<MoodBlend>

Software Requirements Specification

<08/04/2022>

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Prepared for

CSE3044 Software Engineering Term Project

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1.Introduction

People daily feel a lot of basic emotions (sadness, anger or happiness etc.) in life, and this is reflected in their facial expressions. In this situation, what usually accompanies people is music. This is the main topic of the MoodBlend project. MoodBlend is an android mobile application. This project does emotion status analysis according to people's facial expressions and recommends the song that people need.

1.1 Purpose

The main purpose of this project is to detect and analyze the facial expressions of people's feelings that they have experienced and to suggest the most appropriate song to people to them. Thanks to the music offered by our application, people will feel better and more comfortable in the feeling they are in.

1.2 Scope

MoodBlend application is the application of people who are looking for the most suitable song for themselves according to their mood. This software application is an application that easily detects the emotional state of people, analyzes their facial expressions and suggests the most appropriate song. First, the user is greeted by the splash screen in the application. Permission is requested for users to take their photos. If the captured photo is not suitable, a photo shoot should be done again. If the photo taken is appropriate, emotion status analysis is performed from the user's facial expression. The system makes song suggestions according to the emotion state perceived from the facial expression. As a result, thanks to MoodBlend, the user will feel better by finding the most appropriate song for their emotional state.

1.3 Definitions, Acronyms, and Abbreviations

MOODBLEND	Project Name
GUI	Graphical User Interface
UI	User Interface
ANDROID	Android; It is a free operating system based on Linux being developed for mobile devices by Google and the Open Handset Alliance.
UC	Use Case
OS	Operating System

Table 1. Definition, Acronyms and Abbreviations.

1.4 References

- https://dergipark.org.tr/en/download/article-file/1798929
- https://www.ijirt.org/master/publishedpaper/IJIRT143701_PAPER.pdf
- https://ijarcce.com/wp-content/uploads/2021/07/IJARCCE.2021.10682.pdf
- https://www.ijream.org/papers/SSJ2019004.pdf

- https://iopscience.iop.org/article/10.1088/1757-899X/912/6/062007/pdf
- https://www.frontiersin.org/articles/10.3389/fpsyg.2021.760060/full

1.5 Overview

These software requirements are a general introduction. This part contains the perspective of the application, the functions to be used, the features necessary for the user, the assumptions and dependencies. In the specific requirements section, which is the third section, there are the limiting items of the designed system and an explanation of these items. It contains external interface requirements, functional requirements, non-functional requirements, inverse requirements, design constraints, logical database requirements and other requirements. In the fourth part of the SRS, it consists of diagrams. It contains Use Case Diagrams, Classes / Objects, Sequence Diagrams, Data Flow Diagrams (DFD), State-Transition Diagrams (STD).

2. General Description

2.1 Product Perspective

MoodBlend suggests music by detecting the emotional state of the user by examining the facial features. This is because it supports the emotional state and mood of the user. Today, there are many studies on suggesting music according to mood. These works ask the user to choose the mood. However, MoodBlend detects this with its own algorithm by looking at the person's face. MoodBlend is an Android Mobile application. This application meets the need of users looking for mood support.

2.2 Product Functions

MoodBlend application offers users a unique android interface that they can use easily. Therefore, it can be used by a large number of users. Notable features; It has an algorithm that detects the instant mood of people, suggests music according to their mood and supports this mood state. It has positive psychological effects on users. Details regarding the content of the project will be discussed in more detail below.

2.3 User Characteristics

The user base of MoodBlend can be from different age groups. Apart from the child age group, it can appeal to different users such as young, adolescent, middle-aged and old. An employee who is bored with work, a student who has passed the exam, an old man who wants to be surprised can use MoodBlend.

2.4 General Constraints

Constrictions about the application is that no one can reach to others privacy. Since the facial features of the people will be reached with the camera, this information should be protected and should not be shared with people and institutions other than the group members. It will be a problem if there is no internet connection while suggesting music. More details will be given to those subjects later.

2.5 Assumptions and Dependencies

An error may occur while the algorithm determines emotion according to facial features, or it can detect another emotion.

3. Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.1.1 SPLASH SCREEN INTERFACE

This page will be demonstrated when the user first opens the application. It contains the MOODBLEND logo and title.

3.1.1.2 ONBOARDING PAGE INTERFACE

This page is our welcome screen and on this page there will be 1 image and 1 text to make a short introduction about the application. Also a button to go to the next page. When we press this button, we will get camera permission from the user, after getting permission, this page will not appear in other openings. If it does not allow, the next page will not open.

3.1.1.3 MAIN PAGE INTERFACE

We have designed this page to be the homepage of the application so that all processes are here. By clicking the button called ‘take a photo’ on this page , the user will go to the approval page and take a selfie with the opened camera. If user approves the picture he took (the user can not approve the picture and take it again), user will find the own mode with the help of the picture model and write it on the main page. After the user's mode is found, the recommended song will be displayed on this screen via spotify with the help of API.

3.1.1.4 APPROVAL PAGE INTERFACE

Our photo taking page within the app. With this page it will open in the camera and the user will take a photo, after taking the photo we have 2 buttons, one is confirm and the other is reject, take a photo again.The user will return to the main page from here.

The application has 6 main Button in user interface:

1. Let's Start Button: The button on the onboarding page where we will get camera permission.
2. Capture Image Button: Button that the user will use to open their camera
3. Accept and decline buttons will appear on the approval page and to approve or reject the captured photo.
4. Open Spotify:To open the song suggested to the user on spotify
5. Okey Button: It will be used to close the alert that will open in case of any error on the main page. For instance, you do not have an internet connection.

3.1.2 Hardware Interfaces

This application will work on android and tablets. These devices must have an internet connection to run this application.

3.1.3 Software Interfaces

Since this application is a mobile application, it needs API level 24 (Android 7.0) or higher for Android in order to perform. The system has another software product between the API and the moodblend, which is network software that is not visible to users.

3.1.4 Communications Interfaces

The application will use the HTTP protocol for api requests communication over the internet.

3.2 Functional Requirements

Requirements List

REQ1: Home Page -the part where the camera permission is provided from the user.

REQ2: Take Photo- The user takes a photo.

REQ3: Emotion Analysis- The software performs an analysis of the emotional state of the captured photo.

REQ4: Song recommendation: Song suggestion is made according to the perceived emotion state.

REQ5: Link: The user sees the proposed link on the screen.

3.2.1 Home Page

Use Case Name	Home Page
Description	Permission must be obtained for the user to take a photo
Actors	User
Preconditions	The user must use a mobile phone

Trigger	User clicks the permission button.
Basic Flow	Software should let user to take photo of himself/herself by using camera of the mobile phone.
Exception Flow	If the user does not give permission for the photo, the system should ask for permission again
Post Condition	The user must download the Mood Blend application.

3.2.2 Take Photo

Use Case Name	Take Photo
Description	The user takes his/her own photo in this section. Whether the photo is suitable or not is determined by the software.
Actors	User
Preconditions	The user must give permission for taking photo of user face.
Trigger	User click capture image button
Basic Flow	Software should detect the face of the user (if exists) within the taken photo.
Exception Flow	If the photo taken by the user is considered invalid, the software

	should ask the user to take the photo again.
Post Condition	After the photo is approved, the model prepared with machine learning algorithms should work to perform sentiment analysis.

3.2.3 Emotion Analysis

Use Case Name	Emotion Analysis
Description	The emotion status analysis of the approved photo is done by the software.
Actors	User
Preconditions	Approval of the photo
Trigger	The user presses the analysis button in the previous step.
Basic Flow	• Software should detect and recognize users emotion state and make a classification about it with at least 60% correctness percentage. • Software should recognize anger signs from the detected face on the taken photograph. • Software should recognize happiness signs from the detected face on the taken photograph.

	• Software should recognize sadness signs from the detected face on the taken photograph. • Software should recognize signs of surprise from the detected face on the taken photograph. • Software should recognize signs of fear from the detected face on the taken photograph.
Exception Flow	The software may not be able to detect the emotion state incorrectly or at all. In this case, the user repeats the photo step.
Post Condition	Switches to the song suggestion step according to the detected emotion state.

3.2.4 Song recommendation

Use Case Name	Song recommendation
Description	From the song list prepared according to the emotion status, the user is offered a song suggestion.
Actors	User
Preconditions	Conducting an analysis of the emotional state from the photo

Trigger	There is no trigger in this step.
Basic Flow	Software should make song suggesstions according to detected emotional state.
Exception Flow	If the software does not recommend a song, emotion status analysis is performed again.
Post Condition	By clicking on the presented link, a connection with Spotify is established.

3.2.5 Link

Use Case Name	Link
Description	The software establishes a connection with spotify using the Recommended song link.
Actors	User
Preconditions	Display of the proposed song on the screen.
Trigger	Click on the song link
Basic Flow	• Software should provide a link to play offered song on an online music playing platform like Spotify.

	• Software should redirect to the appropriate platform by clicking on the link provided.
Exception Flow	There is no exception flow this step.
Post Condition	This is the last step of application. If you want to use application again, the application will back to top.

3.3 Non-Functional Requirements

3.3.1 Performance

- Software should respond fastly so that its response time should be at most 5 seconds to make appropriate song suggestions after photo of user taken and entered.

3.3.2 Reliability

- Software should make appropriate notifications when internet connection is not available.
- Software should make appropriate notifications declaring permission is mandatory to use the application if user don't permit to take photo with camera of the phone.

3.3.3 Availability

- Software should work on mobile phones that has at least Android API level 24 (Android 7.0) and higher versions.

3.3.4 Security

- Software should request for appropriate permissions to take photo with camera of the mobile phone.
- Software should keep users photo and information relating emotional state private without users self-permission.

3.3.5 Maintainability

- People of all ages are constantly doing music listening activities during the day. Therefore, the application can continuously provide services to users and attract users' attention.
- The application can accompany users' every moment of the day and can suggest music up to date.
- In the future, the application can be developed by adding different propositions for the emotion detection made with the user's face photo. Updates can be made according to user demands.

3.3.6 Portability

- It can be used from all devices of users with mobile phones, which are suitable for downloading the current version of the application.
- Moreover, it can be accessed from any device where the internet can be used, its portability also varies accordingly. Therefore, it is an easily portable project.

3.4 Inverse Requirements

An android device using one of the latest android version is important in terms of running faster. A good internet connection is required for fast data transfer via API.

3.5 Design Constraints

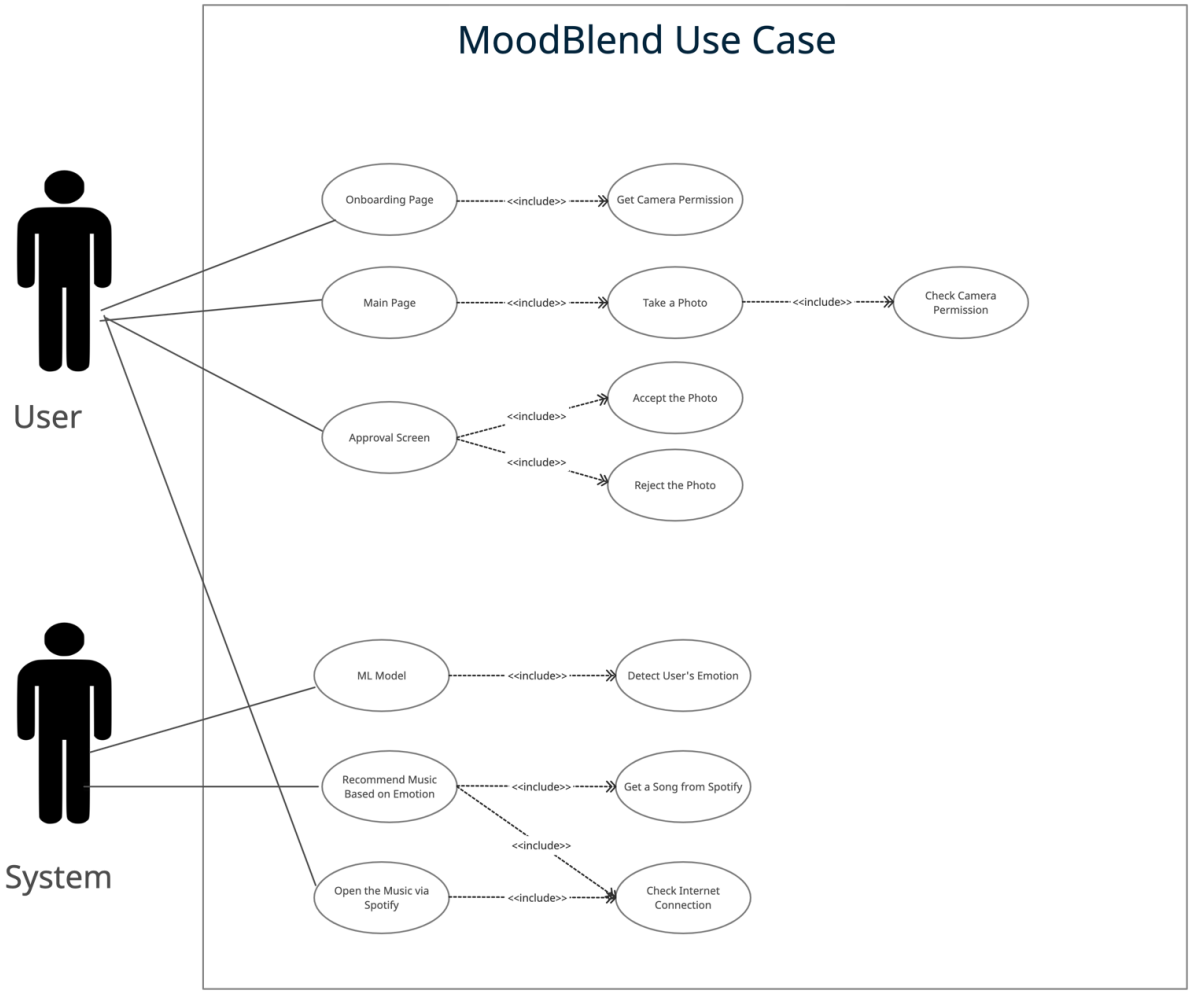
- Change of Spotify API requirements
- Unsupported android devices

3.6 Logical Database Requirements

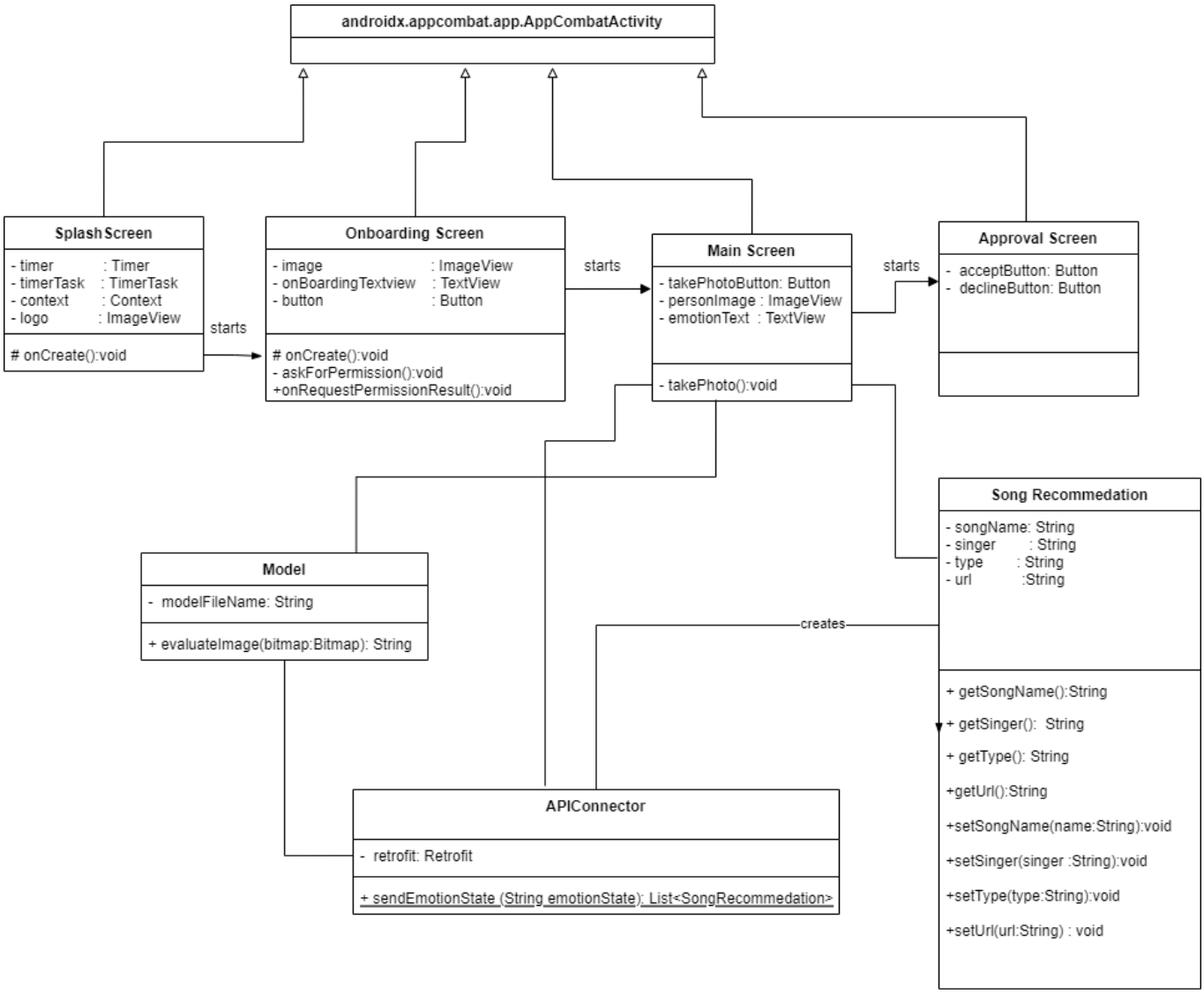
No database is required for the project. With the help of Spotify API, the data comes from the Spotify database.

4. UML Diagrams

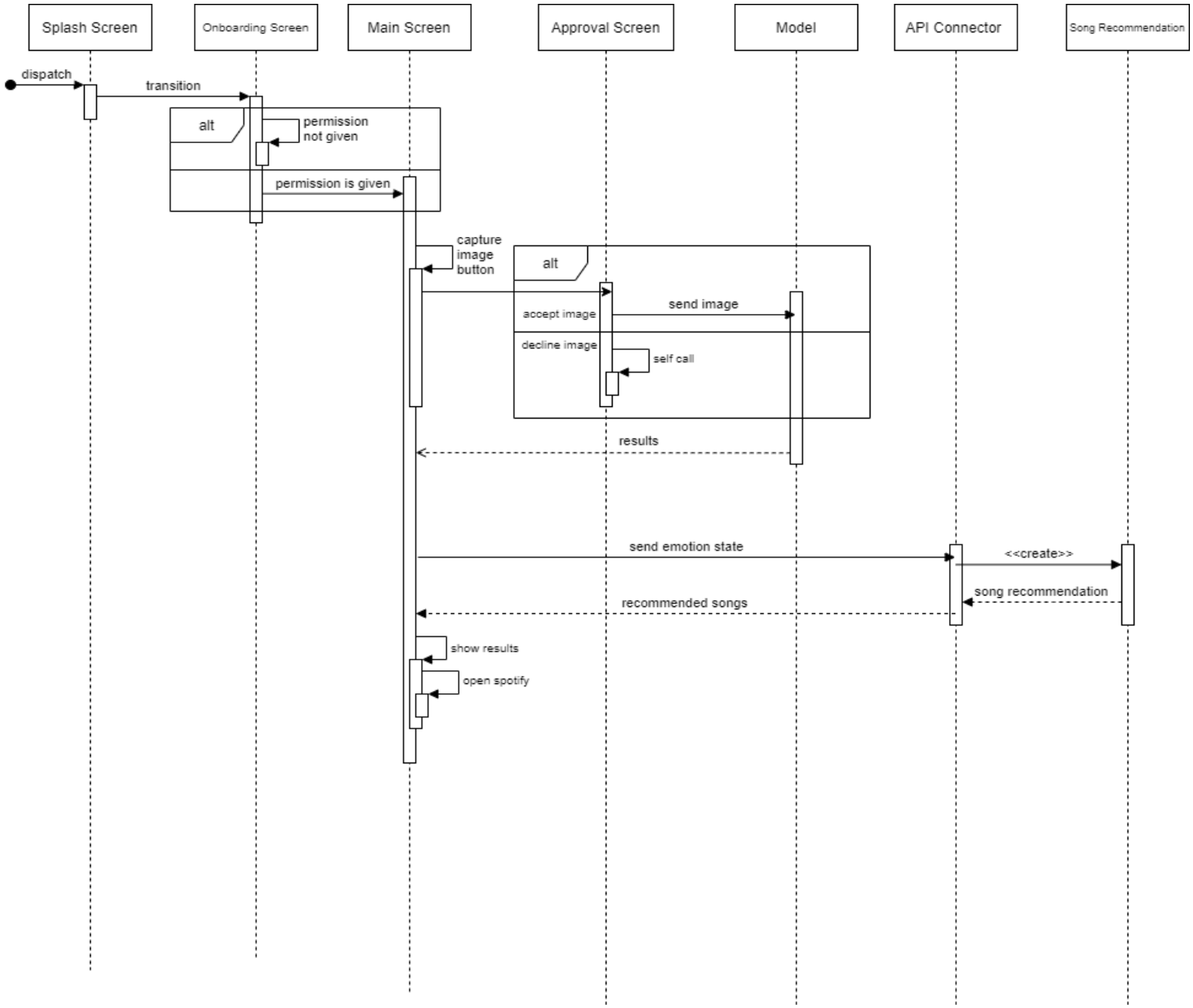
4.1 Use Cases



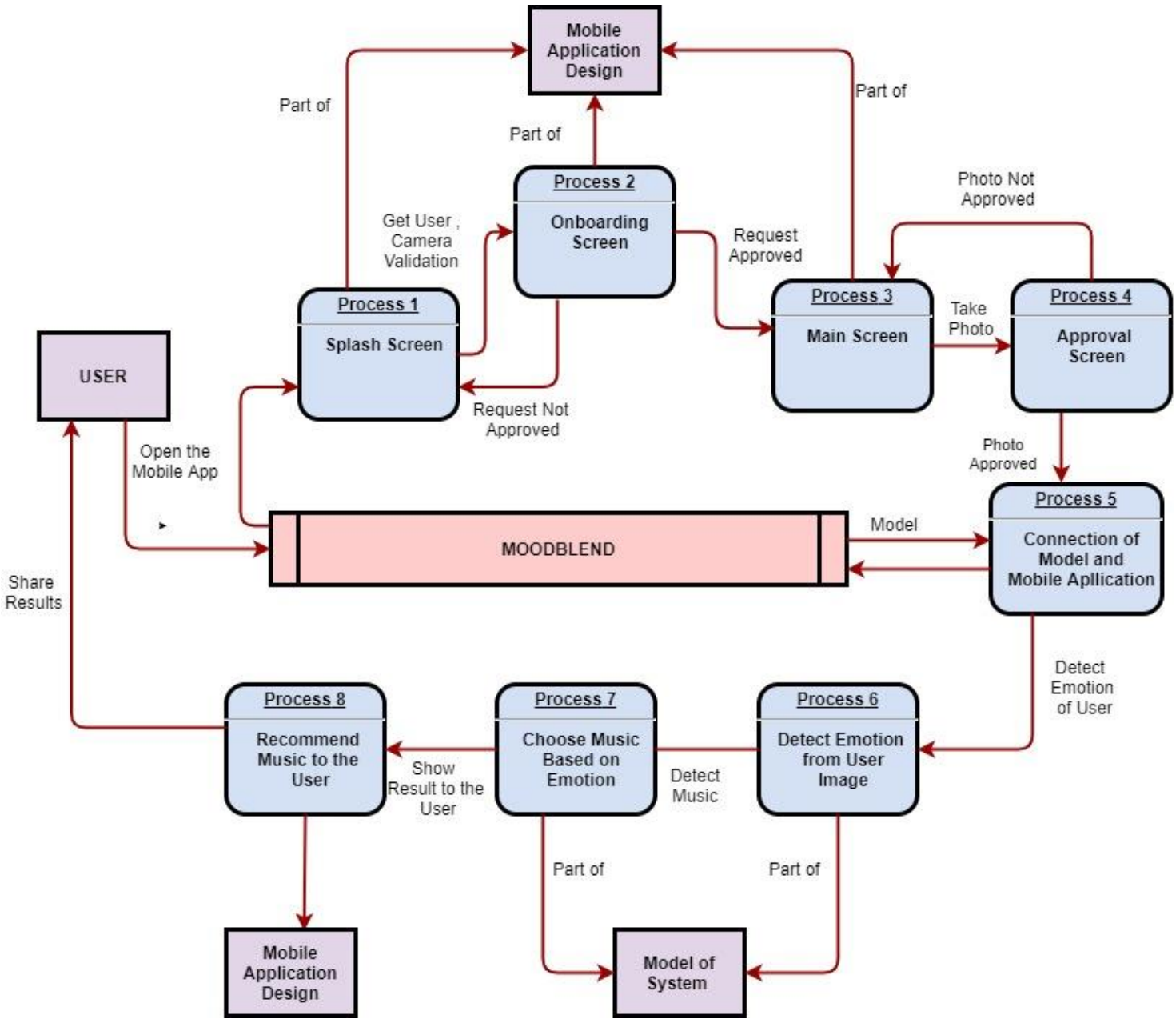
4.2 Classes / Objects



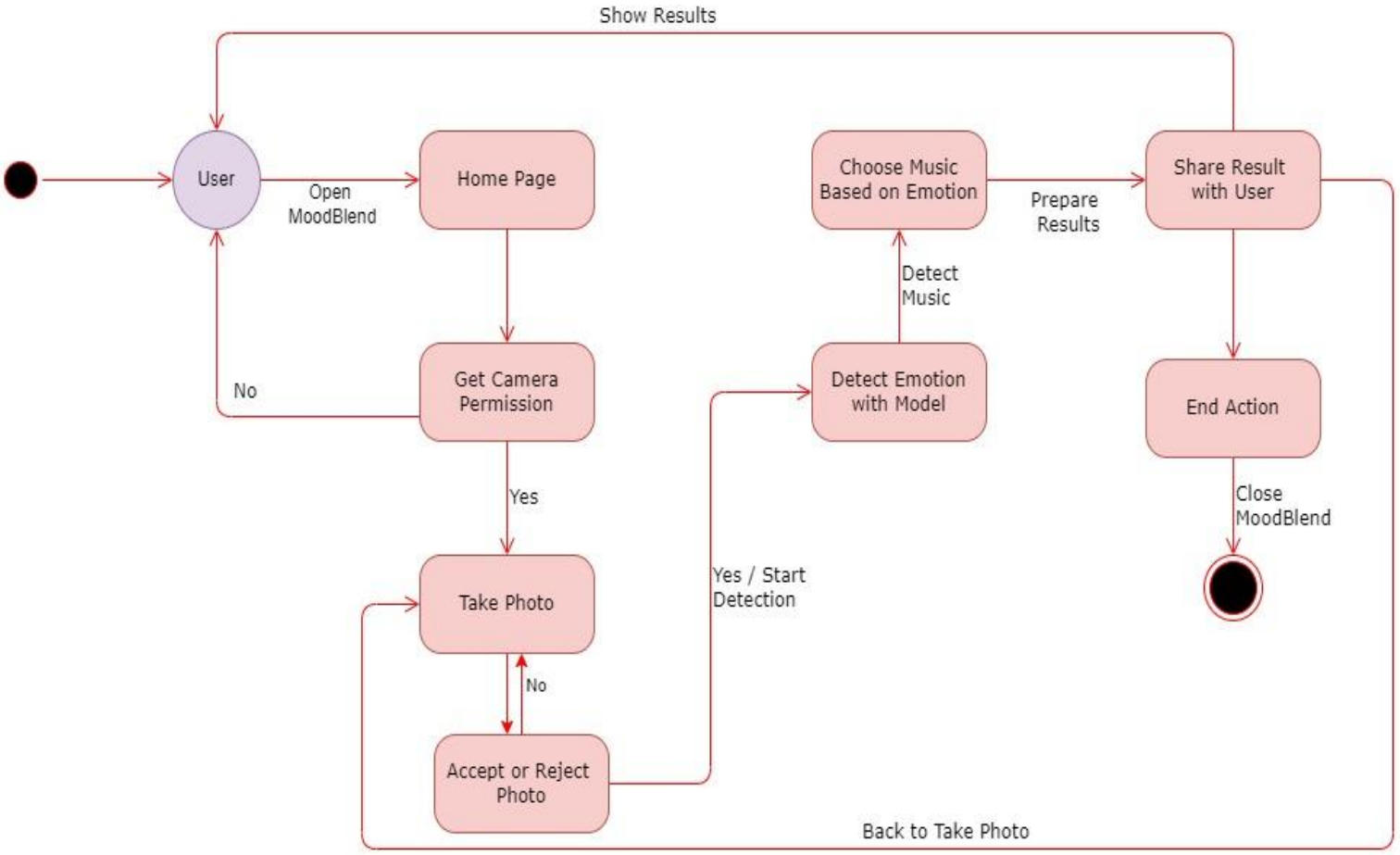
4.3 Sequence Diagrams



4.4 Data Flow Diagrams (DFD)



4.5 State-Transition Diagrams (STD)



Members /Parts	Aydın Duygu	Buse Apaydın	Elif Beril Yılmaz	Hamza Kavak	Zahit Erdem Güzel
Introduction	Discord meeting	Discord meeting	Discord meeting	Discord meeting	Discord meeting
General Description	Discord meeting	Discord meeting	Discord meeting	Discord meeting	Discord meeting
Specific Requirements	Functional	Functional	Functional	External Interface	Functional
Specific Requirements	Nonfunctional	NonFunctional		3.4,3.5,3.6	
Use Case Diagrams	Sequence Diagram	Data Flow, STD Diagram	Use Case Diagram, Sequence Diagram	Use Case Diagram	Sequence Diagram
All Remaining Arrangements of SRS	Discord meeting	Discord meeting	Discord meeting	Discord meeting	Discord meeting