SIT708 MOBILE SYSTEMS DEVELOPMENT

VIScan Application Project Proposal

MANALI SUNIL PEN
221534516

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Introduction

Overview

In this document I am proposing my idea to develop an android mobile application named **VIScan** which can be used to scan a bottle of wine and get the reviews and ratings of that wine bottle. This application can further be enhanced to get the nearest location of the store where this wine can be found and its price as well.

Background

Research shows that human beings are drinking wine from quite a time. Evidence have shown that consumption of wine was in the 6000BC in Georgia and production in the Armenia time 4100BC. As wine has evolved from such a long time and at different places each wine has a different story to tell. Nowadays wine is even used as a gesture to welcome a guest or as a thanks giving gift. And to gift a good quality wine it is very important to know about wine.

Knowing about a popular wine and knowing about their region is also very important. Taste of the wine also matters, some wine taste very tart while some wine taste very sweet without having any sugar in it. Different flavours of wine based upon their appearance can be understood by the figure 1.

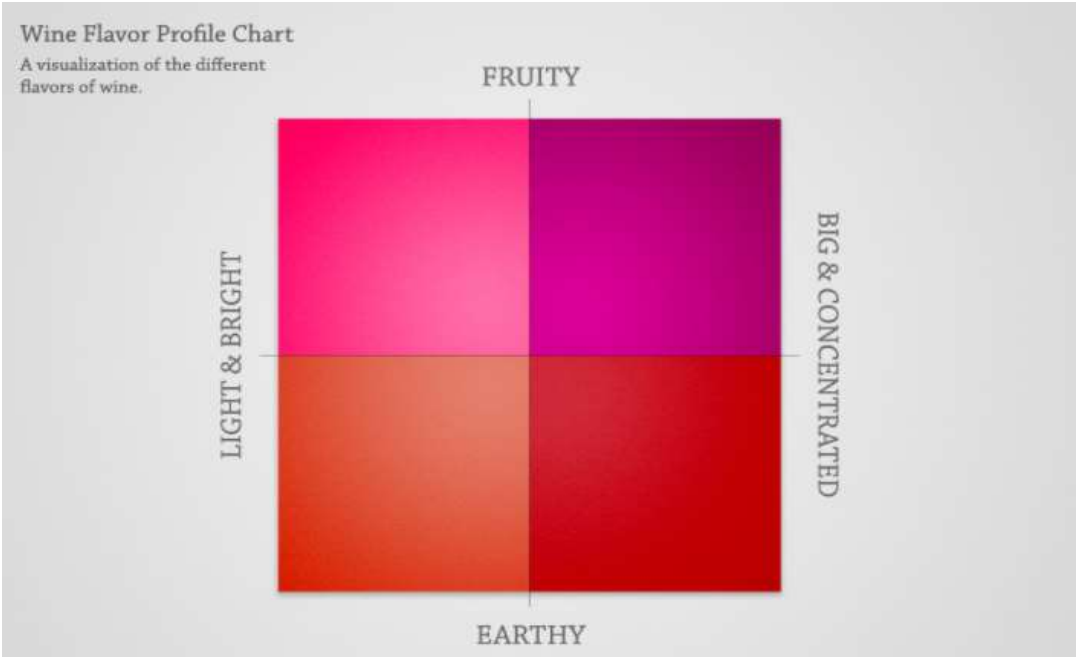


Fig 1: Wine Flavour Profile Chart

90% of the wines are meant to be drank in the year they are released or else they would turn acidic, low alcoholic, tannin or may even residue sugar. So its very important to know about such wine before buying it. Wine can be drunk in peaks and valley, in all moments of your life. So to know more about a wine you are buying and the occasion you want to cherish I am going to develop a mobile application which in a single click of the image can get you the information of the wine and its ratings too.

Market Research and Motivation

To do some market research I searched Google play store on android mobile and came across few applications which try to intent to provide some wine information like VIScan does.

I went through the search result obtain and came across a scenario where the application doesn't allow user to save their favourite wine after they taste it. One of the applications is Delectable [1] Wine which doesn't allow user to save their wine as favourite. The other observation with that application is it takes user email ID while registering and send user information about wine which spams user inbox. However, user stops using such application and the real purpose of the application is lost.

One of the other applications that I went through on the search obtain was Wine Dictionary [2] which serves the same purpose as our applications intent to do its to give information about the wine bottle. But I observed that this application doesn't allow users to scan the label of wine bottle but it allows the user to type the name of the wine bottle and then it will display its details.

I was motivated to create an application which would address above issues as well as add enhancement in the above observation. I want to build an application which would satisfy a user's needs and serve its purpose. I want user should be easily able to identify the wine bottle to be take according to the event by the information provided by our applications. This application will make all the gift givers less worried about the wine to be brought for their friends or relatives or colleague and even give information to every human to choose the wine according to the celebration they intent to do in life.

Competitor Analysis

To come up with the idea to develop a mobile application which does scanning of wine bottles and display its details I had to browse through google play store to get information of the current ideas. The result obtain from the search was quite fascinating. There are few applications which serve the purpose but every application has some or the other functionality missing. I try to implement this functionality in our VIScan application. The comparison is as follows:

Sr. No	Functionality	Delectable [1] Application	Wine Dictionary [2] Application	VIScan Application
1	Scan the wine bottle label	✓		✓
2	Don't send user information about wine and spam the inbox		✓	✓
3	Allow user to save Favourites			✓ (Enhancement phase)
4	Rating	4.2	4.4	

AI/ML Approach

We as a human being can easily distinguish between places, objects, animals, plants, etc but for computers or other technologies to do so need training and testing, which is possible through AI/ML. AI not only decode the image but also has the ability to predict. The software that are train can easily identify places, objects, handwriting, faces, etc.

In VIScan application we need to recognise the label of the wine bottle and then retrieve information about the wine bottle. AI trains the image recognition system to recognize the images. In AI and computer vision there is a field of research called Convolutional Neural Networks that deals with the creation of the algorithm that recognise the image.

AI Approach: The goal of AI training for our application is to create an algorithm that has been taught to identify the text from the image. Three processes are involved in the creation of this algorithms which are as follows:

- First step: Gather and organise the data.
- Second Step: Create a network architecture. Expose this network architecture to databases containing millions of photos to train it.
- Third step: It is to interpret the photos using the model.

Algorithms used for image recognition: We will be using CNN (Convolutional Neural Networks) algorithm for image analysis and classification in our project.

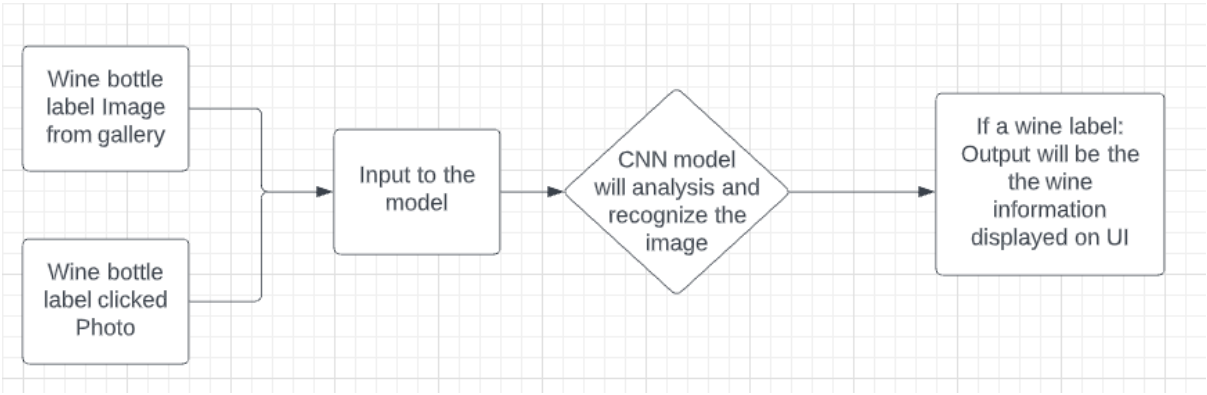


Fig 2: AI approach model diagram of VIScan application

Features

Asset List

The development of VIScan application will include different services, different tools, IDE's from design to development to testing and release phase.

- **Figma**: This is an open-source tool used to design UI/UX. It will help to design a great UI/UX design of VIScan application. It will help to create a wireframe design and even prototype it by creating a connection between pages by connecting the dots.

- **Lucidchart**: This is a web browser application which allows user to use different shapes and diagram they have to design a model. This application will be used to design the Unified Modelling diagram (UML) of VIScan application which will give the visualization experience of it.

- **Creately**: This again is a web browser application which has different model and diagram to draw user case diagram and more. It will give more visual representation of user interaction with VIScan application.

- **Kaggle**: Kaggle is an open-source database for lot of criteria. We will be using this to get CSV file which will content information regarding the classification of the wine or the review of the wine. We will be using this CSV file to train our AI algorithm to classify the wine of the scanned Wine bottle label.

- **Github**: This will be used to maintained the documents and the code of the VIscan application and to maintain the continuous integration of the coding.

- **Android Studio**: IDE for the android application development will be used to develop the VIScan application. With the help of TextViews, ImageViews, Buttons and others the application will be develop.

- **Python**: It is an object-Oriented Programming language which is widely used by data scientist to design and implement algorithms while processing data. Python will be used to design code which will be used to train the algorithms and predict the outcome.

- **Java**: Similar to Python, Java is also object-oriented programming language which will be used to throughout the entire process of VIScan application development and used to call python scripts methods.

- **Android Studio Emulator**: The testing of the application will be done on android studio emulator. It is easy to configure and it helps the developer to easily test the application on different devices.

- **Microsoft Teams:** This will be used to communicate between the team, with the mentor and with the Unit chair.

Product Purpose

VIScan main target are the one who intend to buy a wine but is confuse for which one to go for. The audience will be the one who aim to buy wine for any special occasion or just for trying something new. It can even act as a wine database which will display information about wine and the audience for this will be the once who want to improve their knowledge in this wide sector started from 4100BC. From youngster to the old age everyone can use this application as it is simply click and get basis. The person just needs to click a clear picture of the wine bottle label and the information regarding the wine bottle will be displayed.

For creativity purpose UI colour combination and simplicity are the main factor. The colour that comes to our mind when we hear a word wine is red or white, so I would be designing the UI/UX of VIScan application using the shaded of Red or white. VIScan will be a user-friendly application which will be very basic and not involve any complex functionality. Message for all the actions will be displayed correctly and will use icon which are know by the users so that user of any age from youngster to old age can easily use the application and doesn't need any guidance while navigating VIScan application.

3 Complex components of VIScan application

1. User story: Click image of the label of wine bottle

   To click an image of the wine bottle label we first need to ask for Camera runtime permission when a user start the activity. This can be done by using intent and the command is android.provider.MediaStore.ACTION_IMAGE_CAPTURE. After we have access to android application camera, we can click the image by creating a method for it. For different android devices the sizing will be different so we can even resize an image by writing method for it. All these methods will be written in java since it has large number of libraries and API's for achieving this functionality.

2. User story: Select image of wine bottle label from the gallery

   To select an image of the wine bottle label from the gallery we need to first give permission to access media file of the android application. Intent is used to give permission and which can be done using Intent.ACTION_GET_CONTENT. We need to write a select function which will help us to select image of the wine bottle from the gallery. We can even write a resize function in which the size of the image will be resized so that correct size image will be displayed. All this function will be written in java code since it has libraries to obtain the desired output.

3. User story: Get information about scanned wine bottle

   To display information about the scanned wine bottle we need to develop a CNN algorithm using the python script. This algorithm will recognise the scanned bottle label by the training

given to the algorithm and then will display the information about the wine bottle. For training the algorithm the database will be in the form of CSV file. It can be obtained from the Kaggle website. Java will be used to fetch the information obtain about the wine from the python training code and will help to display that on the Android UI. The information to be displayed will depends on that training data used and information it contains.

Function of the system

VIScan application will allow the user to scan a wine bottle label and display information regarding the wine bottle. To do so first the application will see if it's a new user or a registered user. If new user has installed this application, then they have to click on the Sign-Up button and navigate to the signup page and enter their details and get signed to VIScan application. If already registered user comes up then they can directly enter their valid credentials and login to the application.

On the Home screen user can see a Scan button. By clicking on this button user will navigate to the scanning screen. On this screen user will have click image option or else browse from gallery option. Java codes will be written to click image or else to browse image. Once the image is scanned then the AI coding will come into action. AI CNN algorithm will be implemented to recognize the image and to identify the class of that wine based on the training. First the code will be written in python to recognize the wine bottle in the CSV file. CSV files will be used to train the algorithm to recognized the group of the wine bottle.

The information obtain about the wine bottle will be displayed on the android screen. The java code needs to be written to display the wine bottle information.

The application will also have logout functionality whenever the user wants to logout from the application. The user will need to login again once it has logout from the VIScan application.

Milestones of the Project Plan

Item No	Deliverables	Outcome	Timeline
1	Project Proposal	- Design a professional project proposal which will consist of the project idea, its market research, use cases and user stories and wireframe design and timelines.	Sprint-1: Week 1-4
2	Coding Implementation of UI/UX design of the VIScan	- Design the UI/UX pages of this application in the Android studio. - Use XML of all the pages using appropriate images, colours and fonts.	Sprint-2: Week 5
3	Connect all the pages together	- Provide navigation between all the pages	Sprint-2: Week 6

4	Work on the scanning of the image	- Write the code to either scan the image by clicking picture or else inserting the image by browsing from the folders	Sprint-2: Week 7-8
5	Implement AI in the VIScan Application	- The wine bottle label should be identified and display the information about the wine bottle using the AI/ML concepts	Sprint-3: Week 9-10
6	Demo and final changes in the application according to the feedback	- Demo the application to the mentors and get feedback for it. - Make the necessary changes to the application	Sprint-3: Week 11
7	Final handover of the applications and the documents	- Finally, handover the application and the all the documents.	Sprint-3: Week 12

User Stories and Use cases

User Story 1:

Statement	Acceptance Criteria	Estimation	Priority
As a new user, I should be able to register to this application and would like to login to the application	• User should land to a login page. • If a new user, user should be able to register themselves by clicking on 'Sign Up' button and entering its details. • Already register user should be able to enter their valid login credentials and login to the application by clicking 'Login'	Story points: 8	Priority 1: Medium Priority Reason: This story point will be implemented after main functionality of scanning and displaying wine bottle information

User Story 2:

Statement	Acceptance Criteria	Estimation	Priority
As a user, I should be able to click image of wine bottle label	• User should be able to click on the 'Scan' button on the Home page • When user clicks on the scan button a page to click image should appear	Story points: 7	Priority 1: Hight Priority Reason: This is one of the main functionalities of VIScan application

	• User should be able to capture image by clicking on the click button		

User Story 3:

Statement	Acceptance Criteria	Estimation	Priority
As a user, I should be able to upload image of wine bottle label	• User should be able to click on the 'Scan' button on the Home page • When user clicks on the scan button a page to click image should appear • User should be able to upload image by clicking on the 'Browse Folder' button	Story points: 7	Priority 1: Hight Priority Reason: This is one of the main functionality of VIScan application

User Story 4:

Statement	Acceptance Criteria	Estimation	Priority
As a user, I should be able to get information of the wine when a valid clear image of wine bottle label is clicked or uploaded	• User should be able to click or upload image of wine bottle label • The app should recognize the label and display the information of the wine bottle	Story points: 10	Priority 1: Hight Priority Reason: This is one of the main functionality of VIScan application

User Story 5:

Statement	Acceptance Criteria	Estimation	Priority
As a user, I should be able to see the details of wine bottle once its scan	• User should be able to see the information about the wine bottle once its scan like its name, rating, reviews, etc	Story points: 6	Priority 1: High Priority Reason: This is one of the main functionality of VIScan application

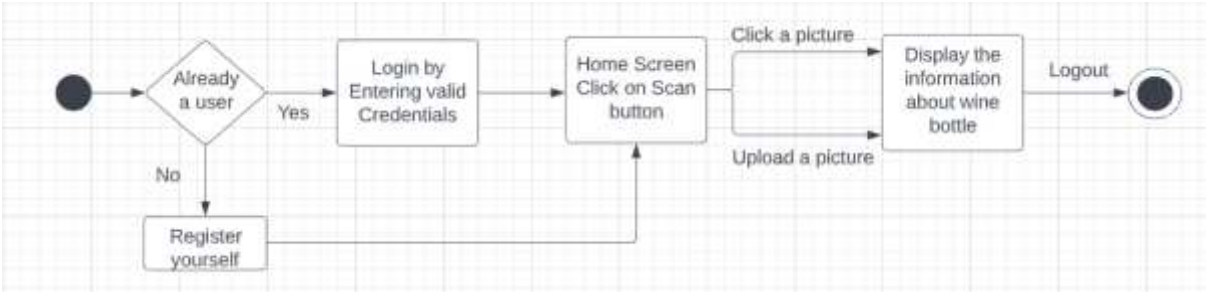
User Story 6:

Statement	Acceptance Criteria	Estimation	Priority

As a user, I should be able to get a message when I scan a wrong product	• User should be able to see a message to scan a new wine bottle label if the previous image was not clear or wine bottle label was not identifiable • The app should allow user to again click a new image or upload an image	Story points: 8	Priority 1: Hight Priority Reason: This is one of the main functionality of VIScan application

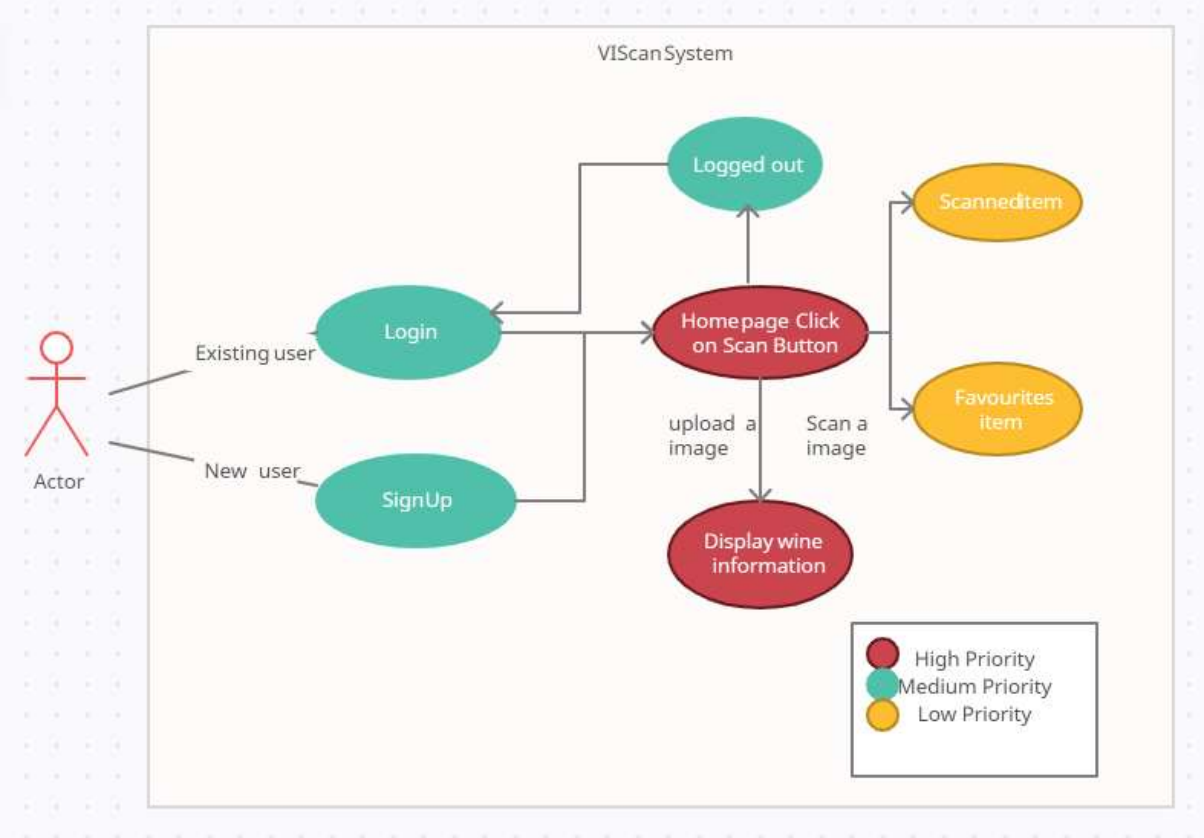
Unified Modelling Language (UML) diagram:

A UML diagram was created in **LucidChart** website to depicts the user interaction with the use cases. It shows the start to finish of the flow of the VIScan application.



Use Case Diagram:

The use case diagram was created using **Creately** website. This use case depicts how a user will interact with each use case of VIScan application. There is one user and 7 use cases for this application.



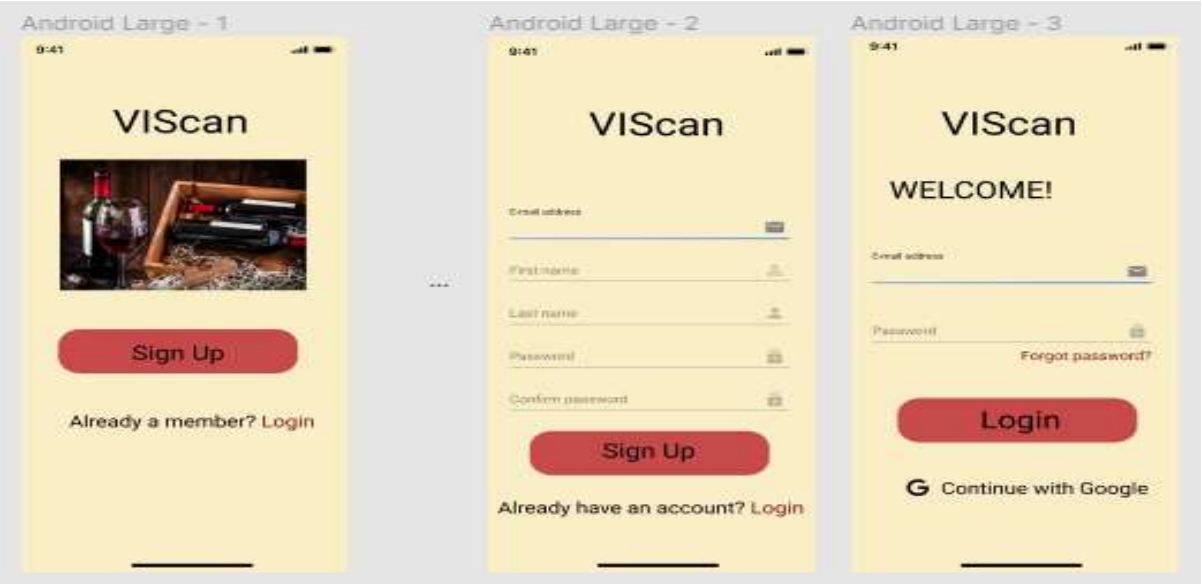
URL to UX/UI Design:

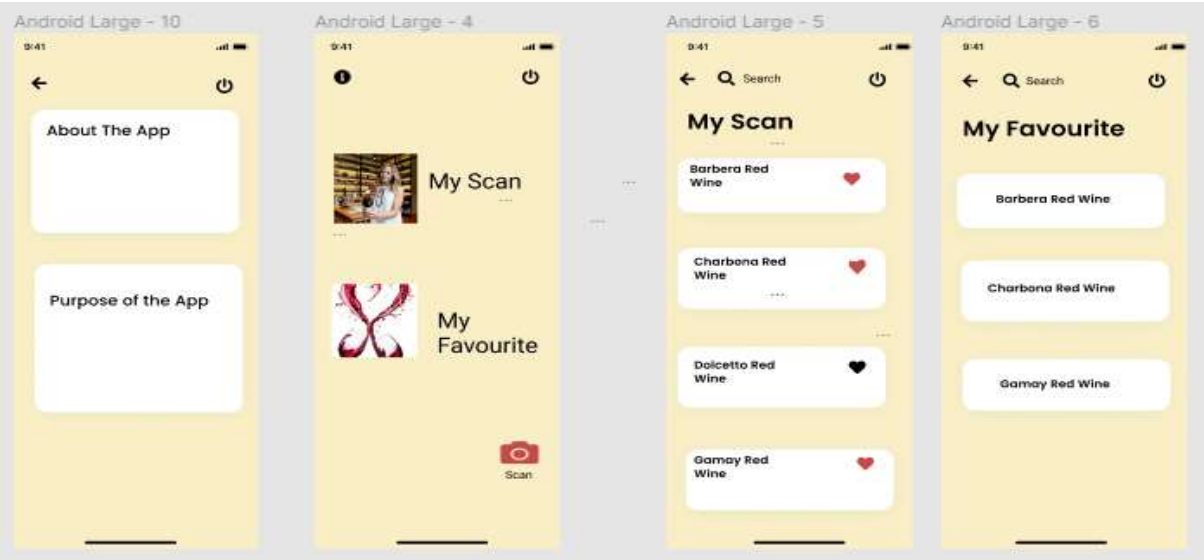
The UX/UI design was done using **Figma**. During the design phase it was notice that VIScan application will have 10 screens.

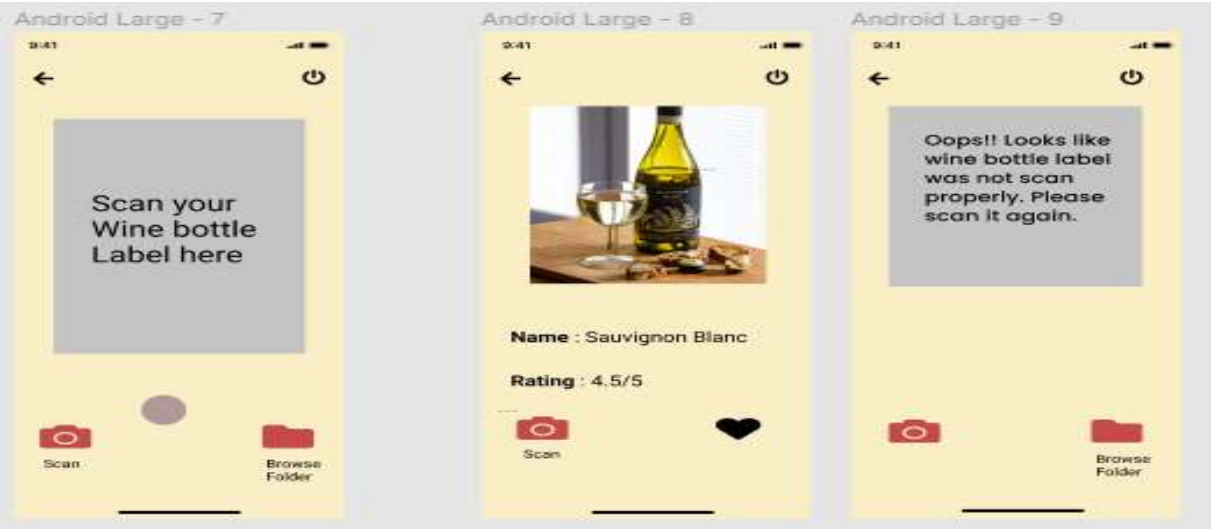
The below is the link for the Figma application UX/UI design of the VIScan application.

https://www.figma.com/file/CBe0IBzzth0gTQighMVwGQ/Untitled?node-id=0%3A1

To play the prototype of this deign click on the play button next to the Share button on Figma application.


Android Large - 1
VIScan
Sign Up
Already a member? Login
Android Large - 2
VIScan
Sign Up
Already have an account? Login
Android Large - 3
VIScan
WELCOME!
Forgot password?
Login
Continue with Google

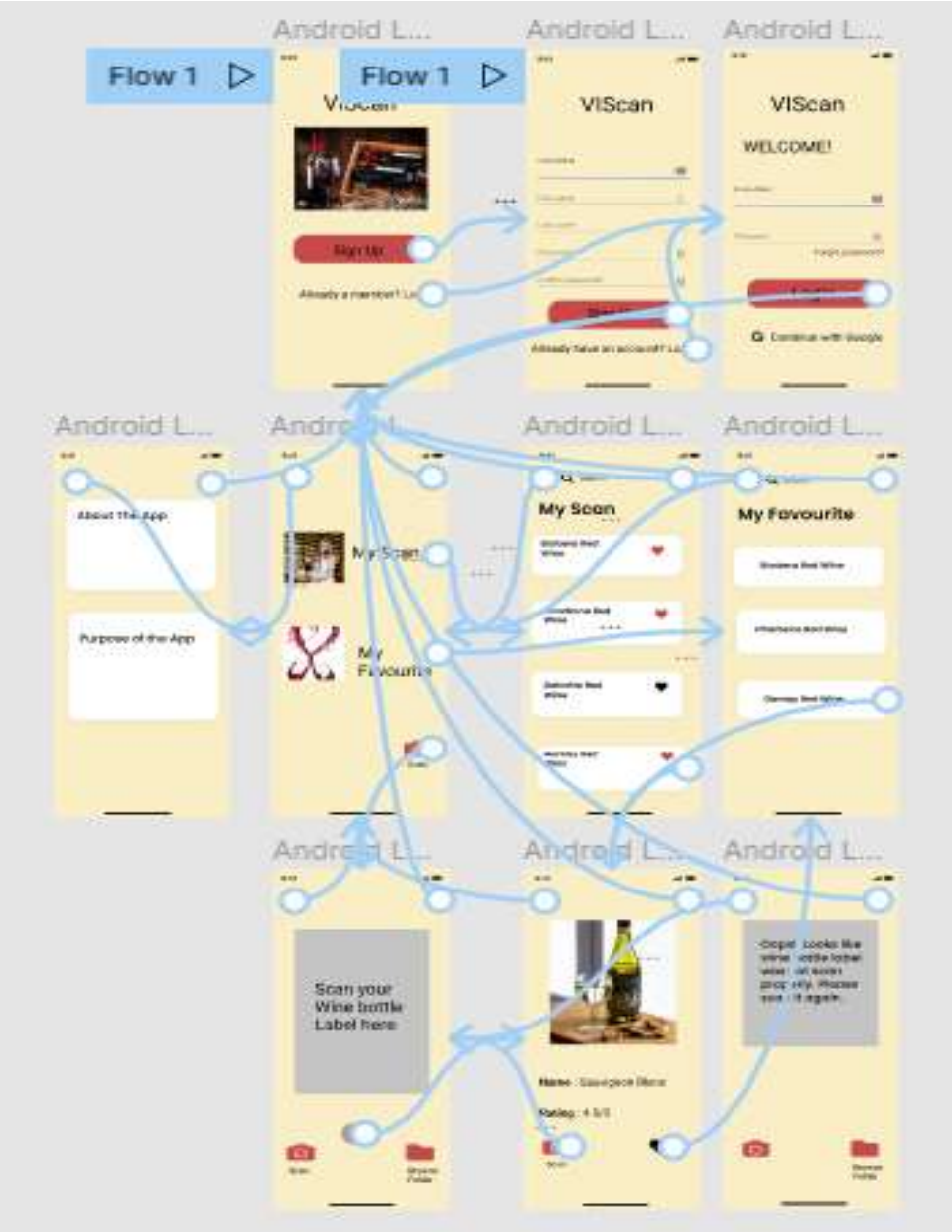

Android Large - 10
About The App
Purpose of the App
Android Large - 4
My Scan
My Favourite
Scan
Android Large - 5
Search
My Scan
Barbera Red Wine
Charbona Red Wine
Dolcetto Red Wine
Gamay Red Wine
Android Large - 6
Search
My Favourite
Barbera Red Wine
Charbona Red Wine
Gamay Red Wine


Android Large - 7
Scan your Wine bottle Label here
Scan
Browse Folder
Android Large - 8
Name : Sauvignon Blanc
Rating : 4.5/5
Scan
Android Large - 9
Oops!! Looks like wine bottle label was not scan properly. Please scan it again.
Browse Folder

High-Level Wireframes

The wireframe depicts the connections between each page and the flow of all the pages. It even shows the high-level design of all the pages.

The below high-level wireframe is design for VIScan application showing 10 pages and its connections between all the pages.



Flow of Wireframe:

1. The user will first prompt with the login screens.

2. If the user is a new user to the application, then they have to Register themselves by clicking on Sign Up button.
3. User then enters their details on the Sign-up page and click on Sign Up button to land to the home screen of the VIScan application.
4. If a user is already register user, then they click on Login link. Enter their valid credentials on the Login page and click on Login button. They will then land to home screen.
5. On home screen user can click on Scan button to navigate to scanning page.
6. User has two options one to scan the wine bottle label by clicking picture or else by uploading the picture of the wine bottle label.
7. If user uploads a clear, successful image of the wine bottle label then the application will display the information of the scanned bottle.
8. If user doesn't scan a clear or scan some other products then the user will be prompted with a message to scan the clear wine bottle label again.
9. In future enhancement when database connection is established then the users scanned bottle information will be saved and if the user wants to mark any of the wine bottle favourite, then they can even mark it.
10. A page will even display the About us and the purpose of the application.

References:

[1] Delectable Inc, "Delectable Wine - Scan & Rate," Google.com, 2013. https://play.google.com/store/apps/details?id=com.delectable.mobile (accessed Apr. 02, 2022).

[2] F. Harper, "Wine Dictionary," Google.com, 2013. https://play.google.com/store/apps/details?id=dictionary.winesecretary.com (accessed Apr. 02, 2022).