Cerberus

Online Contact Details Manager
Software Architecture Document

Version 1.0

Revision History

Date	Version	Description	Author
17/02/2018	1.0	Software architecture document	K.Tharsanan

Table of Contents

Software Architecture Document

1.   Introduction

This document represents a architectural overview of the Online Contact Detail Manager system, using some architectural views. This document will be used to explain architectural decisions that made on the system.

1.1   Purpose

Purpose of this document is to clearly state how the system is going to be developed and deployed. This document will be useful for the developers and clients to know workflow of the system development and key things of the project.

1.2   Scope

This document explains an overview of the system and some of the architectural decision. This illustrate structure of the database and physical deployment of the system.

1.3   Definitions, Acronyms, and Abbreviations

User	Someone who interacts with the mobile phone application
OCDM	Online Contact Details Manager
OCR	Optical character recognition
SRS	Software requirement System
RUP	Rational Unified Process
API	Application Programming Language

1.4   References

[1] "Software architecture document guidelines," [Online]. Available:
https://technowiki.wordpress.com/2013/05/08/software-architecture-document-guidelines/. [Accessed 12 03 2017].

https://creately.com/ is used to draw the diagrams

1.5   Overview

In order to fully document all the aspects of the architecture, the Software Architecture Document contains the following subsections.

Section 2: describes the use of each view

Section 3: describes the architectural constraints of the system

Section 4: describes the functional requirements with a significant impact on the architecture

Section 5: describes the most important use-case realization. Will contain the Analysis Model and the Design Model

Section 6: describes design's concurrency aspects

Section 7: describes how the system will be deployed. Will contain the Deployment Model

Section 8: describes the layers and subsystems of the application

Section 9: describes any performance issues and constraints

Section 10: describes any aspects related to the quality of service (QoS) attributes

2. Architectural Representation

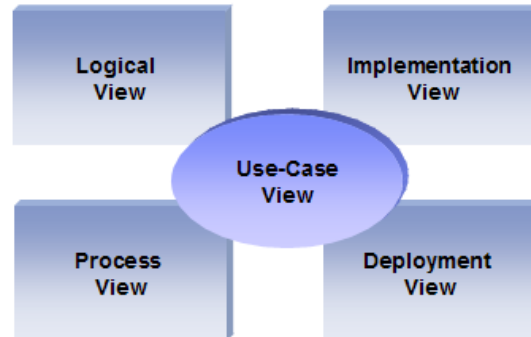This system is going to developed under "4+1" architectural model.

Figure 1 4+1 model

Logical view: Audience of this view are designers. This will cover functional requirements. Describes the design's object model.

Process View: Audience of the view are Integrators. Describe non-functional requirements, design concurrency and synchronization aspects.

Implantation View: audience of the view are programmers. Covers software components, layers and subsystems.

Deployment view: audience are deployment managers. Describes mapping of the system to hardware and show system's distributed aspects.

Use case view: audience are all the stake holders. Describes the set of scenarios and/or use cases that represent some significant, central functionality of the system.

3. Architectural Goals and Constraints

This section describes requirements and some of the major objective of the system that has significant impact on the system.

3.1 technical Platform

this is a android based application so any user who have android version above 5.0 can download from Play-Store and use it.

3.2 Performance

OCR extraction will be finished within 3 secs.
Search for a contact or filter search will be finished within 1 sec

3.3 Privacy

Contacts details cannot be copied from database all the details will be encrypted. If user like to share one detail only, he can share the contact details.

3.4 Security

User password will be stored as encrypted.
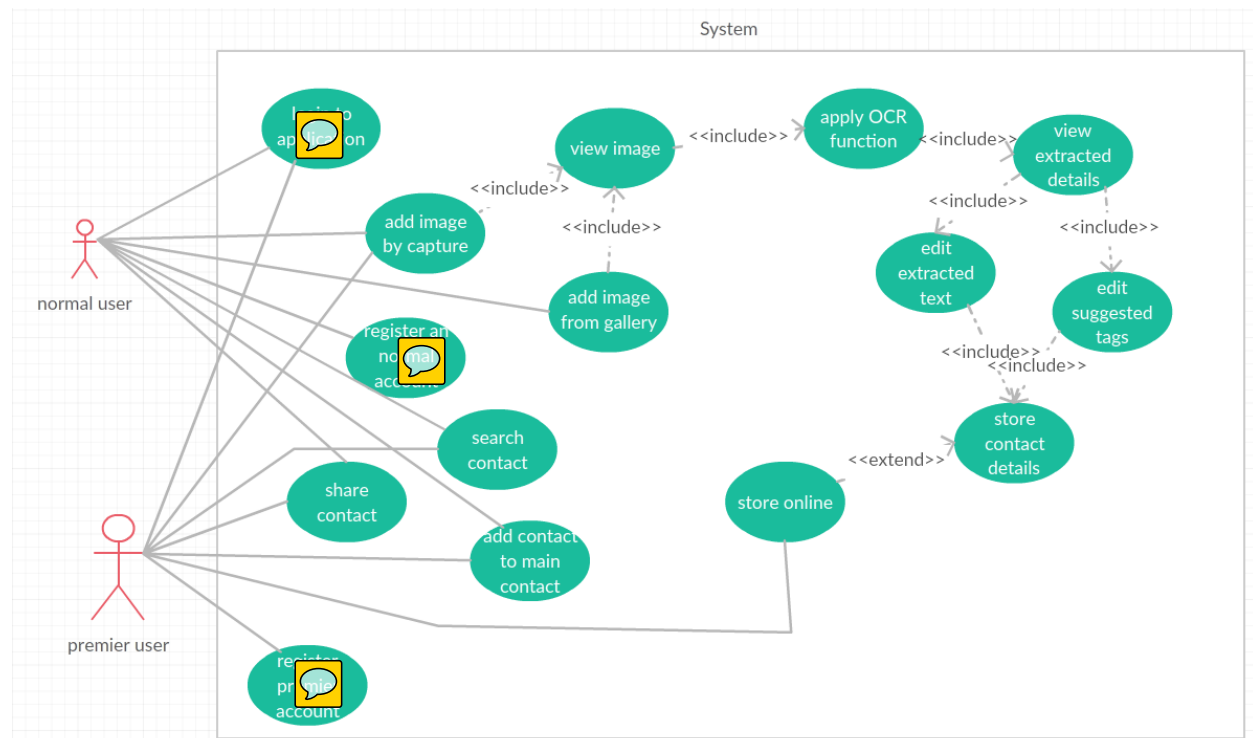Login is required for access the application.

3.5 Portability

As this is a mobile application, It is portable within mobile.

3.6 Persistence

Data persistence will be addressed by database.

4.   Use-Case View

4.1   Use-Case Realizations

Use case name	Login to the application	
Actor	Normal application user	
Description	In order to use application a user want to login first	
preconditions	User should be registered.	
Main flow	User	System
	1.1 Enter mail and password 2. Click sign in button	1. Provide login page 2.1 check authentication 2.2 provide application home page
Successful end/post condition	Home page will be provided	
Fail end/post condition	Reenter mail and password	
Extensions		

Use case name	Capture image
Actor	Normal application user

Description	To apply OCR user should select or capture image.
preconditions	User should be logged in.
Main flow	**User** / **System**

User	System
1. click camera button	1.1. open camera app
2. click capture	2.1. receive captured image

Successful end/post condition	Captured image will be displayed
Fail end/post condition	Show error warning
Extensions	

Use case name	Select image from gallery
Actor	Normal application user
Description	To apply OCR function user should select or capture picture
preconditions	User should be logged in.
Main flow	**User** / **System**

User	System
1. click on gallery button	1.1. open gallery intent
2. select image	2.1. receive selected image

Successful end/post condition	Image will be displayed
Fail end/post condition	Error warning will be displayed
Extensions	

Use case name	Apply OCR function
Actor	Normal application user
Description	By applying OCR function, we can extract text from image.
preconditions	User should be selected an image.
Main flow	**User** / **System**

User	System
1. click OCR button	1.1. apply smoothing functions on image
	1.2. apply threshold function on image
	1.3. apply OCR on image
	1.4. bind tags with text
	1.5. display text with tags

Successful end/post condition	Display extracted text
Fail end/post condition	Error warning will be displayed.

Extensions	

Use case name	Edit extracted text and tag	
Actor	Normal application user	
Description	user can edit suggested text and tags	
preconditions	Edit page should be displayed.	
Main flow	User	System
	1. edit extracted text and related tags	1.1. edit original values
Successful end/post condition	All the information will be edited as user wish	
Fail end/post condition	Alert about wrong edit.	
Extensions		

Use case name	Search a contact	
Actor	Normal application user	
Description	User can search for a contact using name or phone number	
preconditions	Should be logged in. and on the home page	
Main flow	User	System
	1. click search button	1.1. provide search page
	2. enter name or phone number	3.1. search specific data on database
	3. click search button	3.2. display information
Successful end/post condition	Contact detail will be displayed.	
Fail end/post condition	Error warning will be displayed. Or contact not available tag will be displayed.	
Extensions		

Use case name	share contact	
Actor	Normal application user	
Description	User can share a contact.	
preconditions	Should be logged in. and on the home page	
Main flow	User	System
	1. click select action bar action.	1.1. Change view as selectable
	2. Select contact	2.1. Tick selected contacts

	3. Click share option in action bar. 4. Click on share option.	3.1. Provide share option 4.1. Start share intent
Successful end/post condition	Contact will be shared	
Fail end/post condition	Not shared alert will be displayed.	
Extensions		

5. Logical View

5.1 Overview

This system follow layered architecture in the following way.

User Interface
Main system
Database Handling System
Database

5.2 Architecturally Significant Design Packages

Two main classes in this system are DatabaseHandler and ResultProducer. DatabaseHandler will handle all the request to the database. ResultProducer will process extracted text and bind suitable tags with the subtext. Info class will be used to communicate between other classes.
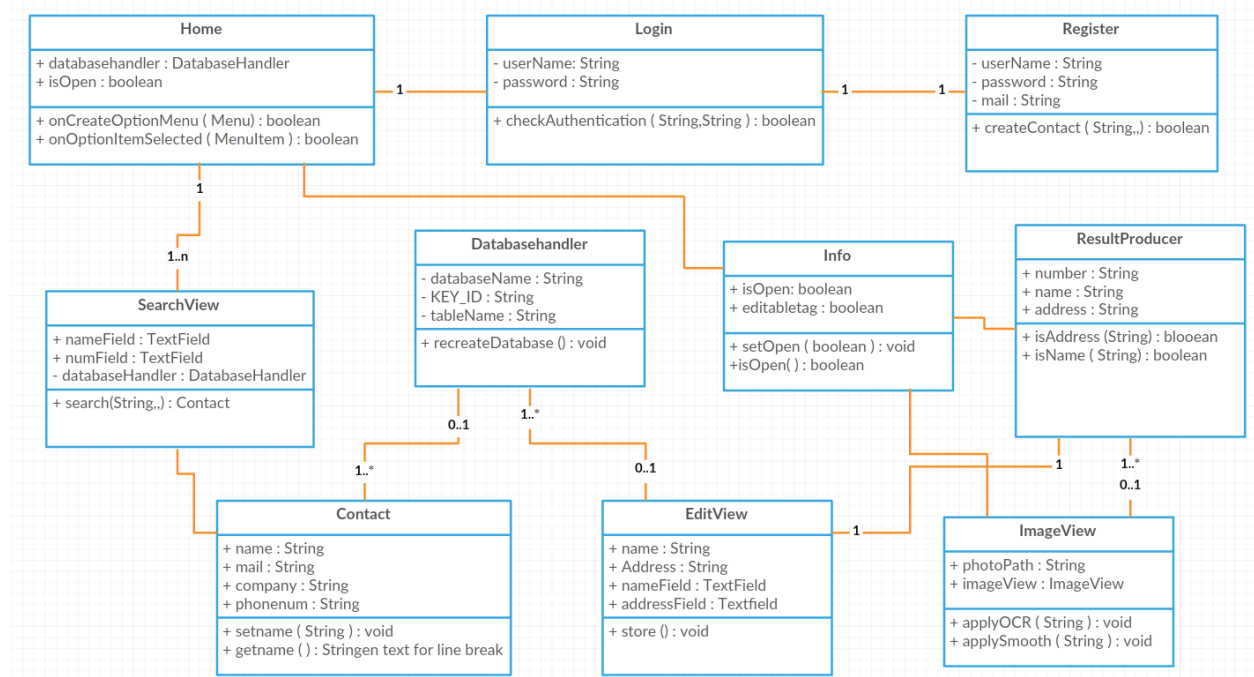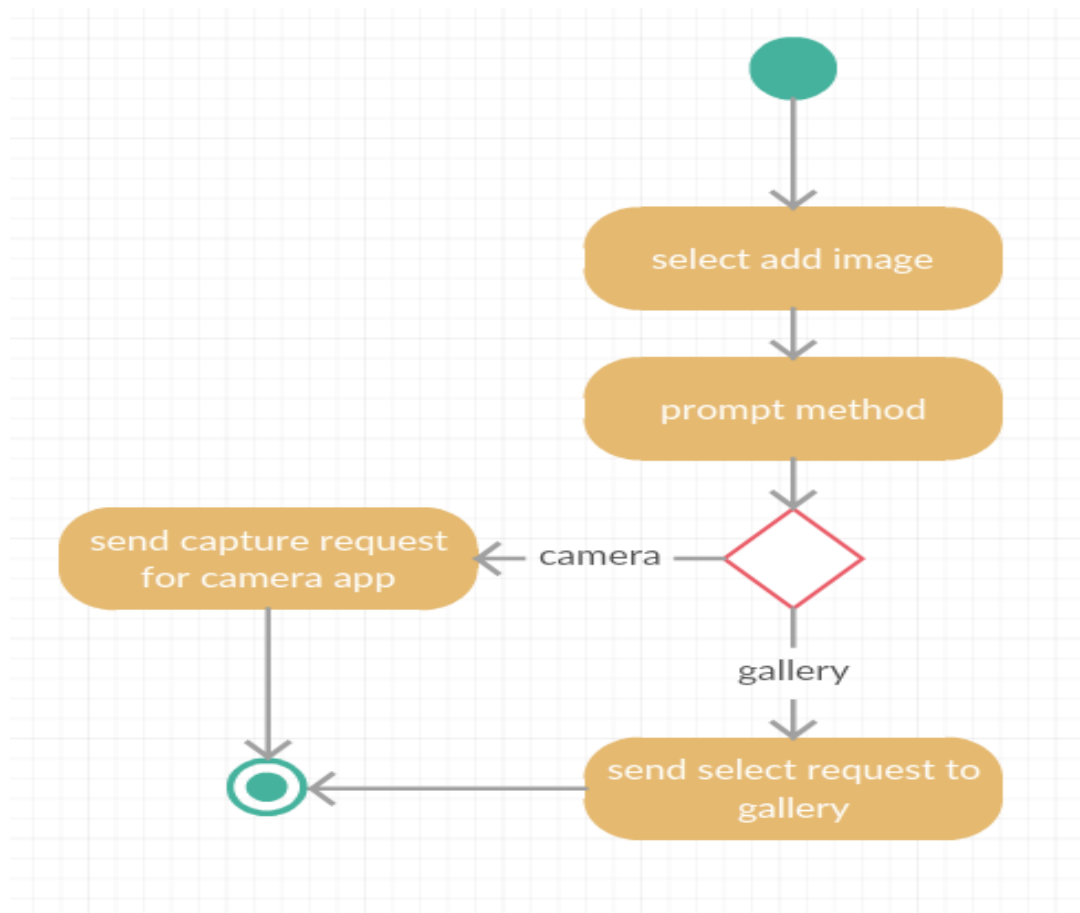

Figure 2 class diagram

6. Process View

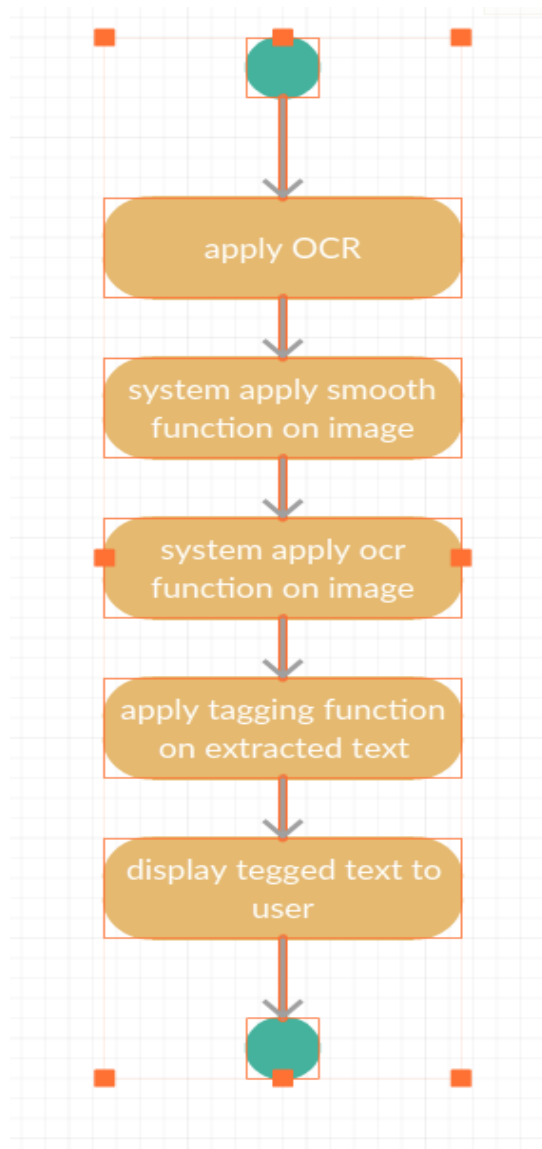*Figure 3 add image- activity diagram*
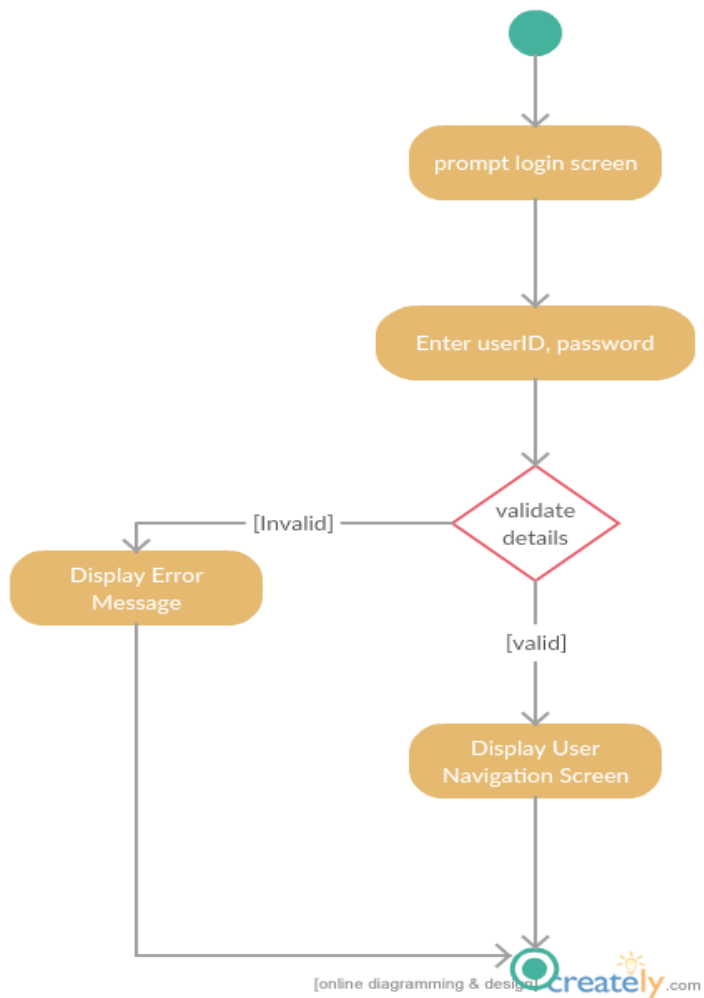
Figure 4 apply OCR -activity diagram

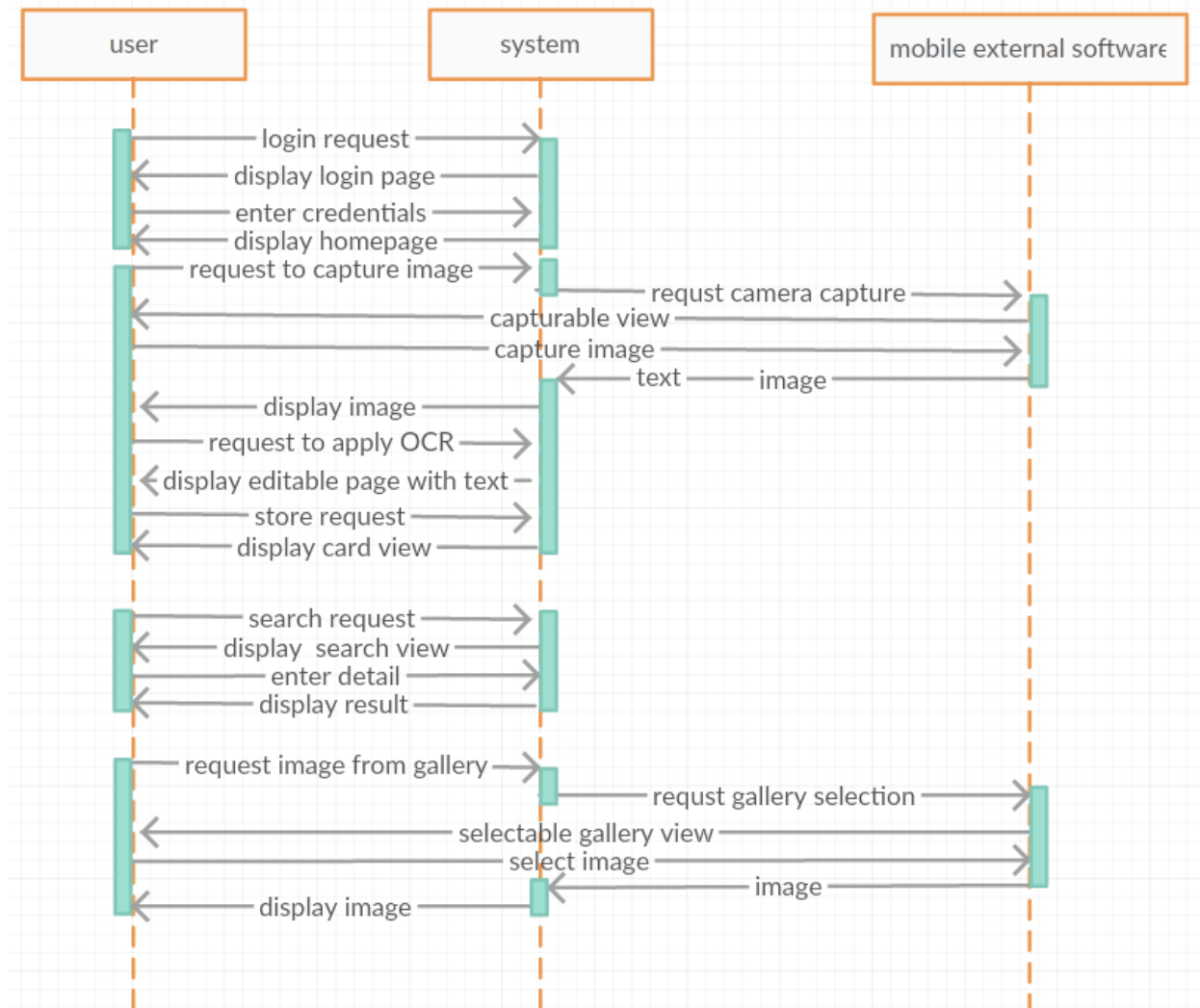*Figure 5 user login- activity diagram*
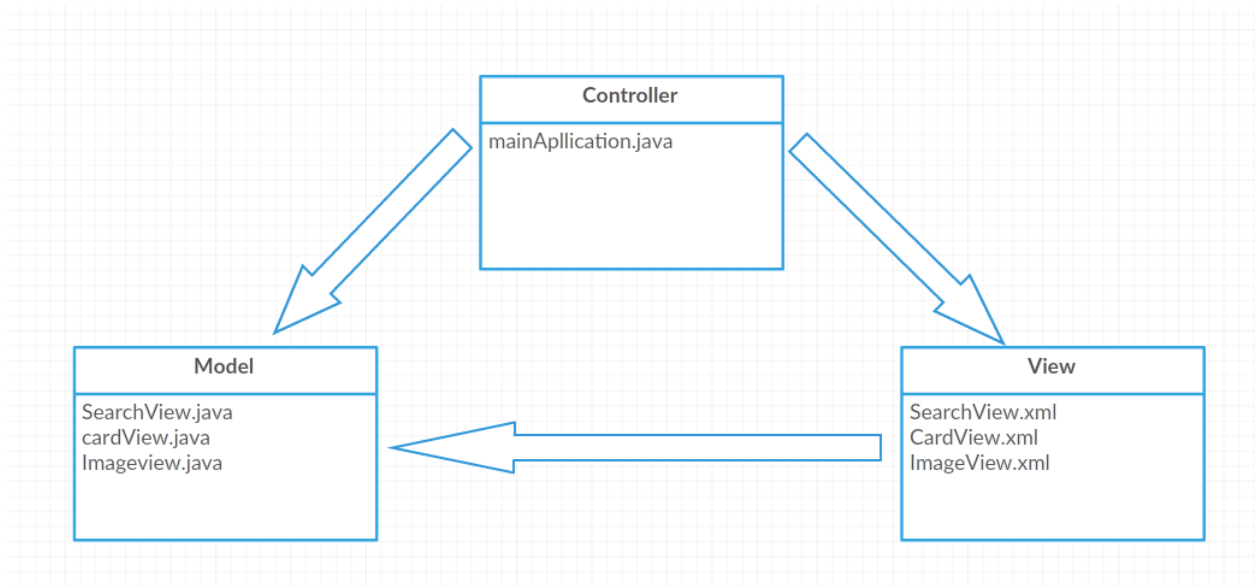
Figure 6 sequence diagram

7.   Deployment View

As it an offline mobile application all the deployment of the application will be on the user mobile. Downloadable application will be deployed on the android play-store.

8.   Implementation View

To control user Interface efficiently system will use MVC architecture pattern. As this is a android application system can easily get MVC support.
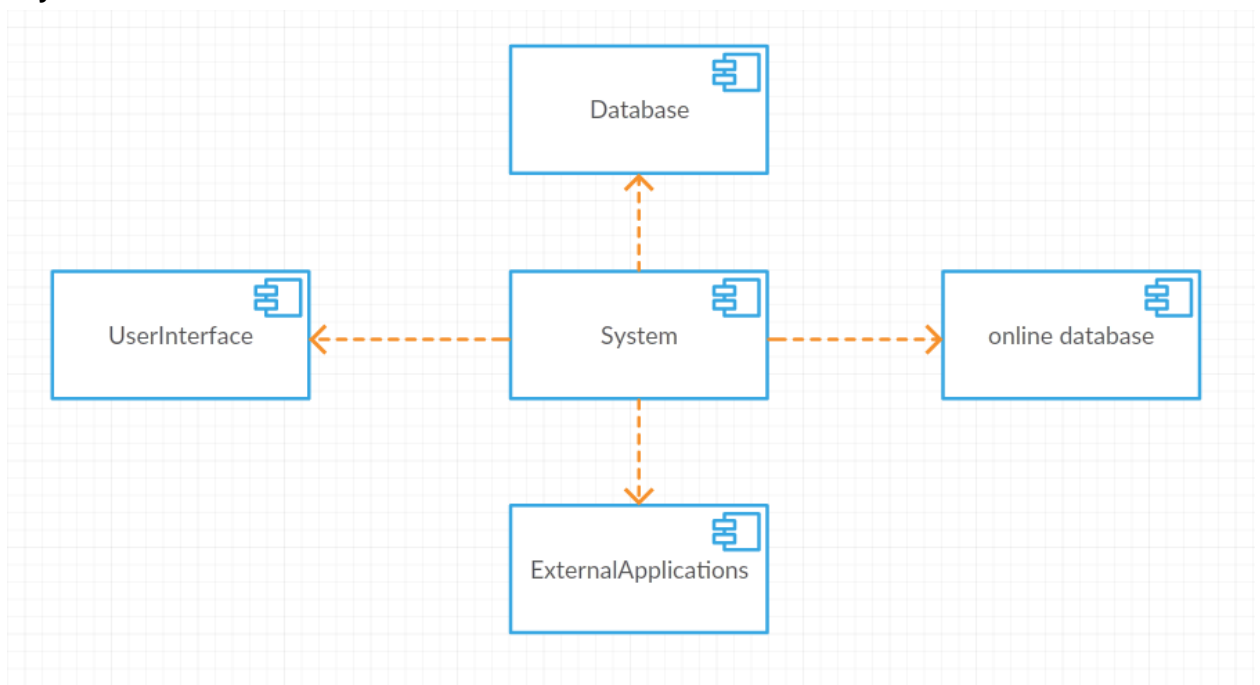
8.1 Overview

System use layered architecture so that system can get more development flexibility and understanding.

8.2 Layers

9. Size and Performance

9.1 Size

Volumes: when application launched, company expect 2 downloads per day.

As this is a offline application handle many users at a time won't be a problem.

9.2 Performance

Performance of the application depends on OCR library accuracy and speed. Currently it take 3 secs to process an image.

10. Quality

The following goals will increase the quality of the system.

Scalability:

- **Description**: System's reaction when user demands additional features
- **Solution:** System is going to be keep developed after launch.

Reliability, **Availability**:

- **Description**: Transparent failover mechanism, mean-time-between-failure
- **Solution**: With every version release system will increase reliability and availability.

Security:

- **Description**: Authentication and authorization mechanisms
- **Solution:** future versions will consider firebase authentication to login and signup.

12. References

[1] Vala, HJ & Baxi, Astha (2013). "A review on Otsu image segmentation algorithm". *International Journal of Advanced Research in Computer Engineering \& Technology (IJARCET).*

[2] Jianzhuang, Liu and Wenqing, Li and Yupeng, Tian (1991). "Automatic thresholding of gray-level pictures using two-dimension Otsu method".

[3] *Pulli, Kari; Baksheev, Anatoly; Kornyakov, Kirill; Eruhimov, Victor (1 April 2012). "Realtime Computer Vision with OpenCV".*

[4] *"Android Studio Release Notes". Android Developers Official Website. accessed on 10th January 2018.*