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Social Networking App

Research Report
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Introduction

This is a report about the research I have collected for my Social Network Android Tablet Application. This report contains information about similar applications and the language chosen to write the application in. It will describe what Android is. There is an explanation on User Interfaces and the different Android user layouts. There is also a list of the available programming languages and programming environments for android app development.

Overview

Areas, technologies and topics researched

Some of the areas I researched in are video files and voice message uploading to social networking sites and the Internet and Social networking APIs

The technologies for this project I researched into are Android the mobile OS, which is a common OS on mobile devices nowadays, Mobile Tablet devices which are becoming more and more popular, the java programming language and the IDE eclipse, and the Android SDK and ADV

Some of the topics which I will discuss from my research will be the rise of devices using the Android OS, the use of tablet devices and how social networking sites are used nowadays.

1. Similar Applications

Through my research I have searched for similar applications. The three main applications for accessing information on the social networking sites are the official Android applications for Facebook, Twitter and Google Plus.

1.1 Facebook for Android

This app is designed and created by the Facebook developers. It is a free app on the android market and can also be downloaded off their website www.facebook.com. It tries to give the feel of viewing Facebook from a browser. [Facebook01]

This app contains the key features that users regularly use:

- News feed updates
- Status updates
- Message checking
- Video watching
- Chat with friends who are on Facebook

Disadvantages of this app:

- Doesn't allow the user to send out going messages unless it is replying to a thread the user already has going.
- Does not allow user to request somebody to be a friend, only allows user to accept friend requests.
- Some features are slow at loading

This a useful application for Facebook users who have mobile devices. It interface can be tedious to use at time. Its slow loading can be frustrating at times, since applications like this should be fast and efficient. It has a feature for refreshing the news feeds, by dragging down the news feeds till a blue bar with release to refresh appears.

1.2 Facebook Messenger

This app is designed and created by the Facebook developers. It is a free app on the android market and can also be downloaded off their website www.facebook.com. This app is designed to allow users faster messaging between users. This app is also available on iPhone and Blackberry. [Facebook02]

Facebook Messenger features:

- Send messages instantly to other friends who have Messenger
- Chat with friends who are on Facebook
- Get free push notifications for incoming messages
- Add location and photos to messages
- Reach friends via text message if they don't have Messenger yet
- Access sent and received messages on both Messenger and Facebook
- Create group conversations for making plans on the go
- Add more friends to group conversations at any time
- Control alert and location settings for each conversation

Disadvantages of this app:

- Only has access to the message feature
- Does not allow new message chime to be turned off

This application seems to of use to users who only want quick access to the messages. The application only supplies a list of the user's messages from their inbox and allows users to reply to messages. The interface is simple as it doesn't have many features to clutter up the screen. It allows for easy page refresh by dragging down the messages till a blue bar with release to refresh appears.

1.3 Twitter Android App

This is the official Twitter app for Android. The app contains the key features from the twitter website for mobile device, allowing users to search in real time, send and view tweets, browse interests and other features they could do on the Twitter website. [Twitter01]
Features of the Twitter App:

- Browse interests
- Find & follow friends
- Tweet and Retweet
- Direct Message privately with your followers
- Share photos, videos and web pages
- View maps, trends, and follow

Disadvantages of this app:

Can take up a lot of memory, as it saves data that the user has viewed

This app has a simple design and is easy to use. Its interface user friendly, it allows for fast and simple switching between the features it offers by the use of buttons on the top of the screen.

1.4 Google+ App

This app is designed and created by the Google inc. developers. This app is currently available on the android market. The app allows users to access their Google+ profiles and data from mobile devices. Its feature matches that of Google+ on a web browser. Including adding friends and people of interest into groups called circles and updating status posts. [Google01]

Features:

- View updates from other users who are in your circles
- Instant photo and video upload by use of the devices camera
- Video chat with up to 9 friends

Disadvantages of this app:

- The app contains bugs that are currently being fixed, but with the release of version 2.1.1 the video function does not work.
- To switch between different features of the app e.g. switching between viewing news feeds to viewing photos, the app has no feature to quickly switch between them, the user has to go back to the main menu screen and choose their selection from there.

This app is relatively easy to use and move around in. The slide function allows the user to move across to the other options of the current feature easily by sliding the finger left or right. The interface is minimalistic and does what it's supposed to do. The only down side to it UI I can note, is in the ability to move back to the main menu. The button to move to the main menu is a small icon located in the top left corner of the screen.

2. Technologies

2.1 Android Motorola Xoom Tablet

For this project I will be developing the Android Application for the will be the Motorola Xoom mobile tablet device. The Xoom Tablet is a mobile tablet device running Android™ 3.1 (Honeycomb) with a 10.1" HD widescreen display, Wi-Fi access and 32GB of internal storage. [Tab01]

Here is a short view of the specifications of the tablet:

- CAMERA: 5 MP
- WEB CAM: 2 MP
- VIDEO CAPABLE: 720p video playback
- VIDEO CAPTURE: 720p video capture
- BATTERY TYPE: 24 W-hr
- BROWSING OVER WIFI: up to approx. 10 hrs.
- WIFI: 802.11 a,b,g,n
- Built-in microphone
- PROCESSOR SPEED: 1GHz Dual Core

In googles study, "Understanding Tablet Device Users" we can see their research into the current use of table devices. The survey was administered to 1,430 U.S. respondents in March 2011and processes into different categories. From the survey we can see the most popular activities on tablets include gaming (84%), searching for info (78%) and emailing (74%), with accessing social networks in 5th place with 56% of users. [Google02]

2.2 Android OS (Operating System)

Android is an operating system for mobile devices such as smart phones and tablet computers. It is developed by the Open Handset Alliance led by Google. [Google03]

The Android OS structure overview

http://developer.android.com/guide/basics/what-is-android.html
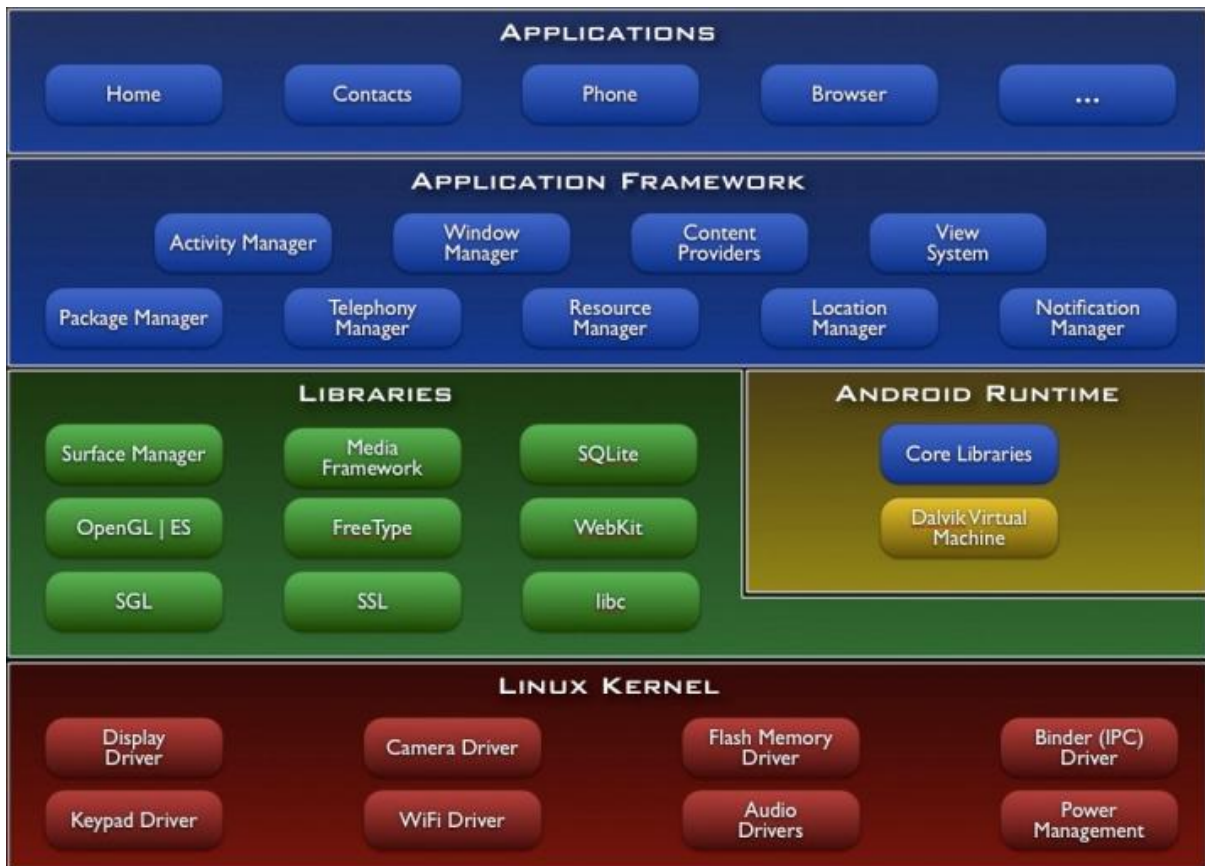
According to Nielsen's blog post on http://blog.nielsen.com/nielsenwire/, he reports on currents trends of mobile operating systems.

Android OS placed the first line with 43% market shares, while the second row is iOS of Apple with 28%, Blackberry holds 18%, Windows Phone 7%, while other OS are 4%. The huge Android market shares reflected from many vendors used the OS, whether operated for high-class cell phone or mid-class, even beginner class. According to Nielsen, its party impatiently waiting similar report for the fourth quarter of 2011

http://www.dsmartphones.com/7855/android-dominate-cell-phone-market-share-in-america/
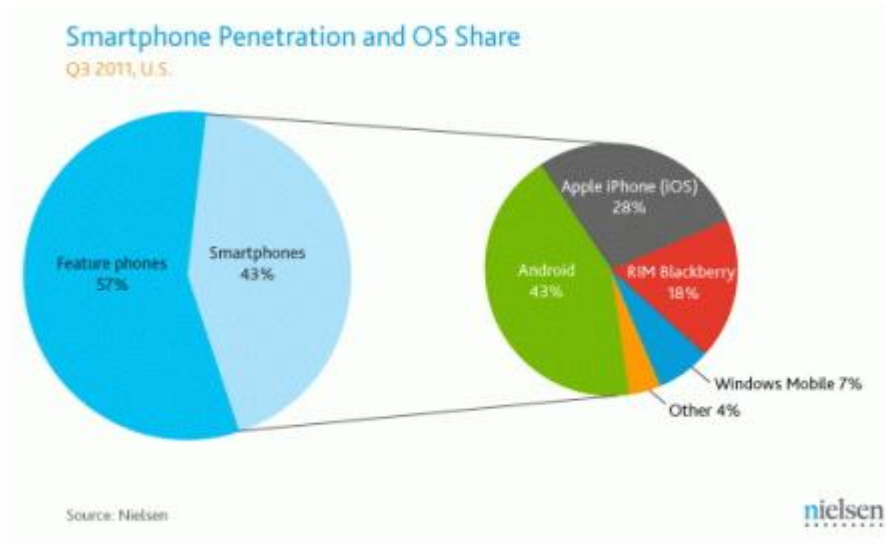
2.3 Android Environment (SDK and ADV)

Android SDK (software development kit) and ADV (Android Virtual Device) are tools to help in the development of Android applications.

The SDK is a software development kit that enables developers to create applications for the Android platform. The Android SDK includes sample projects with source code, development tools, an emulator, and required libraries to build Android applications. Applications are written using the Java programming language and run on Dalvik, a custom virtual machine designed for embedded use which runs on top of a Linux kernel.

The ADV is an emulator configuration that lets you model an actual device by defining hardware and software options to be emulated by the Android Emulator.[Droid02]

2.4 Prototypes/ tutorials done

Tutorials:
The Android Development website contains a section on Android app development, which helps developers learn the basics of app development. To start off I chose the Hello World tutorial which is the first program every developer starts with when start new language or environment.
Hello World
This tutorial shows the basic of developing Android applications in Eclipse with the android SDK and ADV. The app simply displays "Hello World" to the screen of the android device.
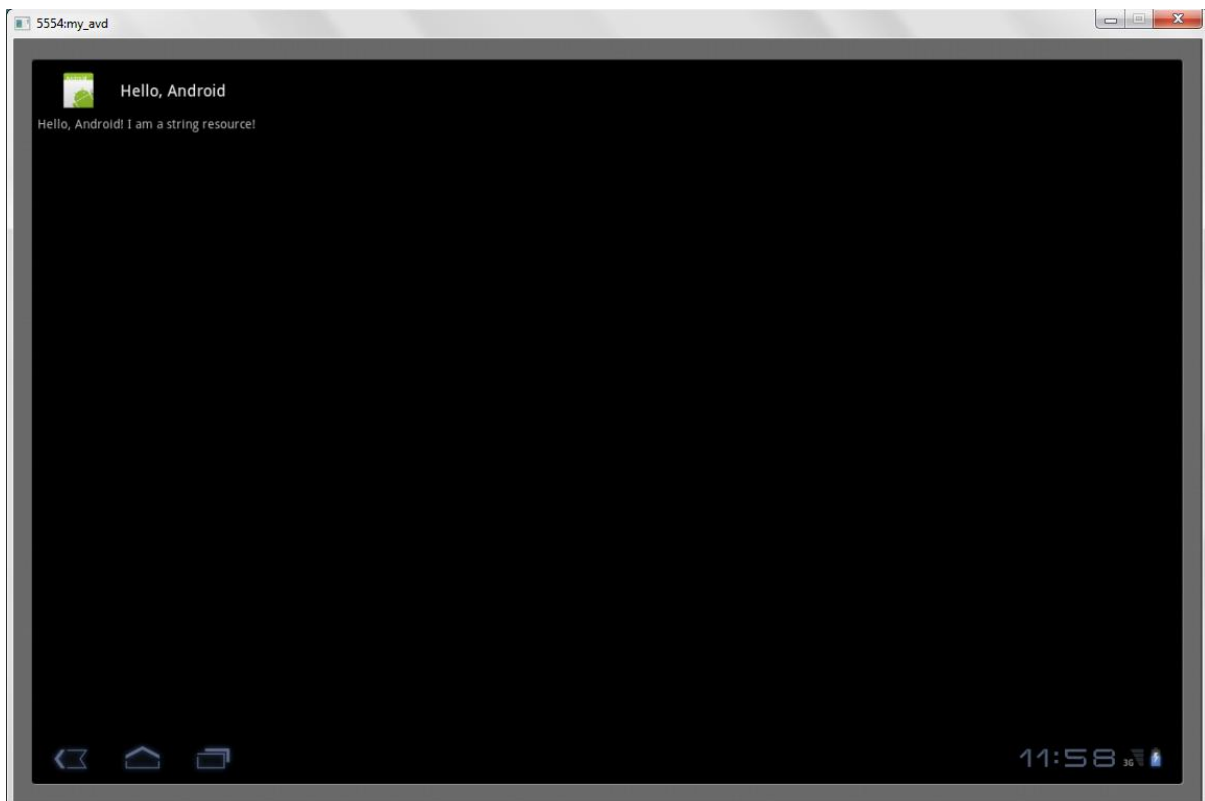
By using the application DroidDraw, which is software that allows the design of android UI design. The software also supplies the xml UI code, that can be copy and pasted into the projects xml file The DroidDraw website http://www.droiddraw.org contains a section on tutorials that shows how to design UIs and the different types of layouts for Android development.

Currency Converter Tutorial

This tutorial available on the DroidDraw website, shows developers to code apps with buttons, textboxes and other widgets.
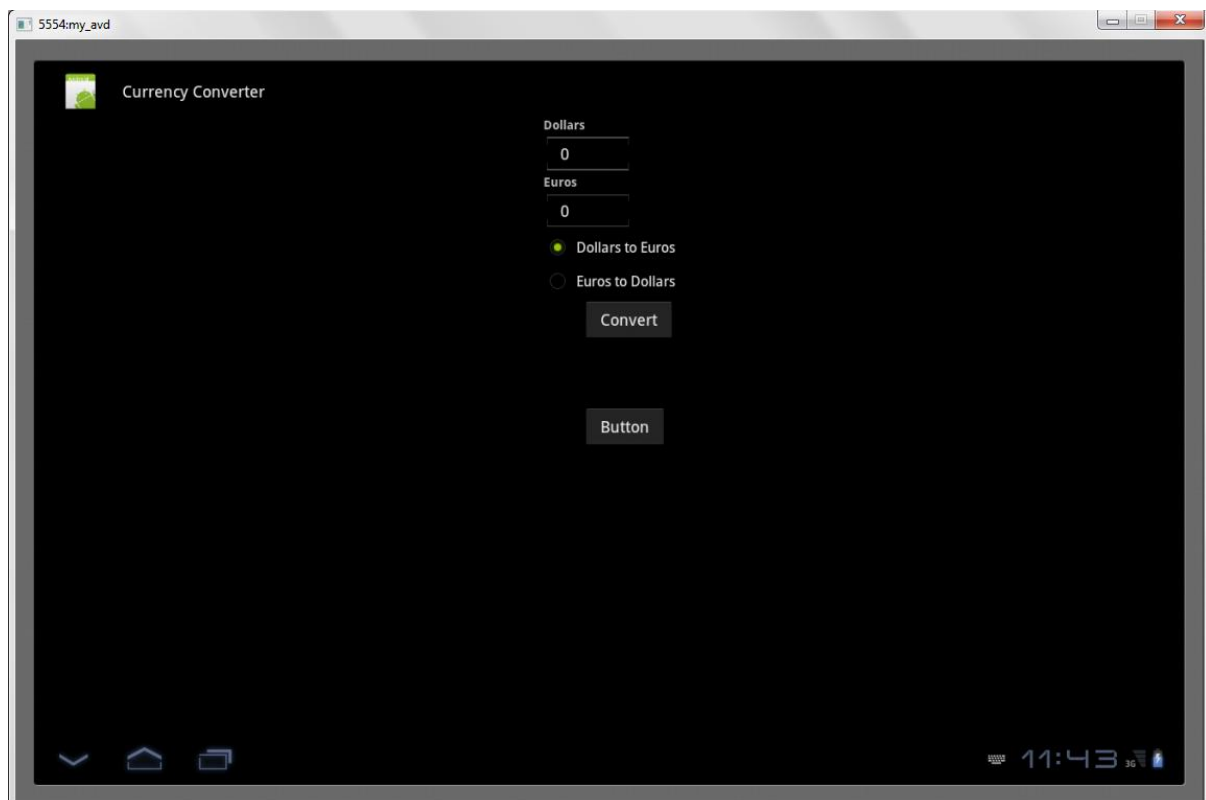
2.5 Social Networking API(Application Programming Interface)

APIs are an essential tool needed to allow software to interact with other different software. This is accomplished by the asking program uses a set of requests or calls.
"Building an application with no APIs, says Josh Walker, an analyst at Forrester Research Inc. in Cambridge, Mass., "is basically like building a house with no doors. The API for all computing purposes is how you open the blinds and the doors and exchange information." APIs also exist between applications." [API01]

In this section we will see how each of the main Social network APIs allow access for the features need for this project.

Facebook API

The API for Facebook is a well documented api, and gives access for use with most if not all of Facebooks features, including message commenting, Facebook chat, and many other features. [Facebook03]

The documentation contains explanations of the various functions calls available and sample code for implementing them. Facebooks development site also contains tutorials on creating apps using their API, and helping developers learn how to build, test and launch their social network integrated application.

When developing an application that connects to the Facebook platform, you must register the app on their site and fill out basic details of the app. An App ID is given, which is added to the app code, this allows the Facebook platform to have knowledge of the app connecting to its features.

Twitter API

Twitters main features for its API can be found at https://dev.twitter.com/docs/api which gives a list of the function calls that allow application to access the functions. The Twitter development site supplies well documented information on the different areas it caters for. In its The REST API section it provides simple interfaces for most the available functions Twitter has to offer.

Twitter uses OAuth to provide authorized access to its API. OAuth is a protocol system that allows for safe and secure interaction to protected data. More information on OAuth can be found on their website at http://oauth.net/. Twitter relies on OAuth to allow secure access to their API and protected data. To obtain an OAuth key for your application, you must register the application on the Twitter development site at https://dev.twitter.com/apps/. Once the application has been registered it can then gain access to the Twitter API using the given OAuth key.

Google+ API

At the moment since Google+ is a recent addition to the social networking sites, it has yet to release its full API. Currently Google+ API limited to read access to public data and all API calls require either an OAuth 2.0 token or an API key. As mentioned in the section on the Twitter API, an OAuth token is a specific identifier that allows the application to gain secure access to the sites API and data. An API key is similar to OAuth; it gives secure access to the site and its data. [API03]

Sample code for accessing users profile:
*GET https://www.googlepis.com/plus/v1/people/{userId}*

3. Voice Uploading

For this project I hope to add a new feature to the social networking apps in a function that allows for the recording of text and voice description. What this means, is that the user adds a text description or leaves a recorded voice description of the video or photo. This feature would add a unique feature to the social network experience.

Voice Recording

Since this application is on an Android device, we will need to understand how the Android OS allows developers to access the devices sensors. The android.media package contains classes to interact with the media subsystem. The android.media.MediaRecorder, is a class that allows samples to be taken from the media, including audio and video. The MediaRecorder operates as a state machine. [Droid01]

You need to set various parameters, such as source device and format. Once set, the recording may begin for an arbitrary amount of time until subsequently stopped.
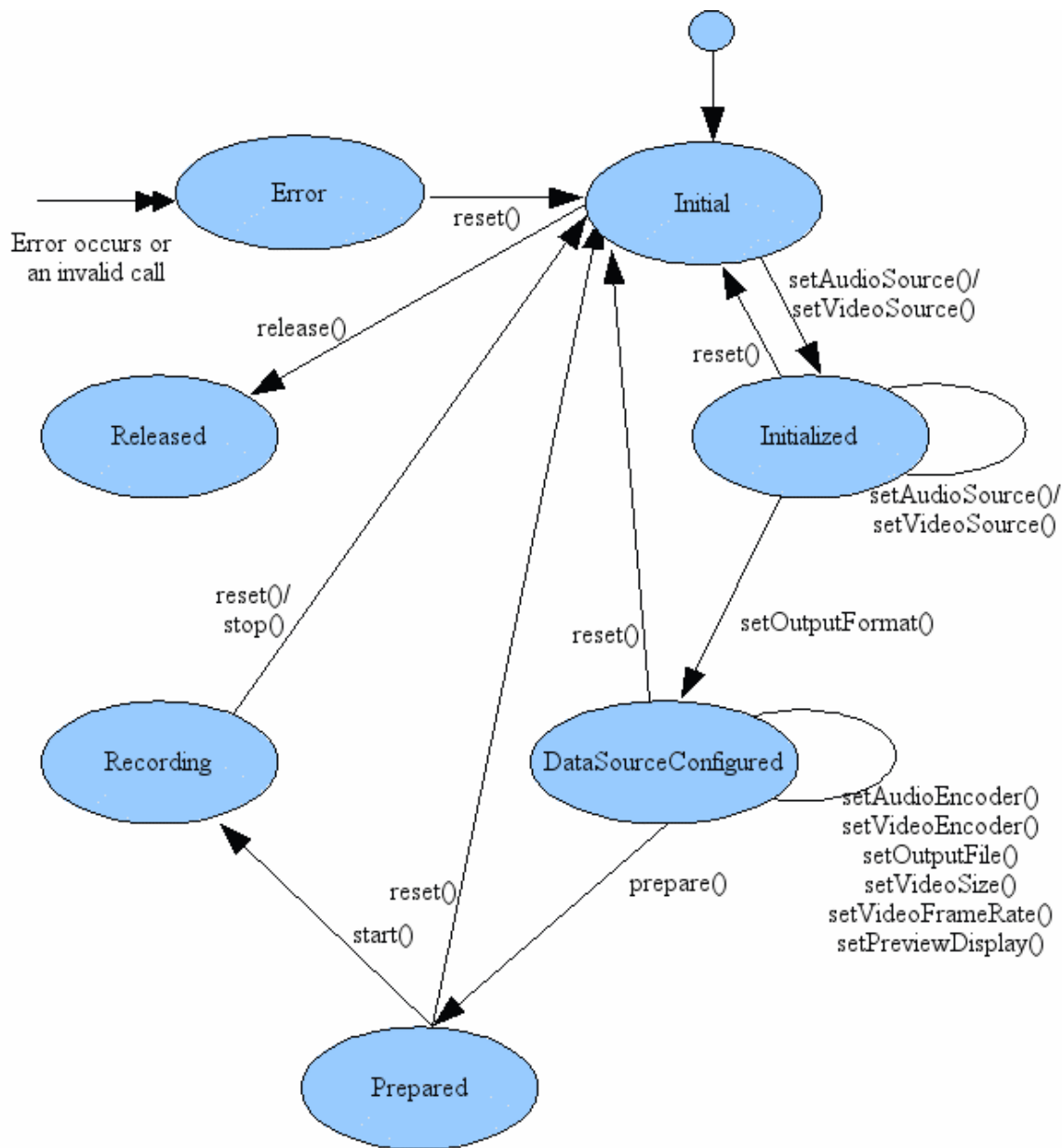
MediaRecorder state diagram

http://developer.android.com/reference/android/media/MediaRecorder.html

Ways of uploading Voice messages to Social networking sites

Through my research of adding voice comments to social network sites, one main way has constantly came up.

Adding a widget
According to a post made by Butterscotch on the website http://video.answers.com/, they created a tutorial on how to add voice messages to social network sites. The tutorial shows that by creating an account on Twitsay.com, it allows the user to phone the service and record the message, the message is then added to a widget and added to the users set up social network page. Another similar approach is using the client on mySay.com which allow you to upload MP£ audio files, which adds the file to a widget and uploads it to the users account.

So far through my research I haven't found any practical way of uploading audio from functions already available on the social networking sites.

4. Uploading Video

In this project I hope to allow the user to upload Video content to their account to share with other users. This will require access to each of the social networking sites API for uploading videos. For efficiency there is a need to find a common video format style to reduce the amount of conversion each API will have to do on the video that is to be uploaded

Each site has their own upload and file size limits and ways of connecting to and uploading the file to their site which I will explain in the section on how each API allows video uploading.

For efficient video uploading we need a low quality video. The videos lower quality will shrink the video file size considerably, and in turn this will allow for faster uploading.

Google+ API video upload

Since Google Plus is a fairly recent addition to the Social Networks, Googles release of its API has been slow, with currently only a small amount of features and limited access.
Currently Google Plus API has no information on the uploading of videos to the user's page through a designate video upload API.
Through my research I believe that once the API has been released to allow videos to be uploaded through the API, the video will have to be uploaded through the YouTube API first.

Since Google now own YouTube, they would not need to add different code for uploading videos to Google+ since the YouTube API can do it all.

Facebooks API video upload

Uploads a video owned by the current session user and returns the new video. In order to upload a video from your application, the user must grant your application the publish_stream extended permission.

Facebook uses specific set of servers for the uploading of videos. The call video.upload function is used to upload the video which is sent to http://api-video.facebook.com

Video files being upload through the API have the same size limitations uploading through the website. The video.getUploadLimits function is used to determine a specific video files limits

Some of the supported Video Types
You can upload the following video file formats through this call:

- 3gp (Mobile Video)
- avi (AVI Video)
- flv (Flash Video)
- m4v (MPEG-4 Video)
- mkv (Matroska Format)
- mod (MOD Video)
- mov (QuickTime Movie)
- mp4 (MPEG-4 Video)
- mpeg (MPEG Video)
- mpeg4 (MPEG-4 Video)
- qt (QuickTime Movie)
- vob (DVD Video)
- wmv (Windows Media Video)

Facebook allows for many other video formats showing how well Facebook have designed their API.

Twitters API video upload:

Unfortunately the Twitter website does not support video content, so there are no API for the upload of video. Through research I have found that most videos are sent by YouTube address via tweets. Currently the website http://www.twitvid.com/ acts as an approach to solve part of Twitters non video functions. Twittvid acts similarly to youtube, but allows for connectivity to twitter pages.

Even though this is not a needed feature for this application, I hope to try and get some video feature to be uploaded to the user's profile.

5. Uploading Photos

In this project I hope to allow the user to upload photos to their account, to allow other users to view them. For this feature two main issues are need to be addressed;
1. How do each social networks APIs allow photo uploading work and 2. what quality is best suited for uploading.
How does video uploading work and what quality is best suited for uploading?
Each site has their own upload and file size limits and ways of connecting to and uploading the file to their site which I will explain in the section on how each API allows video uploading

Google+ API uploading photos

Since Google have only released a small amount of access to their Goole+ API they have not specified how to upload photos to Google+ account. But from research of googles other application APIs, I believe that its API will be similar, if not the same as its Picasa Web Albums Data API.

Picasa Web is an application owned by Google. It has its own APIs to allow developers access to its feature just like most of googles applications it has to offer.

Facebook API uploading photos

On Facebooks API section, they state to use their Graph function for the uploading of photos, due to the updating of the main Photo function section of their API. To start uploading photos you first need to have the publish_stream permission. When permission has been given the process can begin the uploading of a photo by issuing an HTTP POST request to the Graph API connections.
There are two Graph API connections that can be used for this:

- https://graph.facebook.com/USER_ID/photos - The photo will be uploaded to the users account, and will be stored in an album created by the app.
- https://graph.facebook.com/ALBUM_ID/photos - The photo uploaded to the album name specified by the ALBUM_ID.

In Christine Abernathy blog post on Facebook developer site, she gives sample code of these two photo uploading features using PHP.
[API02]

Sample code using https://graph.facebook.com/USER_ID/photos

```php
<?php
    $app_id = "YOUR_APP_ID";
    $app_secret = "YOUR_APP_SECRET";
    $post_login_url = "YOUR_POST_LOGIN_URL";

    $code = $_REQUEST["code"];

    //Obtain the access_token with publish_stream permission
    if(empty($code)){
      $dialog_url= "http://www.facebook.com/dialog/oauth?"
       . "client_id=" .  $app_id
       . "&redirect_uri=" . urlencode( $post_login_url)
       .  "&scope=publish_stream";
      echo("<script>top.location.href='" . $dialog_url
       . "'</script>");
     }
     else {
      $token_url="https://graph.facebook.com/oauth/access_token?"
       . "client_id=" . $app_id
                    . "&redirect_uri=" . urlencode( $post_login_url)
       . "&client_secret=" . $app_secret
       . "&code=" . $code;
      $response = file_get_contents($token_url);
      $params = null;
      parse_str($response, $params);
      $access_token = $params['access_token'];

      // Show photo upload form to user and post to the Graph URL
      $graph_url= "https://graph.facebook.com/me/photos?"
      . "access_token=" .$access_token;

      echo '<html><body>';
      echo '<form enctype="multipart/form-data" action="'
      .$graph_url .' "method="POST">';
      echo 'Please choose a photo: ';
      echo '<input name="source" type="file"><br/><br/>';
      echo 'Say something about this photo: ';
      echo '<input name="message"
         type="text" value=""><br/><br/>';
      echo '<input type="submit" value="Upload"/><br/>';
      echo '</form>';
      echo '</body></html>';
   }
?>
```

Twitter API Uploading photos

The POST statuses/update_with_media method allows for the posting of media files to the twitter account executed on upload.twitter.com. Using this host name rather than api.twitter.com, it ensures high availability and flexibility.

"Unlike POST statuses/update, this method expects raw multipart data. Your POST request's `Content-Type` should be set to `multipart/form-data` with the `media[]` parameter

The Tweet text will be rewritten to include the media URL(s), which will reduce the number of characters allowed in the Tweet text. If the URL(s) cannot be appended without text truncation, the tweet will be rejected and this method will return an HTTP 403 error" [Twitter02]

6. Programming Language

Here is a selection of different programming languages that are available for the development of Android applications.

Java

Java is a programming language which derives most of its syntax from C and C++. This language is best suited for this project because it is best Android App development has been designed to be programmed in java. Google chose java as the programming language for Android development because it had good developer support and mature open-source tools.
[Java01]

Python

Python is fully supported by Google to run on the android environment. But is not an ideal language for app development as it is a large programming language, in terms that the application size will be much bigger than an app coded using java.

C++

C++ is an enhancement of the C programming language. It is a combination of both high and low level language features. It is a popular language in the software development industry, as it allows for fast and efficient programs to be developed. C++ is mainly used for the development for games on the Android platform. Since C++ wasn't originally design for Android app development for developing applications NDK (Native Development Kit) was created to allow applications to be created.

# 7. IDE- Integrated development environment

Eclipse IDE
Developing in Eclipse with ADT is highly recommended and is the fastest way to get started. With the guided project setup it provides, as well as tools integration, custom XML editors, and debug output pane, ADT gives you an incredible boost in developing Android applications.
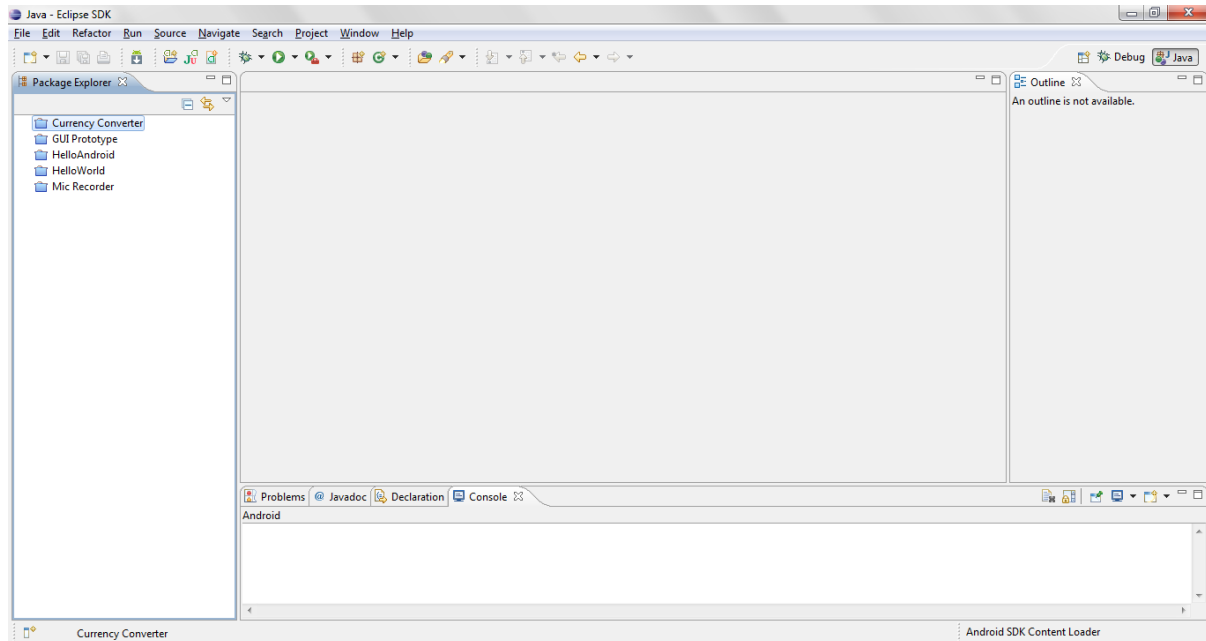
Eclipse IDE interface

Netbeans

"A free, open-source Integrated Development Environment for software developers. All the tools needed to create professional desktop, enterprise, web, and mobile applications with the Java platform, as well as with C/C++, PHP, JavaScript and Groovy." [IDE02]
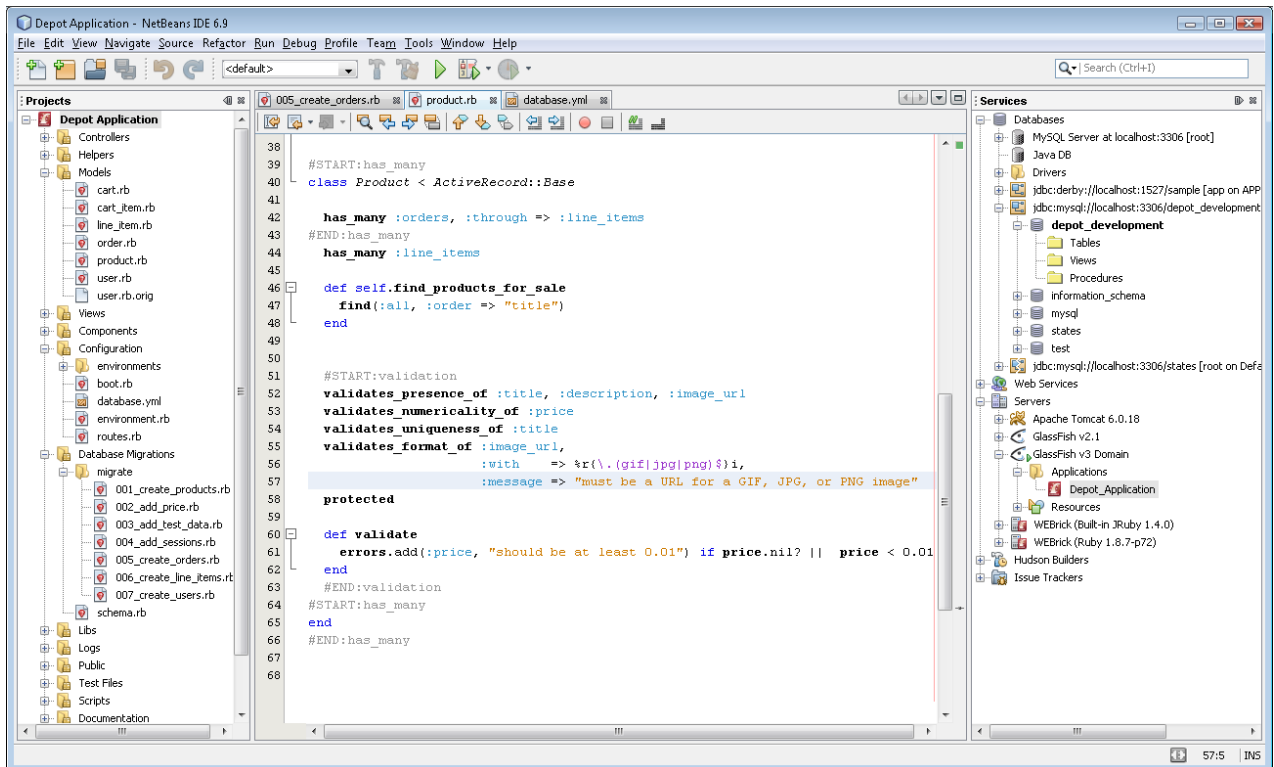
Netbeans IDE interface
http://netbeans.org/images_www/v6/9/screenshots/ruby.png

Google recommends using eclipse and Java for developing Android app coupled with their SDK and AVD, as it contains plug-ins for easy development and their documentation is structured around developing using eclipse and contains more support for Android app development.

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