Catalog

Part A: Requirements Analysis

1. Users' Characteristics

We selected 7 interviewees with different types to complete the user research:

No.	Gender	Age	Occupation	Mobile Size	Using Frequency of Album
1	Male	22	Student of History from Peking University	4.7 inches Slightly larger (compare to his hand)	Not quite frequently, usually for class record.
2	Female	21	Student of Digital Media Art from Communication University of China	5.5 inches Too large	Very frequently
3	Male	30	Employee of a payment platform company	4.0 inches Slightly small	Often
4	Female	28	Employee of a foreign company	4.7 inches Medium	Often
5	Male	21	Student of Electronics Science and Technology from ZJU	4.7 inches Medium	Frequently
6	Female	20	Student of Industrial Design from ZJU	4.0 inches Medium	Very frequently
7	Male	22	Student of International Politics from ZJU	4.0 inches Medium	Often

2. Sampling of the Questions

- What is the type of your phone?
- What is the size of your phone? And comparing to your hand, is it moderate?
- How often do you use the photo album of your phone?
- Under what circumstances would you use the album?
- Do you have any trouble with using the album? And any functions of it needed to be improved? (Base on the answers, have a further communication to question closely.)

- What is your operating mode in using the album, single hand or both hands?
- Do you think that it is necessary to add some single-finger functions, such as scale or rotate the photo with one finger?
- Is there any function you want to add to the album? And have a short description of the necessity of your choice.

3. Requirements Summary

We summarize some requirements that users need from the interviews:

- A more intuitive and convenient album and photo display interface to watch and operate.
- A private space for pictures, which indicates that user can lock or unlock the space up to his will, to protect the privacy and security of the pictures.
- User can rotate (90 degrees per operation), magnify and shrink pictures with one finger.
- The picture can be not only copied but also moved from one album to another.
- There are some tags or attributes about photos can be showed and user can edit some of them.
- User can classify pictures into varied labels and folders.
- GIF can be played in the album

4. Representative Tasks

(1) The new album management system must support different browsing ways to users. We will add a switch to the ”album” interface that can be used to change the display mode. In the original album, there is only one browsing way——list mode. And in that mode, user can hardly find the photo which he wants from the tiny covers of those albums, with much empty space on the right side. From the interviews and a further analysis about it, we get that the empty space can be used to display some attributes about the album, such as the name, description, setup time, the number of photos and so on. And with the switch function, user can watch the albums under large picture mode and medium picture mode. Large mode covers thumbnails maximum for a preview of the content of the album, but without detail information. In the album of medium mode, thumbnails are relatively small, but the screen can display about more than 20 albums for users to quickly search, navigate to an album. With these changes, user can manage the album more quickly and easily than before.

(2) User can rotate (90 degrees per operation), magnify and shrink pictures with one finger. People usually operate the phone with both hands, one hand holds the phone, another finishes the operation such as touch, slide, scale and so on. But there are many situations that the one hand of the user is occupied, then it is

rather difficult to hold and operate the phone with one empty hand at the same time, especially zooming and rotating the picture. We select two representative functions supported by the users——90-degree rotation and zoom, both with one finger. From the interviews, users prefer rotating the picture to rotating the phone when it is needed. Because after rotating the phone, everything changes, the positons of the buttons move to somewhere unfamiliar, and it is hardly to have a further operation with one hand and landscape mode, and more annoying when the “autorotation” is opened——the picture rotates too! And it is not necessary to have a slight rotation to the picture, since that can be done in the “edit” interface. And it may be too troublesome to enter that interface to rotate the picture 90 degrees, for this frequently-used operation, a one-finger slide is enough and more convenient.

5. Project Drivers

(1) The Purpose of the Project

a) The User Business or Background of the Project Effort

To develop an album management system to cover some defects of the one of iPhone, or improve the system in some aspects. According to the questionnaire made by our team, we find that the current iPhone album management system does not cover all users’ demands, or at least, it has some obvious disadvantages, especially some drawbacks in pictures management. For example, it cannot lock the album, in other words, it does not guarantee privacy and security of the users’ pictures. If another one has already unlocked the iPhone, he can easily get access to the pictures, which would violate pictures’ privacy and security. In our plan, with the delivered product, the user intends to lock the album, adjust pictures with one finger, classify pictures into labels and folders, play GIF. In general, users can manage pictures better with our system.

In a casual chat, a friend mentions the inconvenience of the iPhone album management system, both in interaction and management aspect. Thus, our team conducts a questionnaire about it. According to the questionnaire, iPhone users are quite unsatisfied with the current album management system, and they put forward some advice to improve it. So our team is motivated by the need of those users to improve the system.

We think the problems are serious, especially the privacy problem and interaction problem, as many people have mentioned. Smart phones of other brands seem have done better in this area, so we are confused why iPhone does not considered this problem. Since it is an urgent demand, it is necessary for us to do the work.

b) Goals of the Project

To develop a better album management system (software) on iPhone compared

to the current one, because the original system lacks some essential functions, and it is not user friendly.

- Users are allowed to build a private space for pictures, which indicates that user can lock or unlock the space up to his will, to protect the privacy and security of the pictures.
- User can classify pictures into varied labels and folders.
- User can rotate, magnify and shrink pictures with one finger.
- User can move picture from one folder to another
- User can watch and edit picture
- User can watch GIF

For our program, if we achieve the original and basic goals that user can have a better experience with our album management system, our program succeed.

Since iPhone is prevalent, no one would abandon it just because of its defects in the album management system. If our software can popularize successfully, iPhone would get more popularity, then we may need to consider the popularity rate, utilization ratio as well as users' favorable rate.

(2) The Client, the Customer, and Other Stakeholders

a) The Client

We may call the client "The Album Manager".

Users are referred to the people who use album management system on iPhone. With the help of the client, users can manage the albums more conveniently and comfortably.

Our user is single target, and it is the one who owns the iPhone and operate pictures on the iPhone.

b) The Customer

Some program development companies may be our customers, or even APPLE.

The potential and known aspirations of customers have been described above, that is providing users with better experience of managing albums. Companies may develop a bit more functions based on our program, or some institution may buy this application and put into use directly.

c) Other Stakeholders

As a small application, at the present stage there may no other stakeholders.

In the future if it becomes an enterprise project, there may be some sponsor, testers and many experts such as marketing experts, legal experts, usability experts and so on become stakeholders.

(3) Users of the Product

a) The Hands-On Users of the Product

Users want to ensure privacy and security of their pictures, and manage albums more conveniently.

User category	User role	Technological experience	Subject matter experience
Adults	Have some private pictures and hands are occupied. So they can lock albums and operate iPhone with one finger.	Non-essential	Non-essential
Students	Take pictures of various things, and want to classify them into specific types.	Non-essential	Non-essential

b) Priorities Assigned to Users

Only one user will be consider in the interaction (who owns the iPhone and manage albums), so there is no priorities assigned.

Since the intention is to secure the safety of the pictures and offer better experience of managing pictures, there is no one other person engaged in the whole process.

c) User Participation

There will be a manual to instruct users how to operate, and the operation is not something novel or difficult according to the current iPhone or smart phone.

d) Maintenance Users and Service Technicians

Program production Staff.

Do some adjustments to ensure the program run successfully or update the content information.

6. Project Constraints

(1) Mandated Constraints

a) Solution Constraints

Description: The product shall operate using IOS system.

Rationale: The client uses iPhone and the albums in android phones have no a standard interface and functions.

Fit criterion: The product shall be approved as IOS hand-held device.

b) Implementation Environment of the Current System

The product is to be installed and used in IOS system. And the physical environment for these one-finger functions can be a rainy day, a cold day or some other situations that one hand is occupied.

c) Partner or Collaborative Applications

Our album management system must need a camera to work with at least, and some other applications in phone that associated with pictures are also collaborative.

d) Off-the-Shelf Software

We accomplish the system in IOS platform and modify the interfaces of the original album system, the codes of functions are almost shelf-written.

e) Anticipated Workplace Environment

When users need to watch and edit the pictures, the album system is necessary, and once one of their hands is occupied or unwilling to leave from the pocket or quilt at that time, the one-finger functions are necessary. And these one-finger functions must be easy and sensitive to operate, since the phone is hold by one hand, it may be fallen easily.

f) Schedule Constraints

The product must be accomplished before the Apple company modifies the album system to deal with these problems as the users mentioned, and of course, before the iPhone is not prevalent.

g) Budget Constraints

As a four-member team, we do the job all in our owe equipment, such as PC, digital tablet and so on, all we need is time and user data.

(2) Naming Conventions and Definitions

a) Definitions of All Terms, Including Acronyms, Used in the Project

One-finger: User can finish some tasks with one finger touching the screen, and of course, the rest of the hand must hold the phone firmly.

Rotate: In our album management system, the picture can be rotated with one-finger, but 90-degree per slide, it can't be rotated less or more than 90 degrees without entering the "Edit" interface.

b) Data Dictionary for Any Included Models

Coordinate Point: Almost all operations need to be done with the coordinate points of the touching or sliding on the screen.

Attribute: We need to store the attributes of every photo, such as title, setup time, width, height, storage, focal length, aperture, time of exposure, ISO, path, tag and so on; and there are also some attributes for the albums, such as the number of photos and description.

(3) Relevant Facts and Assumptions

a) Facts

Things may be easier to do in android system.

The authority for modifying the system of iPhone is limited.

b) Assumptions

IPhone 7 may have a better album system to cover these problems.

Some of the functions are hard to be accomplished because of the limitative modifying authority.

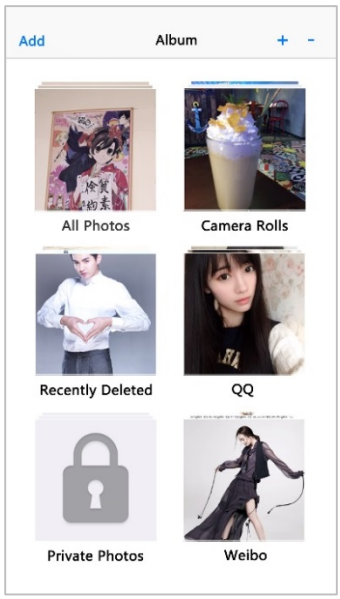
Part B: Building a Prototype

1. Scenarios and Paper-based Mock-up

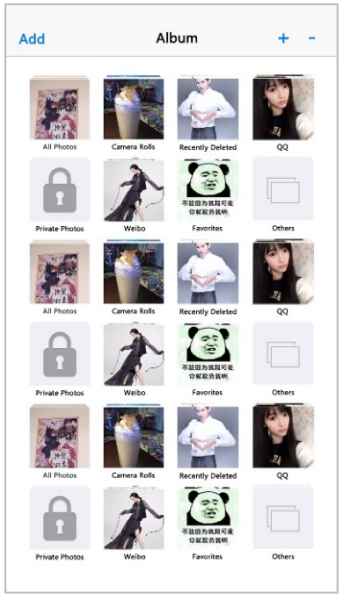
(1) Initial design and sketches

- **Album**

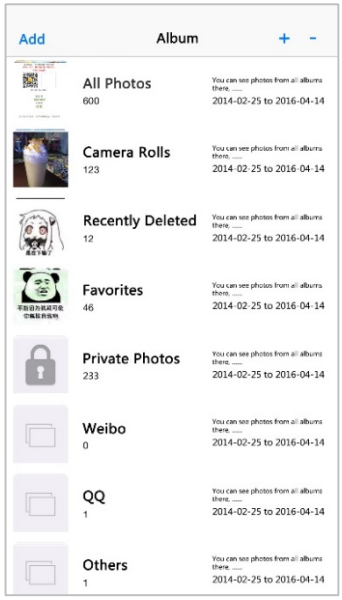
The main interface of our system is the “album”, with three different showing modes, which are large, medium and small respectively. In the album of large mode and medium mode, only the thumbnails of the content and the name of each album are displayed, without other detail information. Small mode is list mode, which shows not only the tiny thumbnails and the album name, but also the details on the right side, such as album description, setup time, the last update time and so on. And the three modes can be switched by the buttons on the top right corner of the interface.



Large Mode



Medium Mode

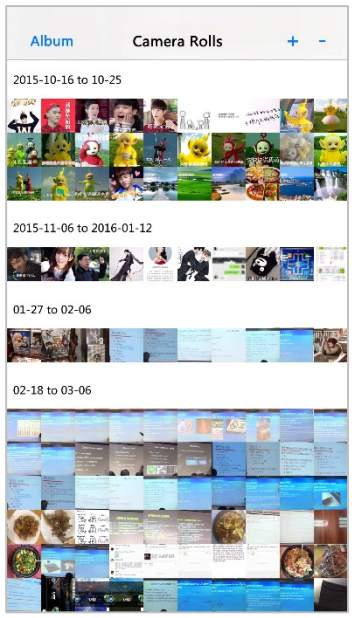


Small Mode

- **Camera Rolls**

After clicking into the album, the camera roll can be viewed. It supports two different show modes, the large one and the small one. The switching operation is same to that in the “album” interface. The photos are sorted by setup time.

Large Mode

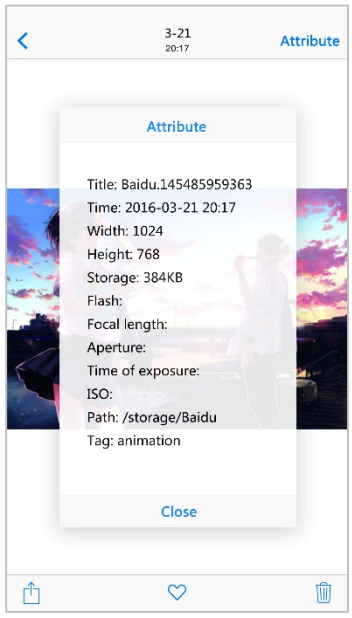


Small Mode

- **Photo**

After clicking into the camera roll, we can watch and edit the whole photo, doing operations such as scaling and rotation. And the detail attribute of the photo can be showed in the interface.

Watch and Edit



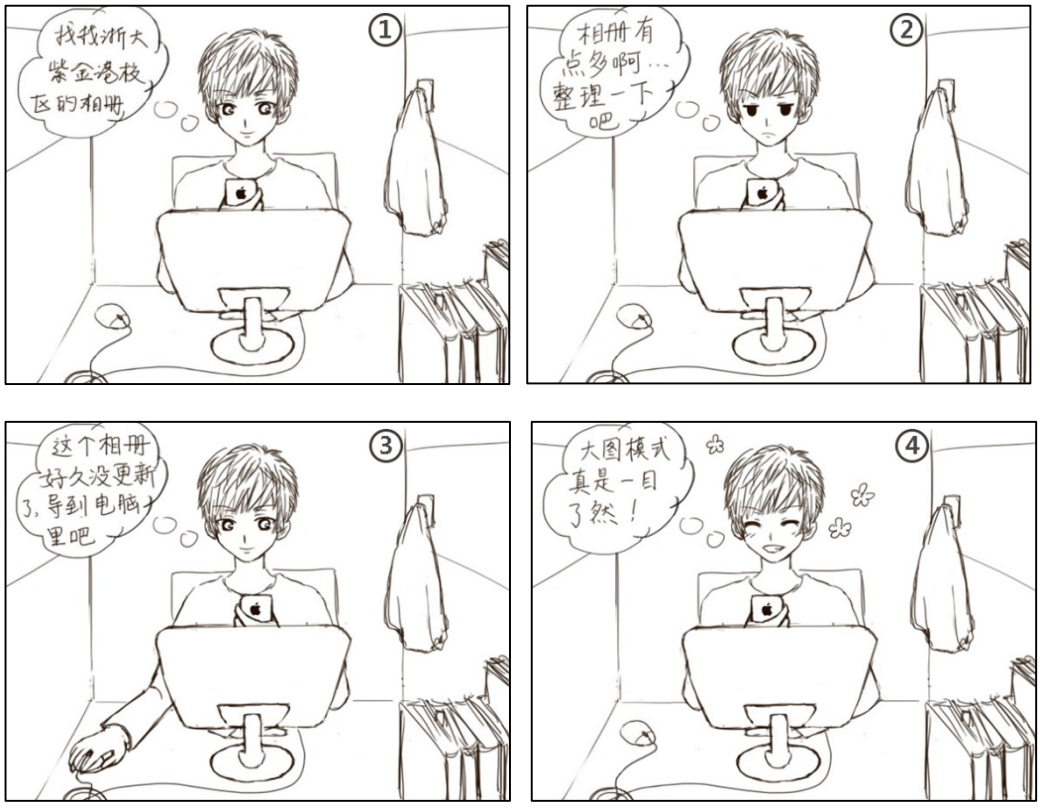
Attribute

(2) Task Scenarios

Scenario 1

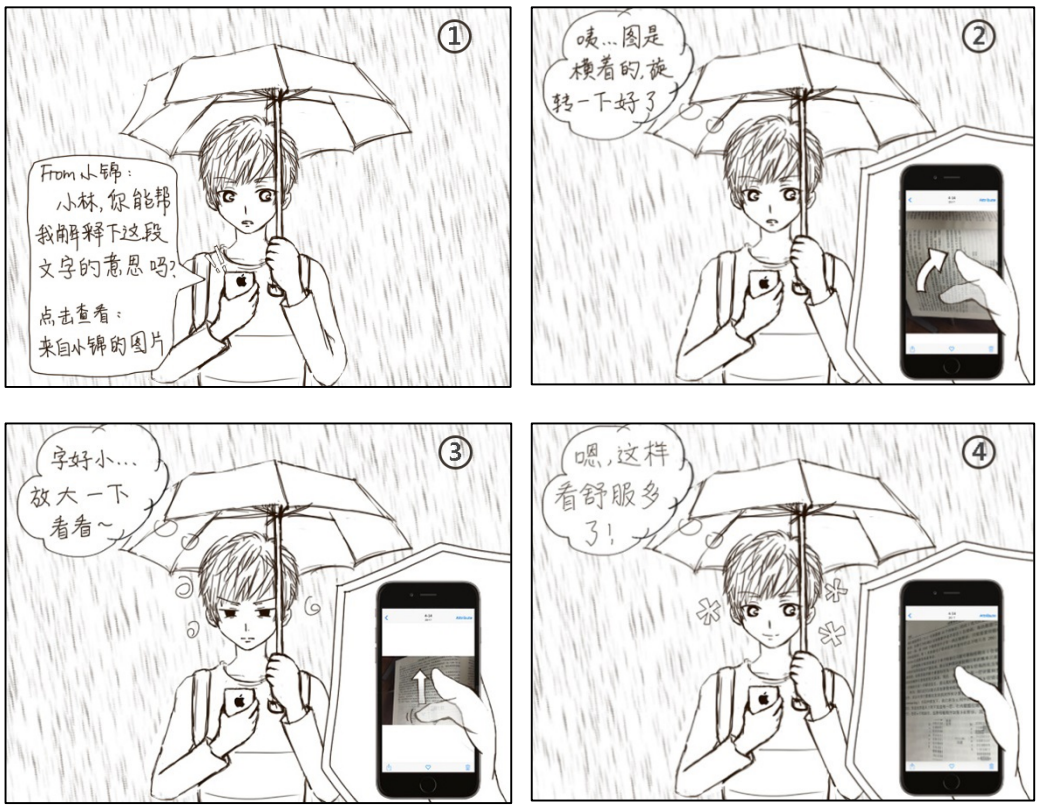
Lin is an album expert with more than 60 albums and thousands of photos in his iPhone. Usually, he searches the album which he wants in the “album” interface with medium preview mode. In this mode, for more than 20 albums per page, he can find the target within 3 pages.

After a semester, Lin plans to have his albums organized, moving some rather old or useless photos to his PC. With the names and covers in medium mode, he fails to have a good decision that which album is needed to be organized. Then, Lin touches the button “-”, switching the mode to the smaller one——list mode, and with the detail information on the right side, he can make the decision easily without clicking into every album to have a check. After that, there are about 20 albums left. And then, Lin switches the interface to the large mode for a better use.



Scenario 1

It is a rainy day, Lin is wondering in the campus with an umbrella in his left hand. At this moment, he receives an message with an image from Xiao Jin, who ask a question in this image to him. But the image was sent in landscape mode, it needs to be rotated 90 degrees in a counterclockwise direction to have a good look. Usually, he can rotate the phone to make it, but with one hand occupied, it is too hard to hold the phone in that case and have a further operation. So with our system, Lin can use his empty hand to hold the phone as usual, and fulfils the tasks with one finger of the same hand. To rotate the photo, his thumb slides on the screen to paint a circular arc, and then, the photo is rotated 90 degrees in the direction of the arc. With Lin's poor eyesight and the tiny words in the photo, he can barely see the question clearly. So he uses his thumb again to scale the photo, with having a long press on the position where needed to be magnified, and then moves it towards the top area. After a series of one-finger operations, Lin fulfils the task, Xiao Jin shows his appreciation to Lin's help.



2. Cognitive Walkthrough

(1) Problem Uncovered

Scenario 1

In iPhone's own album management system, in the ‘photo’ tag, the pictures are only sorted in time order. That provides several modes, annual, selection, time, which are protruding the characteristics of the time, so that cannot help but look very thin and weak. Because users also want classify pictures in other ways. In the ’album’ label, there is only one type of album layout mode, that is, to be used to classify the album by applications. This corresponds with iPhone’s operating system concept, which is application oriented. Different applications have different permissions, as well as album management. Different pictures are bound with their applications, known as the "file" of the application or "document". However, in this label, the system only provides a way to view the album, which is the vertical version of the album arrangement. If clicked into, the specific content can be viewed. Depending on the type of iPhone, a screen can accommodate a number of 5-6 pictures. So for the love of mobile phone users to take pictures, if there are dozens of albums, then this mode makes it very difficult to manage the album. So we put forward the solution that the albums can be switched between different modes, which are large, medium and small. Large mode covers thumbnails maximum for a preview of the content of the album, but without detail information. In the album of medium mode, thumbnails are relatively small, but the screen can display about more than 20 albums for users to quickly search, navigate to an album. The pattern of small album mode is similar to the Windows file management system, which shows the details of the files. On the right side, there is an album description, setup time, the last update time information. With this album management method, users can quickly and easily manage the album. Including add and delete operation, import to the computer, and so on.

Scenario 2

Usually people generally use one hand to hold the phone, and use the other hand to operate the phone. But if the other hand is occupied, user can only use one hand to hold the phone and make operation, then the operation will become relatively difficult. In the iPhone picture operating system, image scaling and rotation need to be done with two fingers. However, most people cannot hold mobile phone by one hand, and zoom or rotate a picture by the other at the same time. As a result, the single finger operation is referred to as a solution. In this scenario, the user needs a hand to take an umbrella, so there is only one hand to hold the phone. So, when he needs to rotate or scale the picture, it is a good way to complete the operation with a single finger.

(2) Design Change

Compared with the album management system of iPhone, our group make the improvement of adding three types of previewing album, and rotating and zooming operation with single finger. Especially the latter one, from the interview, we believe that it is a brand new and necessary function among smart phones, users want it urgently.