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Mobile App Design for Teaching snd Learning

Maria Cristina ENACHE[★]

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ABSTRACT

This paper aims to describe the realization of a mobile application that consists of sending feedback from the learner to the instructor during a presentation. People in the room can send feedback to the instructor in the form of questions, positives or negatives, using the available options. At the end of the presentation, the instructor has the opportunity to see the feedback received in an aggregated form; Selections made by learners with different colors depending on the type of feedback they choose. The remarks are intended to help the instructor to improve his / her future presentations. This paper describes an application whose main purpose is to make communication between the instructor and learners more efficient.

1. Introduction

Android technology is generally opposed to other technologies on the market like Windows Mobile or iPhone, especially because it is the most widespread technology on current mobile devices, being an open source platform. Android is currently the most popular operating system dedicated to portable devices. It was built around a Linux kernel, like Chrome OS or MAC OS, by an anonymous Android Inc. And acquired by Google in 2005.

In 2007, the Open Handset Alliance trade consortium was set up to stimulate the evolution of portable devices; In the same year the Android operating system was announced. At the end of 2008, the first Android-powered terminal 1.0, HTC Dream, was available on the market, offering Wi-Fi, integration of Google services, Android Market (very different from the current version). With the release of Android 1.1, a huge number of problems have been solved in the previous version, and the Android market has been steadily expanding since then.

Android is now up to version 4.0. - the most up-to-date version on the market with Galaxy Nexus phones. The latest version of Android brings the widest variety of changes within the platform. Major changes include: virtual buttons, enhanced widget support, a new font for character representation, and last but not least, facial recognition. [6]

Android mobile devices have seen a lot of growth in recent years, reaching a major market share in 2012 (Figure 1). With the evolution of mobile phones, the applications developed using the Android operating system have expanded.

As a result of this evolution of the Android operating system and mobile apps, the work falls within the same area of interest and consists of implementing an intelligent application to send feedback in the form of questions, positive or negative, to an instructor who Sustains a presentation, course, work.

At the end of the presentation, the instructor has the opportunity to view in aggregate the feedback received from the audience and to answer the questions and observations received along the way.

★ Dunarea de Jos University of Galati, Romania. E-mail address: mpodoleanu@ugal.ro.

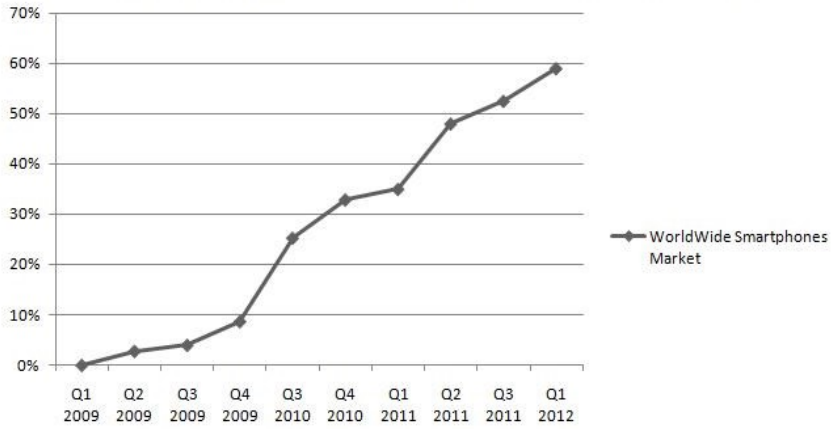

Figure 1. World Wide Smartphone Market [6]

Interaction between users and computers occurs at the user interface, including ergonomic, software and hardware aspects. On modern computers, there are the following central human-computer interface points: the graphical interface (on a monitor or computer screen), the touch screen interface, the verbal commands (voice recognition).

The interface is that part of the software application through which the user interacts with the computer, having the opportunity to express his or her intentions and to interpret the results of the machine. The interface is not only designed as a visual part of the software, for most users it is the entire computing system. Any interface can be useful, usable, and used.

Brazier believes that the interface defines how the user must interact with the system to delegate to the system specific drive tasks. The user translates the unit tasks into basic tasks that are implemented in the user interface. [2]

A particularly important aspect in defining the user interface is that the interface represents from the user's complex system only the aspects relevant for its interaction with the system. The other aspects that exist in the system but are not accessible to the user, do not affect its interaction with the system. Van der Veer called the user interface and virtual machine

A user interface is well written when the program behaves exactly as the user expects. Designing user interfaces is the result of the activities of: understanding user needs, designing, evaluating / testing, final implementation, maintenance.

Ergonomics is the scientific discipline that studies the interaction between people and other elements of a system, as well as the profession that applies theories, principles, information and design methods for optimizing human activity and the performance of the system it is part of (definition adopted in August 2000 by Board of Directors of the International Ergonomics Association].

The name ergonomy derives from the Greek words ergon (= work) and nomos (= rules) to express work science and apply to all fields of activity. Ergonomics promotes an approach that takes into account physical, cognitive, social, organizational, environmental, and other important factors. For this, ergonomics integrates knowledge from a variety of disciplines including: anatomy, physiology, technical science, psychology, sociology, economics, etc.

Ergonomic criteria are a means of incorporating user-friendliness into the design of an interface, helping to structure and complete a set of indicators and measures for evaluation, and to develop interfaces design rules.

An ergonomic criterion meets one or more design rules. Below I will discuss some of the ergonomic criteria:

- User guidance refers to the user's orientation, information and guidance during human-computer interaction. Guides are various: labels, messages, alarms, etc. Guidance facilitates ease of learning and use of the system, resulting in better execution performance and reduced error rates.
- User effort refers to all interface elements that have a role in reducing perceptual or cognitive user load and in increasing dialogue efficiency. The more the user is loaded, the greater the probability of committing errors. It is not advisable to distract the user by displaying unnecessary information as this is a hindrance to performing the task efficiently.
- Exclusive control refers to both the system's processing of the explicit actions of the user and the control the user has on the processing of his actions by the system. When the user explicitly defines entries and when entries are under his control, errors and ambiguities are limited.

- Adaptability refers to the ability of a system to behave contextually and in accordance with user needs and preferences.
- Error handling refers to the means available to prevent and / or reduce errors and to allow recovery in case of error. Errors refer to invalid data entries, syntax errors, etc. Interrupting processing as a result of user errors has a negative effect on users' activity. By limiting the number of errors, the number of interruptions is also limited.
  - ♣ Consistency refers to how interface design options (codes, names, formats, procedures, etc.) are maintained in similar contexts and are different when applied to different contexts. Consistency is an elementary criterion.
  - ♣ The meaning of the codes qualifies the relationship between a term and / or a sign (symbol) and its reference. Codes and names are significant to the user when there is a strong semantic relationship between these codes and the articles or actions they refer to. The meaning of codes is an elementary criterion.

Linux provides hardware abstraction for Android, allowing it to be ported to a wide variety of platforms. Internally, Android uses Linux for memory management, process management, network services and other operating system services.

The next level in the Android architecture contains native libraries. These shared libraries are written in C and C ++, compiled for hardware architecture used by phones and preinstalled on the phone. Some of the most important Android libraries are: Surface Manager, 2D and 3D graphics, SQL database, Browser.

The diagram in Figure 2 shows the major components of the operating system architecture

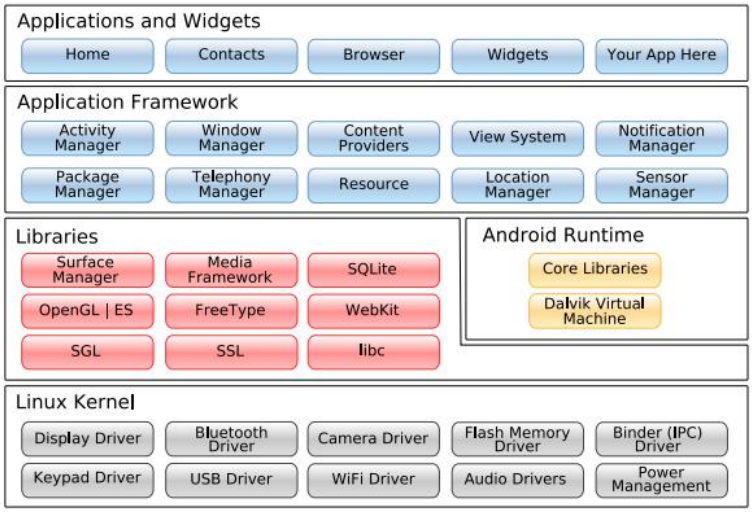

Figure 2. Android Architecture

2. Architecture and functionality

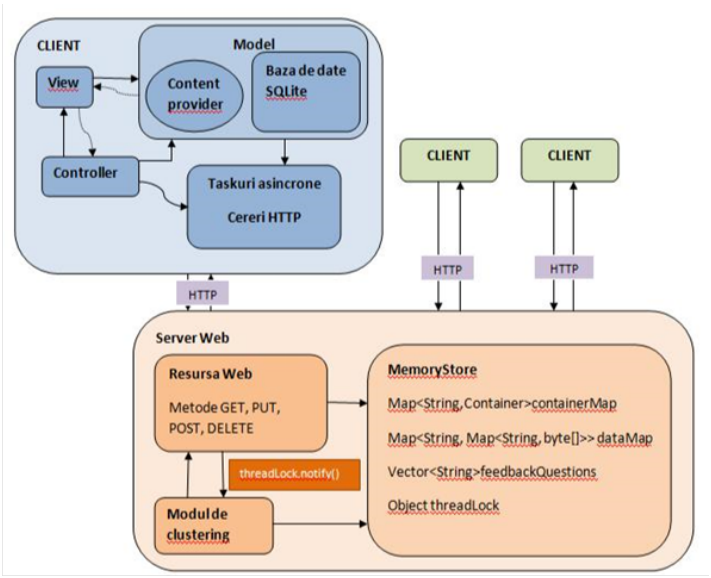

Figure 3. App Architecture

In order to implement the conceptually presented application, it is necessary to implement two major components: the Client module and the Server module.

The Client module handles both the user interaction side: the presenter interface and the audience interface, as well as the server communication side: sends various types of asynchronous HTTP requests to the server (to receive user data from the database).

SQLite to get a list of questions from a specific slide from the entire presentation to get the +1, ambiguous or citation or proof required from a given slide.) The Server module deals with the clustering of questions from the audience, grouping them according to semantic similarities, sending questions to the client, counting each type of feedback, receiving requests from the client. Each of these two modules is divided in turn into smaller modules, which I will describe below.

The Client module consists of:

- The View module is represented in the application by the activities implemented. This module is the main component of the user interface. Features include: PDF selection, interface button functionality, sliding pages.
- The Controller module communicates with View, Model, and asynchronous task modules and HTTP requests. This module receives requests from the user and sends them to the HTTP request module to be processed and sent to the server. On the other hand, it sends requests to ContentProvider, which in turn sends the request to the server. This module includes all the actions that take place when the interface is activated, it is a sort of "event handler".
- The Model Module is the Content Provider and the SQLite database. It deals with data storage and security, contains representations of input data, intermediate data, and output data. Can receive requests from the controller to query the database, return data on request from the database. If necessary, update the request database from the web server. This module is independent of the user interface, which is particularly important because if you want to change the implementation by adding new features, it is not necessary to make changes in the view module.
- The Asynchronous Task Module and HTTP requests receive asynchronous requests from the Controller and Model that they send over the HTTP Web server. This module consists of AsyncTask classes that run on separate threads and are instantiated in the Controller when the buttons are pressed. After the HTTP requests are executed, the mode classes update the interface.

The Server module consists of:

- The Web Resource module communicates with the clustering module and the Memory Store module. In this module there are classes that define HTTP (GET, POST, PUT, DELETE) methods that are used in HTTP requests.
- The clustering module communicates with the web resource and the memory module. In this module clustering of questions takes place according to the semantic similarities between them and the creation of a tree with them. This tree is then sent to the Web Resources module using the PUT, POST methods.
- The Memory Store module is a static class and static class where all the modules of the server are written / read. Receives data from the Web Resource module and the clustering module and includes all data structures.

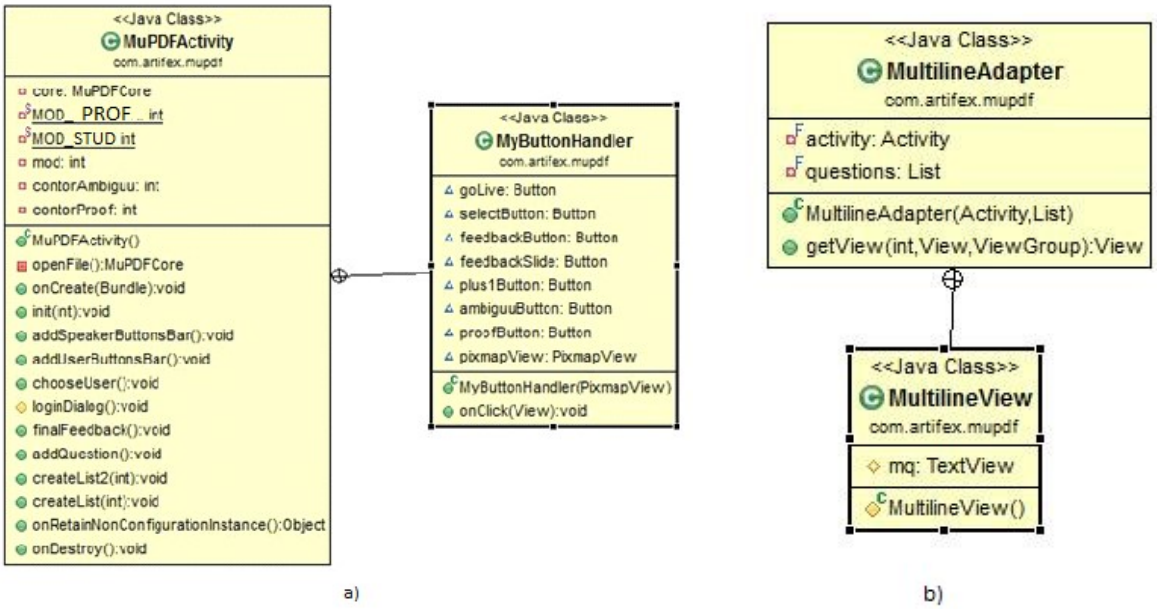

Figure 4. MuPDFActivity class

The Android client has a class - MuPDFActivity that is closely related to the implementation of the interface. This class is divided into two modules that communicate with each other.The main module - MuPDFActivity, includes the names and values of the variables, the implementation of the methods for viewing the buttons and the aggregated questionnaire lists. To implement the feature of viewing large-scale multi-line queries, we have created a new MultilineAdapter class that extends the ArrayAdapter class. The schema of this class is described in Figure 4b. The Multiline Adapter class has two modules that communicate with each other. In the main module of this class, the getView () method of the ArrayAdapter class is overwritten. This method returns a View object that is sent to MultilineView.

3. Conclusion

The use of the app has many advantages for both learners and instructors The main advantage of the learners is the interaction with both those in the gym because they can see the questions noted by each and can interact with the people who have common interests with them but also with the instructor I can ask questions and ask for explanations. The instructor's advantage is first and foremost that he can get relevant feedback from a fairly large number of people, he can respond to the feeback received and can improve his presentations in the future by taking into account his observations.

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