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Research of Multimedia Applications based on Android Platform

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Abstract. Since Google launched the Android open source mobile platform, Android operating system has occupied half of the mobile phone industry. Meanwhile, the Android applications also have a lot of demand. But now some Android applications on the market contain a lot of advertising, these redundant information affecting the customer experience. In order to enhance the user experience, in this paper, will base on Eclipse and Android SDK developer tools which Google launched, use Java to development a simple and practical audio player which paying attention to the user experience. This audio player will uses ContentResolver and Curor to obtain music files, will uses the Service components calls the MediaPlayer class for the music playing in the background. This audio player support the user wonderful music and as well as not to bring other negative effects, at the same time users can normally use.

1 Introduction

In recent years, the emergence of smart phones has changed the definition of mobile phones. Cellphone is no longer just a communication tool, but also inherit most of the functionality of the computer, such as surfing the Internet, watching videos and listening to music, etc. At the same time, various applications added unlimited fun for people's lives. It is certain that the future of the network will be the mobile terminal.

Android is a Linux-based free and open source operating system, mainly used in mobile devices, such as smart phones and tablet PCs, developed by Google and the Open Handset Alliance. Android operating system originally developed by Andy Rubin, main support mobile phones. August 2005 was acquired by Google. November 2007, Google combined 84 hardware manufacturers, software developers and telecom operators formed the Open Handset Alliance, jointly researched and

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developed Android system. After this, Google released the Android source code, Android operating system quickly occupied the smart phone market [1-2].

The applications on the market today are mostly commercial applications, and contain a large number of built-in advertising and redundant information, thus affecting the user experience. After studying some previous Android applications and access to large amounts of materials, we utilize the Java language, the Eclipse platform, Android ADT and the Android SDK to develop the audio player. These systems have a nice interface and smooth operation. These Apps won't steal any personal information, but can exclude useless information and bring a wonderful user experience.

2 Android Architecture

We studied the Android system architecture. Android system architecture uses a layered architecture. the Android architecture consists of four layers：Linux kernel, Libraries and Android runtime, Application framework and Applications [3-5].

2.1 Applications

Android app will be shipped with a set of core applications including client, SMS program, calendar, maps, browser, contacts, and others. All these application programs are developed in Java.

2.2 Application Framework

The developer is allowed to access all the API framework of the core programs. The application framework simplifies the reuse of its components. developers can also use these frameworks to develop their own applications, thus simplifying the application development architecture design, but must abide by the principles of its development framework.

2.3 Libraries and Android Runtime

The library is divided in to two components: Android Runtime and Android Library. Android Runtime is consisted of a Java Core Library and Dalvik virtual machine. The Core Library provides Java core library with most functions. Dalvik virtual machine is register virtual machine and makes some specific improvements for mobile device.

Android system library is support the application framework, it is also an important link connecting between application framework and Linux Kernel. This system library is developed in C or C++ language. These libraries can also be utilized by the different components in the Android system. They provide service for the developers through the application framework.

2.4 Linux Kernel

The kernel system service provided by Android inner nuclear layer is based on Linux 2.6 kernel, Operations like internal storage, process management, internet protocol, bottom-drive and other core service are all based on Linux kernel.

3 Experimental Methods

Audio Player is achieved through the Eclipse platform. In order to develop android app, we will install a plug-in for Eclipse: Android Development Tools (ADT). Once installed, download Android SDK [7-9], install and configure the SDK, then we can develop audio player. It defines the interface in the Application Framework layer, and then acquires music files through ContentResolver in the Android Framework layer. Finally, plays the music by using the Service component calling the MediaPlayer class in the Libraries layer. The system structure is shown in Figure 1.

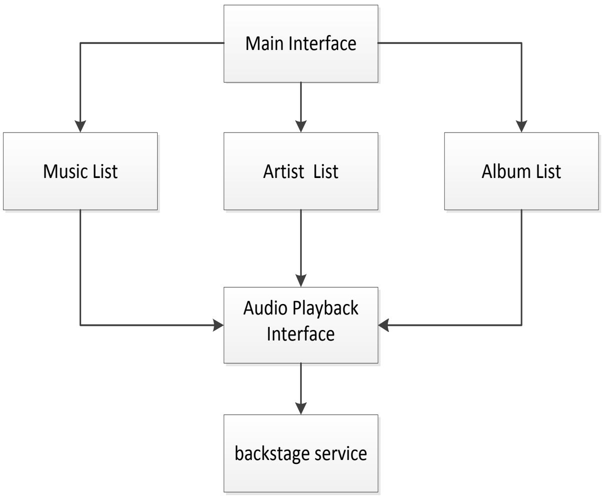

Fig.1. The System Structure

The main interface module is the entrance of the application. Users will see the main interface modules after starting the application. The module itself does not reflect any of the information to the user, just call list module to display. Three lists are demonstrated: music list, album list and artists list. The main interface module is realized by calling MusicListActivity, AlbumListActivity and ArtistListActivity [10] module. Figure 2 is the specific flow chart.

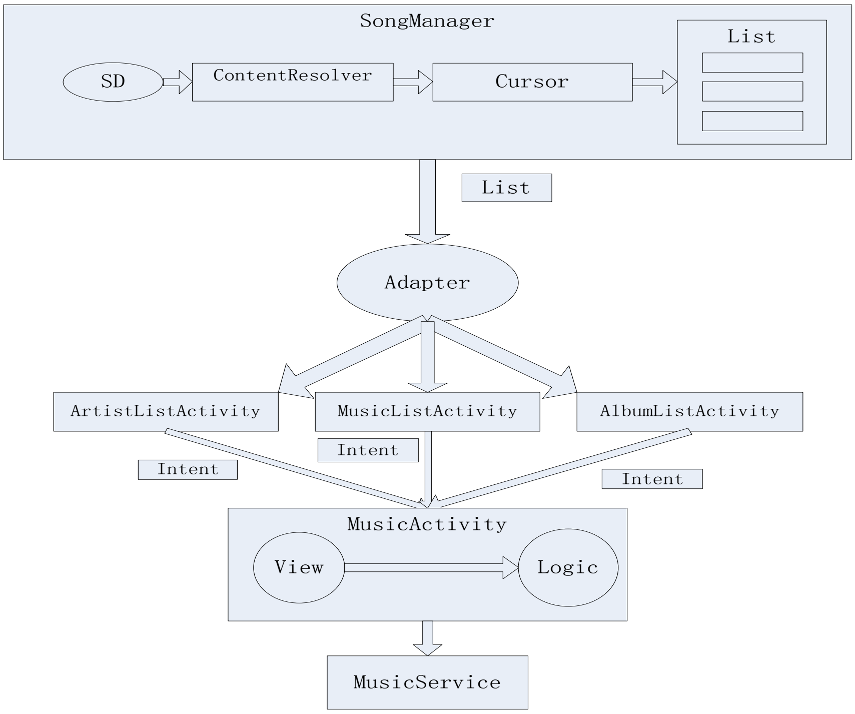

Fig.2 Audio Player Flow Chart

Audio file scanner module is responsible for scanning all the audio files on the SD card. The SongManager in this module is a class, this class has a static method to access to the SD card. The static method acquires the SD card audio resources by using Cursor class method provided by Android system, and will turns the received audio resources into a List class instance objects. The members of List are the JavaBean – Music used in the app. The List Array will eventually be returned to the other modules that they calling it. List module MusicListActivity，AlbumListActivity and ArtistListActivity module will call this module.

Adapter module is a tool that maps instance objects of the List<?> class to the ListView. The adapter module in this application will get a List < Music > instance objects that produced by SongManager module, and map it to the ListView view components in the MusicListActivity and other modules.

List module will not show to the user alone, but called by the main interface module. This module has three parallel parts: MusicListActivity, ArtistListActivity and AlbumListActivity. The function of them is to display the song list, artist and album list in the main interface. These parallel modules will call the static method in the SongManager class to acquire a List <Music> instance object, and then call the adapter module to handle the obtained List <Music> instance objects. Then, map List <Music> to its own ListView component. When the user selects an element of the ListView, this module will encapsulate the information into an intent object and sent it to music playback module.

Music playback module collects the intent sent from List module and analyzed it, then calls the background music services to play the audio file. The View components provides player with some basic functions, such as play, pause, fast forward, fast rewind, single play, random play, etc. This module will make the corresponding logical analysis after the users did operations to the components. Appropriate response and changes will be done according to the results analyzed. Audio player interface is shown in Figure 3.

Fig.3. Audio player

4 Conclusion

The test involves two environments including hardware and software. Test hardware environment is Lenovo Y460 laptop and millet M1 phone; software environment is windows 7 and phone system environment is Android 4.0.3.

By testing each function on mobile phone and the computer simulator, the result showed that audio player run well and no advertising. Expected effect is achieved after testing all the functions, at the same time, having a good user experience.

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