

Design and Implementation of HTML5 based Hybrid Application for Mobile Social Networking Service

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Abstract. With the advance of web standard technologies, user interface of mobile application can be developed easily with hybrid application framework. A Hybrid Applications run on the mobile devices with the development of web technologies such as HTML5, CSS and JavaScript, with inside a native container. In this paper, we design and implement a mobile social network service application at hybrid framework to show the current status of hybrid application framework. A social network service application is one of the representative mobile applications which connect each other that have similar interests. Two main services, blog sharing and group message chatting are implemented within hybrid framework. The easy implementation of user interface makes developed applications to be more deployable.

Keywords: Mobile Device, Hybrid Application, HTML5, Social Network Service

1 Introduction

The development of mobile Operating System-based application has become popular. The application program that runs on smartphones and tablets is called mobile application. The popularity of mobile applications has continued to rise, as their usage has become increasingly prevalent across mobile phone users [1]. A May 2012 comScore study reported that during the previous quarter, more mobile subscribers used apps than browsed the web on their devices: 51.1% vs. 49.8% respectively [2]. The mobile applications are typically developed and operated according to their Operating Systems, and are usually available from the application distribution platforms, such as Google Play, Apple App Store.

A Hybrid Applications run on the mobile devices with the development of web technologies such as HTML5, CSS and JavaScript, with inside a native container. It leverages the device's browser engine to render the HTML and process the JavaScript locally. With the hybrid framework, the UI design and implementation can be relatively easy with HTML script and CSS technology. However, the mobile web has limitation to access to low-level capabilities of devices. A web-to-native abstraction layer enables access to device capabilities that are not accessible in web engine, such

as the sensor devices, camera and local storage [3]. The representative web-to-native application frameworks are Sencha Touch[4] and jQuery Mobile[5].

In this paper, we develop representative mobile application with Hybrid method, and evaluate with applications at the aspect of development cost and performance cost. A Social Networking Service is an online service, platform, or site that focuses on facilitating the building of social networks or social relations among people who, for example, share interests, activities, backgrounds, or real-life connections [6]. In developing Social Network Service application, especially, we focus on user interface design and network interface operations to evaluate performance cost.

2 Related Work

In this Section, the backgrounds and related work are described. One of the most popular development environment for hybrid application is PhoneGap [7] development framework produced by Nitobi, which is purchased by Adobe Systems in 2011 [8]. The PhoneGap enables developers to build mobile applications with HTML5, CSS, and JavaScript, not to use platform specific APIs provided by platform provider. The languages are oriented by web technologies to describe web contents and UI interfaces easily with simple script expressions. In the PhoneGap development framework, making mobile application with these is possible by wrapping up of HTML and JavaScript source codes from the platform framework of the mobile devices. The results for wrapping these codes from platform are hybrid application, which means that they are neither purely native application, nor purely web application. In addition to PhoneGap framework, the standard JavaScript library is required to describe precisely of mobile interfaces. There are two main libraries for mobile application, jQuery Mobile and Sencha Touch. jQuery Mobile is a touch-optimized mobile framework and JavaScript library, currently being developed by the jQuery project team. The development focuses on creating a framework compatible with a wide variety of smartphones and tablet [5]. Sencha Touch is another user interface JavaScript library or framework, specifically built for the mobile application. It is fully based on web standards such as HTML5, CSS3 and JavaScript.

3 Design and Implementation of Hybrid SNS Application

Usually, a mobile SNS application gives personal bulletin boards to each user to update their personal activities and share these with friends. The updated contents of bulletin board are broadcasts to other users who connect with each other to notice the updating of activities. In addition to that, private communication channels between each users or groups of users are provided to communicate each other. The implemented Mobile SNS applications are composed of the described features of SNS application, which has personal user profile, friends list, timeline newsfeeds space called blog, and messaging with text, voices, or video. The user profile manages private user information such as affiliation, phone number, and so on. The personal timeline space shared user timeline space for updating personal activities and sharing

these with friends as a blog manner. Chatting service gives messaging and communication channel between friends of group of friends. The overall architecture of designed SNS application is described in Figure 1.

In the SNS service system, server is required to network operations. Since network operation is HTTP request-based in our SNS application, we have set up web server with Apache, and PHP is used to implement client service, and the back-end, database server is also present. All the information of user in SNS system is stored with a database table. The overview of client and server system of SNS application, and database table for maintaining user information is described in Figure 4. Database table consists of members, chat_list, board, and userID table. Members table manages personal information of each user, chat_list table collects all the chatting list of each user and group of users, board table manages the personal blog's information for each user, sharing of friend's information. Lastly, userID table is used for relationship between users. For each user, it has chatting list having chatting partners, and friend list which connect to, so with this information, Server can interconnect users for blogs and chat histories.

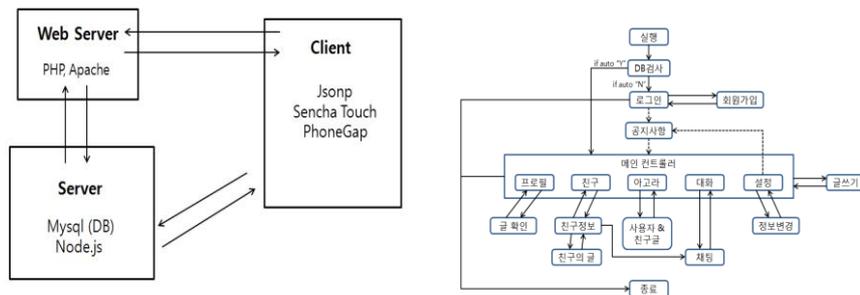


Fig. 1. Client and Server Architecture of Hybrid Mobile Social Network Service Application

HTML5 markup language and JavaScript uses for developing UI elements in hybrid application. HTML5 is a core technology markup language of the Internet used for structuring and presenting content for the World Wide Web. The strength of user interface design with HTML5 and JavaScript is that many UI developers are already familiar with these languages and easy to develop many UI elements with these. It can be argued that there is less of a learning curve when developing hybrid mobile applications compared to native applications [4]. However, the weakness of UI with hybrid applications is that the UI logics is build and run in the web browser using emulated web engine framework, resulting in extra layers of abstraction to display these UI element in display device of mobile systems.

In our development, network operation is HTTP request-based in both of native application and hybrid application, and the request type of transmitting and receiving JSONP, where JSONP is usually used in JavaScript programs running in web browsers. . In the server system, we deploy Node.js to provide client's request, where Node.js is an event-driven architecture and non-blocking I/O API to enhance throughput and scalability. The both of developed SNS applications do network operations based on this Node.js and JSONP data request type, via HTTP requests.

The designed and implemented UI pages for user blog and message chatting are represented in Figure 2.



Fig. 2. Implemented Blog and Message Chatting UI and Database Architecture

4 Conclusion

A hybrid application runs on the mobile devices with the development of web technologies such as HTML5, CSS and JavaScript, with inside a native container. There are two key factors in developing hybrid mobile applications; the one is user interface design, and the other is efficient utilization of device capabilities such as various sensors, cameras, network interfaces. In this paper, we develop representative mobile application, social network service application with hybrid method. In developing, we focus on user interface design and network interface operations. The UI composition time and networking performance are experimented with developed hybrid application.

References

1. Ludwig, Sean, "Mobile app usage grows 35%, TV & web not so much", in venturebeat.com, Dec. 5, 2012.
2. Perez, Sarah, "comScore: In U.S. Mobile Market, Samsung, Android Top the Charts; Apps Overtake Web Browsing.", in techcrunch.com, July 2, 2012.
3. AppBuilder, "What is Hybrid Mobile App?", Telerik Blogs, June 4, 2012.
4. Sencha Touch, <http://www.sencha.com/products/touch/>
5. JQuery Mobile, <http://jquerymobile.com/>
6. Social Network Service, http://en.wikipedia.org/wiki/Social_networking_service
7. Phonegap, <http://phonegap.com/>
8. Andre Charland, "Andre Charland's Answers on PhoneGap". Quora. April 07, 2012