SCENE IT

Abdul Aziz	Muhammad Ali Mujtaba	Karishma Farooq
051-17-127711	051-17-127632	051-17-127501

Dr. Muhammad Usman Hashmi

A Final Year Project Report is

Submitted in Partial Fulfilment of the

Requirements for the Degree of

Bachelor of Science in Computer Science

Department of Computing & Technology

Iqra University

2021

Certificate

We hereby accept the work contained in this report titled: **Scene It**, as a confirmation to the required standards for the partial fulfillment of the degree of Bachelors of Science in Computer Science.

Internal Examiner

External Examiner

Project Supervisor

Head of Department

Dedication

We dedicate this project to our peers, teachers and the institute of Iqra University Islamabad.

Acknowledgements

We would like to acknowledge the guidance of our teachers and the support of our institute, Iqra University Islamabad.

Declaration

We hereby declare that this work, neither whole nor in part, has been copied from any source. It is further declared that we have prepared this report entirely on the basis of our personal efforts made under the sincere guidance of teachers especially our supervisor Dr. Usman Hashmi. If any part of this thesis is proved to be copied out from any source or found to be reproduction of some other, I will stand by the consequences. No portion of the work presented has been submitted in support of any application for any other degree or qualification of this or any other university or institute of learning.

<Muhammad Ali Mujtaba> <Abdul Aziz> <Karishma Farooq>

Abstract

Scene It is a cross platform mobile application for connecting art sellers and buyers. It allows users to host their products in an online store & view the products they want to buy through augmented reality and it also has a motivational section to help artists in their productivity. This application is built using Flutter for front end and AWS as the backend, alongside various libraries.

Table of Contents

List of Figures

List of Tables

1. Chapter 1 Introduction

1.1 Introduction

1.1.1 Purpose

The purpose of this document is to report about a system that is designed for artists to sell their paintings and for art buyers to see the paintings on their walls in real time using their phone before they buy them.

1.1.2 Document Conventions

The words ***buyer*** and ***seller*** are used throughout the document. The seller represents the artists using our application and the buyer represents the people who are purchasing paintings and using the AR features of our application. The word ***user*** refers to anyone who may use the application. The words ***we, our*** and ***us*** refer to the team of developers working on this project. The word ***product*** is used throughout the document which refers to the paintings the sellers put up for sale. The words ***seller*** and ***artists*** are used interchangeably in this document.

1.1.3 Intended Audience and Reading Suggestions

This SRS document is meant to be read by the people supervising this project so they can have an overview of the project. The document may also be used by developers to expand the existing project.

1.1.4 Project Scope

Scene It is developed with two sides. One for the sellers and one for the buyers. The seller's side will allow them to find motivations for paintings and to sell their products. The buyer's side will allow them to search for paintings and see how they will look on their walls in real time using augmented reality.

1.2 Overall Description

1.2.1 Product Perspective

The main purpose of this application is to provide artists with a platform to sell their work as well as to facilitate them by means of inspiration as well as mental health. Furthermore, the application aims to create ease of use for buyers by giving them the ability to see how the painting would look on their wall before purchasing.

1.2.2 Product Features

Scene It will have the following main features:

1. Provide a platform for artists to find sellers online.
2. Help artists find motivation for their paintings.
3. Help buyers find the art their looking for:
4. Search for products.
5. See what the paintings on their walls in real time using augmented reality.

1.2.3 User Classes and Characteristics

- Seller/Artist:
  Sellers will be able to put up their products to be bought by buyers. They may also use Scene It to find inspiration for their paintings.

- Buyer:
  Buyers will use Scene It to find the paintings they are looking for and use augmented reality to see what they would look like on their walls.

1.2.4 Operating Environment

Scene It is designed to run on Android and iOS mobile phones with the following minimum requirements:

- Android:
  - Android version 8.1 or higher

- Apple iOS:
  - iPhone SE or higher
  - iOS 11 or higher

- Both devices must have:
  - Compass (magnetometer)
  - Rear facing camera
  - GPS
  - Gyroscope
  - Accelerometer
  - Internet connection
  - Minimum screen resolution of 480x800

1.2.5 Design and Implementation Constraints

Scene It is an app that will connect sellers to buyers. Sellers will find motivation for their paintings and once the paintings are ready, they can be sold to buyers after the buyers have seen how the paintings will look on their walls. The only difficulties users might face is when there are no buyers or sellers in their city. However, that is not a technological constraint.

1.2.6 Assumptions and Dependencies

Scene It does not provide any payment method. Therefore, the users should determine the payment method.
User registration and authentication will be implemented with the help of a REST API served through an AWS backend.

1.3 System Features

1.3.1 Browse Gallery: A Platform for Buying & Selling Art

1.3.1.1 Description and Priority

The main feature of Scene It is that it connects art buyers and sellers. This feature is about making a good e-commerce mobile application for art enthusiasts for both Android and iOS. This will involve making a system to display products, a system to search for them as well as a database to store all the information. This feature is of the highest priority.

1.3.1.2 Stimulus/Response Sequences

A user logged in as a buyer will be able to browse different profiles and even search for specific art.

A user that is a seller will be able to upload pictures of their art which will display in their profile.

1.3.1.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.2 Chatting Services between Seller and Buyer

1.3.2.1 Description and Priority

This feature is concerned with allowing the seller and buyer to contact each other. This can be done through email and contact information as well as the allowing chatting services. This feature is also very important to allow both parties to communicate.

1.3.2.2 Stimulus/Response Sequences

The user will choose to message a seller through their profile when they see a product they want to buy and the system will enable them to chat.

1.3.2.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.3 Display Products in Real-Time through Augmented Reality

1.3.3.1 Description and Priority

This feature is concerned with allowing the users to test the product that they want to buy through their camera and see how it would look in their surroundings. This feature is of high priority, it gives buyers a chance to instantly get an idea of the product and encourages the transaction.

1.3.3.2 Stimulus/Response Sequences

The user will be able to select a product and select the camera option and the system will show them in real time how it would look using augmented reality.

1.3.3.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.
REQ-3: The user must have a camera in their mobile device.

1.3.4 Rating and Reviews

1.3.4.1 Description and Priority

This feature is concerned with allowing the users to rate products they've bought and to leave a review as well. This feature is of moderate priority.

1.3.4.2 Stimulus/Response Sequences

The user will be able to select a product and select a rating and will also be able to leave a review which will be recorded by the system.

1.3.4.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.5 Searching Product

1.3.5.1 Description and Priority

This feature is concerned with allowing the users to search for. This helps make it easy to buy and sell products. This feature is of moderate priority.

1.3.5.2 Stimulus/Response Sequences

The user will be able to go to the search bar and enter text in the text field to commence the search.

1.3.5.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.6 See Recommendations

1.3.6.1 Description and Priority

This feature is concerned with allowing the users to get posts recommended to them based on their previous activity. This feature is of moderate priority.

1.3.6.2 Stimulus/Response Sequences

The user will be able to press a button to see recommended posts displayed in the gallery.

1.3.6.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.7 See Quick Quotes

1.3.7.1 Description and Priority

This feature is concerned with allowing the users to see short quotes for their motivation and mental health. This is a moderate priority feature.

1.3.7.2 Stimulus/Response Sequences

The users will be able to navigate to the mind section of the app and then select quick quotes from the menu to have short quotes displayed to them.

1.3.7.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.8 Read Success Stories

1.3.8.1 Description and Priority

This feature is concerned with allowing the users to read stories that will keep them motivated to move forward in their career. This is feature is of moderate priority.

1.3.8.2 Stimulus/Response Sequences

The user will be able navigate to the mind section of the app and select success stories from the menu to have stories displayed to them.

1.3.8.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.3.9 Meditate

1.3.9.1 Description and Priority

This feature is concerned with allowing the users to listen to relaxing audios to help them meditate. This is a high priority feature.

1.3.9.2 Stimulus/Response Sequences

The user will be able navigate to the mind section of the app and select audio meditation to have a list of audios displayed to them. The user will then be able to play any of the audios by tapping the play button.

1.3.9.3 Functional Requirements

REQ-1: The user must have an Android or iOS device.
REQ-2: The user must have internet access and be logged in to their account.

1.4 External Interface Requirements

1.4.1 User Interfaces

The user interface for Scene It will be implemented using Google's material design language for Android and Apple's Cupertino design language for iOS. We will provide a user interface that is easy to use and also familiar to the users. That is why conventions for both platforms will be followed.

The buyer's side will have a screen to scroll through products available for sale. It will also have a search button to narrow down the list of products visible on the screen. There will also be a screen which will use the camera to view the painting on a wall in real time so the buyer can decide if he wants to make the purchase or not.

The seller's side will have a screen for motivation and a screen where they can upload their products.

There will also be a screen where buyers and sellers can chat so they can exchange information like location, price etc.

1.4.2 Hardware Interfaces

For Scene It to function properly, it should be run on a phone with the following hardware specifications:

- Compass (magnetometer)
- Rear facing camera
- GPS
- Gyroscope
- Accelerometer
- Internet connection
- Minimum screen resolution of 480x800

1.4.3 Software Interfaces

Scene It will be developed using Google's Flutter framework which runs on Dart programming language. AWS will be used as a REST API at the backend.

1.4.4 Communications Interfaces

Scene It will use Dart's IO library to make asynchronous calls to the API. This is required for the authentication, registration and fetching of data.

1.5 Other Nonfunctional Requirements

1.5.1 Performance Requirements

Since the augmented reality features of the app requires a modern smart phone, any app that is able to run the app should be able to run it adequately. Phones older than the requirements mentioned in section 2.4 may be able to run the application but with some difficulties.

1.5.2 Safety Requirements

Scene It does not interfere with other applications on the device therefore it will not harm or modify any data other than its own on the user's device. Furthermore, phones with a slower CPU may experience some heating while using the augmented reality features but that should not be an issue.

1.5.3 Security Requirements

Scene It will not ask the users for sensitive information. All user information will be saved on Google's Firebase servers. Users who are not authorized will not be able to sell/buy anything on the application. However, they can view products available for sale. It is the responsibility of the users to keep their credentials safe.

1.5.4 Software Quality Attributes

1.5.4.1 Availability

Scene It will be available 24/7 provided that the user has internet access and AWS servers aren't down due to maintenance, which is highly unlikely.

1.5.4.2 Security

All users' information will be stored securely on AWS servers.

1.5.4.3 Usability

Scene It will have a user interface according to each platform's conventional design language so that users can have a familiar user experience. This will ensure an effortless and enjoyable experience for the users.

2. Chapter 2 Literature Review

2.1 Introduction

Art is rising in popularity as a way to express yourself and put forth your talent for the world to see. It is a hard task for artists to be gain exposure, especially those who are new to the game because buyers are always reluctant to buy a product from an artist they haven't heard of. Furthermore, artists have struggles with both mental health as well as creativity. The economic and general working conditions for the creative fields can be very harsh. A lot of suicides are also committed by creative workers. And there are also struggles with mental blocks that impede progress in their own work. Scene It would allow the buyers to use augmented reality to see how the painting would look on their wall before making the purchase. Scene It will also provide them with meditations, inspiration quotes & success stories for their mental health.

2.2 Related work

A few popular applications providing similar services are listed below:

- BBuzzArt
- Your Masterpieces

2.2.1 BBuzzArt

BBuzzArt is an e-commerce platform set in Asia that gives exposure to emerging artists. BBuzzArt also provides delivery services from artists to buyers.

2.2.1.1 Terminology

BBuzzArt is an e-commerce website and it is also available as an application on Android and on iOS. It has many useful features like followers, messaging, and image sharing.

2.2.2 Your Masterpieces

Your Masterpieces is a platform for buyers to discover artists around the world. It is a platform that caters to artists who produce non-digital artwork.

2.2.2.1 Terminology

Your Masterpieces is available on webs as well as on mobile for both Android and iOS. The platform provides many features like categorizing art for different areas like bedrooms, living rooms etc.

2.2.3 Categorizing the Existing Techniques/Works/Researches

The feature sets of the aforementioned applications are described for the purpose of analysis and comparison. The two applications cover most basic features like providing a social platform that connects artists to buyers and give artists the exposure they need to strive in the field. They also provide features like followers for artists, browsing through different categories of art etc. But they do not provide motivation for artists who are struggling. Furthermore, neither of the applications provide a way to see the art in real time before buying it. Scene It provides a section for motivation and for improving focus and also a section where buyers can use augmented reality to see the paining before buying it.

2.2.4 Limitations/Gaps within Existing/Works

After comparative study the limitations of existing applications are as follows:

- BBuzzArt and Your Masterpieces do not provide a way to see the paintings using augmented reality before making the purchase.
- They do not provide focus or motivation for struggling artists
- Your Masterpieces does not have a feature for users to follow other artists to see their work.

2.3 Proposed Improvements in Existing Works

Scene It will be implemented in Flutter using the Dart language so that it can target users who use Android or iOS. The objective is to provide users with motivation so they can keep creating amazing art while also giving buyers the ability to see how the painting would look on their walls before they make the purchase.

2.4 Comparative Analysis

Table 1 shows comparative analysis between Scene It and existing applications. All major features are compared.

Features	Scene It	BBuzzArt	Your Masterpieces
Product Images	✓	✓	✓
Reviews	✓	✓	✓
Mental Health and Motivation	✓	×	×
Augmented Reality	✓	×	×
Chatting Services	✓	×	×
Recommendation System	✓	×	×
Search Feature	✓	✓	✓
Cross-Platform	✓	×	×

Table 1: Illustrates the comparative analysis of existing application with Scene It

2.5 Summary

This section aims to provide a detailed comparative analysis and study between Scene It and other existing applications in the art domain. All major features are discussed which highlights the unique features of Scene It.

3. Chapter 3 System Design

3.1 Introduction

This System Design Document has been created to outline the proposed system design for Scene It. The multi-platform mobile app intends to provide a dedicated platform for art enthusiasts and in this segment it's design details shall be declared.

3.1.1 Purpose

The purpose of this System Design Document is to provide a description for how the Scene It mobile application will be constructed.

3.1.2 System Overview

The Scene It mobile application will help connect art sellers and art buyers. There will be a database to save the information of the users that sign up and then the users will be able to browse for art or even search for specific things. The user will also be able to view the art through augmented reality. And chat between the two parties will also be possible. Mental health and motivational facilities will also be implemented as well as the possibility of leaving reviews. These goals are to be implemented through Flutter, AR-Kit, ARCore and AWS.

3.1.3 Design Map

The Scene It mobile application has a straightforward design with a flutter GUI and an AWS back end with the idea of connecting art buyer and seller and saving their information while also providing them with some useful features like search or view through augmented reality.

3.2 Design Considerations

3.2.1 Assumptions

It is assumed that the user has an internet connection to use the Scene It mobile application and that they have a smartphone.

3.2.2 Constraints

The Scene It application will only work for phones that have the Android or iOS operating system. Some of the features of the application also require that the mobile device of the user has a functioning camera and that the art buyer and seller have a valid account to use the application or to sign up for one if they don't have an account.

3.2.3 Design Methodology

The design is based around a user-friendly GUI on the front end and a reliable database on the back end with the business logic in the middle and features such as searching, augmented reality, rating/reviews and mental health services.

3.2.4 Risks and Volatile Areas

None have been identified.

3.2.5 Risk Mitigation

None have been identified.

3.3 Architecture

3.3.1 Overview

The system of the Scene It application is built with a database for securing user information and a GUI to allow users to browse art and additional subsystems such as chatting between buyer and seller, viewing art in augmented reality and searching for specific things as well as mental health facilities. The use cases of the application are defined below.

Use Case_ID:	UC-ID-1
Use case name:	Sign In
Actors:	1- Art Buyer 2- Art Seller
Description:	From login section art buyer and seller can sign in.
Use Case_ID:	UC-ID-2
Use case name:	Sign Up
Actors:	1- Art Buyer 2- Art Seller
Description:	All new users can make a new account.
Use Case_ID:	UC-ID-3
Use case name:	See Recommendations
Actors:	1- Art Buyer 2- Art Seller
Description:	Users can see posts recommended to them based on their activity.
Use Case_ID:	UC-ID-4
Use case name:	Chat
Actors:	1- Art Buyer 2- Art Seller
Description:	The art buyer and seller will be able to contact each other through chat.
Use Case_ID:	UC-ID-5
Use case name:	Search For Something
Actors:	1- Art Buyer 2- Art Seller
Description:	The art buyer will be able to search for specific items or location-based items using a search bar.
Use Case_ID:	UC-ID-6
Use case name:	Browse Gallery
Actors:	1- Art Buyer 2- Art Seller
Description:	The art buyer will be able to browse through the GUI to go through and see what kind of products are available.

Use Case_ID:	UC-ID-7
Use case name:	View Art In AR
Actors:	1- Art Buyer 2- Art Seller
Description:	The art buyer will be able to view products using their camera.
Use Case_ID:	UC-ID-8
Use case name:	See Quick Quotes
Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to see quotes for motivation and mental health.
Use Case_ID:	UC-ID-9
Use case name:	Meditate
Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to listen to audio meditations for their mental health. Pause/play will also be possible here and the audio will also play while the user has navigated out of that screen.
Use Case_ID:	UC-ID-10
Use case name:	Read Success Stories
Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to read artists' success stories to help motivate them to excel in their work.

Use Case_ID:	UC-ID-11
Use case name:	Sign Out
Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to sign out of the app by clicking the icon at the top right corner of the UI.
Use Case_ID:	UC-ID-12
Use case name:	Add a Post
Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to add new posts by clicking the plus button at the bottom right corner of the home screen. They will be able to enter details about the product as well as a picture.
Use Case_ID:	UC-ID-13
Use case name:	Leave a Review
Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to leave comments on posts based on their experience. They will do so by clicking the comment button under each post.
Use Case_ID:	UC-ID-14
Use case name:	View User Profile

Actors:	1- Art Buyer 2- Art Seller
Description:	The users will be able to view other user's profiles where they will see basic information about that user along with all posts made by that user.

Table 2: Use Cases

3.3.2 Subsystem 1: Chatting

Art buyer and seller will be able to chat with each other simply through selecting a GUI option of chat in the mobile application.

3.3.3 Subsystem 2: Searching

Art buyers will be able to browse for specific items or locations through a search feature based around keywords. The user will simply have to type in the GUI based search bar to access this feature.

3.3.4 Subsystem 3: Mental Health Facilities

The users will be given access to a GUI based mental health section which will have meditations in the form of audio recordings as well as motivational quotes and inspirational stories. To access this, the user will need to be logged in and then proceed to the mental health section by selecting it in the GUI.

3.3.5 Subsystem 4: View Art (Augmented Reality)

The art buyer will be able to view the product they want to buy in AR simply by clicking on a camera icon in the GUI. This will help the user test the product in their surroundings and help them decide if they want to buy it.

3.3.6 Subsystem 5: Ratings & Reviews

The art buyer will also be able to rate a product to share their experience and talk about the quality of the product.

3.3.7 3.3.7. Subsystem 6: Recommendation System

The art buyer will also be able to see posts recommended to them based on their previous activity.

3.4 Database Schema

The Scene It mobile application will use a MongoDB to store its data and will contain tables that store the information of the users such as their email, id, username and role.

Table Name	Field Name	Data Type	Allow Nulls	Field Description
Posts	id	Varchar(50)	No	Every post in the table has a unique ID.
Posts	userId	Varchar(50)	No	Every post has to store the ID of the user who made the post.
Posts	username	Varchar(50)	No	The post should store the username of the author for quick fetching.
Posts	title	Varchar(50)	No	The title of the post.
Posts	body	Varchar(50)	Yes	The body field stores the description of the product. This can be null.
Posts	postTime	Varchar(50)	No	The time of the post. This is auto generated by the api.
Posts	location	Varchar(50)	Yes	The location of the post.
Posts	images	Varchar(50)[]	Yes	To store the image url for the post.
Posts	tags	Varchar(50)[]	Yes	To store the tags related to this post.

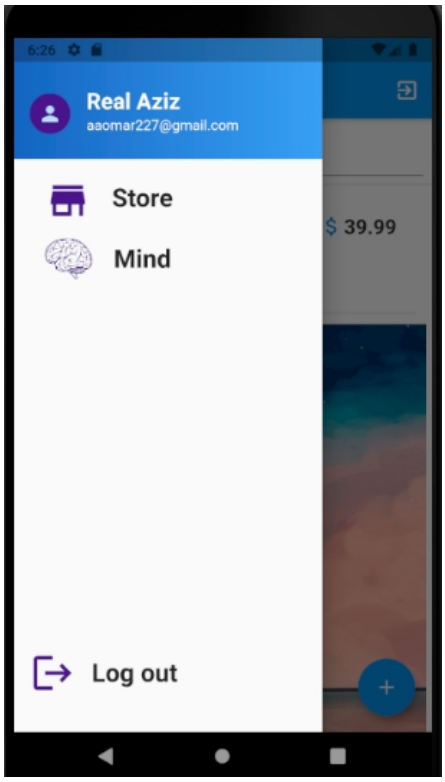
Table 3: Posts Data Table

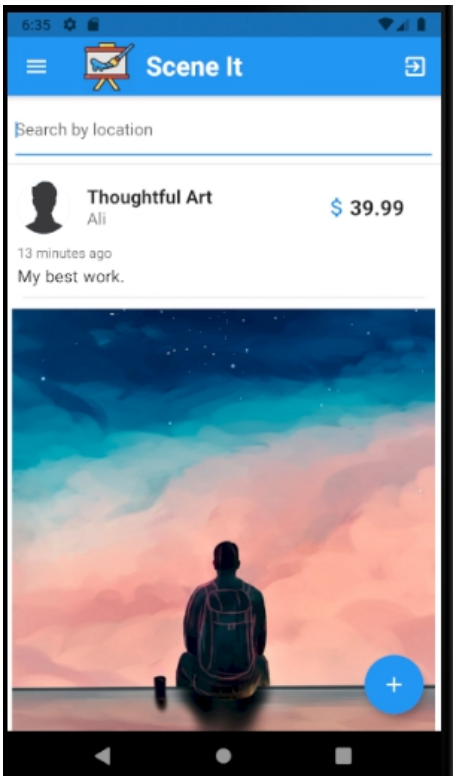
Table Name	Field Name	Data Type	Allow Nulls	Field Description
Users	id	Varchar(50)	No	Every user in the table has a unique ID.
Users	username	Varchar(50)	No	The unique username of the user.
Users	firstName	Varchar(50)	No	The user's first name.
Users	lastName	Varchar(50)	No	The user's last name.
Users	email	Varchar(50)	No	The user's email address.
Users	mobileNumber	Varchar(50)	No	The user's phone number.
Users	password	Varchar(50)[]	No	The user's password. This entry is encrypted.

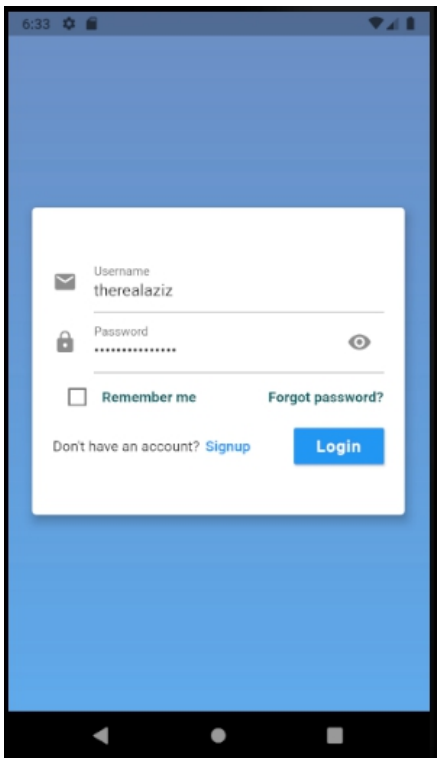
Table 4: Users Data Table

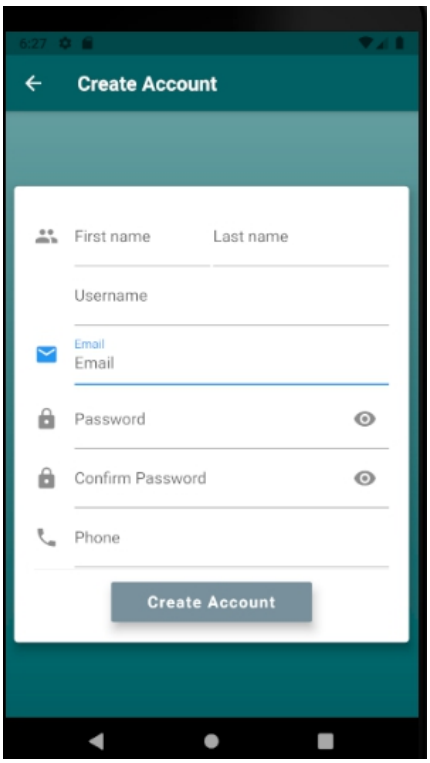
3.5 High Level Designs

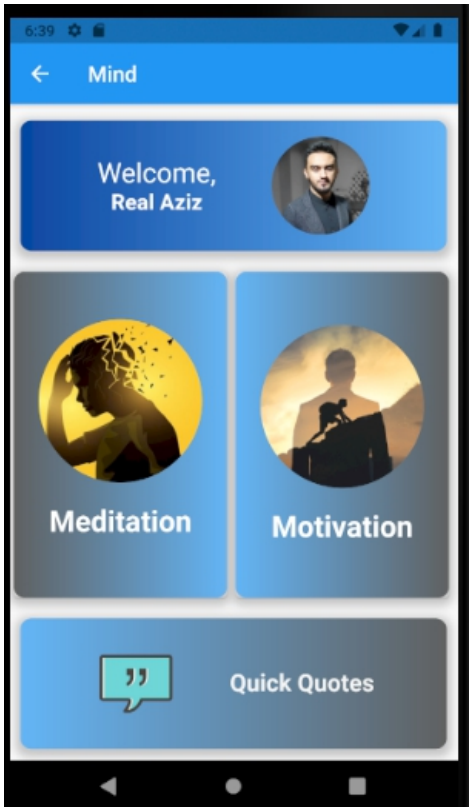
Scene It is a GUI based mobile application and the GUI will be implemented in Flutter. Some example screenshots of the implementation have been attached below.

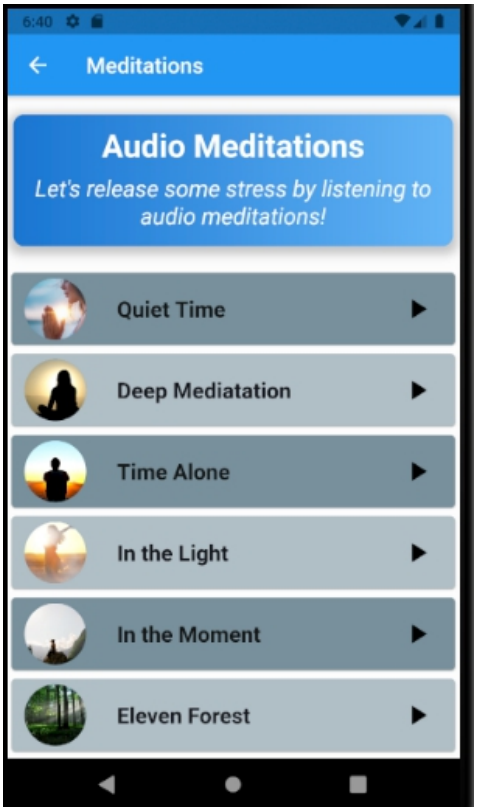


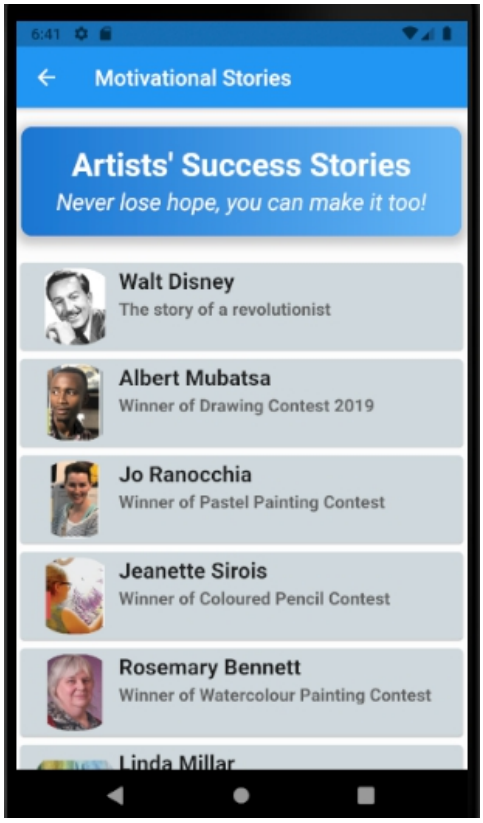







6:39
Mind
Welcome,
Real Aziz
Meditation
Motivation
Quick Quotes


6:40
Meditations
Audio Meditations
Let's release some stress by listening to audio meditations!
Quiet Time
Deep Mediatation
Time Alone
In the Light
In the Moment
Eleven Forest


6:41
Motivational Stories
Artists' Success Stories
Never lose hope, you can make it too!
Walt Disney
The story of a revolutionist
Albert Mubatsa
Winner of Drawing Contest 2019
Jo Ranocchia
Winner of Pastel Painting Contest
Jeanette Sirois
Winner of Coloured Pencil Contest
Rosemary Bennett
Winner of Watercolour Painting Contest
Linda Millar


6:42
Rosemary Bennett
RESTAURANT LE CONSULAT
Rosemary Bennett has been painting since childhood. She is proficient in many mediums but did paint exclusively in watercolors for twenty years. She is more an Illustrator with watercolour but uses all the techniques with the medium to produce the end result she desires. She continues to create and enjoys her time with art.
She went to Loire Valley for a painting trip and ended the trip by going to Paris. While she was in Paris, she visited a cafe which was full of colors & life. She took a few photos and later painted them with watercolour on paper. She used watercolour as an extension of her feelings about being in the City of Lights. She believes that watercolour was an apt choice to depict this scene.

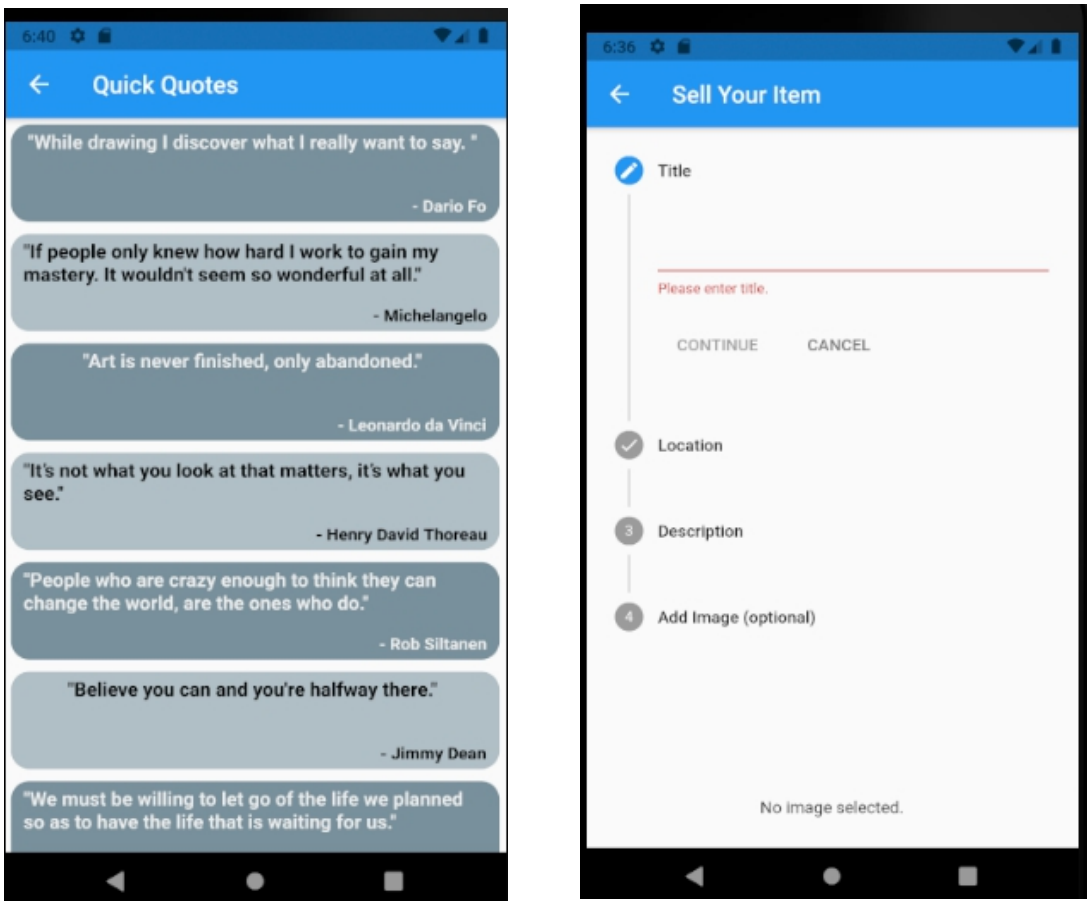


Figure 1: GUI Screenshots

3.6 Low Level Designs

Scene It will have multiple features and use cases as we have discussed before and we can see the low-level designs based on the following diagrams.

ERD:

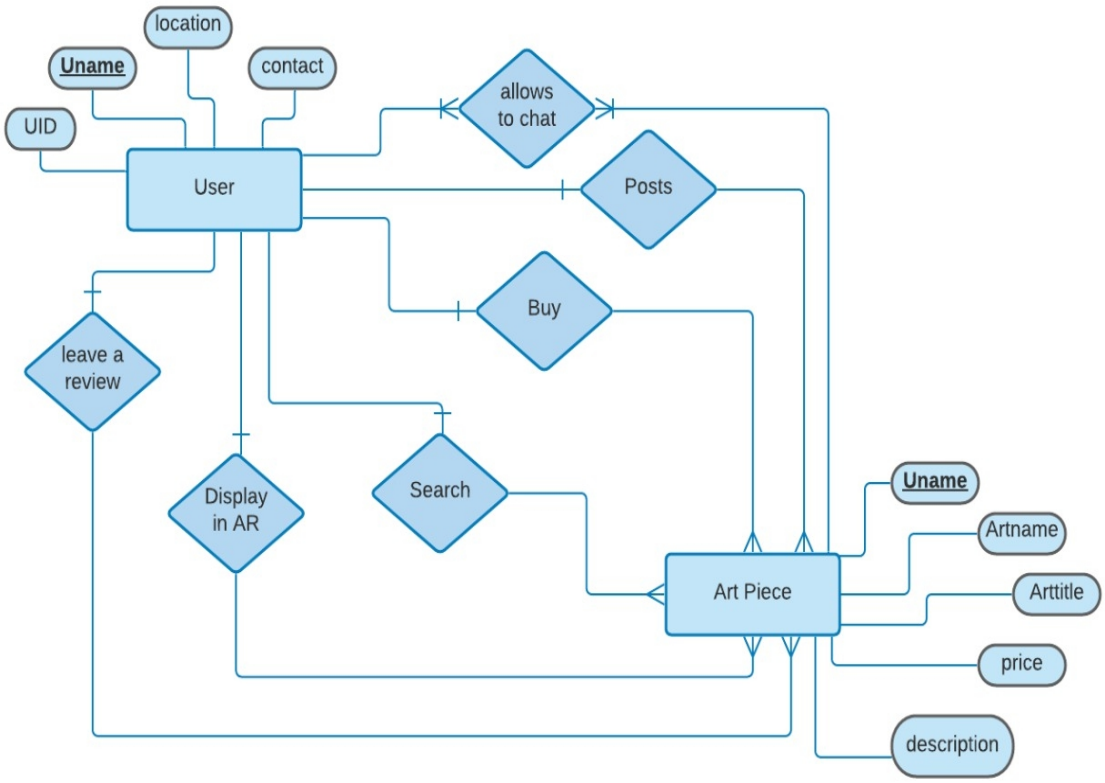


Figure 2: ERD

Use Case Diagram:

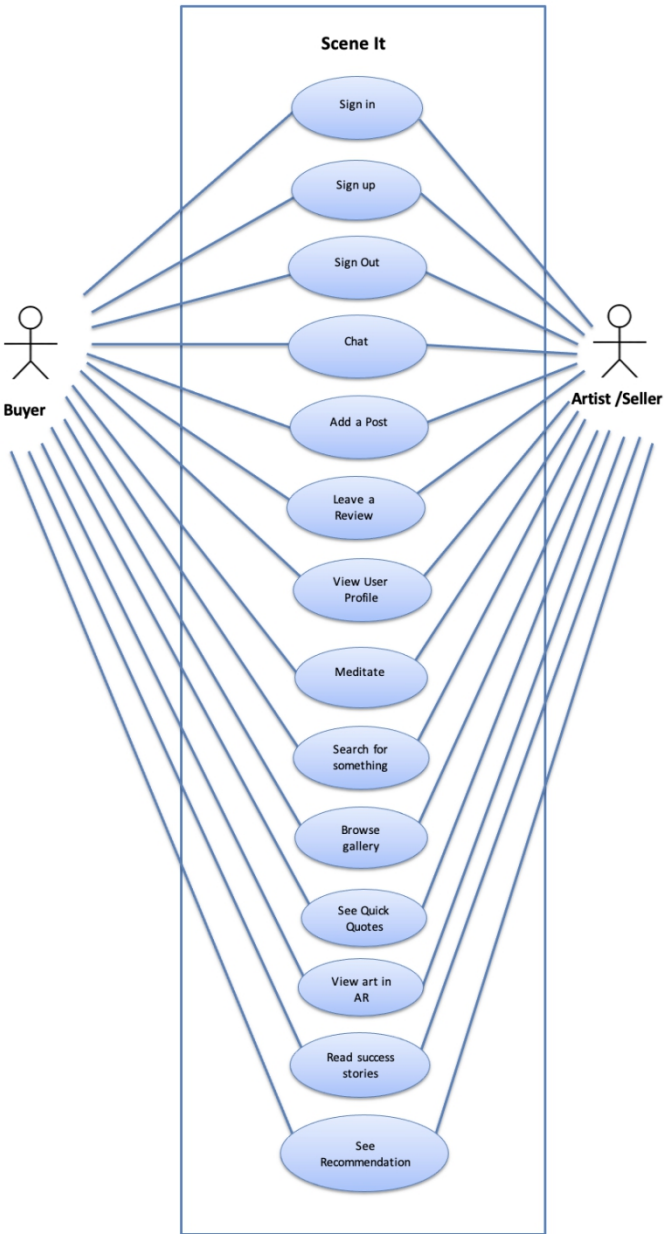


Figure 3: Use Case Diagram

Class Diagram:

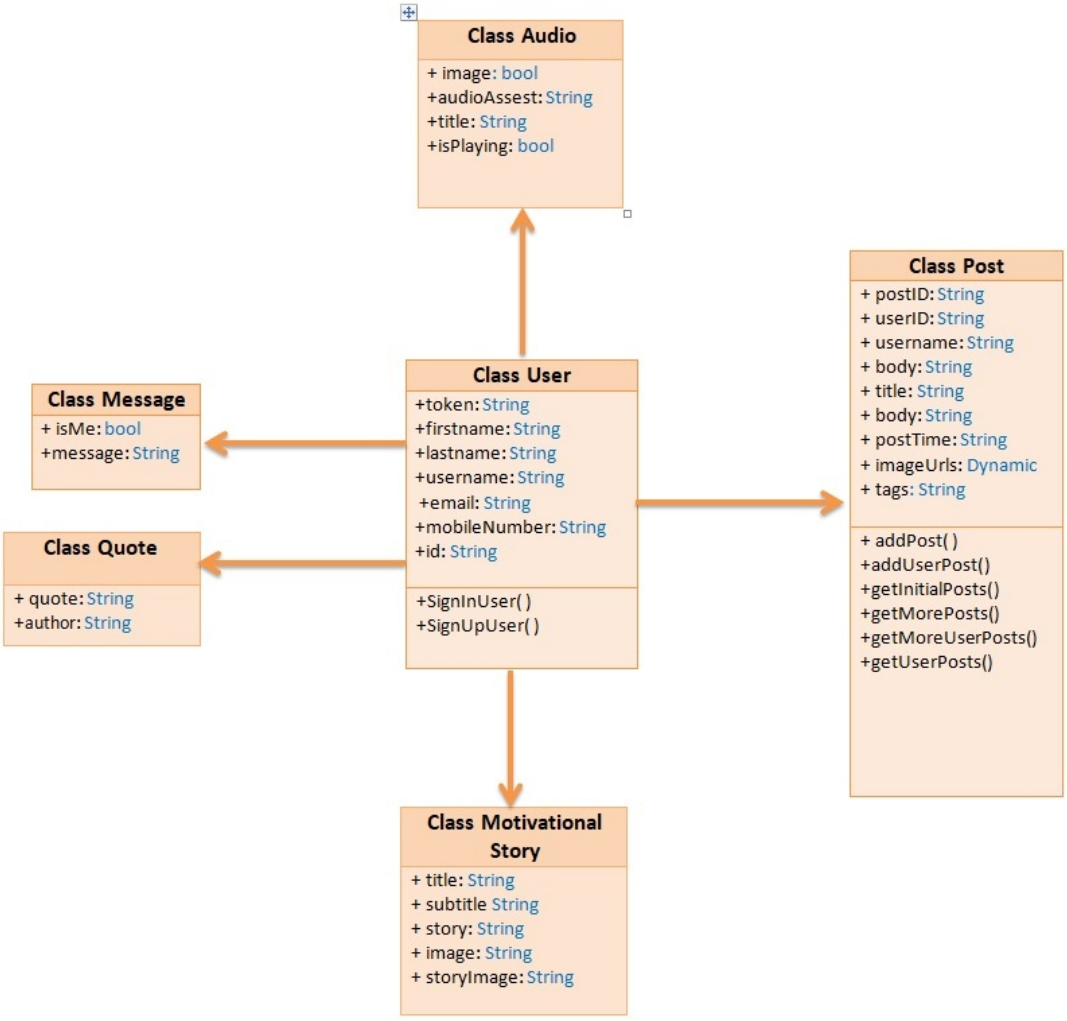


Figure 4: Class Diagram

4. Chapter 4 Implementation

4.1 Discussion

The project design was implemented using Widget based classes in Flutter. The UI elements which only had static data was implemented through extension of Stateless Widget while classes that needed to handle data were implemented through an extension of Stateful Widget.
The data storage was done by connecting the app to an AWS backend and we used two database tables, namely: Posts and Users.
The augmented reality feature was implemented separately for Android & iOS using ARCore and ARKit respectively. Many other libraries were also utilized for different functionalities. These will be discussed in detail later.

4.2 Development Methodologies

The project was implemented by three developers, each working on different parts of the app. The UI was first built using Flutter then various features were implemented using different libraries. Throughout the implementation, the process of version control/code sharing as well as app testing was carried out.

4.3 Implementation Tools and Technologies

The following tools and technologies were used:

1- Android Studio & VS Code – as an IDE
2- GitHub Desktop – for code sharing and version control
3- AWS server written in Java – for the backend
4- Flutter – for cross-platform UI development
5- Multiple Flutter libraries were imported:

```
dependencies:
  flutter:
    sdk: flutter
  http: ^0.13.0
  flutter_secure_storage: ^3.3.5
  jwt_decoder: ^1.0.3
  time_ago_provider: ^3.2.0
  arcore_flutter_plugin: ^0.0.11
  font_awesome_flutter: ^8.11.0
  web_socket_channel: ^2.1.0
  image_picker: ^0.7.5
  arkit_plugin: ^0.6.2
  audioplayers: ^0.18.3
  assets_audio_player: ^3.0.3+3
  path_provider: ^2.0.1
```

4.4 Summary

The project was built in Flutter for the front-end and Java for the backend with AWS as the server. While developing, design languages and conventions for both platforms were kept in mind to provide a familiar user experience.

5. Chapter 5 Testing

5.1 Testing Techniques Employed for this Project

The project was tested throughout the development process on different mobile devices of both Android and iOS as well as on the emulators provided for both operating systems by Google and Apple. UI constraints as well as the functionality of the app was thoroughly tested.

5.2 Test Cases

5.2.1 Test Case 01: Signup Screen

5.2.1.1 Description: A user should be able to enter data into all text fields and register successfully**.**

5.2.1.2 Precondition: The user must be on the signup screen and be using a valid email id as well as passwords must contain at least 8 letters and the passwords must match.

5.2.1.3 Test Steps:

1. Navigate to signup screen by tapping the 'Signup' button.
2. Enter valid data in the respective text fields such that it's a valid email and the password is at least 8 letters. The passwords must match.
3. Tap the 'Create Account' button.

5.2.1.4 Expected Result: A dialog saying signup successful.

5.2.2 Test Case 02: Signin Screen

5.2.2.1 Description: A user should be able to enter data into all text fields and login successfully**.**

5.2.2.2 Precondition: The user must be on the signin screen and be using a already registered username as well as password.

5.2.2.3 Test Steps:

1. Navigate to signin screen by opening the 'Scene It' app or by tapping the logout icon in the top right of the app screen..
2. Enter valid username and password in the respective text fields.
3. Tap the 'Login' button.

5.2.2.4 Expected Result: The user should be successfully logged in to their account and the home screen store should now be visible.

5.2.3 **Test Case 03:** Signout

5.2.3.1 Description: A user should be able to tap signout icon on app bar or 'Log out' button in the app drawer to signout of their account **.**

5.2.3.2 Precondition: The user must be logged in to their account.

5.2.3.3 Test Steps:

1. Tap the logout icon in the app bar of the store home screen or open the drawer and tap the 'Log out' button.

5.2.3.4 Expected Result: The user should be successfully logged out of their account and the signin screen should now be visible.

5.2.4 **Test Case 04:** View Art in AR

5.2.4.1 Description: A user should be able to see posts through their camera with augmented reality**.**

5.2.4.2 Precondition: The user must be logged in to their account and have a phone with a functional camera and the latest version of Google play services.

5.2.4.3 Test Steps:

1. Tap the image of the post you want to view once.
2. Now that it's in full screen, tap it again.
3. Now tap the camera icon at the bottom of the screen.

5.2.4.4 Expected Result: The user should now have their camera open with the image being displayed in real time.

5.2.5 **Test Case 05:** Add New Post

5.2.5.1 Description: A user should be able to see add new posts in the store**.**

5.2.5.2 Precondition: The user must be logged in to their account.

5.2.5.3 Test Steps:

1. Tap the plus icon button in the bottom right of the store screen.
2. Fill in the text fields one by one.
3. Optionally, upload an image from your gallery by tapping the gallery button or upload a picture taken from your camera by tapping the camera button.
4. Tap submit to finish.

5.2.5.4 Expected Result: The user should now have their post uploaded and it should be visible in the store screen.

5.2.6 Test Case 06: Search by Location

5.2.6.1 Description: A user should be able to see search for location specific posts using a search bar.

5.2.6.2 Precondition: The user must be logged in to their account.

5.2.6.3 Test Steps:

1. Tap the search bar in the top of the store screen.
2. Fill in the text field to search by location.

5.2.6.4 Expected Result: The store screen should now be filled with only the posts that are in the searched location. Uppercase or lowercase entries should not affect the result.

5.2.7 Test Case 07: Comment

5.2.7.1 Description: A user should be able to see comment on posts to rate their experience and review the item.

5.2.7.2 Precondition: The user must be logged in to their account.

5.2.7.3 Test Steps:

1. Tap the comment button of a post in the store screen.
2. Fill in the text field that pops up with your comment.
3. Tap the go icon to post your comment.

5.2.7.4 Expected Result: The post should now have the submitted comment in its comment section.

5.2.8 Test Case 08: Contact

5.2.8.1 Description: A user should be able to chat with another user who has made a post.

5.2.8.2 Precondition: The user must be logged in to their account.

5.2.8.3 Test Steps:

1. Tap the contact button of a post in the store screen.
2. Fill in the enter message text field that pops up in the chat screen.
3. Tap the go icon to send your message.

5.2.8.4 Expected Result: The sent message must have been received by the user to whom it was sent to.

5.2.9 Test Case 09: Mind

5.2.9.1 Description: A user should be able to access the mind section of the app and listen to audio meditaions, read success stories of artists or read quick quotes.

5.2.9.2 Precondition: The user must be logged in to their account.

5.2.9.3 Test Steps:

1. Tap the mind button in the app drawer.
2. Optionally, tap quick quotes to read them.
3. Optionally, tap motivation to read success stories.
4. Optionally, tap meditation to open audio meditation screen and tap the play icon on any of the provided entries. Tap the stop icon to stop the audio.

5.2.9.4 Expected Result: The user must be able to see quick quotes, motivation as well as audio meditaion screens. The user must also be able to play the meditations and the audios must start playing. He should also be able to stop the audio with the stop button.

5.2.10 Test Case 10: Recommend

5.2.10.1 Description: A user should be able to like posts and get recommendations based on their activity.

5.2.10.2 Precondition: The user must be logged in to their account.

5.2.10.3 Test Steps:

1. Tap the like button of any post.
2. Open the app drawer and tap on ‘Recommend Me’.

5.2.10.4 Expected Result: The user must be able to like posts as well as be able to see posts in the recommendations screen based on the tags of their liked posts.

5.2.11 Test Case 11: Delete Post

5.2.11.1 Description: A user should be able to delete their previous posts.

5.2.11.2 Precondition: The user must be logged in to their account and have made some posts.

5.2.11.3 Test Steps:

1. Tap the delete icon that will only be visible on the posts you made.

5.2.11.4 Expected Result: The store must refresh and the post must be deleted.

5.3 Test Results

1- We were able to confirm the proper functioning of the authorization process.

2- We faced problems in making sure that the UI stays in boundaries in different screen resolutions. These problems were fixed by making the design responsive and dynamically changing depending on the screen size. Further testing proved this issue to be resolved.

3- Mobile phone cameras properly displayed the AR images and in-app testing of search, recommendation and chatting showed us that they were working properly.

5.4 Summary

The testing process pointed out several issues that were later resolved and confirmed with further testing. The UI, backend, and all features were separately tested.

6. Chapter 6 Conclusions and Future Work

6.1 Future Work

This app can be scaled up to a larger product and can serve the needs of struggling artists everywhere to help them economically as well as with their mental health.

Appendices

Appendix A: Plagiarism Report

FYP Report

ORIGINALITY REPORT

11%	7%	2%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Higher Education Commission Pakistan Student Paper	4%
2	Wasim Ahmed Khan, Abdul Raouf, Kai Cheng. "Chapter 7 Virtual Reality Design for Programmable Logic Controller Based Applications", Springer Science and Business Media LLC, 2011 Publication	2%
3	www.geogebra.org Internet Source	2%
4	Submitted to Asia Pacific University College of Technology and Innovation (UCTI) Student Paper	1%
5	www.it.iitb.ac.in Internet Source	1%
6	wiredspace.wits.ac.za Internet Source	<1%
7	Submitted to Taylor's Education Group Student Paper	<1%

8	mads-p.dk Internet Source	<1%
9	Submitted to The Hong Kong Polytechnic University Student Paper	<1%
10	Submitted to (school name not available) Student Paper	<1%
11	lra.le.ac.uk Internet Source	<1%
12	todomoo.sourceforge.net Internet Source	<1%
13	Submitted to University of Sydney Student Paper	<1%
14	myfik.unisza.edu.my Internet Source	<1%
15	hdl.handle.net Internet Source	<1%
16	research.ijcaonline.org Internet Source	<1%
17	www.slideshare.net Internet Source	<1%

Appendix B: Glossary

AR: Augmented Reality is the real-time use of information in the form of text, graphics, audio, and other virtual enhancements integrated with real-world objects.

Asynchronous: Technique that allows the code for wait for a certain block of code to finish without blocking the rest of the code.

AWS: AWS is a web service provided by Amazon for businesses to use.

Dart: A programming language used in the Flutter framework.

Flutter: A framework developed by Google to make cross-platform mobile apps with a single code base.

Github: A version control system that allows code to be shared and synchronized between teams.

Java: A programming language used in the Spring Boot framework for designing backend APIs.