Guillaume MONTAVON
Benoît MEILHAC

Study and development with the Android platform

Supervisors :
Mr PIAT
Mr TATIBOUET

IT Department
Université de Franche-Comté
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Abstract

Acknowledgment

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1 Introduction

Mobile phone market currently knows a huge revolution with the emergence of smartphones. This revolution was launched by Apple with its IPhone. Lots of people have been seduced by this one. Google realized the potiential of this market and chose to get inside. Therefore it decided to create its own Operating System (OS) for smartphones which could competed with IPhone OS[1] as known as IOS. Its name is Android.

Since Android was created, it knows a very large growth. Indeed, this OS is became the leader in sales of smartphones in the world in just two years after its placing on the market. Due to its free access, lots of manufacturers have adopted it very quickly. Android has a large developer community that contributes to the creation of diverse and varied applications available on Android Market, the online software store developed by Google for Android devices.

The objectives of this project were to begin with study the Android platform, which it is, what it offers to users and developers. And in a second place, the creation of an application using the possibilities of the platform.

A first part will permit to present in details what Android is, the tools used to develop an application and the subject of this project which will present the chosen application. Finally, a second part will describe the implemented application.

[1] IPhone Operating System

2 Context

2.1 What is Android ?

2.1.1 Presentation

Figure 2.1: Android logo

Mettre le texte en couvrant quand possible...

Android is an open source operating system for smartphone, PDA[1] and mobile devices. It was conceived by *Android Inc.*, a startup that Google purchased in 2005. This operating system differs mainly of its competitors in that it is open, it is also used by many manufacturers and therefore smartphones on the market. Google's business model very appropriate, the adoption of Android by manufacturers has been very rapid because of the free use.

Its deployment was announced by the Open Hanset Alliance (OHA) November 5 2007 and the first phone equipped end of 2008 to the United States and in the beginning of 2009 in France. Since, Android has a significant growth. It became in the beginning of 2011, first in sales of smartphones in the world.

[1]Personal Digital Assistant

Developer community is very active, indeed it exists more than 200 000 applications available on the Android Market, the online software store. This makes it very interesting.

More than a hundred of mobile devices are equipped of Android. Here are some examples of devices using Android :

(a) HTC Desire

(b) Google Nexus One

(c) Samsung Galaxy S

(d) Samsung Galaxy Tab

Figure 2.2: Examples of devices using Android

2.1.2 History

July 2005 : Purchased by Google

A purpose of Google was to enter on market of mobile phone. That is why it purchased the small company *Android Inc.* which developed applications for mobile. From that moment, Google is working on the operating system Android.

November 2007 : Open Handset Alliance (OHA)

Second key point, the creation of OHA by Google. OHA is a business alliance of many firms to develop open standards for mobile devices. There are some big names as *Bouygue Telecom, Samsung or even Intel, Nvidia*. After this alliance, the birth of the Android platform is announced. Now, this alliance has 80 members approxymately.

December 2007 : Development kit

Google publishes the first release of its SDK[2].

September 2008 and March 2009 : First smartphone

The first smartphone equipped of Android operation system is available for sale by *T-Mobile* in September 2008 and is available in France in March 2009.

October 2008 : Licensing

Android is totaly under free software/open source license and its entire source code is published. Manufacturers can modify components and customize the system.

2.1.3 Android version

Android has seen a number of updates since its original release. They fix bugs and add new features.
Generally each new version of the Android operating system is developed under a code name based on a dessert item.
Here are a table of Android releases :

This is the version 2.2 which is the most used, the latest being the 2.3.

2.1.4 Features

Android has lot of functionnalities, enumerate them is too long so only the most important will be presented.

[2]Software Development Kit

Android version	Name of the version
1.5	**C**upcake
1.6	**D**onut
2.0/2.1	**E**clair
2.2	**F**roYo «*Frozen Yogourt*»
2.3 Version currently in used	**G**ingerbread
3.0	**H**oneycomb
Later	**I**ce cream sandwich

Table 2.1: Table of the different versions of Android

Extended desktop

The desktop is extended on 3 or more parts, it depends of the manufacturer which can modify the interface. Each part is customizable by the user, it is possible to put shortcuts (to applications, folders, files, contacts, ...) or widgets.

Widgets

Like desktop for newer operating systems, it is possible to put widget on the desktop. They can give various information and provide interaction with the system.

Various sensors

Android take in charge different sensors : accelerometers, gyroscopes, magnetometers, proximity sensors, pressure sensors or even thermometers. Lots of application use sensors, for example, Google Maps uses compass and accelerometer.

Other features

Here are some others features :

- multitasking;
- tethering[3];

[3]wireless connection sharing

- voice based features;
- multi-touch;
- web browser;
- media support;
- new connectivity (WiFi, Bluetooth, GPS, GPRS/EDGE/3G/3G+, ...);
- 3D graphics;
- video calling;
- ...

2.1.5 Android Market

2.1.6 Android in the future

2.2 Presentation of the subject

With the Android platform, the developer can have many possibilities in the creation of applications. Therefore there are so many applications available on the Android Market.

The final purpose of the project is to use more functionnalities as possible in an application to get a view of what is feasible. To save development time, the software (a task manager), realized in the first semester as part of the unit value *Modélisation, Interface utilisateur, Conception Avancée (MICA)*, was chosen.

So that, the project consists to :

- adapt the existing application to an Android smartphone;
- add correctly several useful functionnalities to the smartphone;
- have a functionnal application.

2.3 The task manager

2.3.1 Presentation of existing

The task manager realized as part of the unit part MICA[4] is a sofware for managing daily tasks that everyone should make. It is a memory aid used by everyone.

Existing functionnalities

This software can realize the following actions :

- manage tags;
- manage tasks;
- sort tasks according to specific criteria;
- assign sub-tasks to tasks;
- change language via a software internationalization in English;
- save the tasks list.

View of the existing

2.3.2 Presentation of the software for smartphones

The sofware must be able to adapt to a smartphone while containing the functionnalities listed above. That is to say, he must be able to adapt to screen size, have a simple interface and not over-elaborate, but still full. It must also include new possibilities available with Android.

Omitting the functionnalities already listed in the presentation of the existing, the task manager for smartphone must be able to :

- use the SQLite database available on Android smartphones;
- synchronize with a remote server;
- use the various functionnalities included with Android;
- manage user accounts on the server.

[4]Modélisation, Interface utilisateur, Conception Avancée

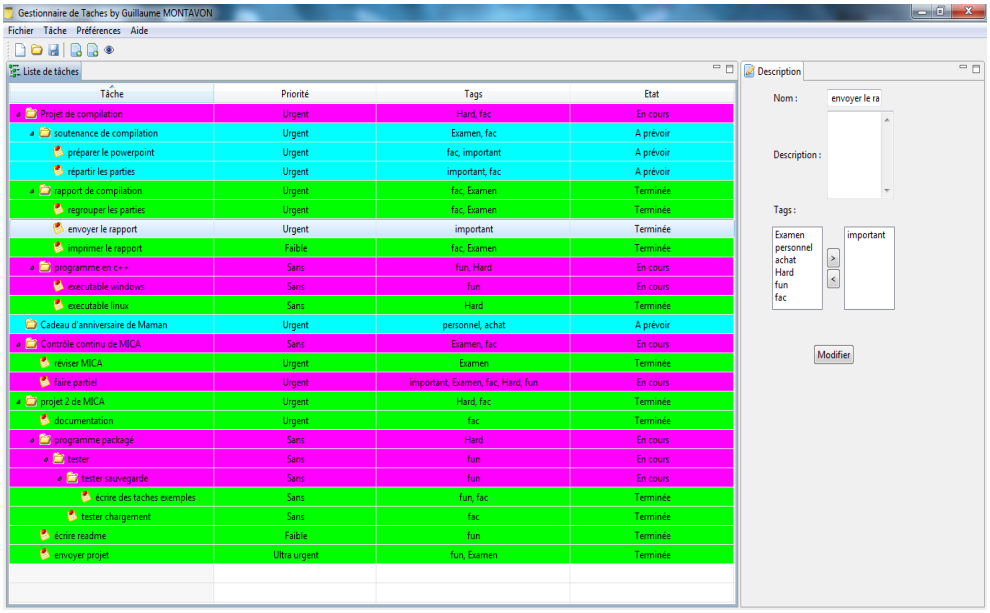

Figure 2.3: Example of screenshot of the existing task manager

2.4 Specifications

2.4.1 Application design

The application can be divided into different main parts. One general part that reflects the objectives of the first software task manager. One part concerning the storage of information on the smartphone. And a last part to manage the remote server.

The general objectives of the application are :

- manage the application with tasks and tags (added, remove, modification, sorting);
- a graphical interface fluid and pleasant to use while still powerfull and complete;
- internationalization of the application in English;
- manage the application preferences.

Concerning the database :

- creation of a coherent basis to manage all the data of the application;
- storing, modifying and deleting data.

Concerning the synchronization with the remote server :

- creation of a database more evolved than the smartphone;
- sending and receiving data with their storage, modification and deleting;
- manage users;
- implementation of various methods of synchronization :
  - overwrite data from the smartphone replaced by those of the server;
  - overwrite data from the server replaced by those of the smartphone;
  - combine data of the server and the smartphone.
- manage a proxy server.

2.4.2 Technical constraints

Developing an application with Android imposes some constraints to have a result.

Development tools

Several tools are available to easily develop with Android :

- Google Android SDK[5] which contains an emulator of smartphone;
- eclipse IDE[6] to develop in Java;
- Android plugin ADT which one can to use the emulator with eclipse.

Web server

A web server was set up to test remote synchronization. This server is hosted by *OLikeOpen* (web host which offer his services for free) and has a MySQL database and PHP tools for communicating with it.

[5]Software Development Kit
[6]Integrated Development Environment

Miscellaneous

There are lot of version of Android and they evolve everyday, so this is why the development was completed and tested on 2.2 version (*FroYo*). However, an emulator is not sufficient to verify the correct running of the application, a smartphone that has the correct version of Android was necessary to validate the tests.

2.4.3 Temporal constraints

The first part of the project consists to the study of the Android platform, so the development time of the application depends of time to get one's feet wet with the tools proposed by Android. The rest of the time is a full development of the task manager.

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