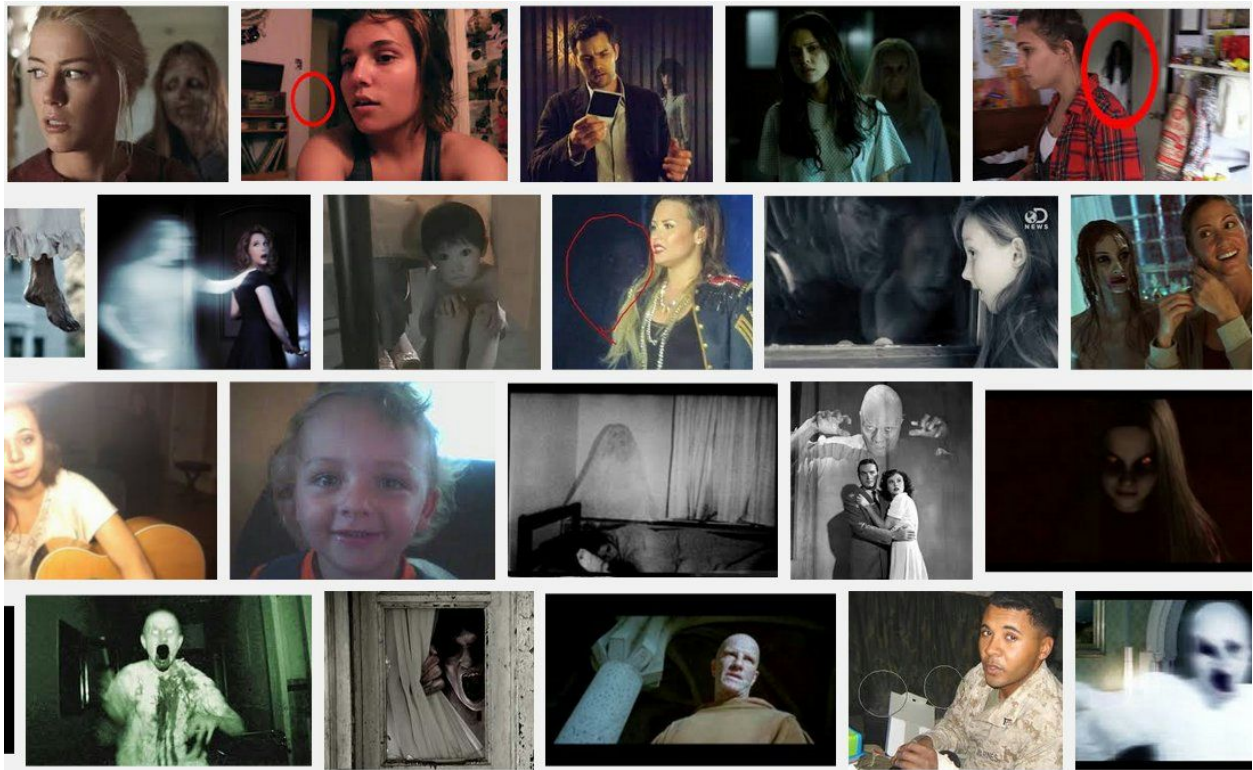


THE ANDROID CAPSTONE PROJECT 2015

# GhostMySelfie App

## DAILY SELFIE WITH CONCURRENT IMAGE PROCESSING ESPECIFICATION

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### Introduction

This app enables users to take pictures of themselves - selfies - over an extended period of time. It periodically reminds the user to take a selfie and presents the selfies in a list that makes it easy to see how the user has changed over time. This extended implementation also allows users to process their selfies to add filters **and also it presents an aleatory ghost overlaying the selfie, currently there is only six different ghost**. The image processing is done via a remote web service. In addition, all

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interactions between the device and the remote web service will be done concurrently in the background to ensure that the UI thread on the device is not interrupted.

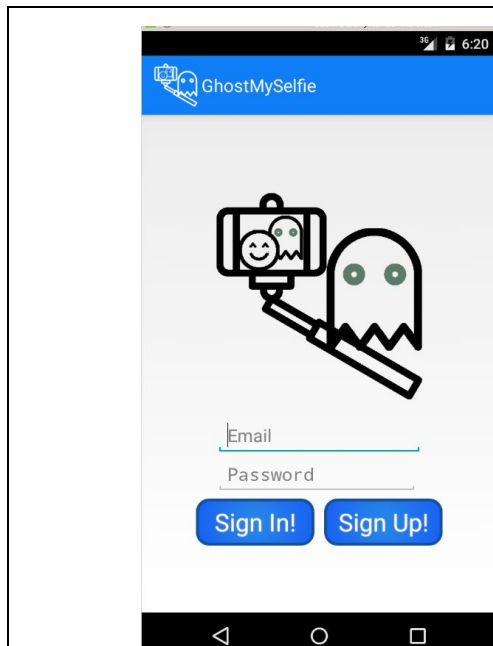
For register a user for first time, the user is registered with other hidden user that has permissions to register users. The Selfies of a user are saved in the server, so the user can see its own selfies even if is logged in other device.

## How do I will implement basic project requirements.

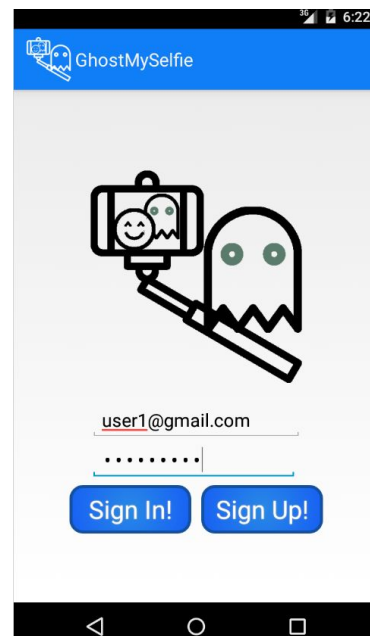
Below I explain how my project implementation will meet each requirement listed in the rubric. Also there is a table that shows classes and methods related to each requirement.

### App supports multiple users via individual user accounts.

Every user can login using basic authentication for first time and the user (**in this case is the email**) and password will travel over SSL/TLS protocol to the Server with OAUTH 2 and saved in the server for other logging-ins.



**Figure 1. Sign In to Login**



**Figure 2. Sign Up to register.**

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User password will never saved in the device only the current logged user name or in this case **email as user**.

### **App contains at least one user facing function available only to authenticated users**


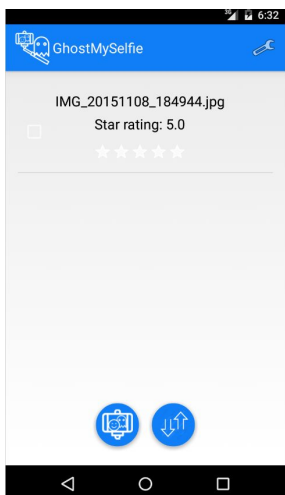
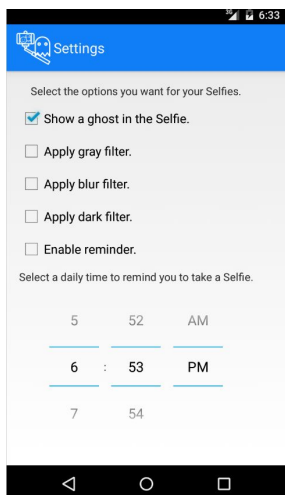
With Oauth 2 the server will filter not authenticated users, if the user is correctly authenticated, the server will process the images that the user send.

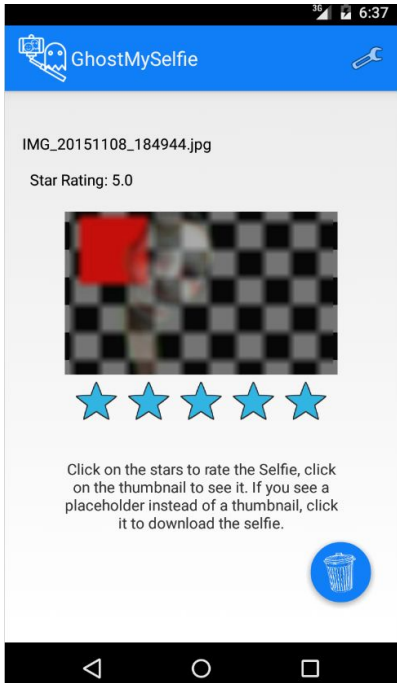

There is more than one function available to authenticated users, one of them is to rate a selfie.

### **App comprises at least 1 instance of each of at least 2 of the following 4 fundamental Android components:**

- **Activity**

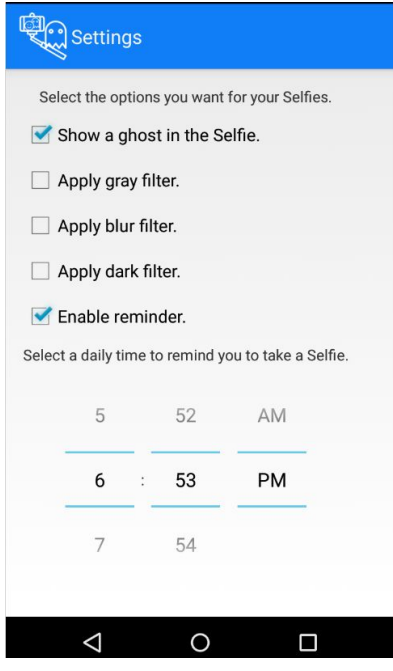
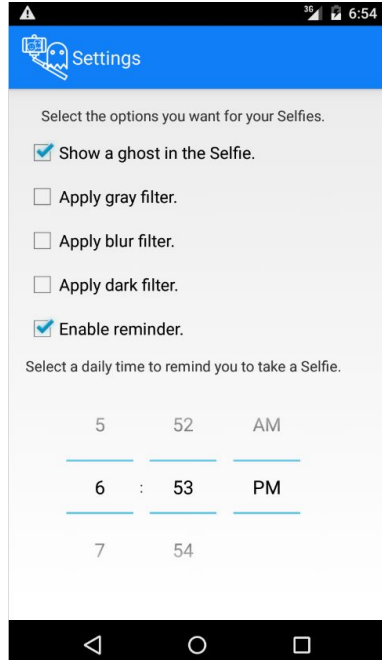
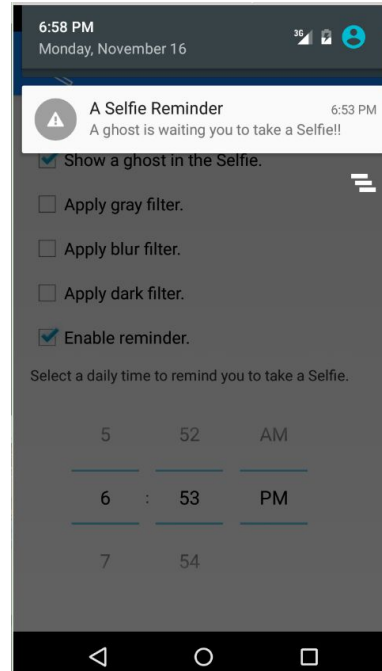
There are four activities GhostMySelfieDetailActivity, GhostMySelfieListActivity, LoginScreenActivity and SettingsActivity with an extra activity to show the selfie in fullscreen.

		
Figure 3. Activity 1 for Sign In or Sign Up.	Figure 4. Activity 2 for take a Selfie or Modify Selfie(s).	Figure 5. Activity 3 for set filters or notifications.

 <p>The screenshot shows the 'GhostMySelfie' app interface. At the top, there's a blue header with the app name and a settings icon. Below it, the filename 'IMG_20151108_184944.jpg' and 'Star Rating: 5.0' are displayed. A central area shows a blurred selfie with a red square placeholder. Below the image are five blue stars. A text instruction reads: 'Click on the stars to rate the Selfie, click on the thumbnail to see it. If you see a placeholder instead of a thumbnail, click it to download the selfie.' At the bottom right is a blue trash icon. The Android navigation bar is visible at the very bottom.</p>	 <p>This screenshot shows the app in fullscreen mode. The background is black, and the central area displays a blurred selfie with a red square placeholder, matching the one in Figure 6. The Android navigation bar is visible at the bottom.</p>
<p>Figure 6. Activity 4 for rate a Selfie and see the details of the selected Selfie.</p>	<p>Figure 7. Activity 5 for show the Selfie in fullscreen.</p>

- **BroadcastReceiver**

The app use an Alarm class that extends the BroadcastReceiver to get notifications to take a selfie in certain time intervals with some scary sound. The app has options to stop notifications and the scary sound for notifications. Also after operations that process images to the server, it will be broadcasted an intent to send the result of the request to the calling activity.

		
<p>Figure 7. Activitating an alarm notification at 6:53 PM.</p>	<p>Figure 8. Alarm is triggered with a scary sound.</p>	<p>Figure 9. Notification.</p>

## - Service

The app has services that runs in background and executes various requests to the server. After the operation, it broadcasts the intent to send the result of the request to the calling activity.

## - ContentProvider

In the Model layer the app use ContentProvider and Resolver to save data to sqlite database.

**App interacts with at least one remotely-hosted Java Spring-based service**

The app use **Amazon** Elastic Compute Cloud (**Amazon EC2**) in Ubuntu Server with MySQL Database, that is a web service that provides resizable compute capacity in the cloud.

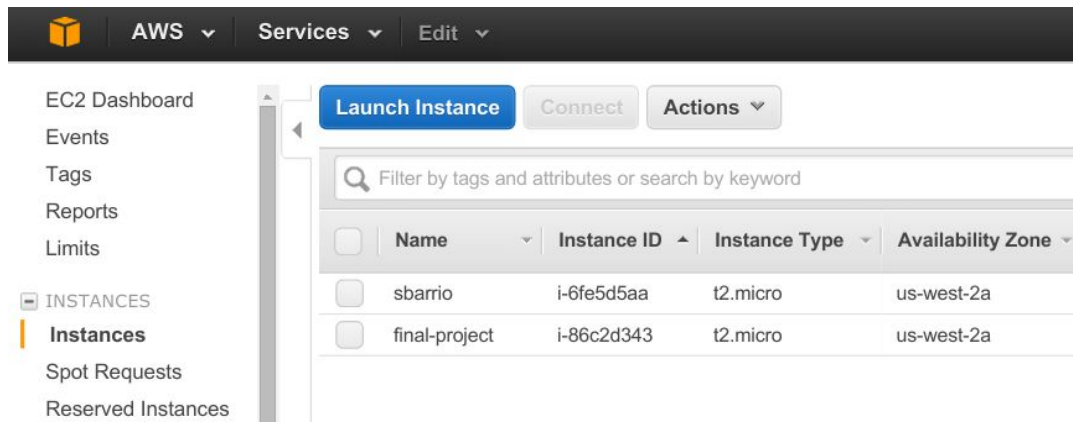


Figure 1.5

The service is hosted in an instance that can be putted in a Auto Scaling Group to manage Amazon EC2 capacity automatically, maintaining the right number of instances for the application, operate a healthy group of instances, and scale it when the app needs it.

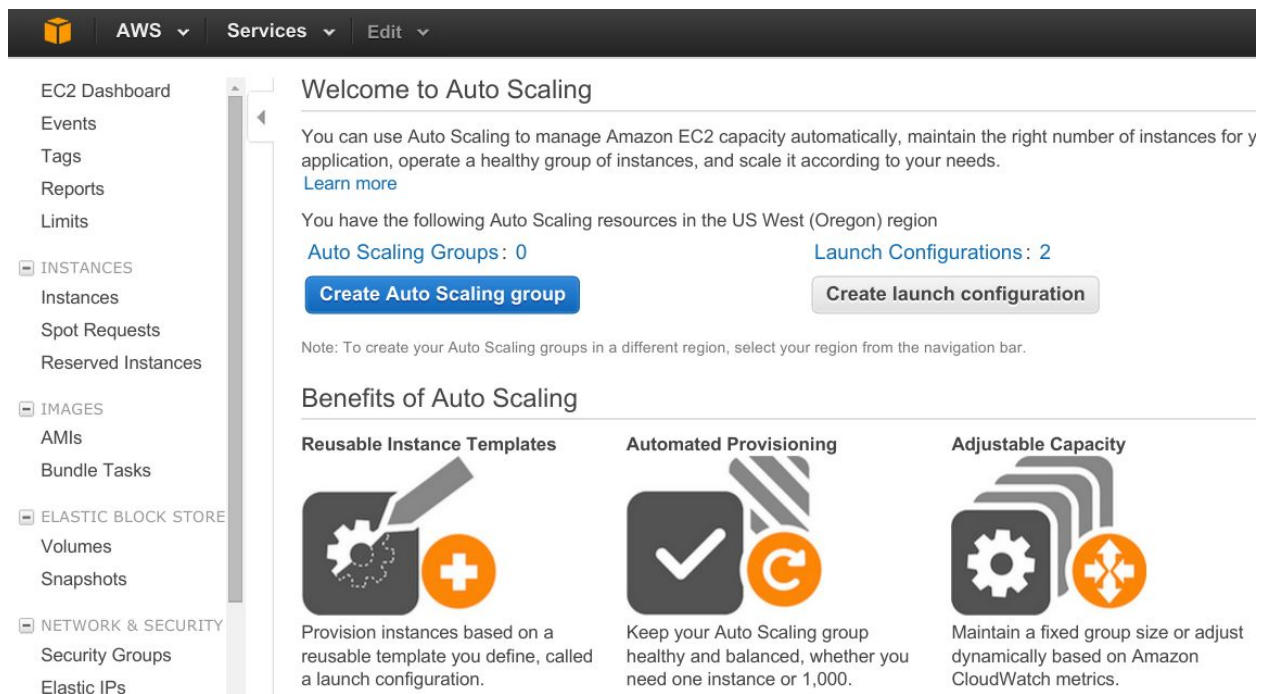
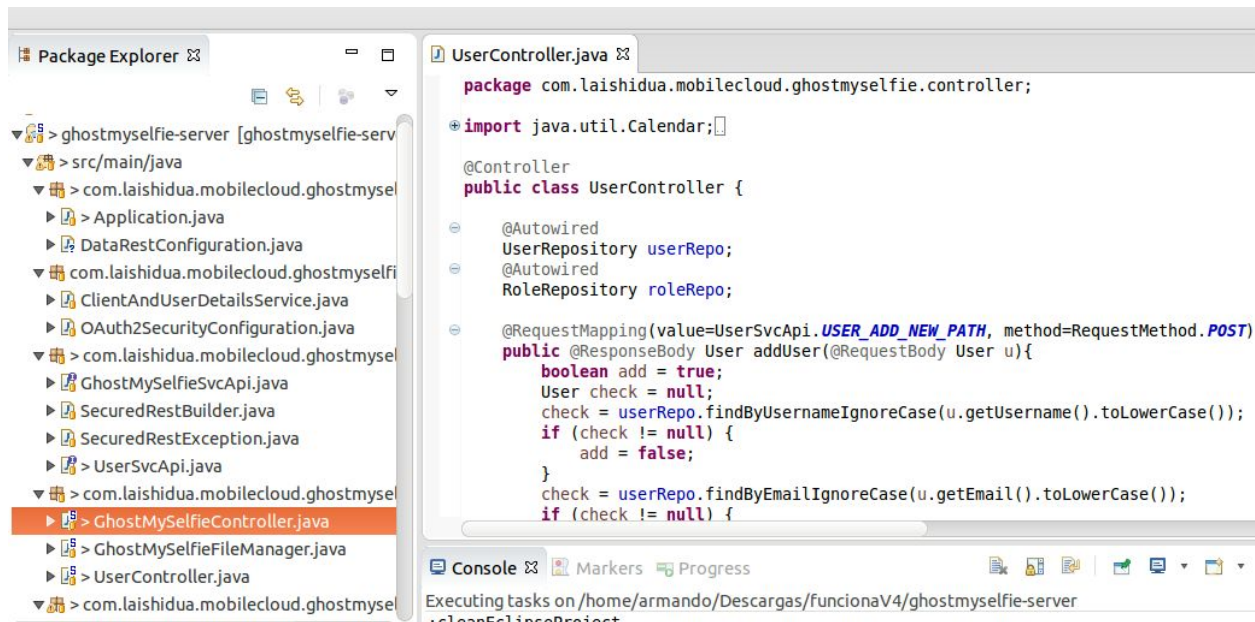


Figure 1.6



I preferred it over the Amazon beans talk because I like to configure all the servers by myself.



## App interacts over the network via HTTP/HTTPS.

To build a Self Signed certificate I execute in bash console:

```
%JAVA_HOME%/bin/keytool -genkey -alias tomcat -keyalg RSA -keystore keystore
```

Writing the DNS name when its needed.

I put the keystore in:

```
%Tomcat_Home%
```

Then I configure the file:

```
%Tomcat_Home%/conf/server.xml adding:
```

<Connector

```
    protocol="org.apache.coyote.http11.Http11NioProtocol"
```

```
    port="8443" maxThreads="200"
```

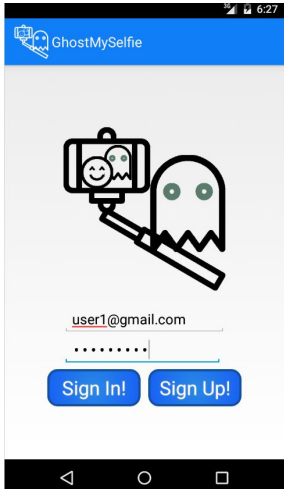
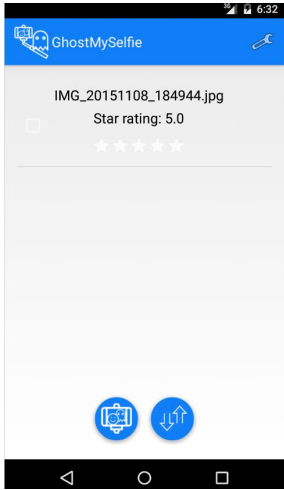
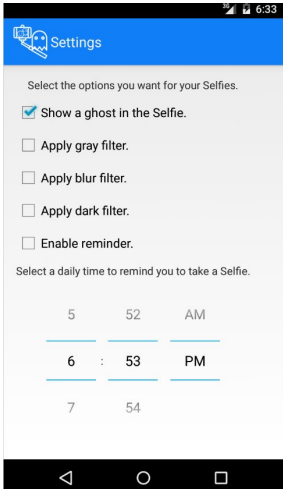
```
scheme="https" secure="true" SSLEnabled="true"
```

```
keystoreFile="keystore" keystorePass="<The keystore password>"
```

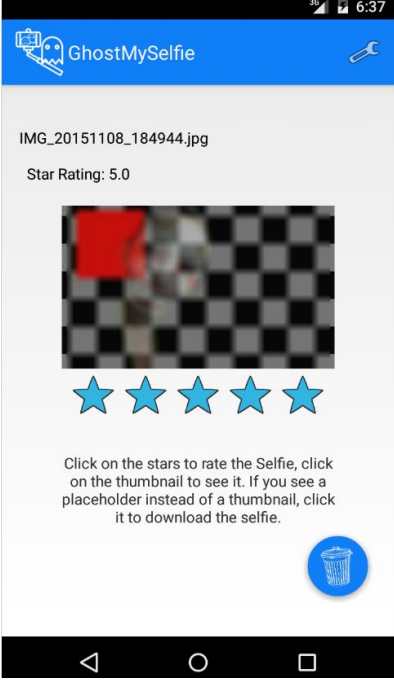

```
clientAuth="false" sslProtocol="TLS"/>
```

## App allows users to navigate between 3 or more user interface screens at runtime

The user as shows in Activity part above, can navigate in firstime runtime over 4 screens.

		
Figure 10. Screen 1 for Sign In or Sign Up.	Figure 11. Screen 2 for take a Selfie or Modify Selfie(s).	Figure 12. Screen 3 for set filters or notifications.



	
<p>Figure 13. Screen 4 for rate a Selfie and see the details of the selected Selfie.</p>	<p>Figure 14. Screen 5 for show the Selfie in fullscreen.</p>

**App uses at least one advanced capability or API from the following list (covered in the MoCCA Specialization): multimedia capture, multimedia playback, touch gestures, sensors, animation.\*\***

The app use ACTION\_IMAGE\_CAPTURE from MediaStore Class as Multimedia Capture to take a Selfie. Standard Intent action is sent to have the camera application capture an image and return it.

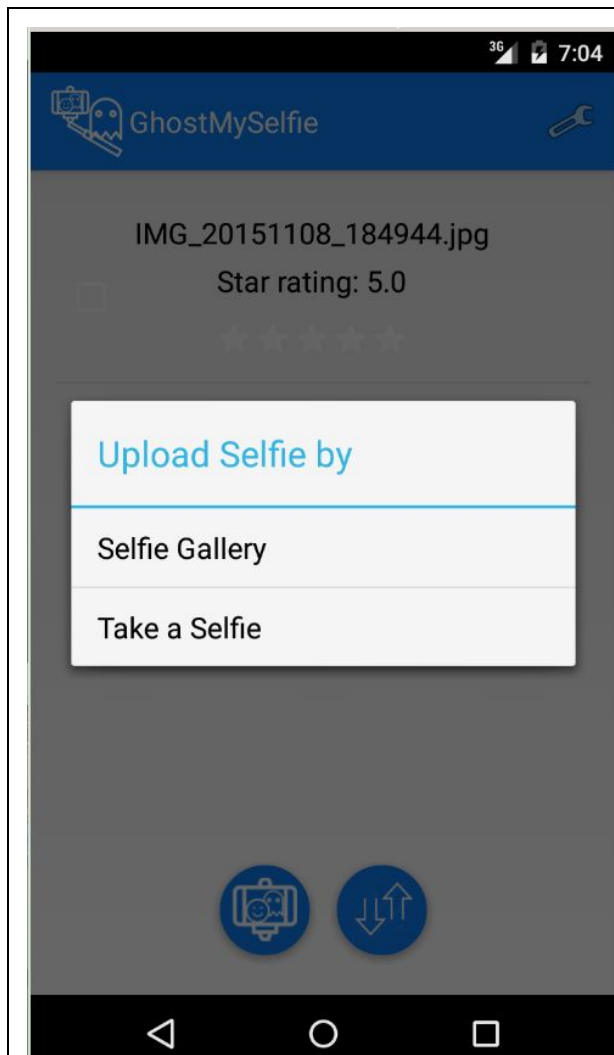


Figure 15. Taking a Selfie.

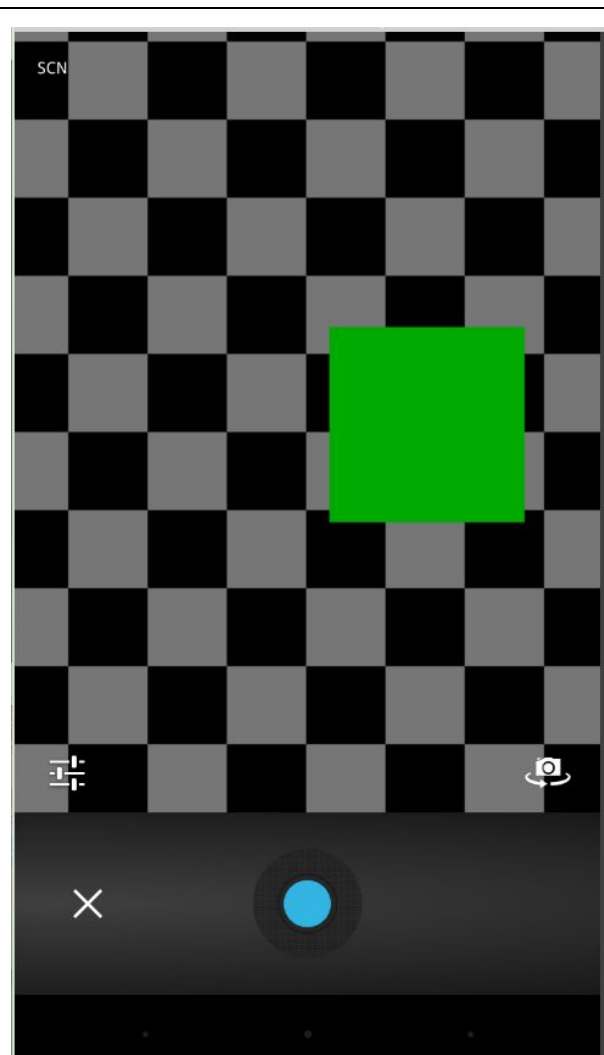


Figure 16. Open camera to take a Selfie.

**App supports at least one operation that is performed off the UI Thread in one or more background Threads of Thread pool.**

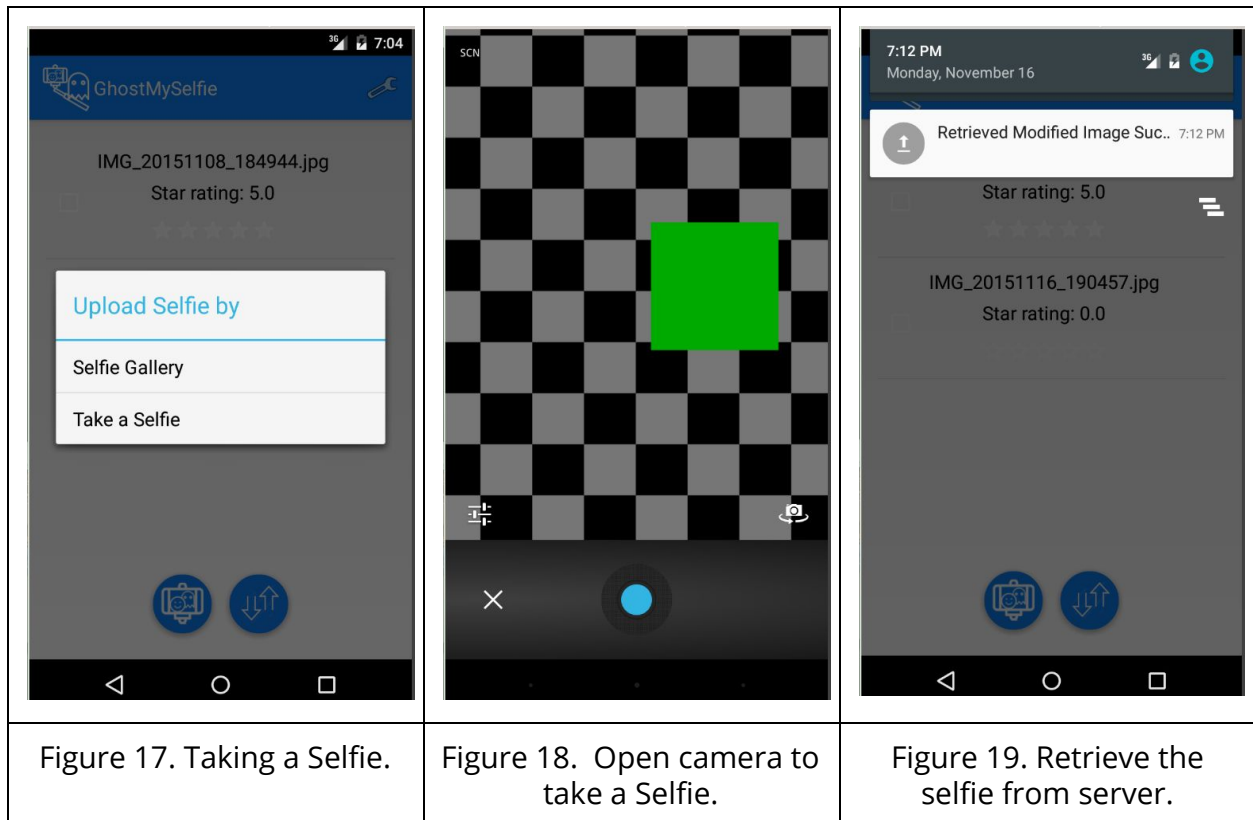
The app use a mediator class that mediate communication between the Service and the local storage on the Android device. The methods in the mediator class block, so they are called from the background thread.

### **Functional Description and App Requirement.**

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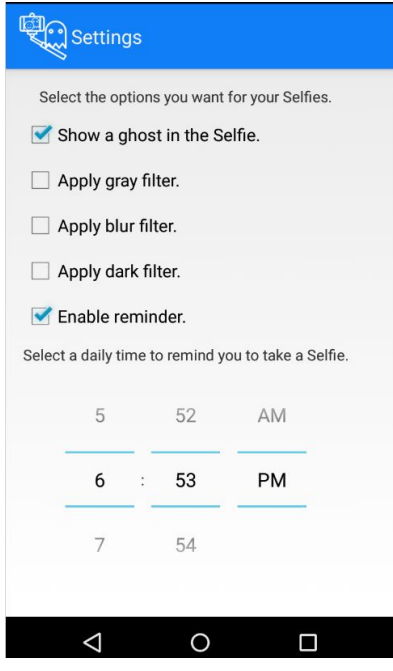
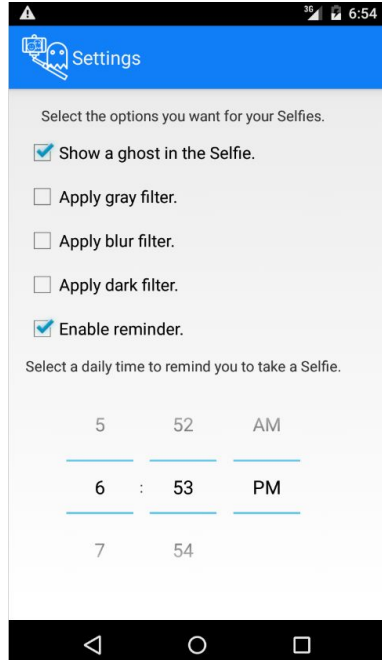
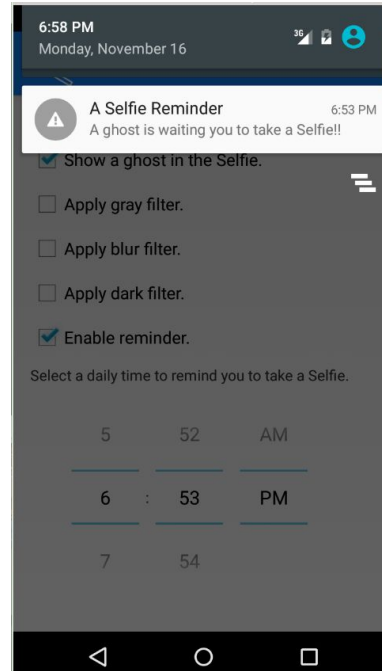
### App allows user to take and save a Selfie.

The app use ACTION\_IMAGE\_CAPTURE from MediaStore Class as Multimedia Capture to take a Selfie. Standard Intent action is sent to have the camera application capture an image and return it.



### App reminds user to take a Selfie.

The app use an class that extends the BroadcastReceiver to get notifications to take a selfie in certain time intervals with some scary sound.

		
<p>Figure 20. Activitating an alarm notification at 6:53 PM.</p>	<p>Figure 21. Alarm is triggered with a scary sound.</p>	<p>Figure 22.App reminds user to take a Selfie everyday at 6:53 PM.</p>

### App allows user to view saved Selfies in a List View.

App will use android.widget.ListView that contains a list of Videos available from the Selfie Service. This listView object get reference to the ListView created in the XML for displaying the results.

App contains an Adapter class that show the view for each Selfie's meta-data in a ListView. The Adapter Class has a method used by the ListView to "get" the "view" for each row of data in the ListView.

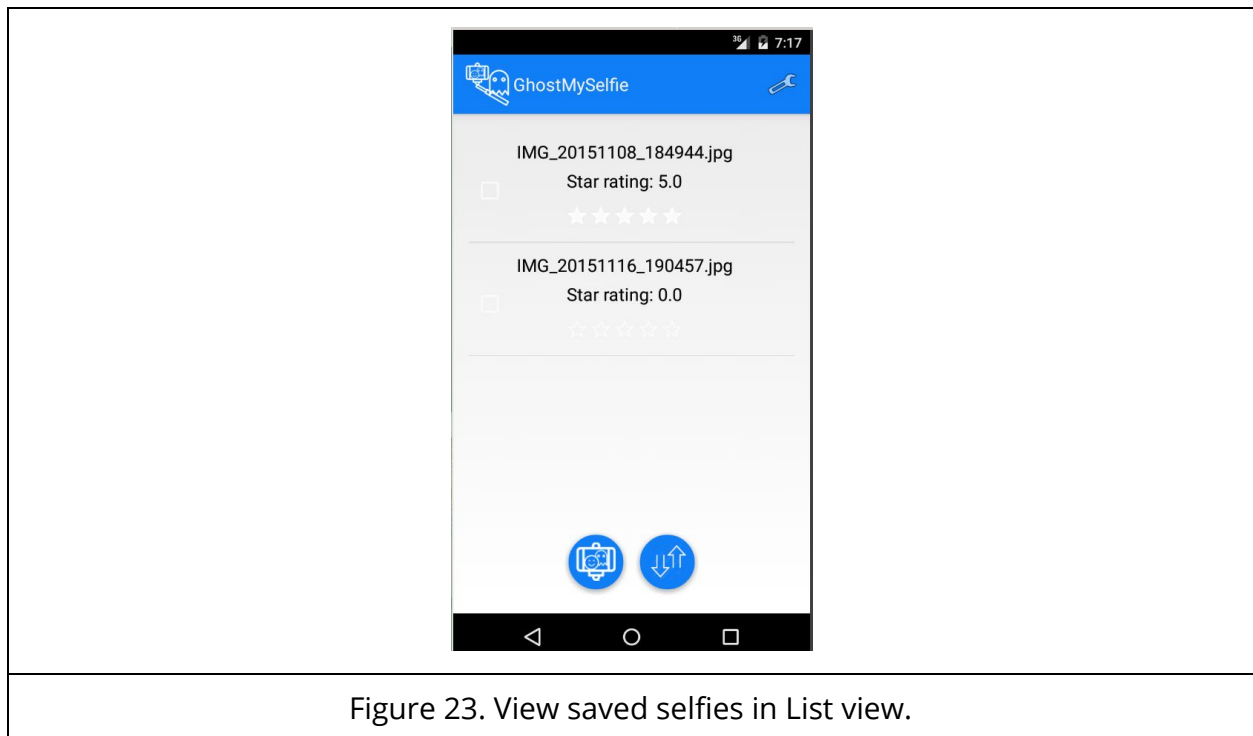
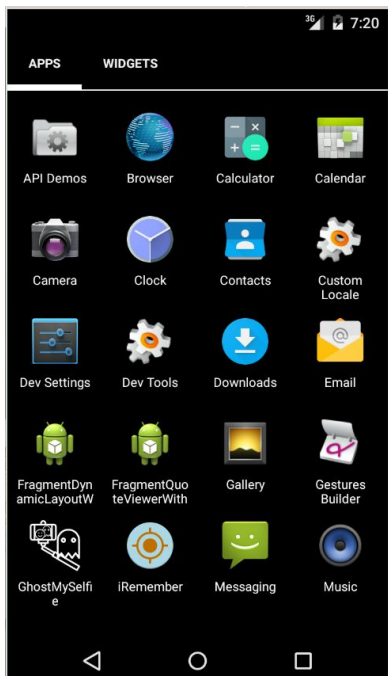
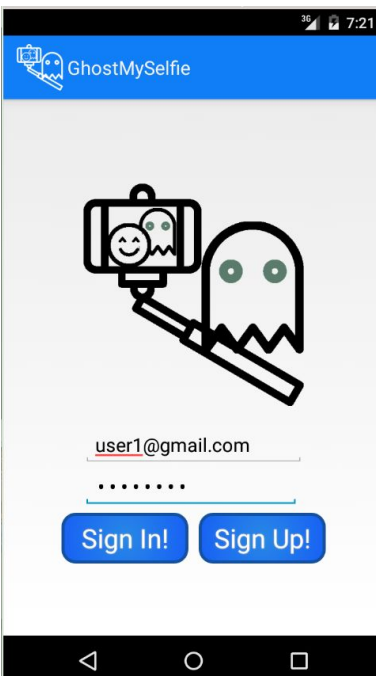
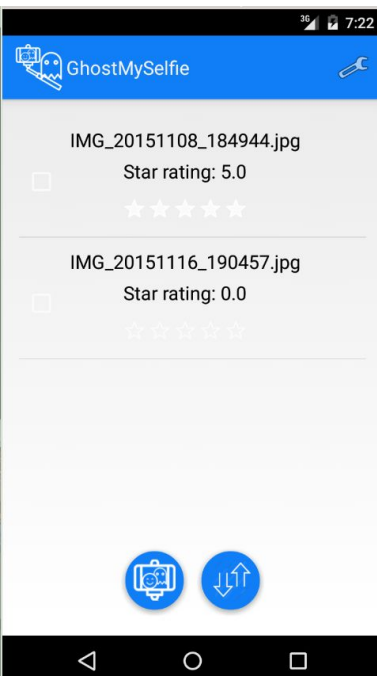


Figure 23. View saved selfies in List view.

**If the User closes and then reopens the app, the user has access to all saved Selfies.**

The app save all path from the processed images that comes from the server in a SQLite database. For this the user has to get internet connection. The Selfies of each user logged in are saved in the server, and once the user is logged in, only his or her selfies details will show as a list. The same happen if the user login using another device.

		
<p>Figure 24. Closing the App.</p>	<p>Figure 25. Opening the App.</p>	<p>Figure 26. Selfies of the user are saved and showed in the list.</p>

**The App allows the User to select one or more Selfies, select one or more graphic effects, and apply the selected effects to the selected Selfies, and then view the processed Selfies in a ListView.**

The Settings Menu has the next options :

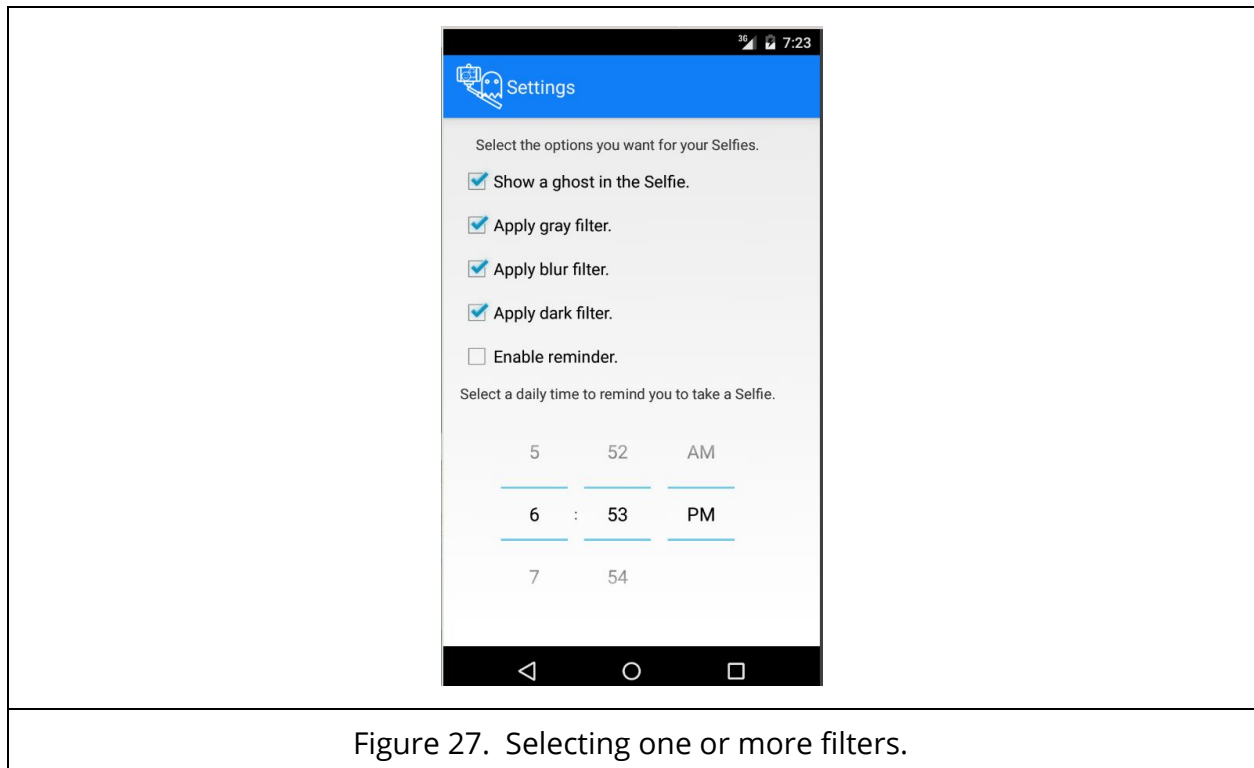
- Show a ghost in the Selfie: If you want a face or body of a ghost image overlaying an image Selfie.
- Apply gray filter: Grays out an image.
- Apply blur filter: Simple blur effect to an image.
- Apply dark filter: Night effect to an image.

If user selects one or more than one Filter and click the button with the arrows in the list activity, the app will send the filters as an array to the server with the Image from the rows that are selected from the list of selfies, the Server will process each Image first

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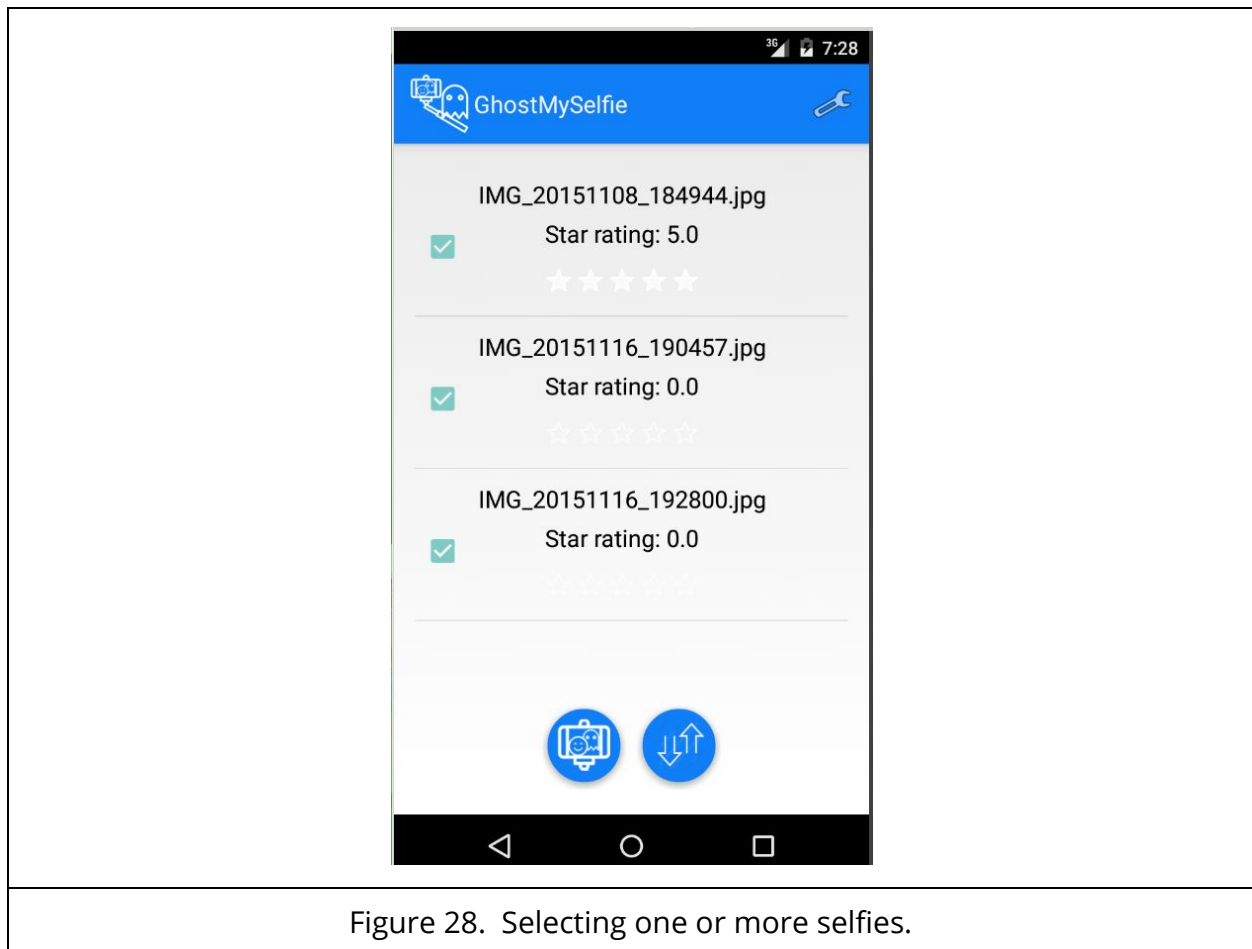
overlaying a ghost to the Image using Chroma Key composition and then applying the effects one by one to the image.

App use Retrofit Rest client to communicate between the device and the remote web service using JSON for automatic parsing and Multipart data.



The user can select one or more Selfies to apply the effects.





**Some part of the operations corresponding to Requirement 5 (Applying Graphics Effects to Process Images) must be executed concurrently in a remote web service. Once processed, the images are returned to the device, where they are displayed in a ListView.**

After user select filters, selfies and click the arrows button in the list Activity, the intent service runs in background and executes various request to the server to process the images at the same time, for each request to the server a **Connector** will create a number of request processing **threads using Tomcat options**. After each concurrent operation, it broadcasts the intent to send the image results of the request to the calling activity replacing each image in the device if already exist.

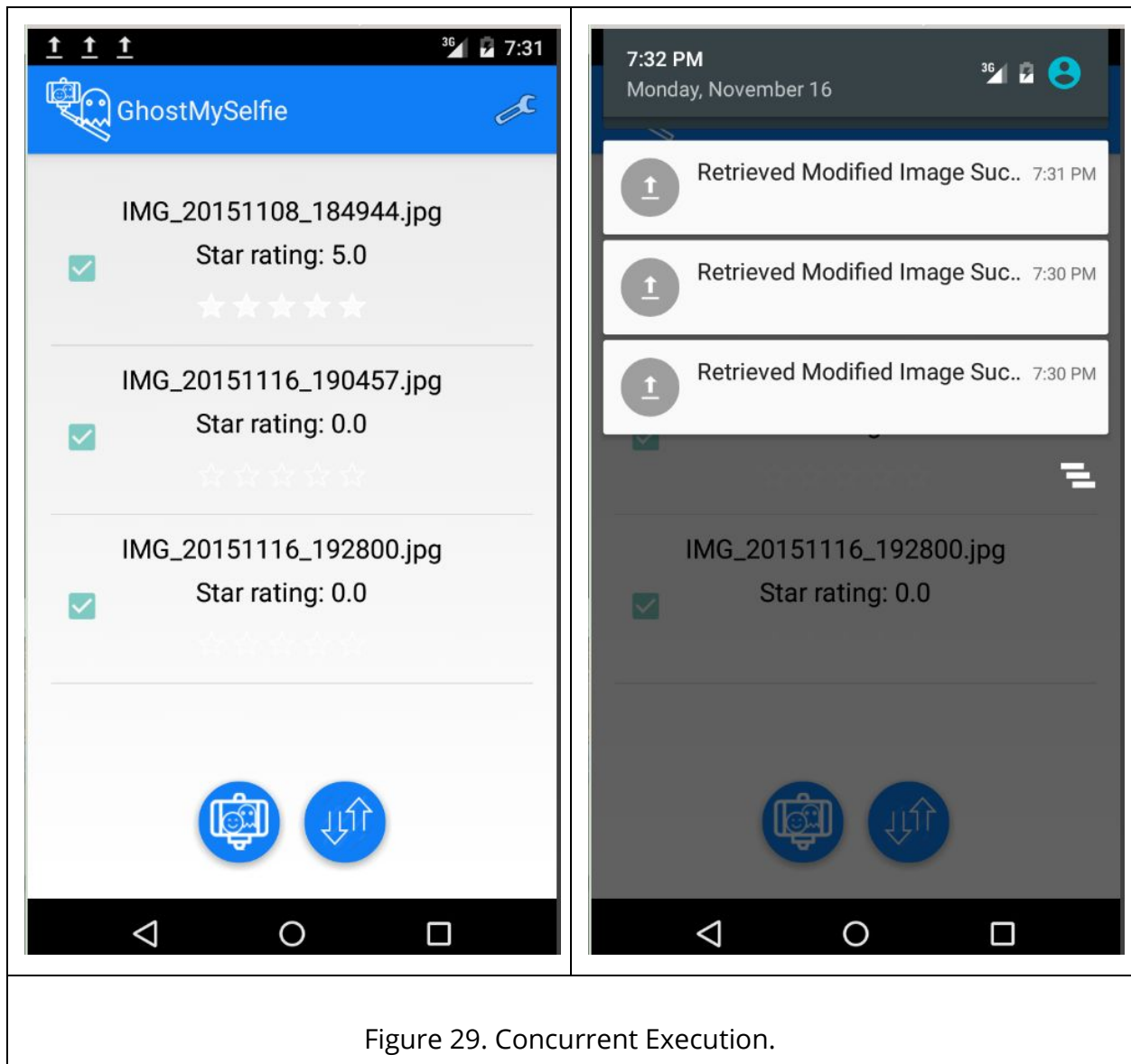
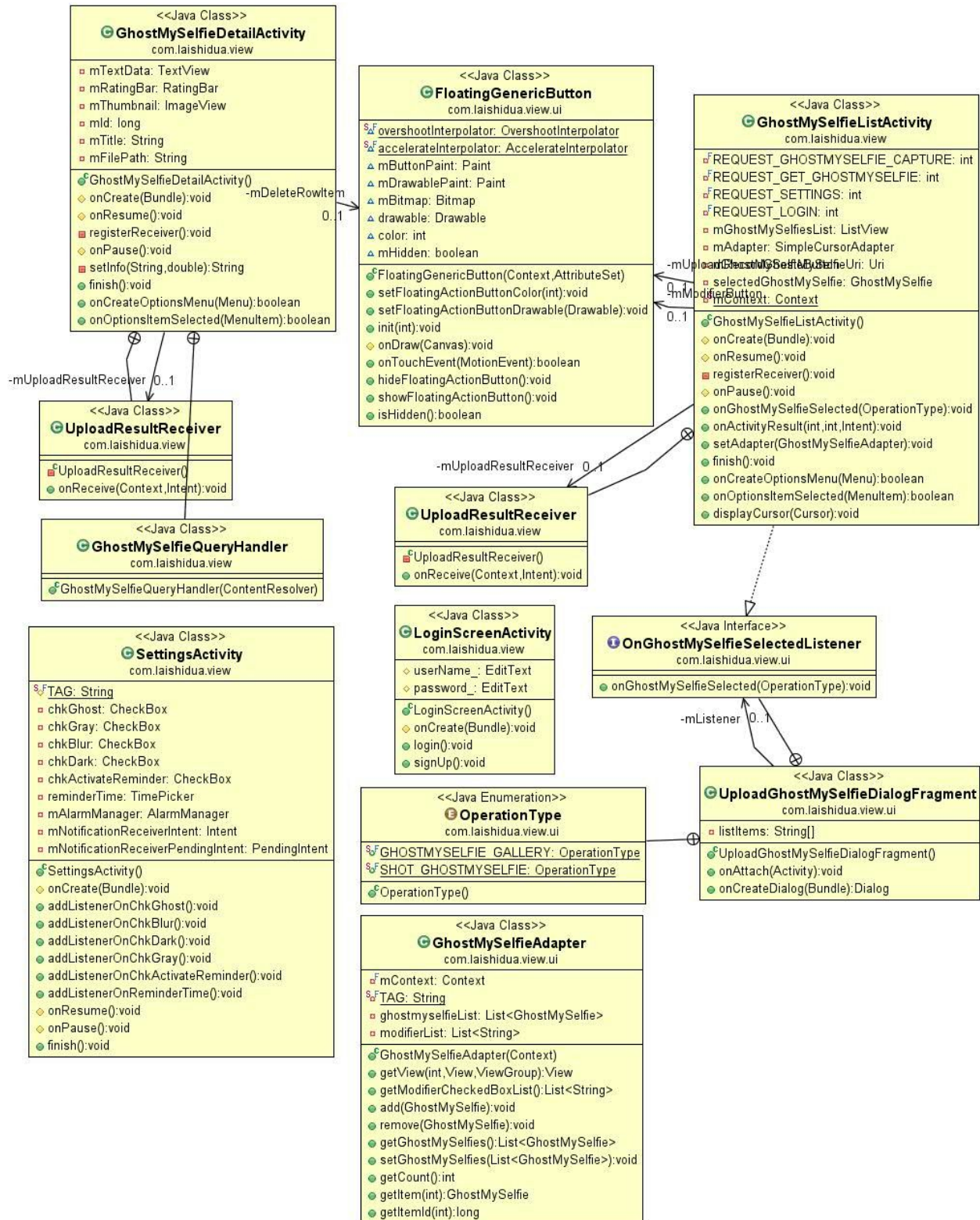





















Figure 29. Concurrent Execution.

## CLIENT UML



<<Java Class>>	
<b>AlarmNotificationReceiver</b> com.laishidua.utils	
	MY_NOTIFICATION_ID: int
	TAG: String
	tickerText: CharSequence
	contentTitle: CharSequence
	contentText: CharSequence
	mNotificationIntent: Intent
	mContentIntent: PendingIntent
	soundURI: Uri
	mVibratePattern: long[]
 AlarmNotificationReceiver()	
 onReceive(Context,Intent):void	

<<Java Class>>	
<b>Constants</b> com.laishidua.utils	
	SERVER_URL_STANDARD: String
	SERVER_URL_AMAZON: String
	SERVER_URL: String
	MEGA_BYTE: long
	MAX_SIZE_MEGA_BYTE: long
	user: String
	pass: String
 Constants()	

<<Java Class>>	
<b>GhostMySelfieMediaStoreUtils</b> com.laishidua.utils	
	DOWNLOADS_PROVIDER_PATH: String
 GhostMySelfieMediaStoreUtils()	
 getGhostMySelfie(Context,String):GhostMySelfie	
 getPath(Context,Uri):String	
 getGhostMySelfieDataColumn(Context,Uri,String,String[]):String	
 isExternalStorageDocument(Uri):boolean	
 isDownloadsDocument(Uri):boolean	
 isMediaDocument(Uri):boolean	

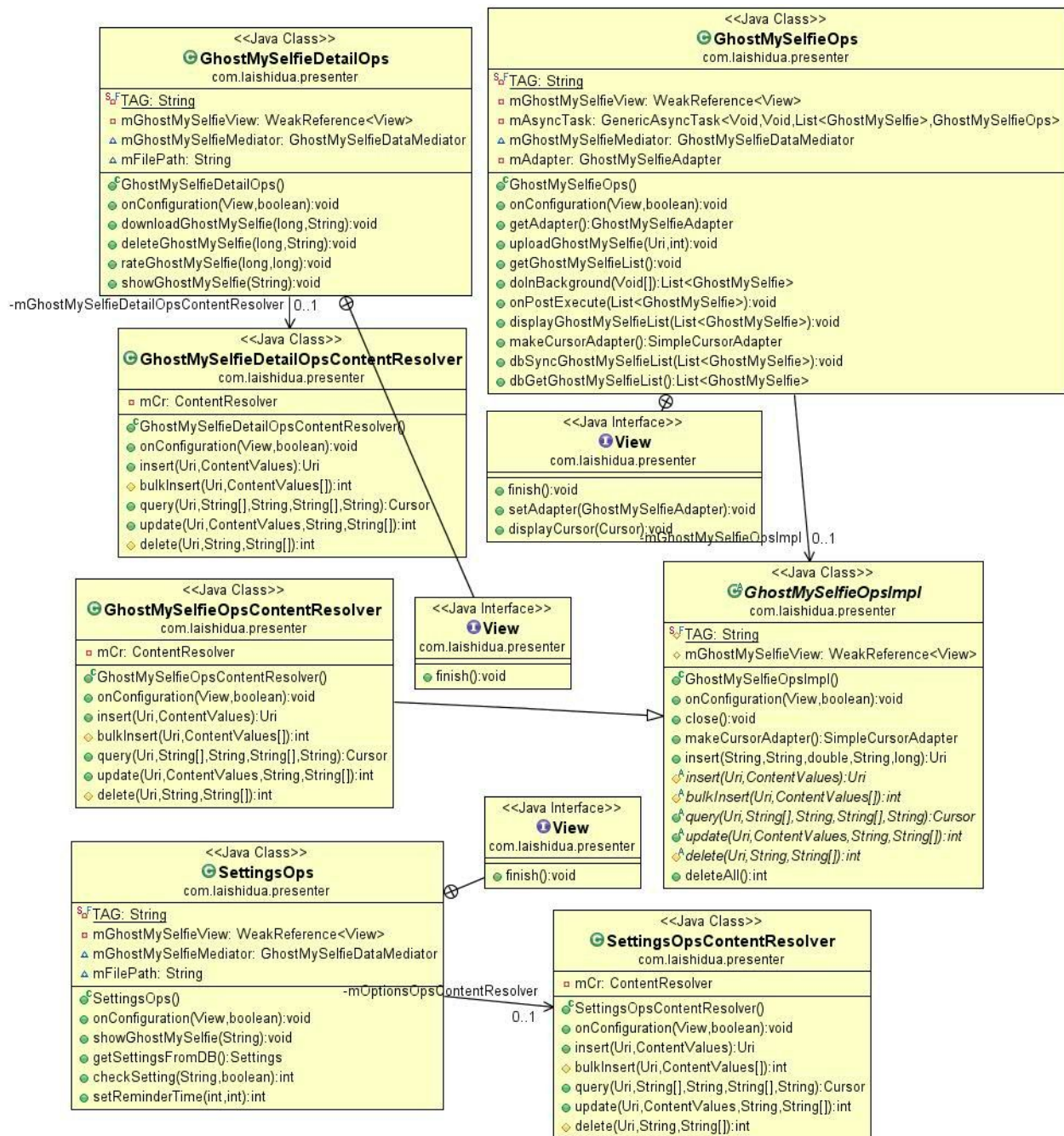
<<Java Class>>	
<b>GhostMySelfieStorageUtils</b> com.laishidua.utils	
 getRecordedGhostMySelfieUri(Context):Uri	
 storeGhostMySelfieInExternalDirectory(Context,Response,String):File	
 notifyMediaScanners(Context,File):void	
 isExternalStorageWritable():boolean	
 getGhostMySelfieStorageDir(String):File	
 GhostMySelfieStorageUtils()	

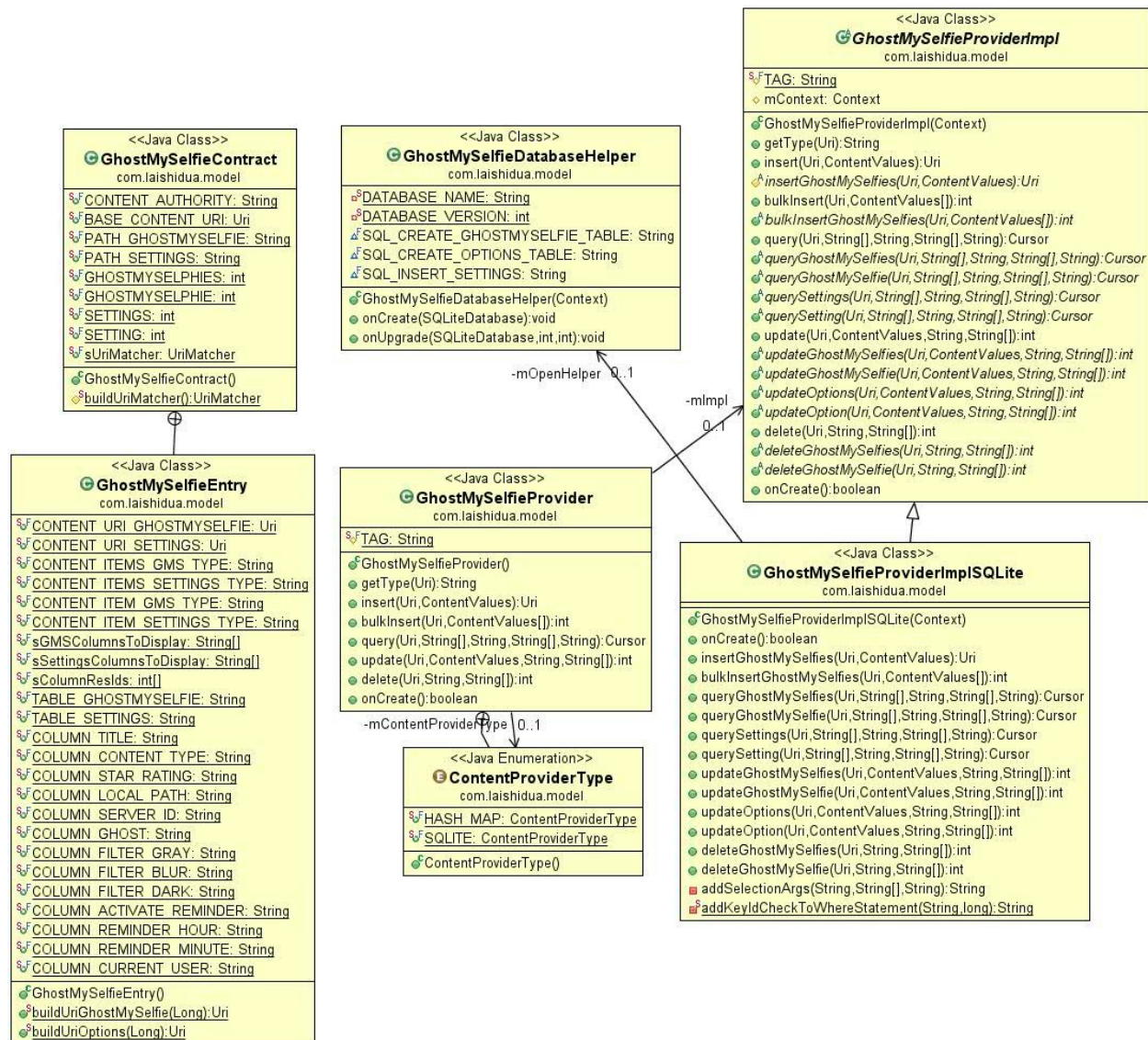
<<Java Class>>	
<b>Settings</b> com.laishidua.utils	
	ghost: boolean
	gray: boolean
	blur: boolean
	dark: boolean
	reminder: boolean
	reminderHour: int
	reminderMinute: int
 isGhost():boolean	
 setGhost(boolean):void	
 isGray():boolean	
 setGray(boolean):void	
 isBlur():boolean	
 setBlur(boolean):void	
 isDark():boolean	
 setDark(boolean):void	
 isReminder():boolean	
 setReminder(boolean):void	
 getReminderHour():int	
 setReminderHour(int):void	
 getReminderMinute():int	
 setReminderMinute(int):void	
 Settings()	



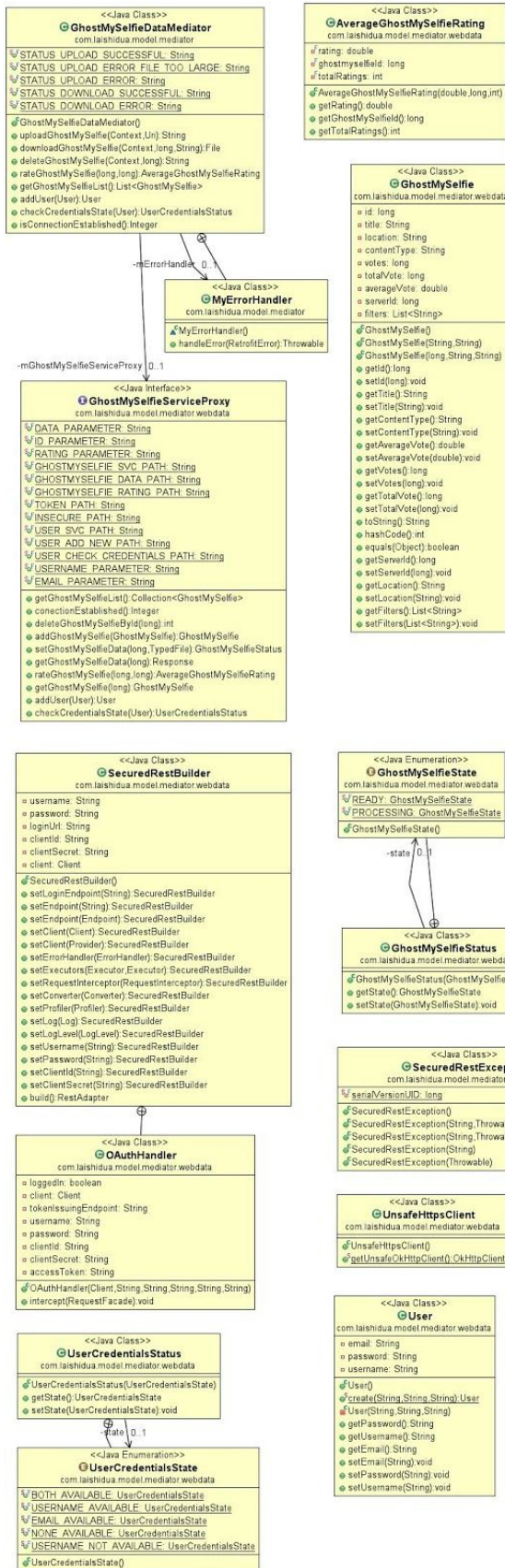
<<Java Class>> <b>GhostMySelfieService</b> com.laishidua.model.services
\$F ACTION_UPLOAD_SERVICE_RESPONSE: String \$F NOTIFICATION_ID: String \$F NOTIFICATION_DEFAULT_ID: int \$F ACTION_UPLOAD: String \$F ACTION_DOWNLOAD: String \$F ACTION_DELETE: String \$F ACTION_RATE: String \$F DATA_OP: String \$F DATA_ID: String \$F DATA_TITLE: String \$F DATA_PATH: String \$F DATA_VOTE: String \$F DATA_RATING: String mGhostMySelfieMediator: GhostMySelfieDataMediator mNotifyManager: NotificationManager mBuilder: Builder
GhostMySelfieService(String) GhostMySelfieService() makeUploadIntent(Context,Uri,int):Intent makeDownloadIntent(Context,long,String):Intent makeDeleteIntent(Context,long):Intent makeRateIntent(Context,long,long):Intent onHandleIntent(Intent):void sendOperationBroadcast(String,double,String):void finishNotification(String,boolean,int):void startNotification(boolean,int):void

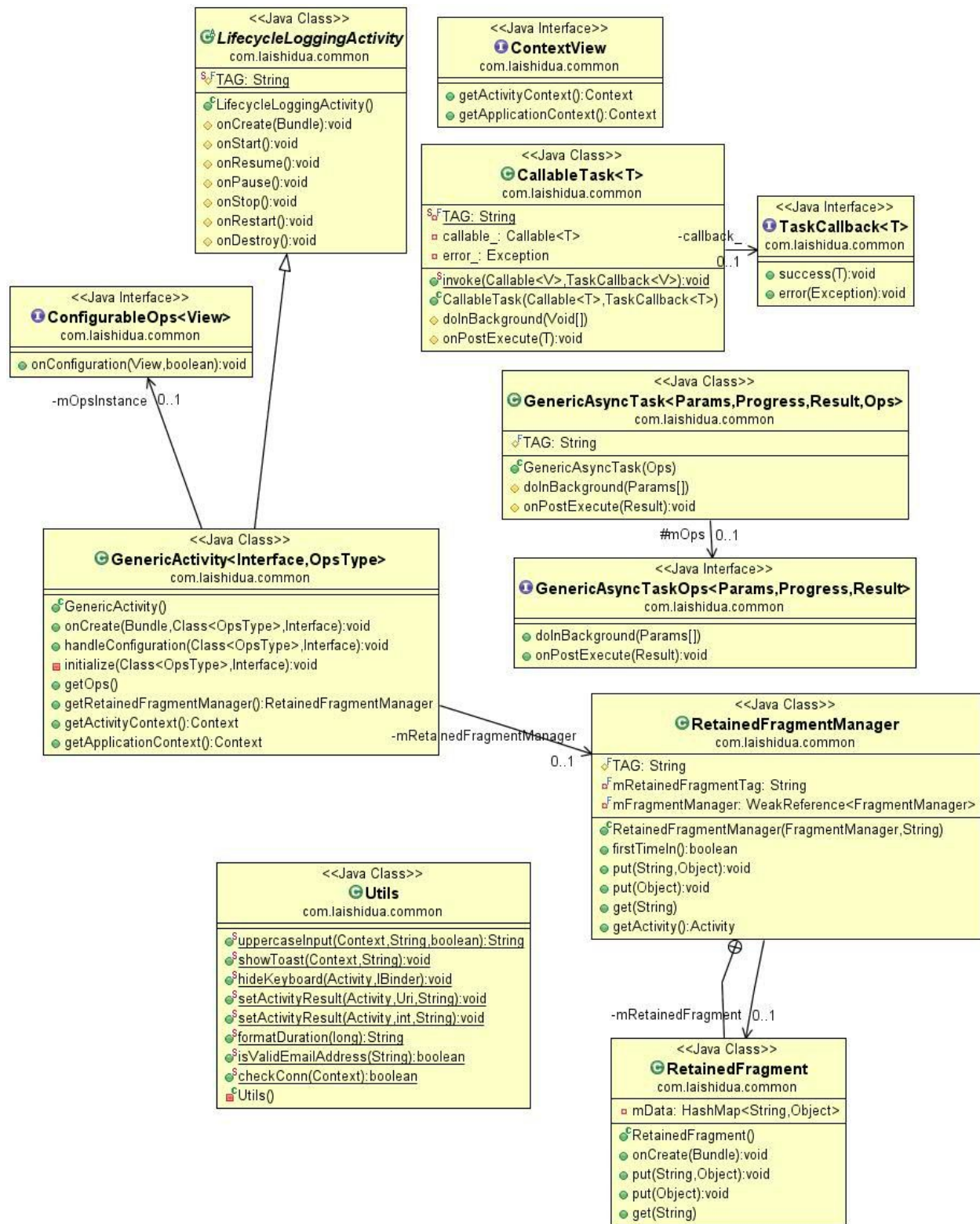
<<Java Interface>> <b>GhostMySelfieSvcApi</b> com.laishidua.model.services
\$F DATA_PARAMETER: String \$F ID_PARAMETER: String \$F RATING_PARAMETER: String \$F GHOSTMYSELFIE_SVC_PATH: String \$F GHOSTMYSELFIE_DATA_PATH: String \$F GHOSTMYSELFIE_RATING_PATH: String
getGhostMySelfieList():Collection<GhostMySelfie> conectionEstablished():Integer deleteGhostMySelfieById(long):int addGhostMySelfie(GhostMySelfie):GhostMySelfie setGhostMySelfieData(long,TypedFile):GhostMySelfieStatus getGhostMySelfieData(long):Response rateGhostMySelfie(long,long):AverageGhostMySelfieRating rateGhostMySelfieByGet(long,long):GhostMySelfie



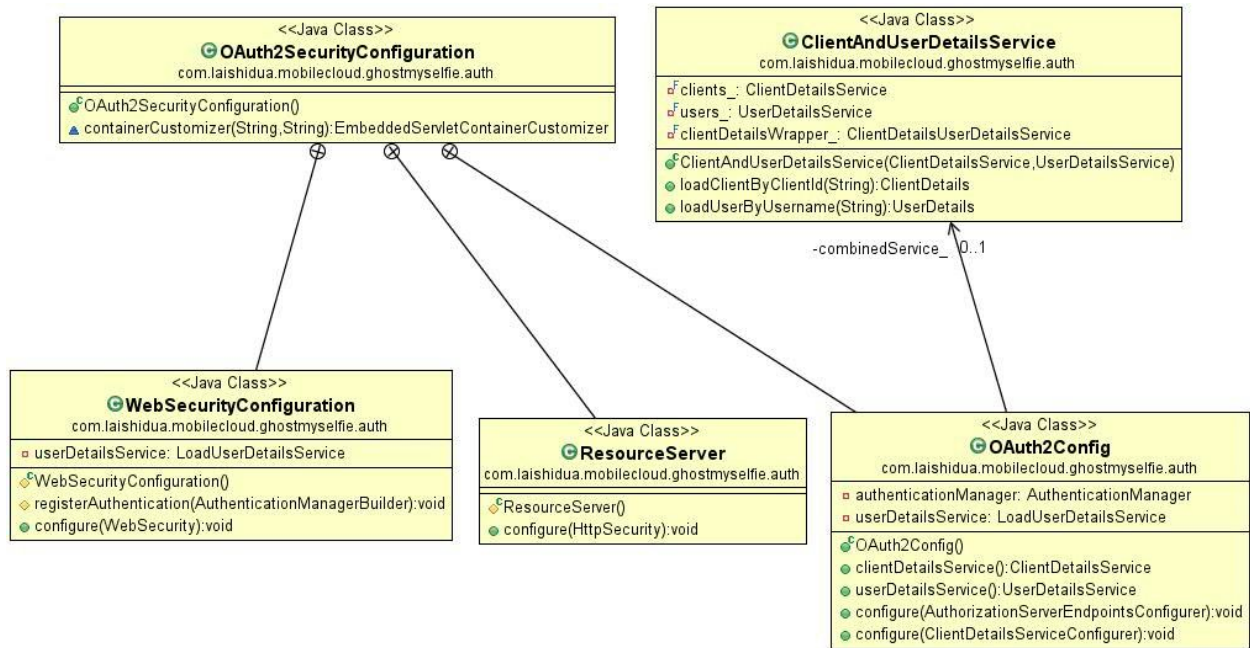




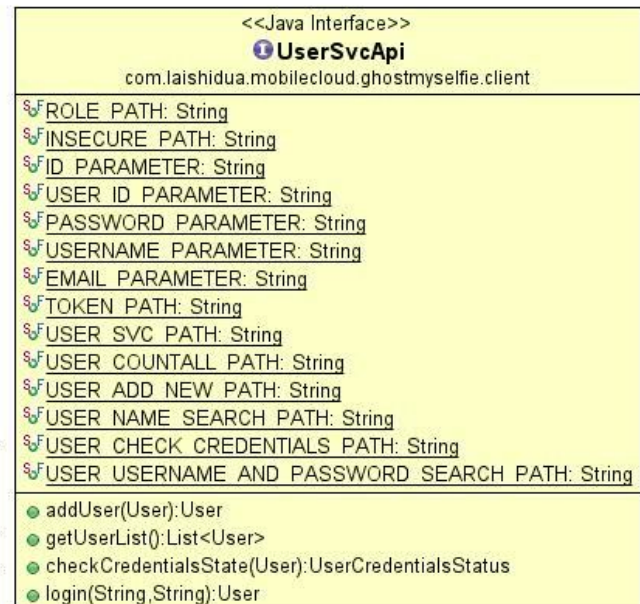
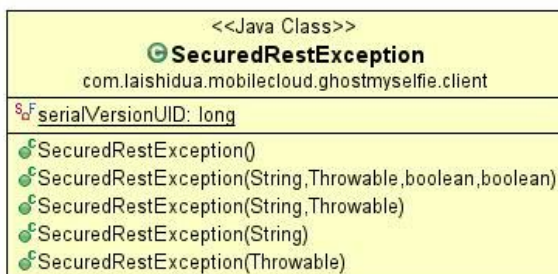
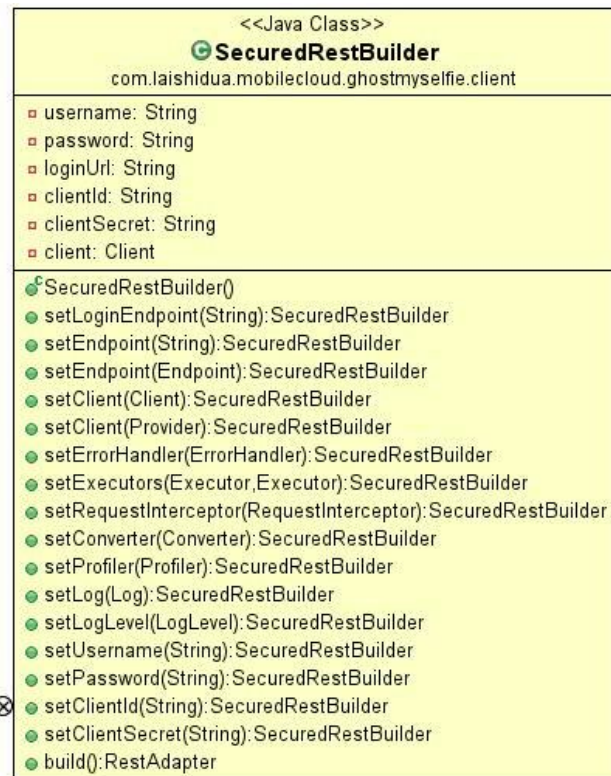
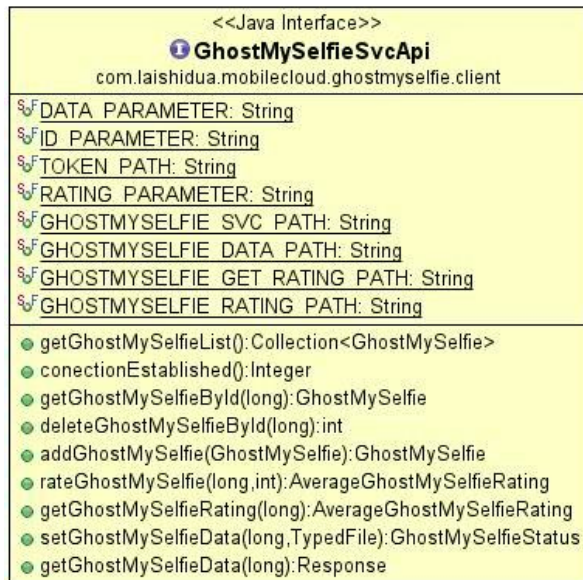


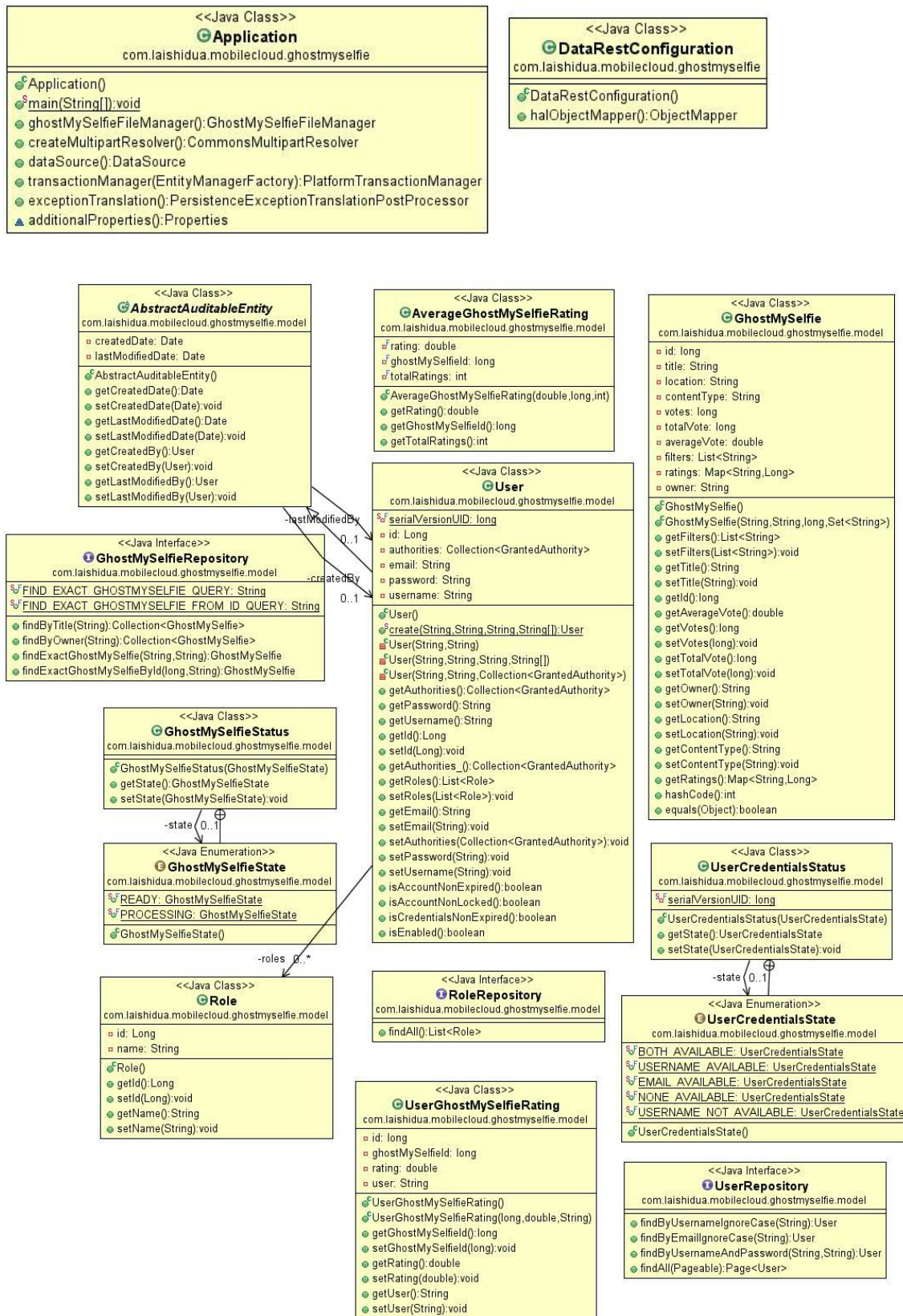


## SERVER UML









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<<Java Class>>	
	<b>LoadUserDetailsService</b>
com.laishidua.mobilecloud.ghostmyselfie.utils	
▫ userRepo: UserRepository	
	LoadUserDetailsService()
	loadUserByUsername(String): UserDetails

<<Java Class>>	
	<b>ResourcesMapper</b>
com.laishidua.mobilecloud.ghostmyselfie.utils	
	serialVersionUID: long
▫ serializer: JsonSerializer<Resources>	
	ResourcesMapper()