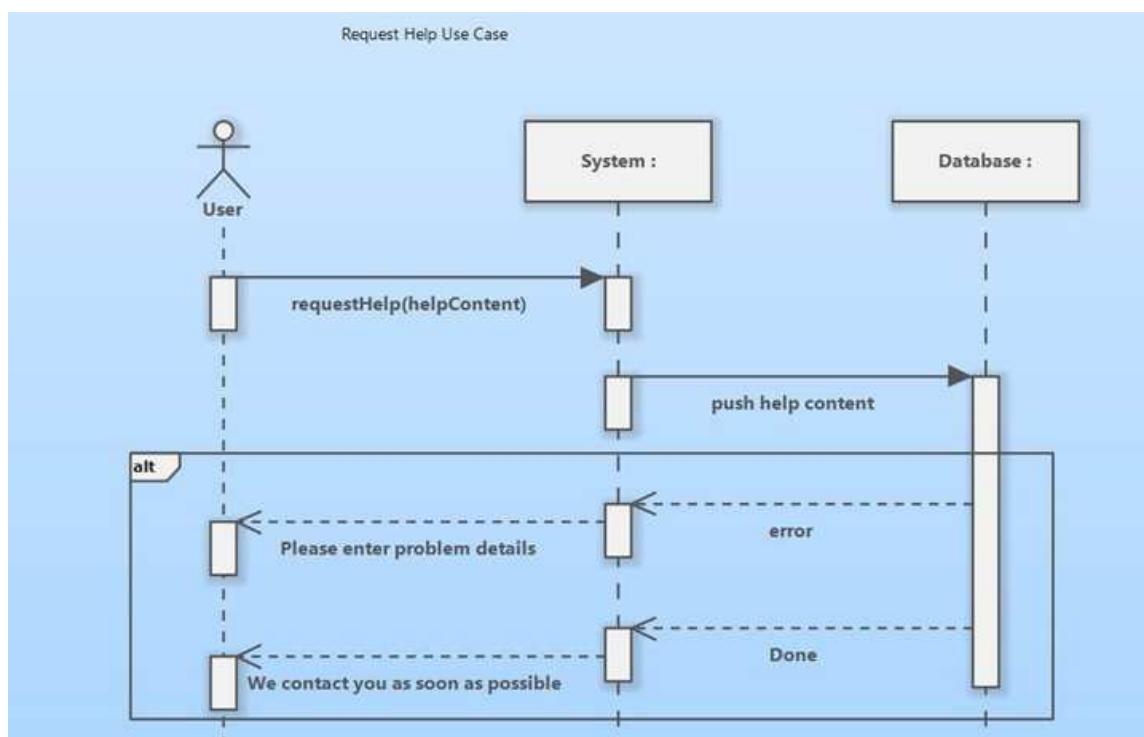


Figure 3.30
Sequence Diagram User Request Help

3.4 Prototype Adobe XD:

3.4.1 Login page

Figure 3.31 Shows Login Page prototype using adobe XD with fields to login

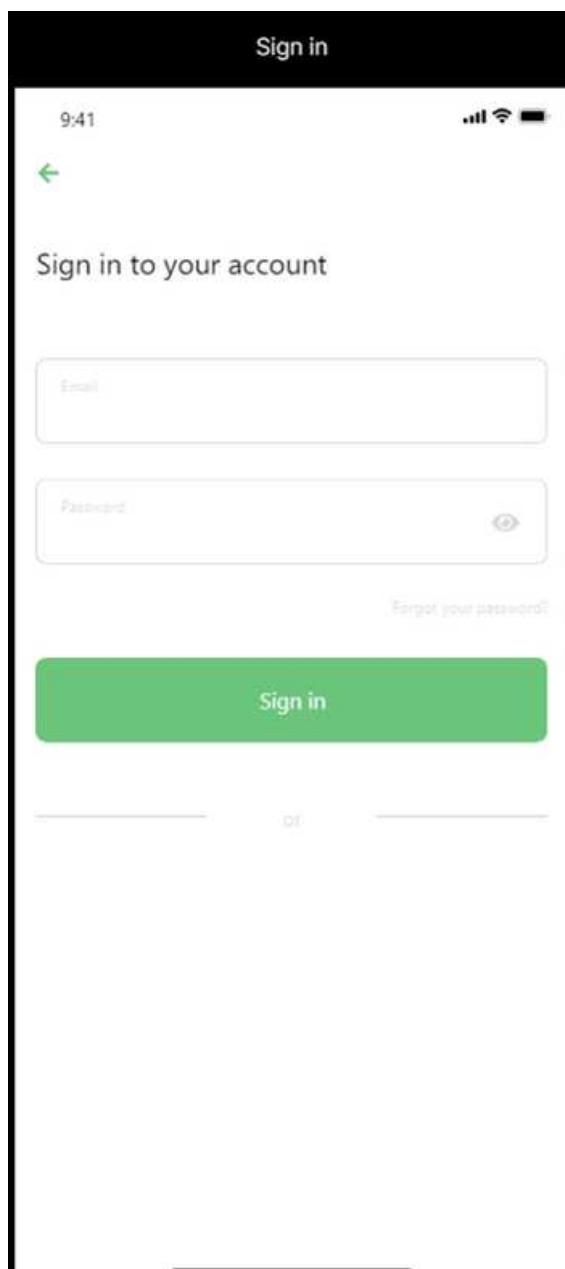


Figure 3.31
Prototype Adobe XD Login page

3.4.2 Create Account

Figure 3.32 Shows Prototype using Adobe XD to create account page with required fields

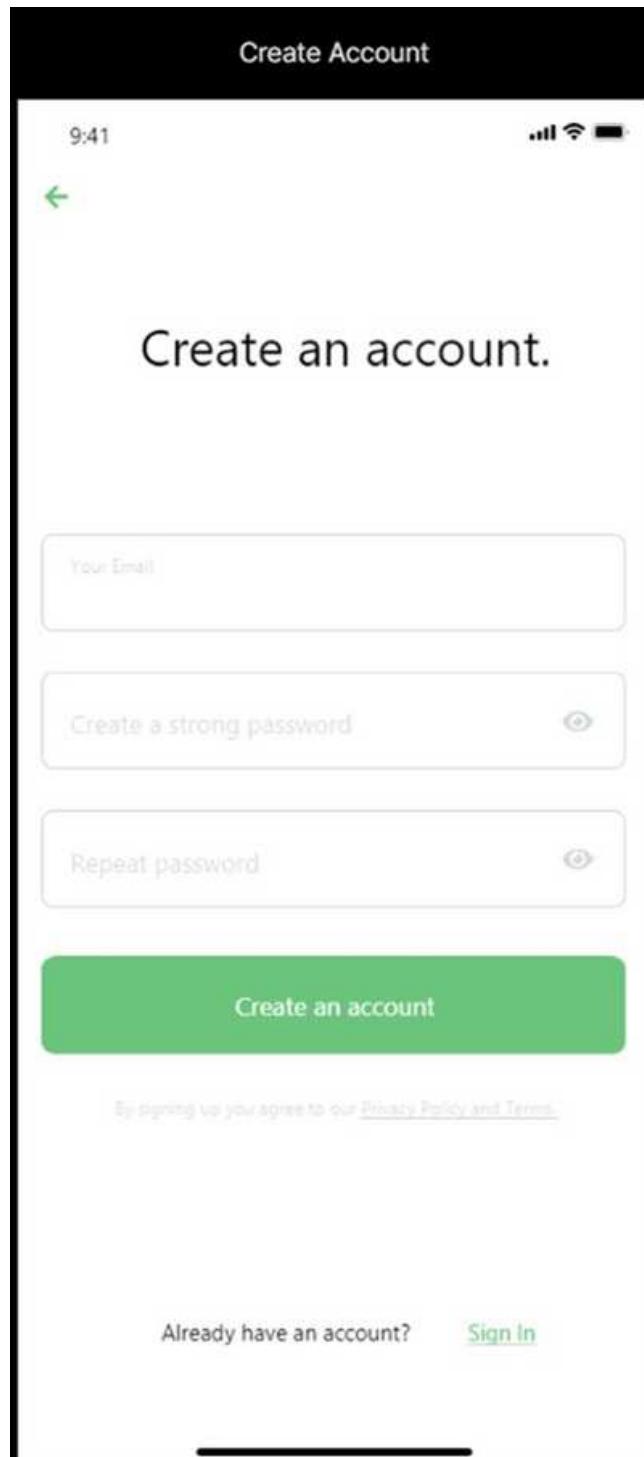
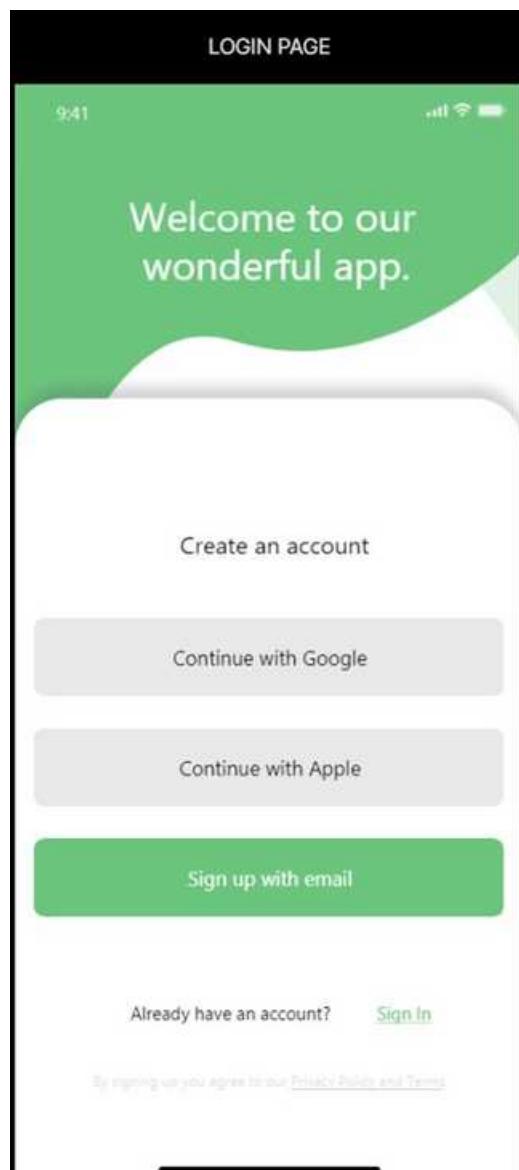


Figure 3.32
Prototype Adobe XD Create Account

3.4.3 SignUp

Figure 3.33 Shows Prototype using Adobe XD to signup using different ways or already have an account



**Figure 3.33
Prototype Adobe XD SignUp**

3.4.4 Success Login

Figure 3.34 Shows a Prototype using Adobe XD with a message of success login

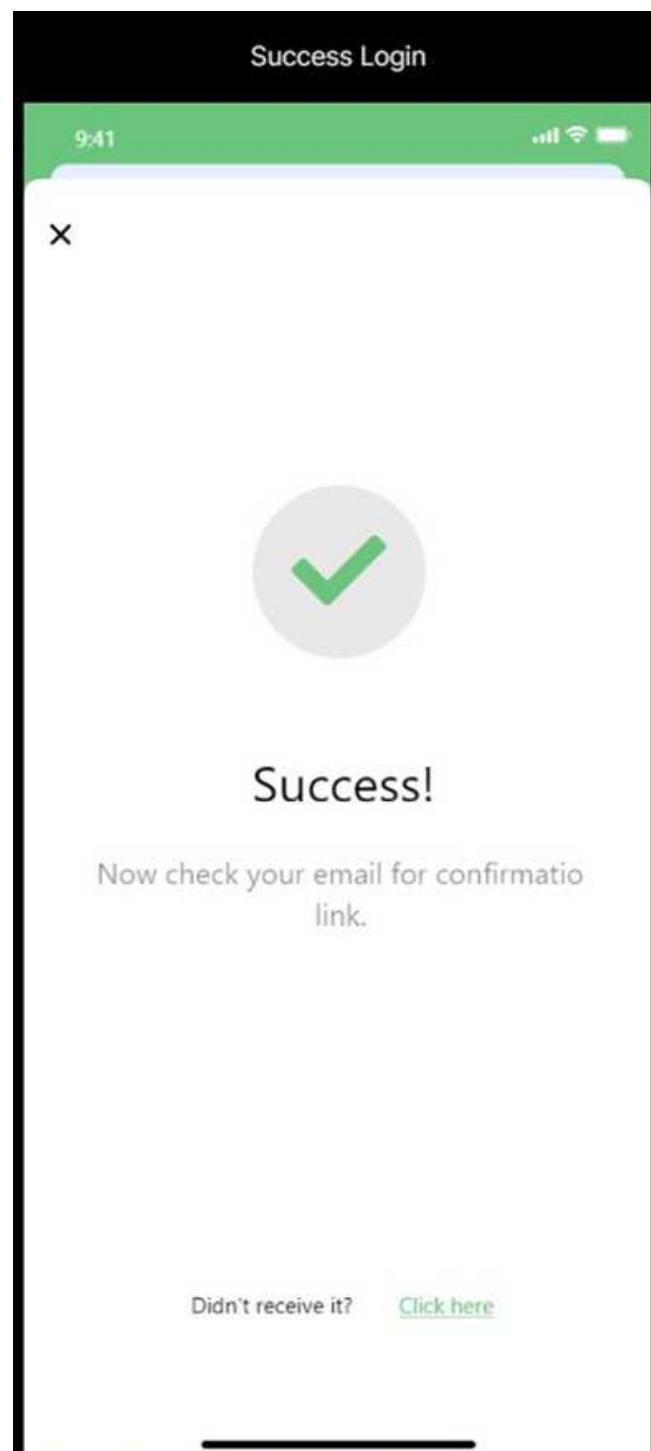


Figure 3.34
Prototype Adobe XD Success Login

3.4.5 Forget Password

Figure 3.35 shows a Prototype using Adobe XD page of Forget Password to give you the ability to reset your password by entering your email and press submit button

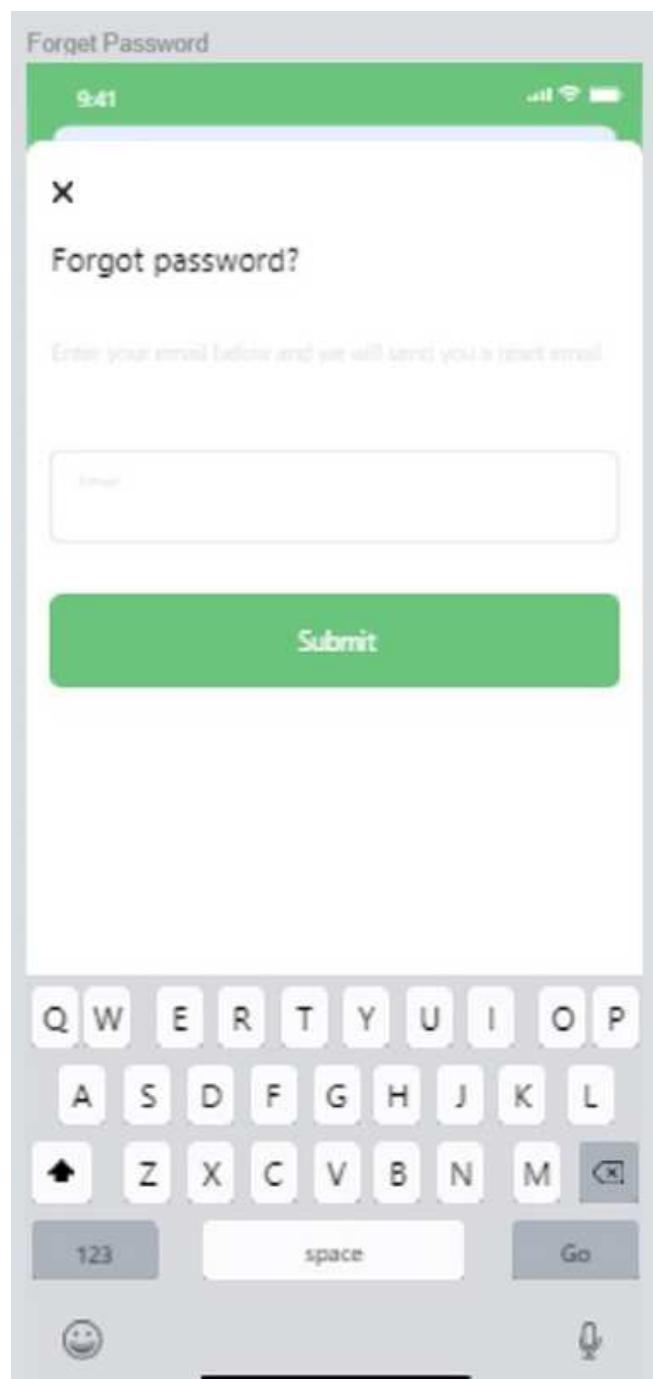


Figure 3.35
Prototype Adobe XD Forget Password

3.4.6 Getting Started

Figure 3.36 shows a Prototype using Adobe XD tutorial page shows the main page when starting the app

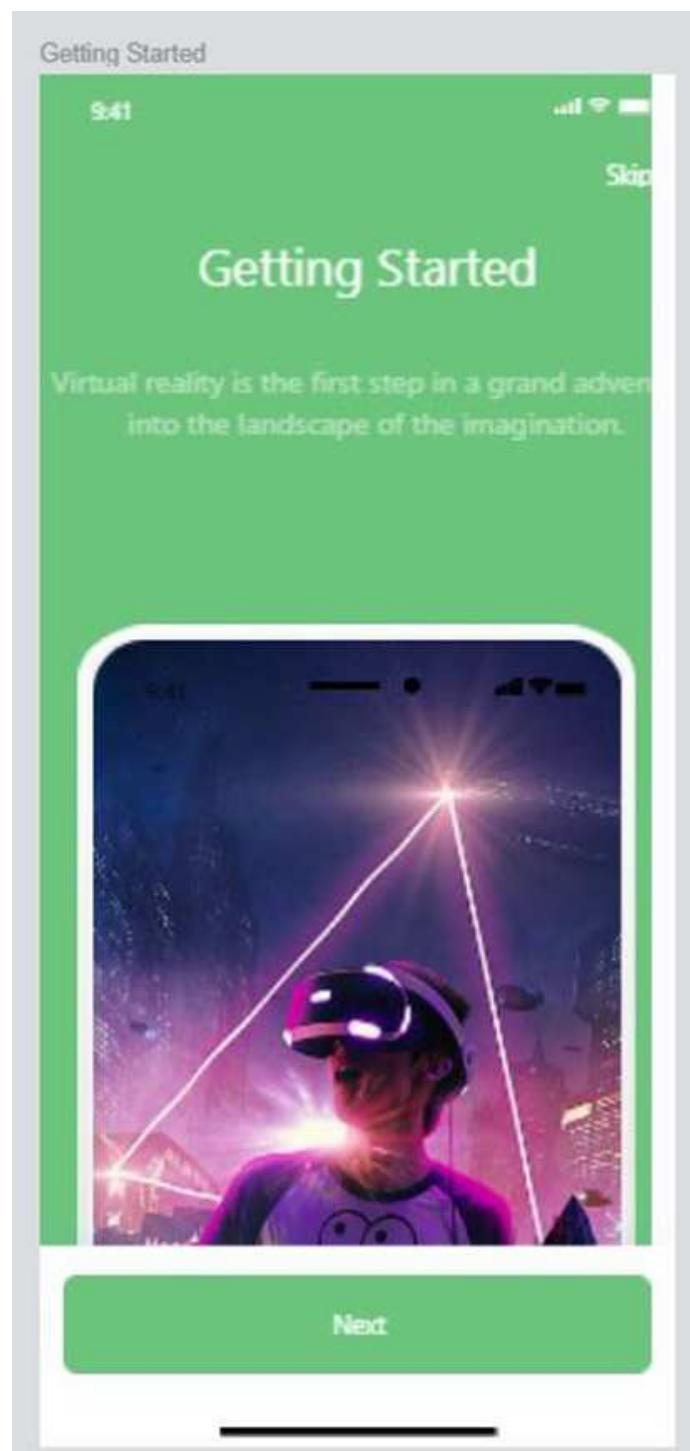


Figure 3.36
Prototype Adobe XD Getting Started

3.4.7 Generate Room

Figure 3.37 shows a Prototype using Adobe XD page that shows the dimensions field which will help you generate room in 3D Environment

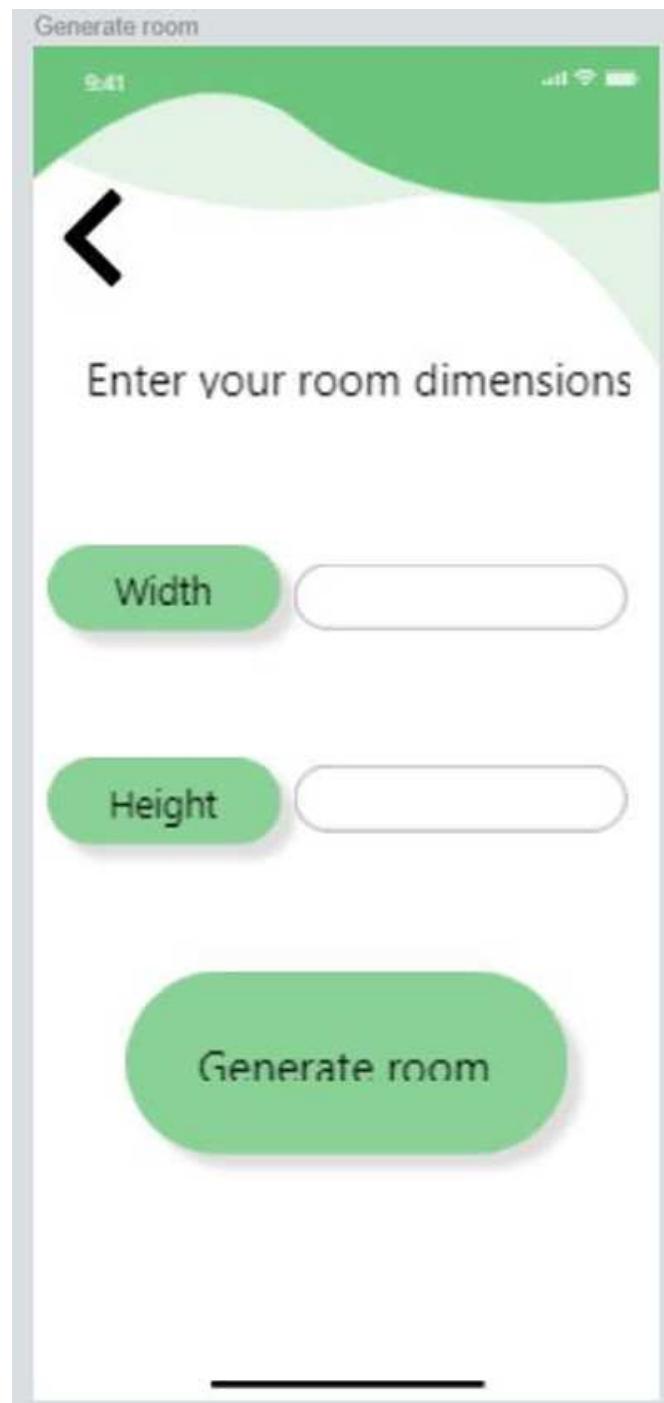


Figure 3.37
Prototype Adobe XD Generate Room

3.4.8 AR Allow Access Camera

Figure 3.38 shows a Prototype using Adobe XD the ask to access camera to be able to start the AR Technology using your phone or tablet camera

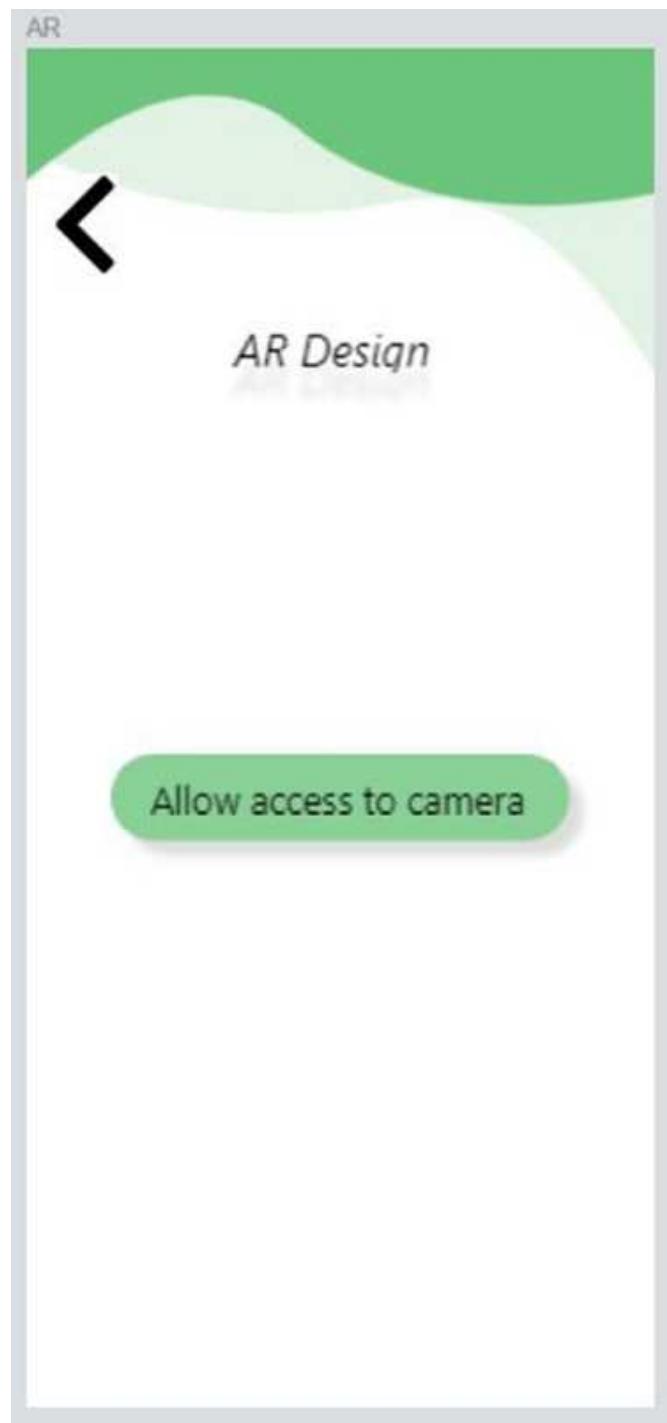
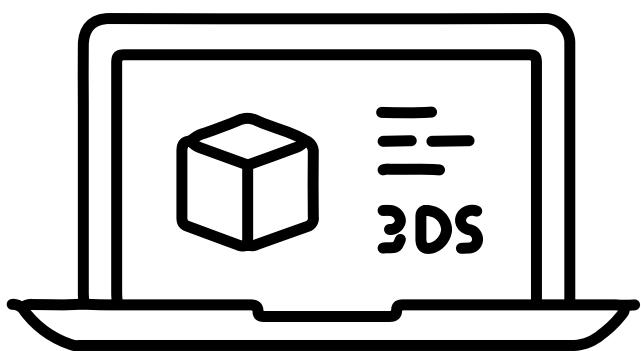


Figure 3.38
Prototype Adobe XD AR Allow Access Camera

CHAPTER 4: IMPLEMENTATION



4.1 Technologies Used :

4.1.1 Mobile Based :

**AUGMENTED
REALITY**



**3D
ENVIRONMENT**

4.1.2 HeadSet Based :

**VIRTUAL
REALITY**



4.2 Mobile Based :

4.2.1 AR Main Idea :

Augmented Reality Technology

enabling users to superimpose their virtual designs onto the real world. By using a mobile device or tablet, users can view their designs within their actual physical spaces. This feature allows for real-time visualization and facilitates better decision-making by providing an accurate preview of how the design will appear once implemented.

4.2.2 3D Environment Main Idea :

A 3D environment that empowers users to create detailed and realistic room interiors. It includes a vast library of objects, materials, and textures, allowing for accurate representation of furniture, fixtures, lighting, and other elements. Users can customize and arrange objects with precision, ensuring that their designs reflect their vision accurately.

4.3 HeadSet Based :

4.3.1 Virtual Reality :

VR technology to provide an immersive and realistic experience. Users can explore their designed spaces in a virtual environment, allowing them to walk through rooms, interact with objects, and gain a true sense of scale and proportions. This enhances the design process by providing a lifelike representation of the final result.

4.4 InterioPro App (AR & 3D) :

4.4.1 Lunch Page :

Figure 4.1 shows implemented InterioPro App Lunch Page

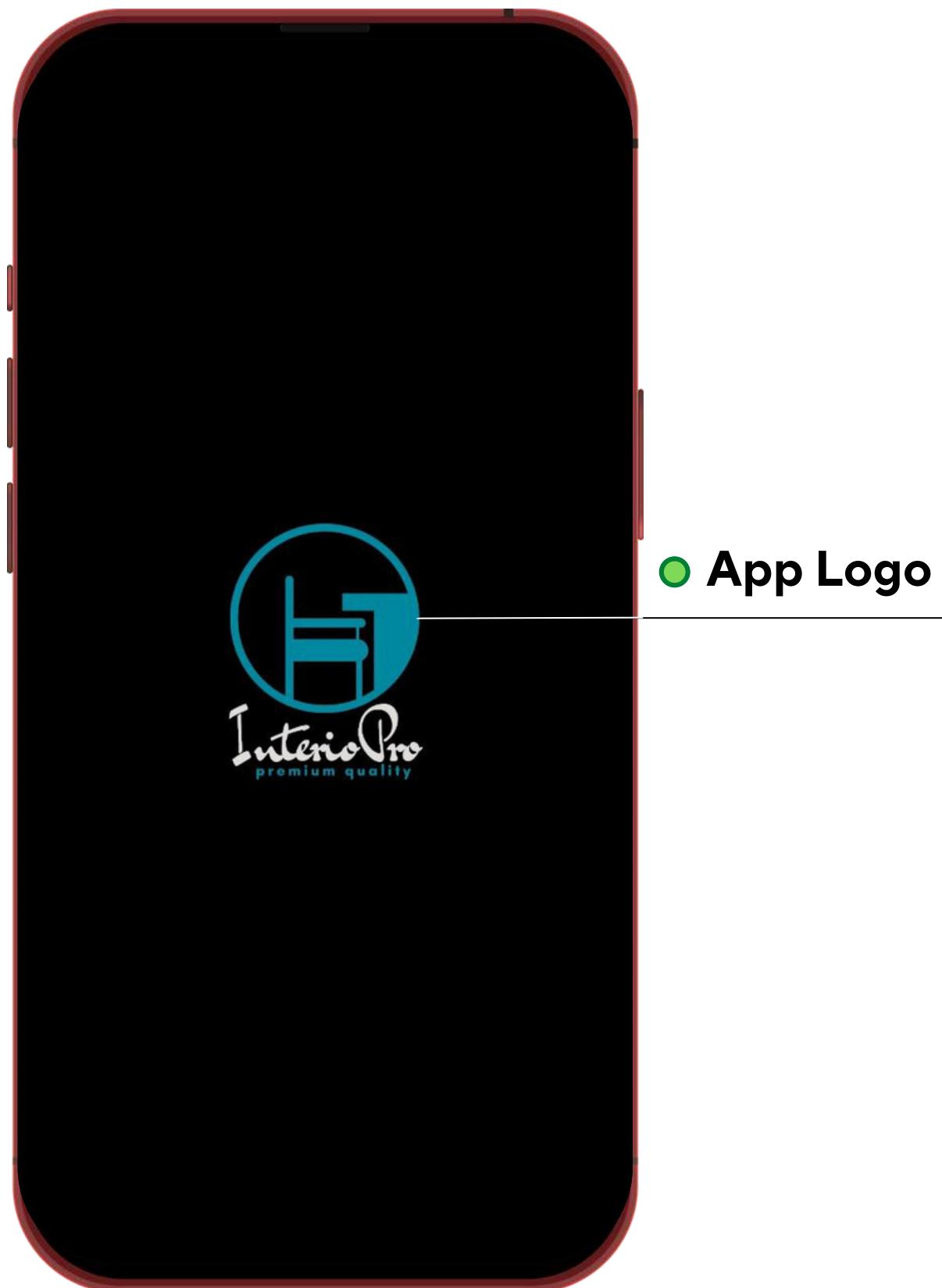


Figure 4.1
InterioPro App Lunch Page

4.4.2 Tutorial One :

Figure 4.2 shows implemented InterioPro App Tutorial page one with the ability to exit the tutorial or continue

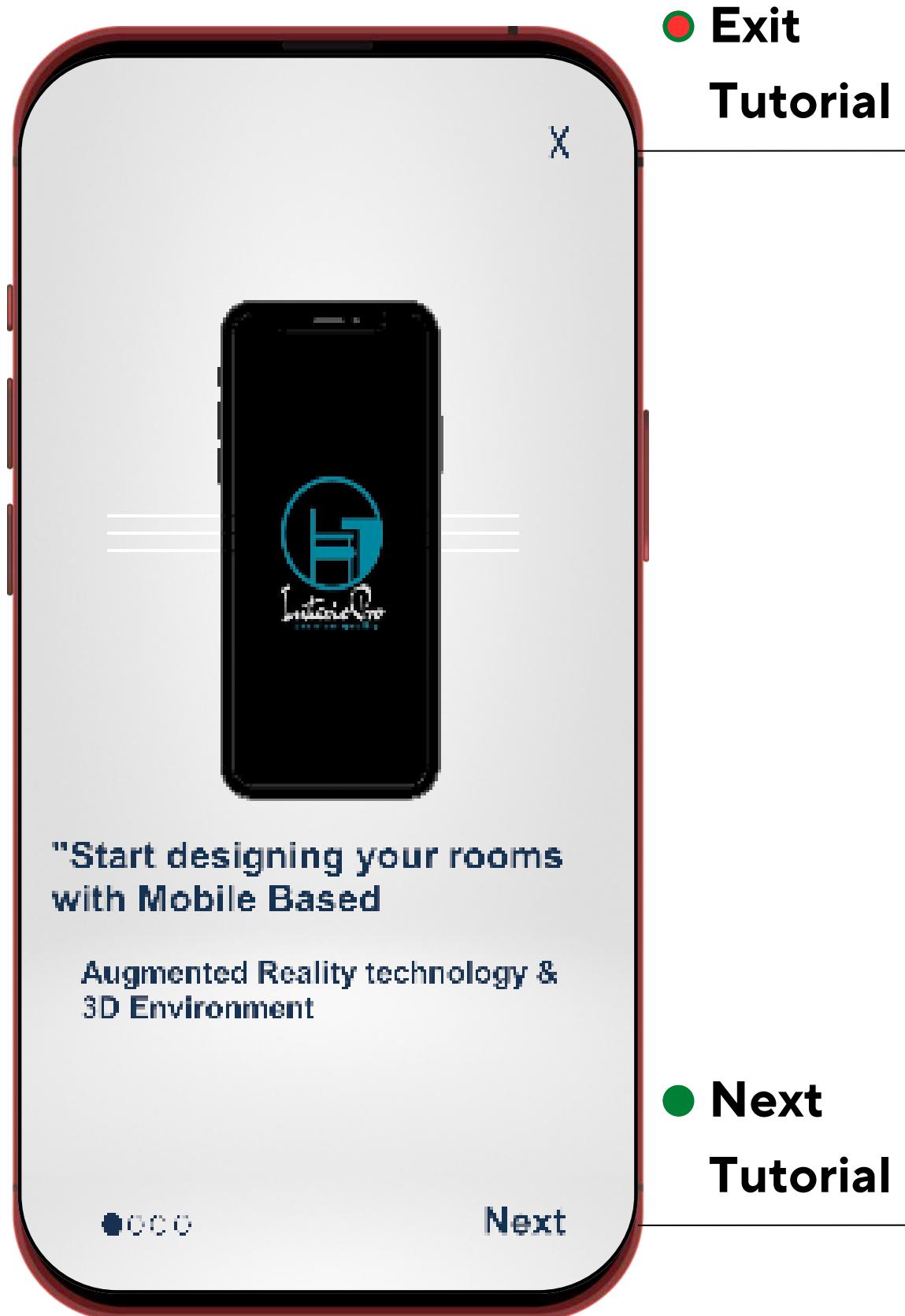


Figure 4.2
InterioPro App Tutorial One

4.4.3 Tutorial Two:

Figure 4.3 shows implemented InterioPro App Tutorial page two with the ability to go back to the previous tutorial or exit the tutorial or continue



Figure 4.3
InterioPro App Tutorial Two

4.4.4 Tutorial Three:

Figure 4.4 shows implemented InterioPro App Tutorial page Thired with the ability to go back to the previous tutorial or exit the tutorial or continue

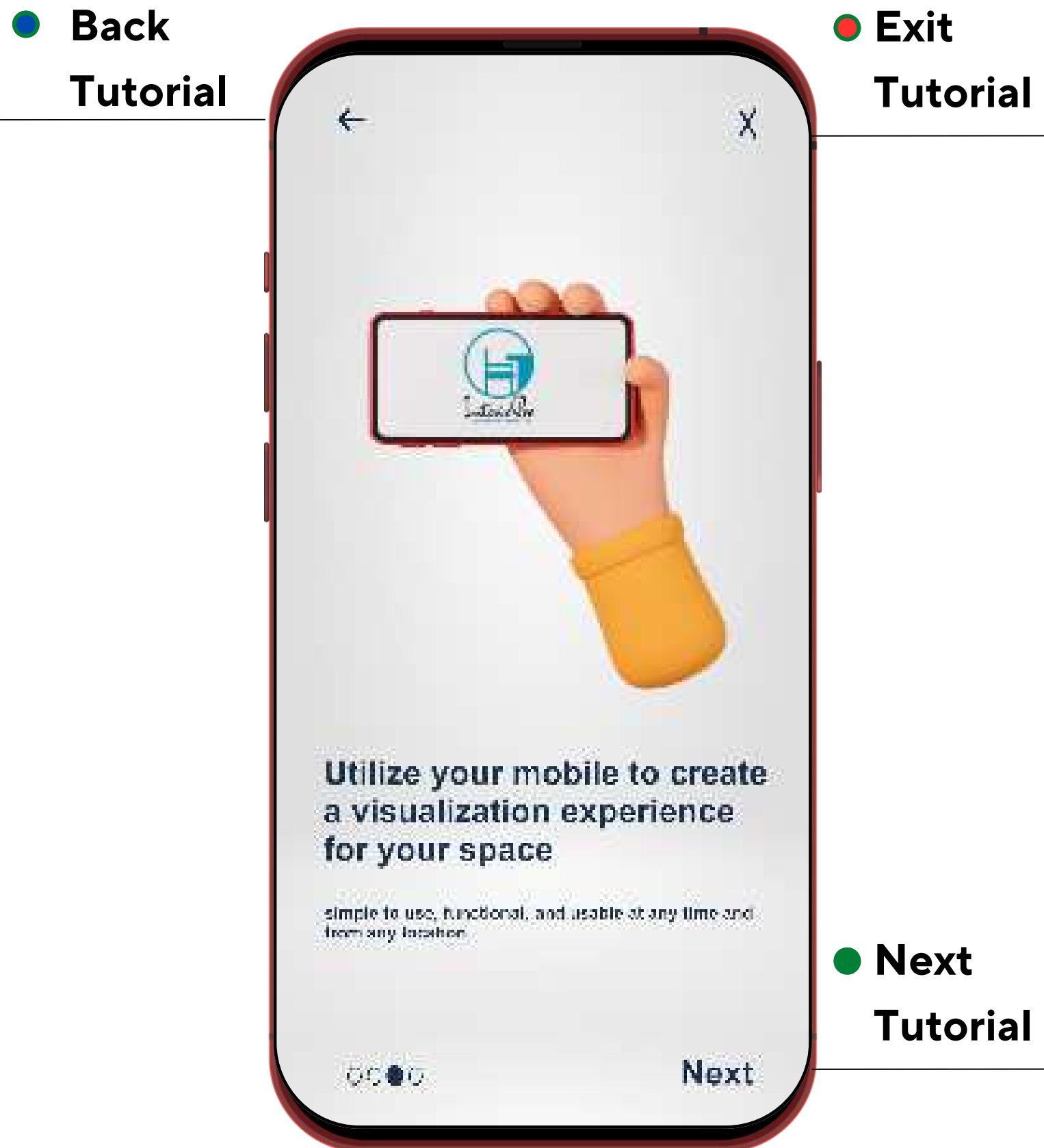


Figure 4.4
InterioPro App Tutorial Three

4.4.5 Tutorial Four:

Figure 4.5 shows implemented InterioPro App Tutorial page Forth with the ability to go back to the previous tutorial or exit the tutorial or continue

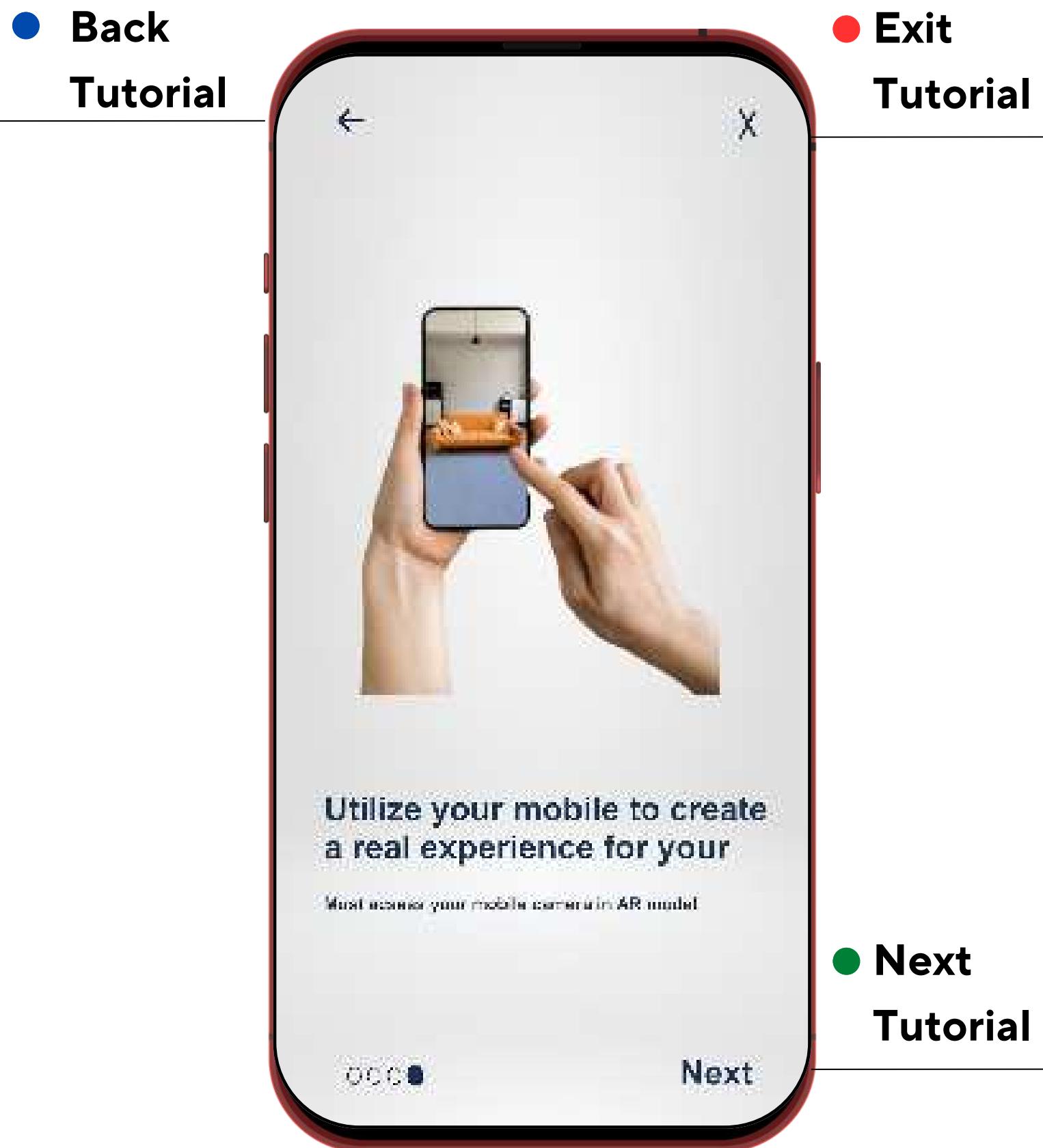


Figure 4.5
InterioPro App Tutorial Four

4.4.6 Home Page :

Figure 4.6 shows an implemented InterioPro App with a home page with an active page button to access more features and a start button to begin designing, as well as the ability to see video tutorials for both technologies or return to the previous tutorial when the app is launched.



Figure 4.6
InterioPro App Home Page

4.4.7 3D Environment Video Tutorial :

Figure 4.7 shows an implemented InterioPro App this page shows 3D Environment tutorial video page with active page , back previous page logo



Figure 4.7
InterioPro App 3D Environment Video Tutorial

4.4.8 AR VIDEO TUTORIAL :

Figure 4.8 shows an implemented InterioPro App this page shows AR tutorial video page with active page , back previous page logo



Figure 4.8
InterioPro App AR Video Tutorial

4.4.9 Active Page :

Figure 4.9 Shows an integrated InterioPro App. This page displays the ability to signup and login buttons, as well as an exit button tutorial video page with active page, back previous page logo with more details button.



Figure 4.9
InterioPro App ActivePage

4.4.10 login Page :

Figure 4.10 Show an InterioPro App that has been integrated. This login page displays the back logo and a form where the user can input his email and password and login, as well as the option to request a password reset.

● Back
Logo

● Active
Page

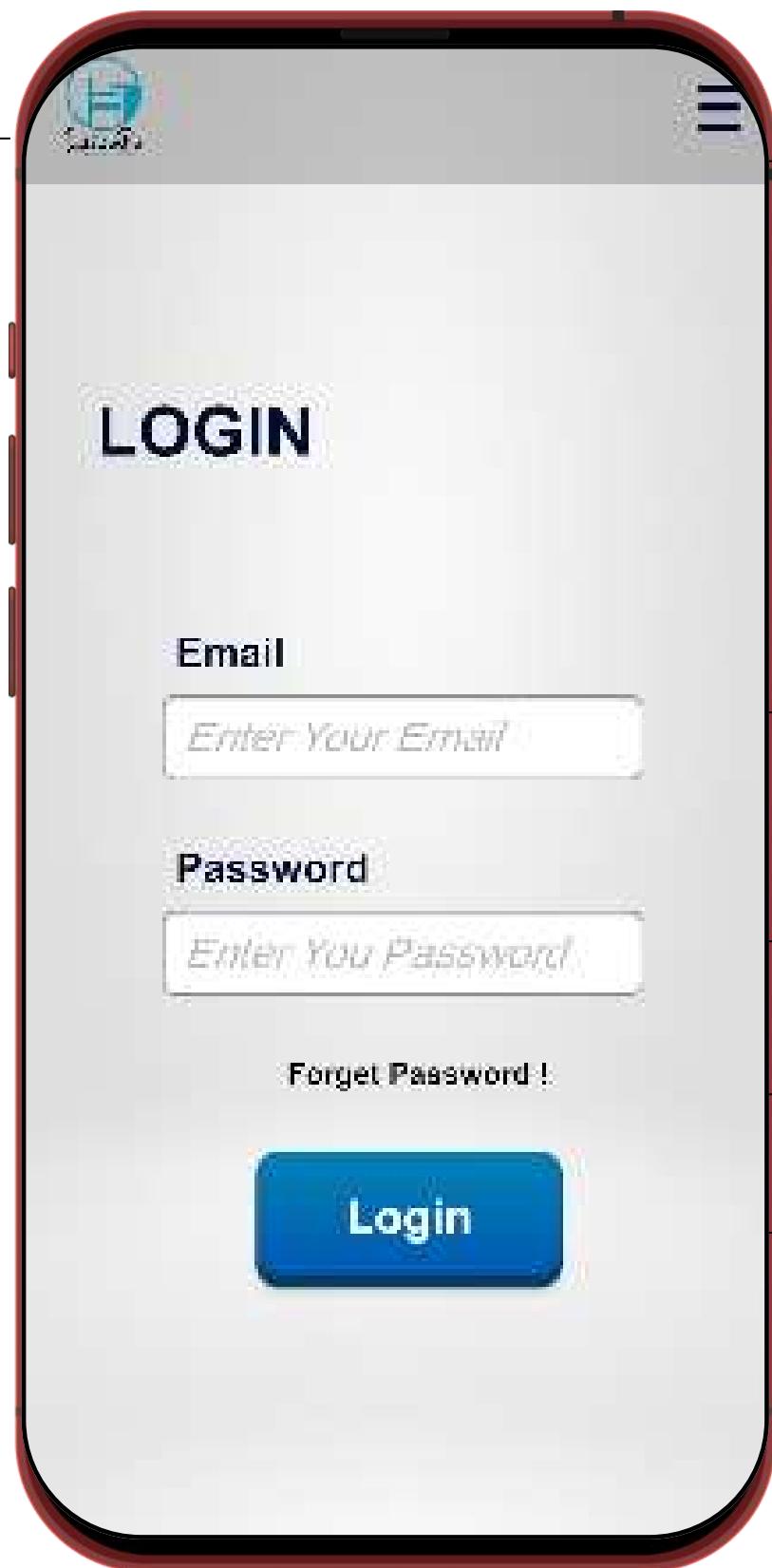
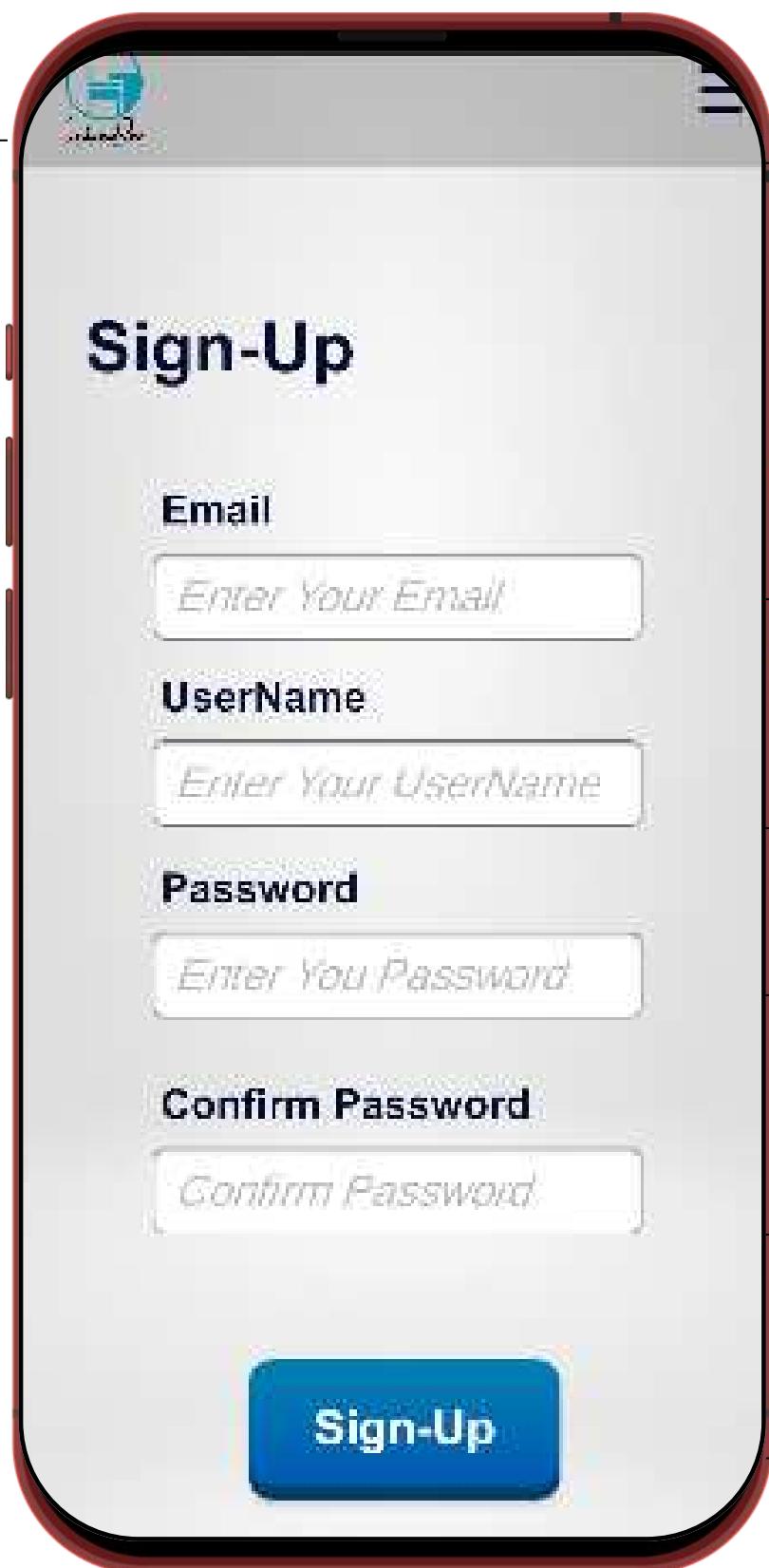


Figure 4.10
InterioPro App Login Page

4.4.11 SignUp Page :

Figure 4.11 Show an InterioPro App that has been integrated. This Signup page displays the back logo and a form where the user can input his email and password and Signup.

● Back
Logo



● Active
Page

- Email
- UserName
- Password
- Confirm Password
- Signup

Figure 4.11
InterioPro App Signup Page

4.4.12 MobileBased Page :

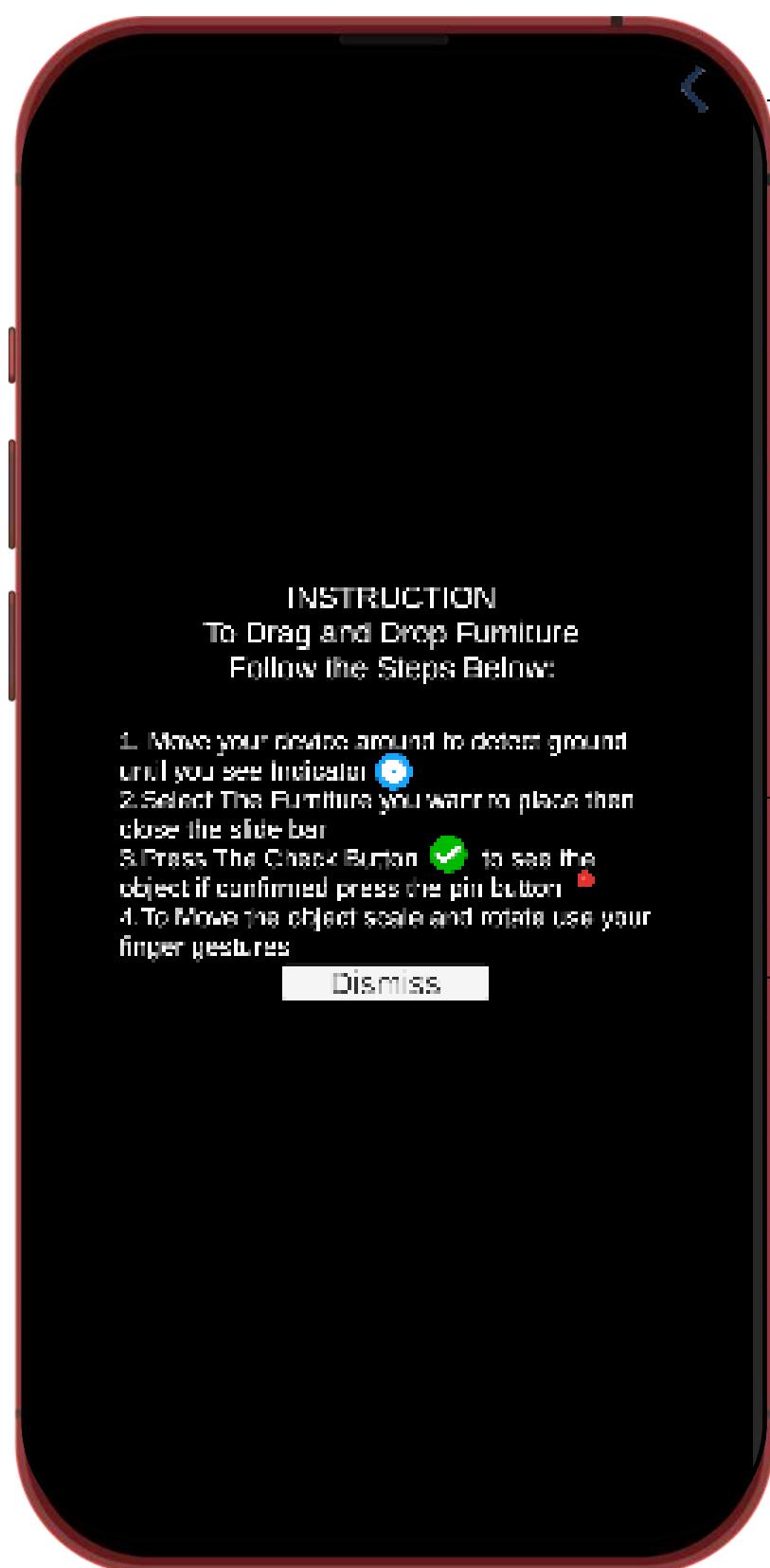
4.12 Figure Display a fully integrated InterioPro App.
This page demonstrates the ability to switch between 3D and AR environments.
With a back button, a tutorial video, and a logo on the back



Figure 4.12
InterioPro App MobileBased Mode Page

4.4.13 AR Instruction Run :

Figure 4.13 shows an implemented InterioPro App this page shows instructions of how to use AR Technology



● Back Icon

● Instructions
AR

● Dismiss
Button

Figure 4.13
InterioPro App AR Instructions Page

4.4.14 AR Main Menu:

Figure 4.14 shows an implemented InterioPro App this page shows the main category menu of the AR technology



Figure 4.14
InterioPro App AR Menu

4.4.15 AR Run Example :

Figure 4.15 shows an implemented InterioPro App this page shows the Run of the AR Technology with a category menu and two button which helps the user to view and place the object



Figure 4.15
InterioPro App AR Run Example

4.4.16 3D Environment choose Page :

Figure 4.16 shows an implemented InterioPro App this page shows the ability for the user to choose between different rooms and 3 buttons which help user to go back to tutorial or previous page or the Active Page

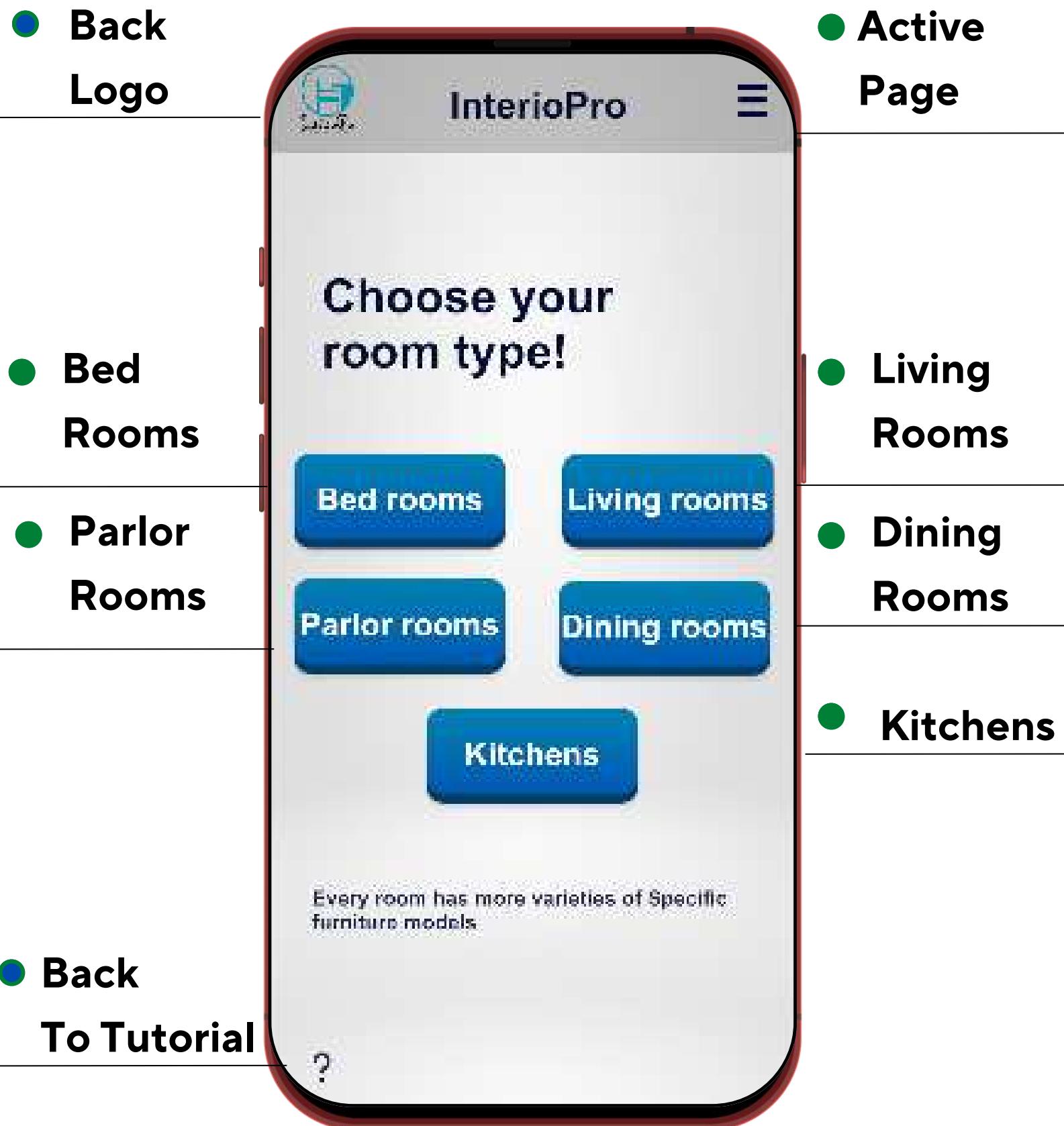


Figure 4.16
InterioPro App 3D Environment choose Page

4.4.17 3D Environment Mode Run :

Figure 4.17 shows an implemented InterioPro App this page shows the 3D Environment Run Page With Menu At the left and Controller And View Rotation With the Ability to request Design

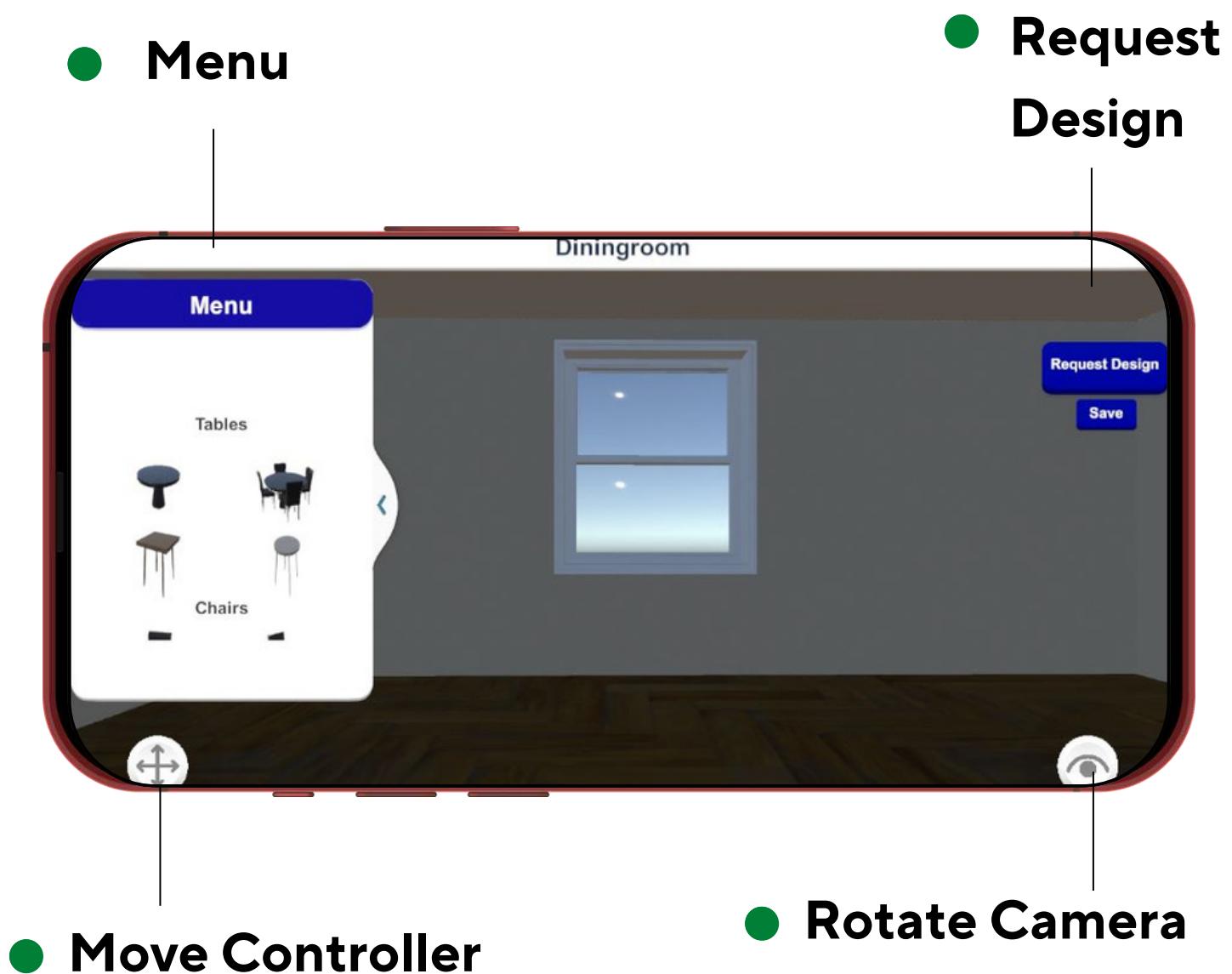


Figure 4.17
InterioPro App 3D Environment Mode Run

4.4.18 Dining Room Menu

Figure 4.18 shows an implemented InterioPro App this page shows the Menu For the Dining Room

● Dining Room Menu

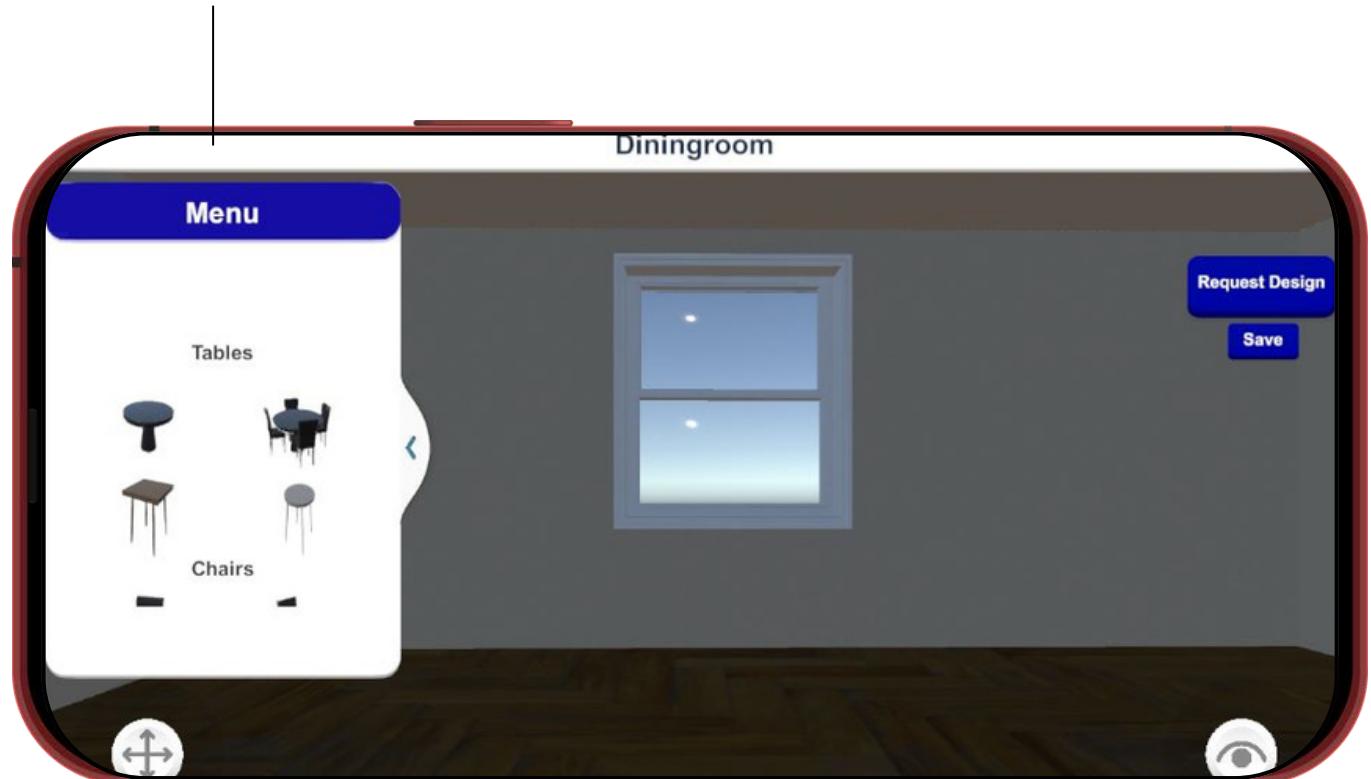


Figure 4.18
InterioPro App 3D Environment Dining Room Menu

4.4.19 Parlor Room Menu

Figure 4.19 shows an implemented InterioPro App this page shows the Parlor Room Menu

● Parlor Room Menu

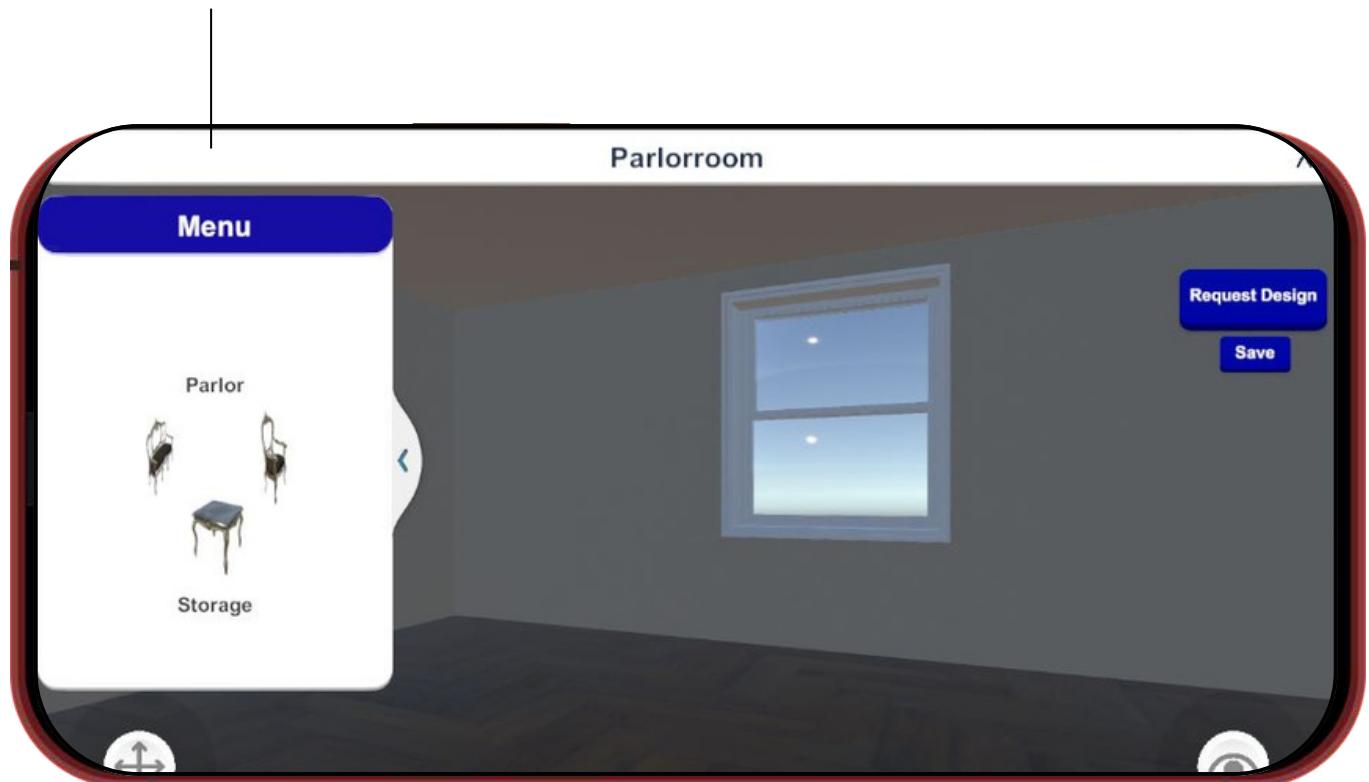


Figure 4.19
InterioPro App 3D Environment Parlor Room Menu

4.4.20 Kitchen Menu

Figure 4.20 shows an implemented InterioPro App this page shows the Kitchen Menu

● Kitchen Menu

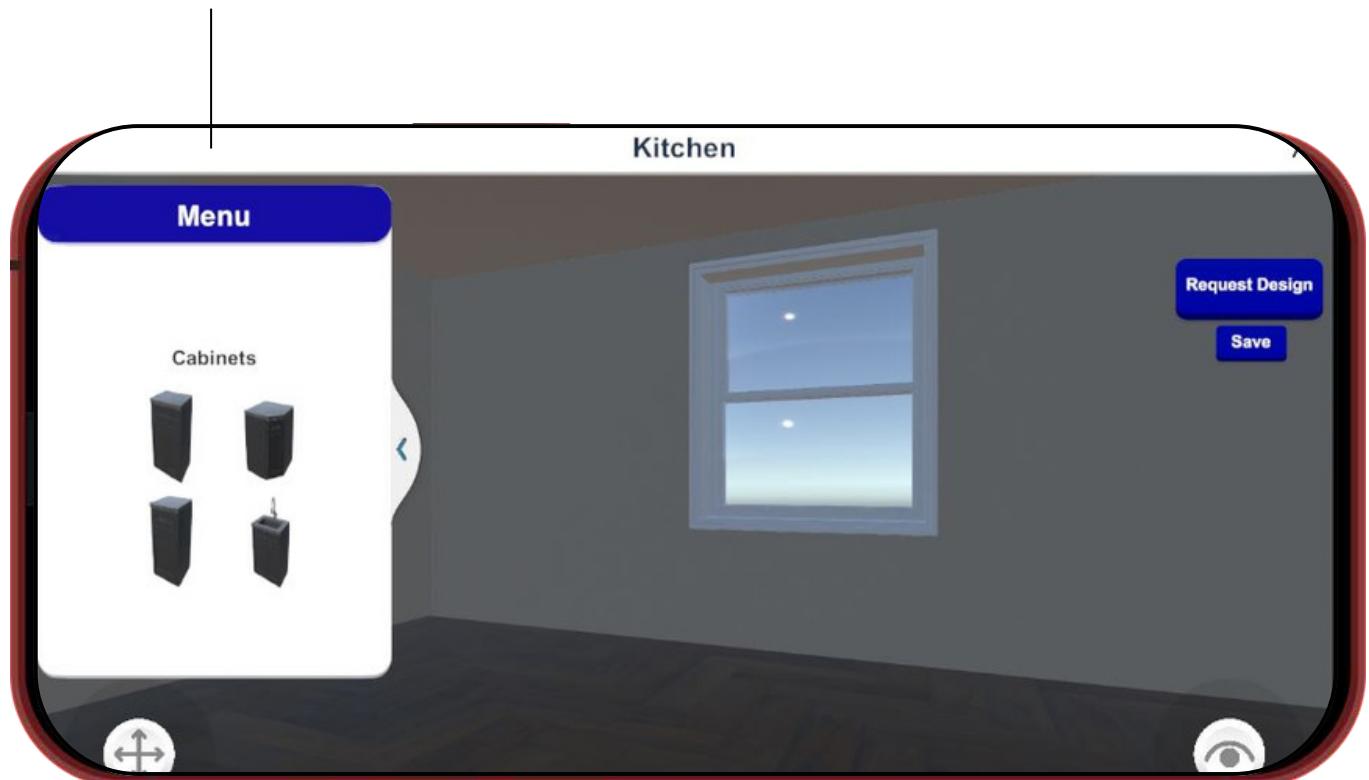


Figure 4.20
InterioPro App 3D Environment Kitchen Menu

4.4.21 BedRoom Menu

Figure 4.21 shows an implemented InterioPro App this page shows the BedRoom Menu

● BedRoom Menu



Figure 4.21
InterioPro App 3D Environment BedRoom Menu

4.5 HeadSet Mode (Oculus Quest 2)

4.5.1 VR Main Menu



Figure 4.22 shows an implemented InterioPro App this page shows the Main UI Page of the VR

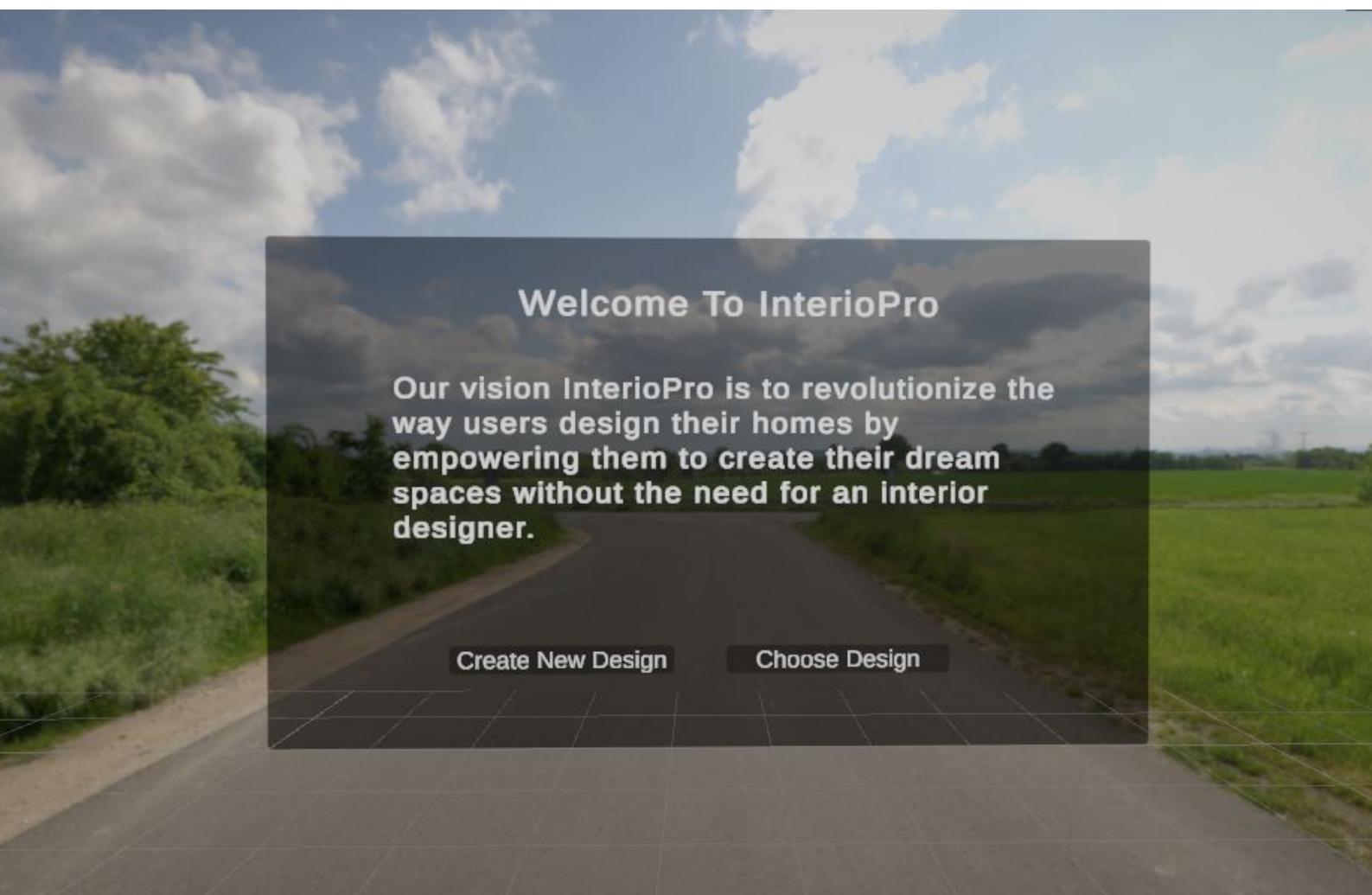


Figure 4.22
InterioPro App VR Main Menu

4.5.2 Choose To View Furnitured Room



Figure 4.23 shows an implemented InterioPro App this page shows UI Which help the user to shows between two Furnitured Room With A back Button



Figure 4.23
InterioPro App VR Choose To View Furnitured Room

4.5.3 Choose Empty Room To Design



Figure 4.24 shows an implemented InterioPro App this page shows UI Which helps the user to show From different room template With A back Button

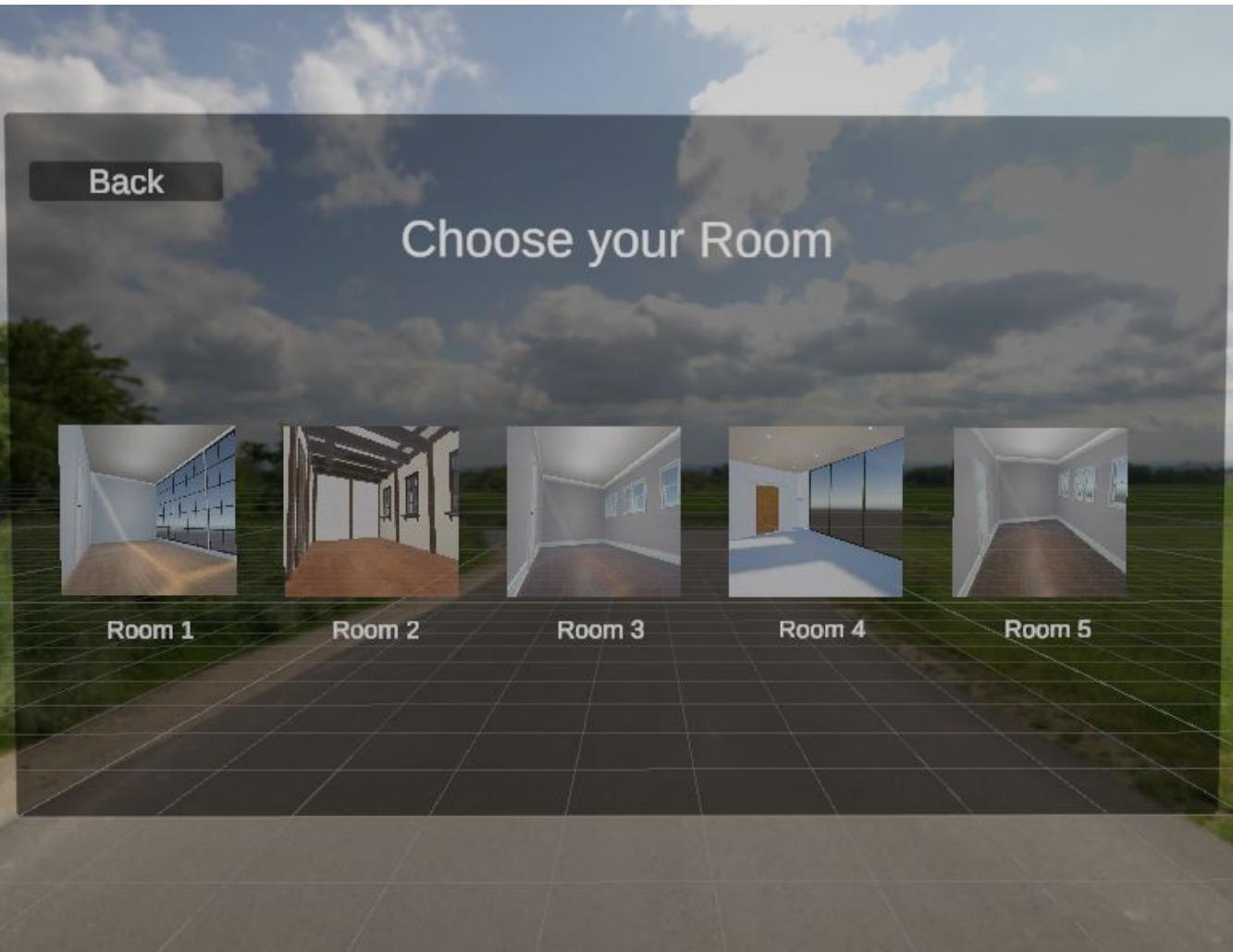


Figure 4.24
InterioPro App VR Choose Empty Room To Design

4.5.3 Empty Room Example

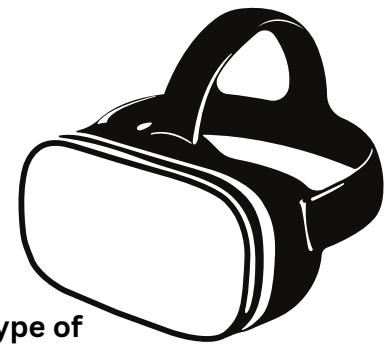


Figure 4.25 shows an implemented InterioPro App Here is a prototype of empty room You will be able to design in



Figure 4.25
InterioPro App VR Empty Room Example

4.5.4 Furnitured Room

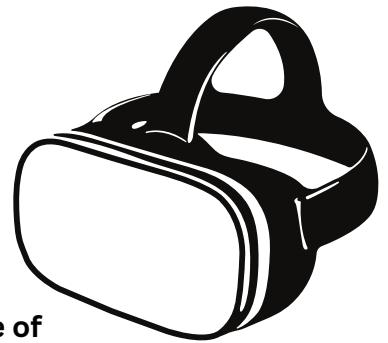


Figure 4.26 shows an implemented InterioPro App Here is a prototype of Furnitured room You will be able to gain idea of designing and edit it



Figure 4.26
InterioPro App VR Furnitured Room



4.6 Codes Used

4.6.1 Next-Back Scene Code

Figure 4.27 shows a Code way to move. Only switch between scenes go next and back.

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.SceneManagement;
public class SwitchScenes : MonoBehaviour
{
    public void Next()
    {
        SceneManager.LoadScene(SceneManager.GetActiveScene().buildIndex + 1);
    }
    public void Back()
    {
        SceneManager.LoadScene(SceneManager.GetActiveScene().buildIndex - 1);
    }
}
```

Figure 4.27
Code Used : Next-Back Scene Code

4.6.2 To Go For Specific Scene

Figure 4.28 shows a Code that helps the user to go for a specific scene.

```
public void ExitMenu()
{
    SceneManager.LoadScene("Home");
}
public void ExitMenuII()
{
    SceneManager.LoadScene("StartPage");
}
```

Figure 4.28
Code Used : To Go For Specific Scene



4.6.3 Slider Code

Figure 4.29 shows a Code that makes the slider menu functional close and open

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5
6  public class SliderMenuAnim : MonoBehaviour
7  {
8      public GameObject PanelMenu;
9
10     public void ShowHideMenu()
11     {
12         if(PanelMenu != null)
13         {
14             Animator animator = PanelMenu.GetComponent<Animator>();
15             if(animator != null)
16             {
17                 bool isOpen = animator.GetBool("show");
18                 animator.SetBool("show", !isOpen);
19             }
20         }
21     }
22 }
```

Figure 4.29
Code Used: Slider Code

4.6.4 Show Objects 3D

Figure 4.30 shows a Code that used in 3D gives the ability to show objects

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5
6  public class ShowObjects : MonoBehaviour
7  {
8      public GameObject prefabToPlace; // Assign the prefab in the inspector
9
10     public Vector3 NPosition;
11     public Quaternion NRotation;
12
13
14
15
16     public void OnClick()
17     {
18
19         Instantiate(prefabToPlace, NPosition, NRotation);
20     }
21 }
```

Figure 4.30
Code Used: Show Objects 3D



4.6.5 Instruction Panel Work

Figure 4.31 shows a code that displays the instruction panel before anything else, and when pressed, the panel is turned off while the menu and other buttons are enabled.

```
public class PanelDescr : MonoBehaviour
{
    public GameObject panelObject;
    public GameObject canvas;
    public GameObject check;
    public GameObject pin;

    bool active;

    public void OpenAndClose()
    {
        if (active == false)
        {
            panelObject.SetActive(true);
            active = true;
        }
        else
        {
            panelObject.SetActive(false);
            active = false;

            canvas.SetActive(true);
            active = true;
            check.SetActive(true);
            active = true;
            pin.SetActive(true);
            active = true;
        }
    }
}
```

Figure 4.31
Code Used: Instruction Panel Work



4.6.6 Asign Object to To Function

Figure 4.32 shows a code that help to initialize the object in inspector window in unity

```
public class PlaceMultiple : MonoBehaviour
{
    public PlaceIndicator placeIndicator;
    public GameObject objectFirst;
    public GameObject objectSecond;
    public GameObject objectThird;
    public GameObject objectForth;
    public GameObject objectFifth;
    public GameObject objectSix;
    public GameObject objectSeven;
    public GameObject objectEight;
    public GameObject objectNine;
    public GameObject objectTen;
```

Figure 4.32
Code Used: Asign Object to To Function

4.6.7 Check And Show Object

Figure 4.33 shows a code that functions two button in AR The Check And Place button

```
public void ClickToCheck()
{
    if (objectToPlace == null)
    {
        return;
    }
    if (checkBeforePlace != null)
    {
        Destroy(checkBeforePlace);
    }
    checkBeforePlace = Instantiate(objectToPlace, placeIndicator.transform.position, placeIndicator.transform.rotation);
}
public void ClickToPlace()
{
    if (objectToPlace == null)
    {
        return;
    }
    if (checkBeforePlace != null)
    {
        newPlaceObject = checkBeforePlace;
        Instantiate(newPlaceObject, checkBeforePlace.transform.position, checkBeforePlace.transform.rotation);
        Destroy(checkBeforePlace);
    }
}
```

Figure 4.33
Code Used: Check And Show Object

4.6.8 Asign Object to To Function



Figure 4.34 shows a code that Place to object in the scene that is previously initialized in inspector window

```
public void SetObjectPlace(GameObject objPrefab)
{
    objectToPlace = objPrefab;
}

public void ClickToPlaceFirst()
{
    SetObjectPlace(objectFirst);
}
public void ClickToPlaceSecond()
{
    SetObjectPlace(objectSecond);
}
public void ClickToPlaceThird()
{
    SetObjectPlace(objectThird);
}
public void ClickToPlaceForth()
{
    SetObjectPlace(objectForth);
}
public void ClickToPlaceFifth()
{
    SetObjectPlace(objectFifth);
}
public void ClickToPlaceSix()
{
    SetObjectPlace(objectSix);
}
public void ClickToPlaceSeven()
{
    SetObjectPlace(objectSeven);
}
public void ClickToPlaceEight()
```

Figure 4.34
Code Used: Asign Object to To Function

4.6.9 Drag Objects



Figure 4.35 shows a code that helps the user to drag object move it all directions

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class DragObject : MonoBehaviour
6  {
7      private Vector3 mOffset;
8      private float mZCoord;
9
10     void OnMouseDown()
11     {
12         mZCoord = Camera.main.WorldToScreenPoint(gameObject.transform.position).z;
13         //store offset = gameobject world pos - mouse world pos
14         mOffset = gameObject.transform.position - GetMouseWorldPos();
15     }
16
17     private Vector3 GetMouseWorldPos()
18     {
19         //pixel coordinates (x,y)
20         Vector3 mousePoint = Input.mousePosition;
21
22         // Z coordinates of object on screen
23         mousePoint.z = mZCoord;
24
25         return Camera.main.ScreenToWorldPoint(mousePoint);
26     }
27
28     void OnMouseDrag()
29     {
30         transform.position = GetMouseWorldPos() + mOffset;
31     }
32 }
```

Figure 4.35
Code Used: Drag Objects

CHAPTER 5: CONCLUSIONS AND FUTURE WORK



5.1 Conclusions

5.1.1 Main Conclusions

The 3D Interior Design application boasts several key features that set it apart from traditional design tools. Firstly, it offers a fully functional furniture visualization system, enabling users to manipulate objects with ease. The intuitive user interface allows for seamless movement, rotation, and scaling of furniture, empowering users to design their spaces precisely as they envision them. Furthermore, the application operates in real-time, providing instant feedback on changes made to the design, ensuring a dynamic and immersive experience.

5.1.2 Current Development Focus Conclusions

At present, our development efforts are focused on perfecting the user interface and overall user experience. We recognize the importance of an intuitive and user-friendly interface that allows for easy object selection and placement. To this end, we are refining the interactive menu system, ensuring that users can effortlessly interact with the application and seamlessly integrate furniture into their designs. By prioritizing the user's needs and feedback, we aim to create a design tool that is accessible and enjoyable for users of all skill levels.

5.2 Future Work

In the future, we have ambitious plans to further enhance the capabilities of our 3D Interior Design application. Here are some of the exciting features and advancements we envision:

1. Room Sharing between Users: We aim to facilitate collaborative design by enabling users to share their created rooms with others. This feature will allow seamless collaboration and exchange of design ideas, making the application a social platform for interior design enthusiasts.
2. Dimension Input for VR and 3D Room Generation: To provide users with a more immersive experience, we plan to incorporate the ability to input precise room dimensions. By doing so, users will be able to generate accurate virtual reality (VR) and 3D representations of their designed rooms, helping them visualize the end result with greater accuracy.
3. Cloud Database for Project Saving: We intend to implement a cloud-based database system to securely store users' design projects. This will ensure that designs are easily accessible from any device and can be saved, retrieved, and edited at any time, providing convenience and flexibility.
4. Admin Control and Category Expansion: Our future plans include empowering the application's administrators with the ability to add new categories of furniture and decor items. By doing so, we will continuously expand the available selection, allowing users to explore a diverse range of options from different stores and brands, thus ensuring a truly futuristic and comprehensive design experience.

With these future developments, we strive to transform our 3D Interior Design application into a cutting-edge platform that revolutionizes the way people visualize, create, and interact with interior designs.