Software Requirements Specification

for

Photomaster

Version 1.0

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

- Photomaster is an application aimed towards solving the problem of cluttered galleries on one's devices and it also enables the user to personalize the way in which he views photos.
- The application could tag images based on several parameters which makes sorting and searching the gallery a much better experience as compared to the endless scrolling most users resort to.
- Images can be searched based on predetermined parameters to retrieve only those that are required.
- Photomaster aims to act as a one stop application that enables users to reduce clutter, efficiently organize and retrieve images, whilst also providing the user with the choice of beautifying images by means of minor adjustments.

1.2 Document Conventions

- The functions and characteristics that will be analysed in this document are not implemented yet.
- But all features of product will comply with ISO standards, such as Code Conventions for the Flutter Programming Language, ISO/IEC 15504: Information Technology - Software Process Assessment, ISO/IEC 12207:1995, ISO/IEC 14102:1995 and other ISO standards.

1.3 Intended Audience and Reading Suggestions

- The purpose of this document is to provide a detailed overview of the application and its functions. Overall, this document aims to assist anyone who works on this project with the software delivery processes.

1.4 Product Scope

Photomaster will offer the following functionalities:

- Collecting images from your photo gallery.

- Tagging images with predetermined labels which include events and occasions, locations, people present, date and time etc.
- Removing duplicate images to reduce clutter by deleting images or archiving them.
- Organizing photos into albums using the tags given to each image.
- The photos are organized and searchable so you can easily find the photo you are looking for.
- Add filters, crop photos, and more on your mobile device or computer.

2. Overall Description

2.1 Product Perspective

While there are applications like Adobe bridge, Google Photos freely available in the market they only provide some of this application's functionality. A lot of features available on one application are not available on another thus forcing the user to download multiple applications. Photomaster takes a simpler approach unlike its counterparts that have such large learning curves that users must resort to taking courses on how to use the application. Our product also reduces the overhead of going through multiple applications by serving as a one stop shop that provides all of functionalities in one application.

In this digital age, users capture and store thousands of images on their devices, while the expansion of memory in mobile devices in the recent years has facilitated this development, the user often struggles when asked to display a particular image, with the current applications in the market users are expected to scroll endlessly through their gallery, which simply takes a lot of time. This application aims to fix this problem with our efficient search system and the option of clients assigning tags to images, users can quickly find the image their looking for by simply entering a tag, the tag can be an event, place, person etc.

The application will be made available on all platforms (desktop and mobile) and it aims to ease the searching and sorting process of one's gallery. By scanning all accessible storage, the app will tag every image using image metadata and will ask users to manually tag in cases where no tags are scanned.

The app also facilitates duplicate detection allowing the user to select which images to keep, and which to either archive or delete. The images if archived will be stored all in a real-time database, which will also remember image tags, user choices, consequently making the future querying more efficient.

This product is a standalone product and does not serve as a part of any suite of products.

2.2 Product Functions

- **Duplicate Detection Module:** This function will remove redundant images. This process starts with duplicate detection based on image metadata for e.g.: the images which are clicked in the range of 0 to 2 seconds and once the duplicate images are identified the application will give the user a side-by-side view of duplicate images in their respective sets. The user can then select the images to be kept, following which the others are either deleted or archived to an external storage or marked as void and this will be dependent on the user's requirements.

- **Album creation:** The user can create albums manually and edit their names.
- **Image editing:** The application allows the user to perform basic editing like cropping images, adjusting brightness, resize the image, rotate the image, adding effects, etc.
- **Search by tag** This feature allows the user to find a particular image by allowing the user to search by tags assigned to a particular image.
- **Geolocation** The user will be shown a map which contains locations of various images taken by Photomaster app, on clicking a location the user will be shown the images taken at that location. The images' locations will be accessed using either the coordinates available on the EXIF file

2.3 User Classes and Characteristics

The user should be able to use the following functions:

- The user will be able to delete duplicates from their device or marking the duplicates as void or archiving the duplicates.
- The user will be able to create albums
- The user will be able to tag the images which are not tagged.
- The user will be able to search for the photos by specifying the details.

Our target audience is anyone who has many photos on their device.

People who have access to the internet and who can access the application.

Our generation who are more inclined towards taking photos.

2.4 Operating Environment

Operating Systems:

Android

· Android devices with Android 9+

2.5 Design and Implementation Constraints

- The app should be light weight.

- Should use less RAM and processing power.
- The app should be portable and installable also it should be platform independent.
- The application should have easy UI.

3. External Interface Requirements

3.1 User Interfaces

Initially when the user opens the application, they should see a login page. If the user has not registered yet, then they should be redirected to the sign-up page.

If it is a new user, then the system will ask for access permission to view and process the user's existing images from their device. Then the system will scan and load the user's images in the application.

Else if it is an existing user, then they can either scan new images or use existing ones to perform some functionalities.

After the scanning of the images, the system will look for all the duplicate images present in the all the images of the user and will give user three options regarding what must be done with those images.

Next step is removing duplicate images, the user can perform three functionalities on the images. The first is image tagging where the automatic tag generation is performed from the EXIF file of the image and user is asked to input additional tags related to the personal details of the image to create personalized experience to the user. Second functionality is image editor where the user can perform image editing to enhance the image. Lastly is album creation where the user can generate an album based on the specific queries or events for which the user wants the images.

Lastly the user can either perform some other functionalities in the app or logout from the application.

3.2 Hardware Interfaces

Hardware requirements:

- Ethernet connection (LAN) or Wi-Fi adapter (Wi-Fi)
- Memory (Ram): Minimum 2 GB ram would work but 4 GB ram is recommended.
- Usage of CPU can vary based on the user's usage.

3.3 Software Interfaces

The system shall communicate with the device to access the all the images and other media stored on the device. The communication between the database and the application consists of operation concerning both reading and modifying the data.

4. System Features

4.1 Enhancements

- **Image selection**

When you choose an image to edit, it will be highlighted and will then take over the screen, with three options to crop, feature select, and alter the image in the bottom bar.

- **Function Selection**

Long pressing the image brings up an option in the bottom bar to crop, rotate, and flip the image, as well as alter the image.

- **Crop**

When you click the crop button, a squared layer will appear around the image, which we will have to tweak to get the clipped part we want. In the bottom bar, you will also find options for pre-set ratios and manual cropping.

- **Pre-set Ratios**

The pre-set ratios button allows you to choose the aspect ratio of the image you want to use.

- **Ratios (Original ratio, 1:1, 2:3, 3:2, 3:4, 4:3, 9:16, 16:9)**

A definitive sequence of aspect ratio buttons will be available in the bottom bar which the user will have to choose to pick the appropriate aspect ratio for the image.

- **Manual Cropping**

When you click the crop button, a squared layer will appear around the image, which we will have to tweak to get the clipped part we want.

- **Confirm Selection**

The confirm selection option will ask users if they are satisfied with the image alterations they have made, and if not, they can adjust it again.

- **Rotate**

Users can select the rotate option from the function menu, and they will be directed to a new screen where image rotation will be available. The user can manually adjust the angle he wishes to rotate by.

- **Flip**

Users can select the flip option from the function menu, and they will be directed to a new screen where the image can be flipped horizontally or vertically.

- **Horizontal flip**

The horizontal flip option will allow users to flip the image horizontally.

- **Vertical flip**

The vertical flip option will allow users to flip the image vertically.

- **Adjust**

The function selection will have a adjust functionality, allowing users to manually modify the contrast, brightness, and saturation.

- **Save image to copy**

After all the adjustments have been made the user will get an option to save the image.

Image Editor

- **Function Selection**
    - Users will be able to choose the suitable function to apply to their photographs using the feature selection. Cropping, Rotate and Flip, and Adjust will be among the function operations available to them.
- **Crop**
    - The crop functionality will allow the users to crop the image to the desired dimensions needed by them, they will be provided with two options pre-setting the ratio or manual cropping.

Pre-set Ratios - The users will be able to pick between the given ratio options

- Original ratio,
- 1:1
- 2:3
- 3:2
- 3:4
- 4:3
- 9:16
- 16:9

- **Manual Crop** - The users will be allowed to manually crop the picture to their desired dimensions.

- **Rotate and Flip**
  - The user can flip or rotate the image to the correct proportions using the rotate and flip option.
    - **Rotate** - The rotate option will manually allow the users to rotate the image.
    - **Flip** - The flip will further two options:
      - Horizontal Flip - The horizontal flip option will horizontally flip the image.
      - Vertical Flip - The vertical flip option will vertically flip the image.

- **Adjust**
  - The user can flip or rotate the image to the correct proportions using the rotate and flip option. The adjust option will allow the users to manage the brightness, contrast, and saturation of the image.
    - **Brightness** – A horizontal bar will be present which will indicate the brightness of the image the user can move around the bar to adjust the brightness
    - **Contrast** – A horizontal bar will be present which will indicate the contrast of the image the user can move around the bar to adjust the contrast.
    - **Saturation** – A horizontal bar will be present which will indicate the saturation of the image the user can move around the bar to adjust the saturation.

4.2 Duplicate Detection

Description: This function will remove redundant images. This process starts with duplicate detection based on image metadata for e.g.: the images which are clicked in the range of 0 to 800 ms and once the duplicate images are identified the application will give the user a side-by-side view of duplicate images in their respective sets. The user can then select the images to be kept, following which the others are either deleted or archived to an external storage or marked as void and this will be

4.3 Tagging

- After creating an account and log in, the user will see their photos in the form of specific collections. These collections will be formed by creating tags for each image.
- Once the image is extracted from the database, we extract metadata from the image. This metadata would include the location of the photo taken, date and time, face identification tag (if already created for that person), etc.
- In case no metadata is found, the user would be asked to enter tags for the same. Tags could include – 'Birthday,' 'Shopping,' 'Raj,' etc.
- Once tags are generated, it is saved in the database along with the image. An album is created, which would then be displayed to the user.
- The user can choose to save the album created. If the user saves this album, details of the same are updated on the database.

4.4 Search by tag

This feature allows the user to find a particular image by allowing the user to search by tags assigned to a particular image.

4.5 Geolocation The user will be shown a map which contains locations of various images taken by Photomaster app, on clicking a location the user will be shown the images taken at that location. The images' locations will be accessed using either the coordinates available on the EXIF file

5. Other Non-functional Requirements

5.1 Performance Requirements

- Latency
  The typical user shall be able to get the results of their search or filter within 1-2 seconds.
- Response Time
- All system responses shall occur within 0.5-1 seconds

5.2 Software Quality Attributes

Availability

Once the phone opens the Photomaster application it is ready to carry out its task when it needs to be or requested for use. The system shall provide users with a minimum operational availability of 99.9%

Maintainability

Our system can be maintained easily by any user if it includes any updates or repairs. The mean time to fix any errors or bugs should not exceed 1 person per day.

Portability

Our application can be accessed through mobile. So, it is accessible anywhere at any time for image editing, filtering, and searching.

Accessibility

Any graphical user interfaces shall be usable by persons with colour blindness. Any graphical user interfaces shall use an adequate font size to be usable by persons with limited visual acuity.

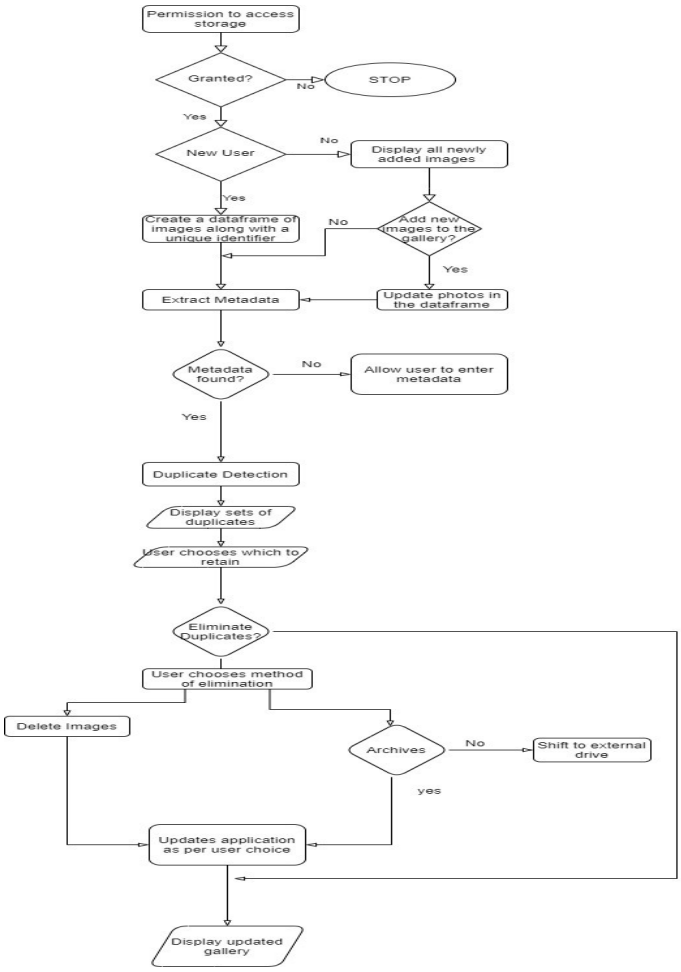
Robustness

The application should gracefully handle invalid input (i.e., detect invalid input, request valid input, and not crash) from all externals. The system should gracefully handle hardware failures (i.e., provide hot failover, notify the system operator, and not crash).

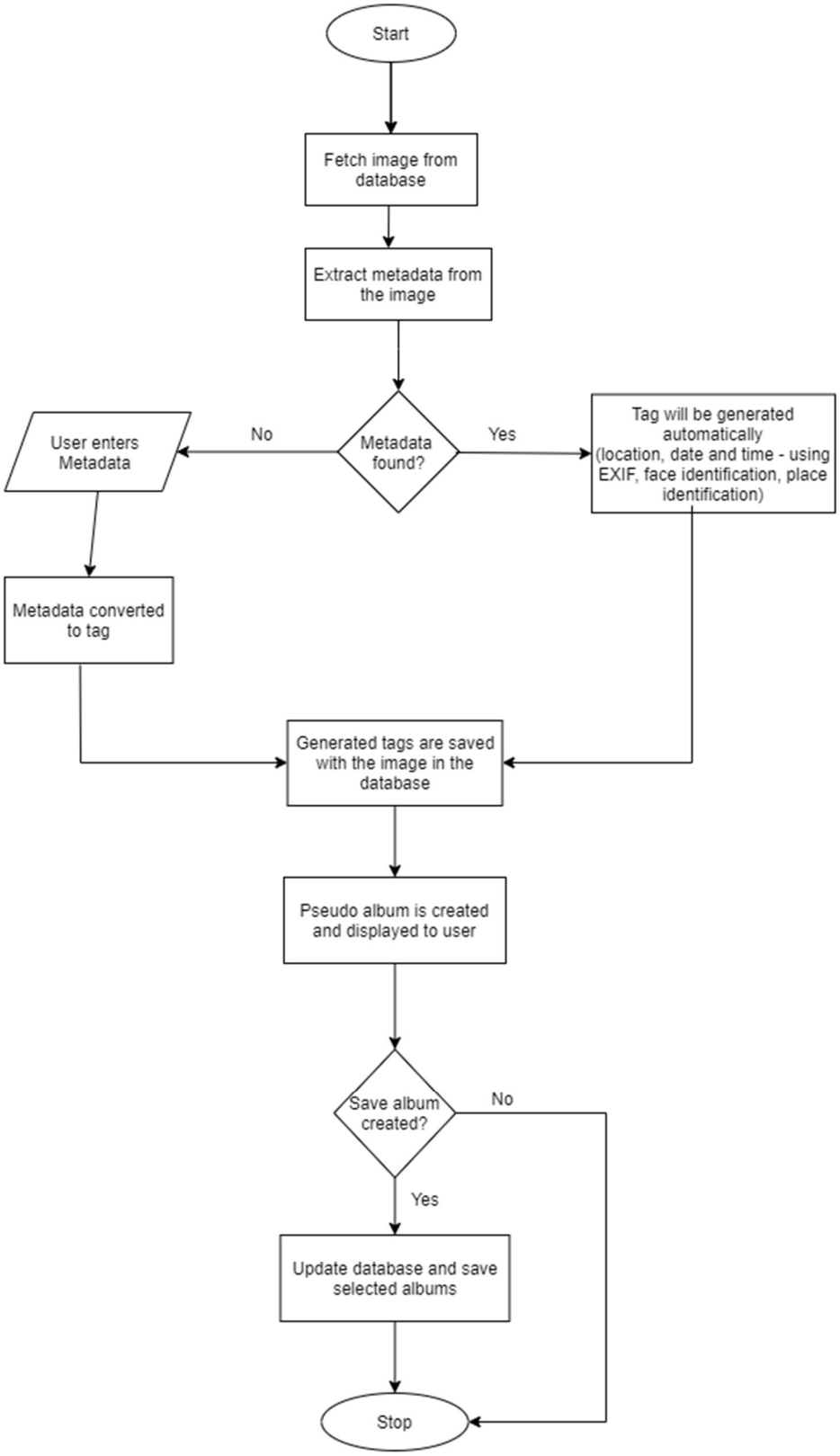
6 Other Requirements

Appendix A: Analysis Models

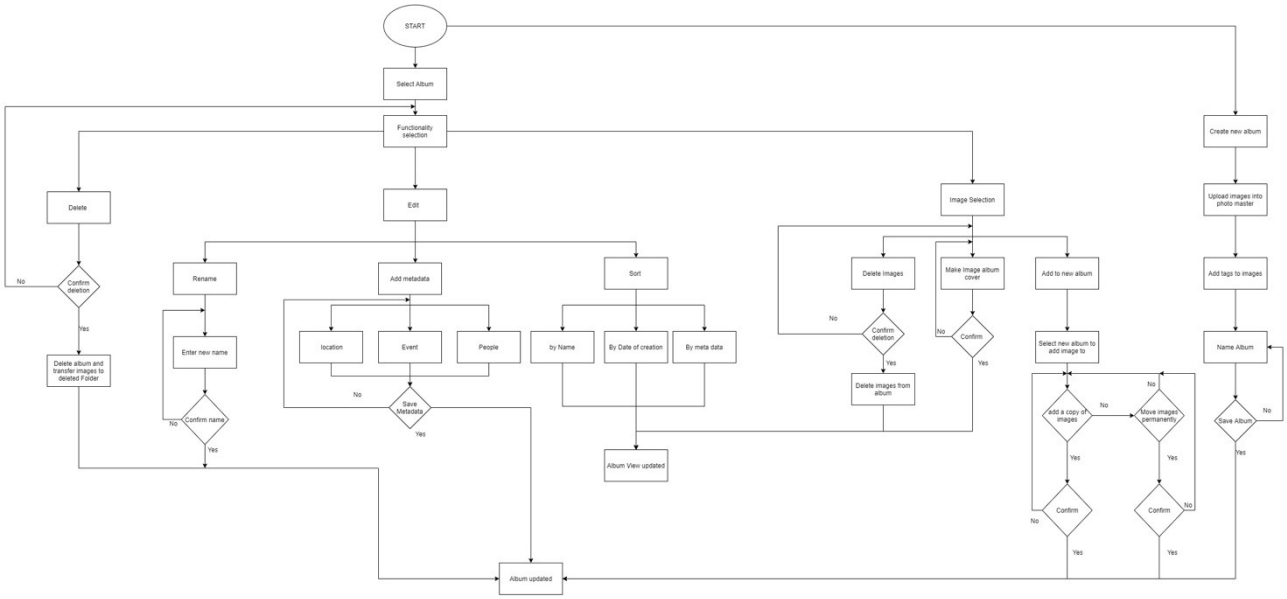
Duplicate Detection



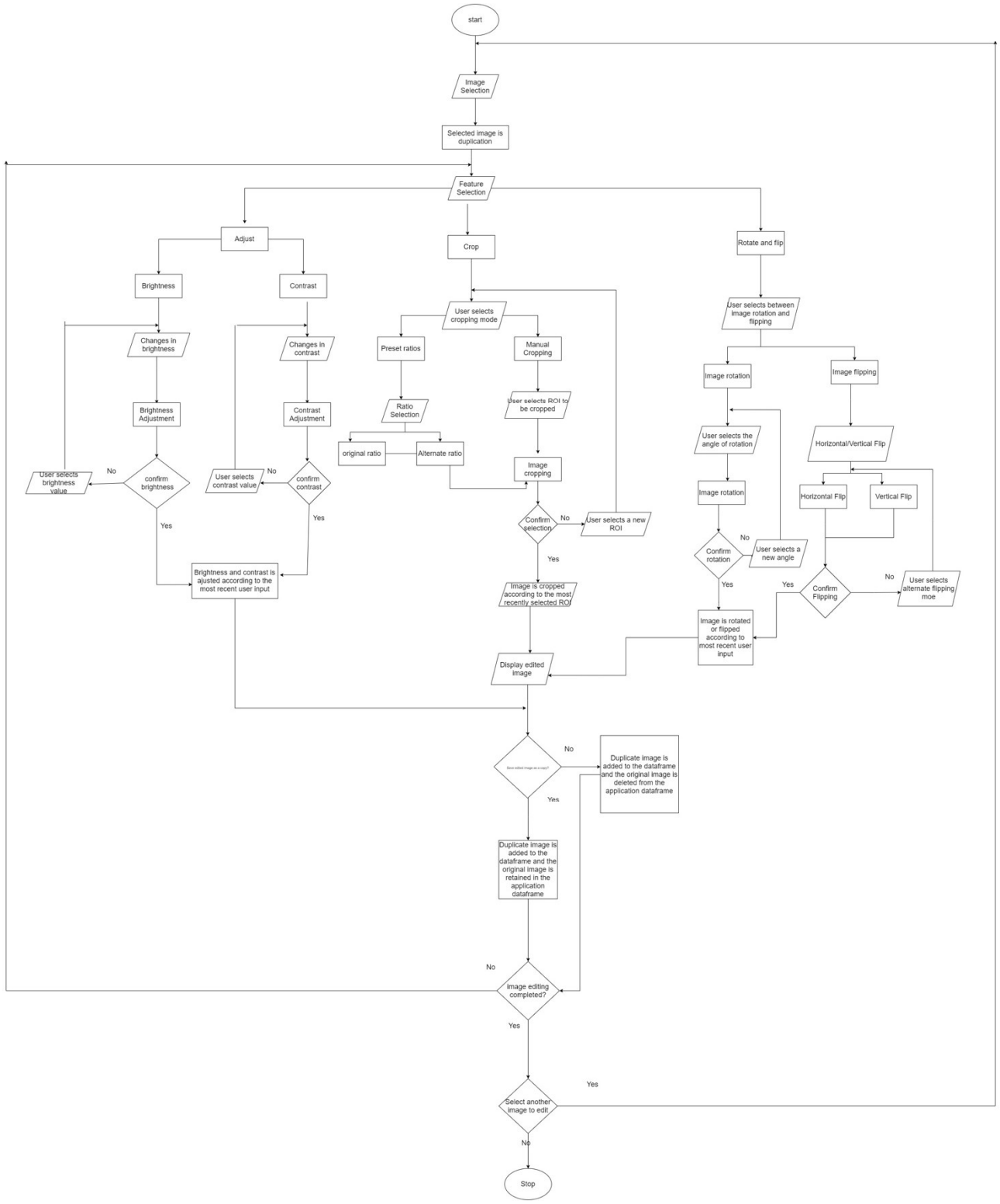
Tag Creation



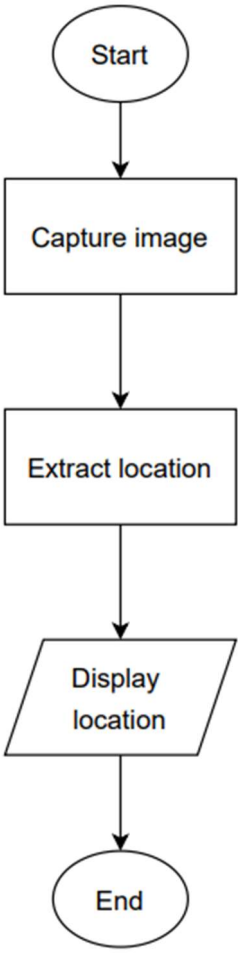
Album Functionalities



Enhancements



Geo-location:



Appendix B: DB Schema