# Cross-platform development using HTML5, Jquery-Mobile and phonegap realizing WikiSocial Application

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***Abstract*— The increase in mobile device operating systems that reach the average user opens more and more topics for research on development of mobile applications. Today, developing a cross-platform mobile application is easy using the PhoneGap framework, HTML5, jquery-mobile, etc. In this paper, we present the research and development methodologies used in making the ManipalWiki mobile application which can be run on Android devices, iOS devices and Windows 8 phones. This application provides the user with information about the city Manipal, classifieds in the city, events to be held around the world, etc. It also has a user generated feed system or shout in the application.**

***Keywords— PhoneGap; jquery-mobile; html5; m-commerce; Wiki social; Shoutbox; Xcode; Android Studio; Eclipse; mcommerce; ManipalWiki; Laravel; CodeIgniter; MVC;Android; IOS;Windows8; Tonse Technologies.***

***Note-***

- ***Shoutbox, Shout, mcommerce are concepts created by Tonse Technologies and is subject to copyright under process.***
- ***ManipalWiki (www.manipalwiki.com) (brand) is owned and operated by Tonse Technologies.***
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## I. INTRODUCTION

This paper discusses the methodology used for the development of the application, ManipalWiki. The focus is on how the PhoneGap framework can be effectively used to develop the application along with the use of jquery-mobile.

## II. RESEARCH METHODOLOGY

The main question is "Why is Wiki Social application required for mobile devices/gadgets and how will it maximize mobile platform independence?"

### *A. Procedure*

Questions with respect to sustainability of the application are:

- Why are normal websites not useful for mobile devices?
- Why are mobile native applications preferred over mobile websites?
- What can be achieved using PhoneGap?
- How will the initial architecture use PhoneGap web application, m-commerce?
- What are the different solutions for developing mobile applications?
- What is ManipalWiki?

In this paper, the focus is on developing a prototype mobile application. The following steps were taken to complete the demonstration of the application, i.e., ManipalWiki:

1. Understanding how the PhoneGap framework works.
2. Improve the application's architecture based on more research and actual development experienced while developing the application.
3. Developed a more sophisticated mobile application that will communicate with the web server through web services. Steps involved in this were:
   a) Development of mobile application on the cloud and testing it on the web.
   b) Revised the same application by moving the database from MySQL to Mongo DB.
   c) Upgraded the server framework to Laravel.
   d) Developed the PhoneGap application using html5, jquery-mobile, cascading style sheets, etc. and tested it on android, iOS and windows 8 devices.

   Page constraints have limited the paper scope to actual functionality of the application.

   - In order to achieve the basic web application, web server was set up on CodeIgniter MVC framework. CodeIgniter has the ability to deal with web services at a faster development rate.
   - A mobile application via PhoneGap was developed which mainly consists of single sign-on authentication, shout box, social sharing, Google analytics, classified system, event system and mapping and the user-profile system.
   - The application was tested on Android, iOS and Windows 8 simulators, tested on actual iPhone by paying $100 to Apple developer account, tested on android device by paying $25 to Google developer account and tested on Windows 8 phone by paying $100 to Windows App Developer Account.

### *B. Software Development Methodology*

Software development methodology based on queries/questions and a general search was conducted in the first phase of research [1]. The initial software architecture was developed based on this research and has since undergone dozens of revisions to become more precise, achievable and as referred to the corresponding market survey that was created to justify the use of the application. An iterative software module/application development cycle was used, taking the best choice for prototype application development. The following technologies were used in making the app:

1. PhoneGap

PhoneGap is a mobile development which enables software programmers to build applications for mobile devices using JavaScript, HTML5, and CSS3, instead of device-specific languages such as Objective-C, Java, etc.[2] The resulting application looks both native and web-based as it can be developed using platform-specific languages as well as web technologies.

The native functionality is brought in via plug-ins that can be called from JavaScript, allowing for direct communication between the native layer, and the HTML5 pages. PhoneGap framework itself includes basic plugins that allow access to the device's accelerometer, camera, microphone, compass, file system, and more. For the ManipalWiki this framework is best suited as it can be deployed into many devices. Also, the use of the standardized web APIs is made much easier in PhoneGap and so it can be effectively used in the application.

The PhoneGap project is created, built and run using the commands mentioned in the PhoneGap Documentation[8]. The documentation also includes commands for adding platforms and plugins to the project. Once the code written in HTML5, JavaScript and CSS3 is built, the project can then be run in the respective

IDEs which were used for native applications such as Eclipse/ Android Studio, XCode and Visual Studio provided the corresponding platforms are already added.

2. jQuery-mobile

JQuery is designed to make many JavaScript development tasks much easier. Using jQuery it is possible to significantly reduce the development time, but the extra overhead is in downloading the library. The developers of jQuery have overcome this overhead by enabling the selection of only the required files.

Instead of writing unique applications for each mobile platform, the jQuery mobile framework allows you to design a responsive UI for the application that will work on all popular smartphone, tablet, and desktop platforms [3]. To use the jQuery-mobile framework it is important to link to the jQuery and jQuery Mobile JavaScript libraries, and style sheets (the files can be downloaded and hosted locally). The jQuery Mobile Theme Roller application is a powerful theming framework that can be used by the developers to customize color schemes and certain CSS aspects of UI features. The same was used in the ManipalWiki for designing the transitions and content in each page.

3. HTML5

HTML5 is one of the technologies used in the web in conjunction with JavaScript and CSS3 [6][9]. The same is used in developing PhoneGap Applications. The HTML5 pages can be run on all available browsers and therefore can be run on all mobile devices without much modification. This idea was used and thereby, it is possible to use HTML5 [5] and create Mobile apps using the PhoneGap framework.

*C. Application Architecture*

Application architecture is explained in terms of how the ManipalWiki is hosted on the Laravel-equipped cloud. Web services have been built inside the Wiki Application and the mobile phone cross platform application is built using PhoneGap which communicates with the web server through the web services to obtain data and information.

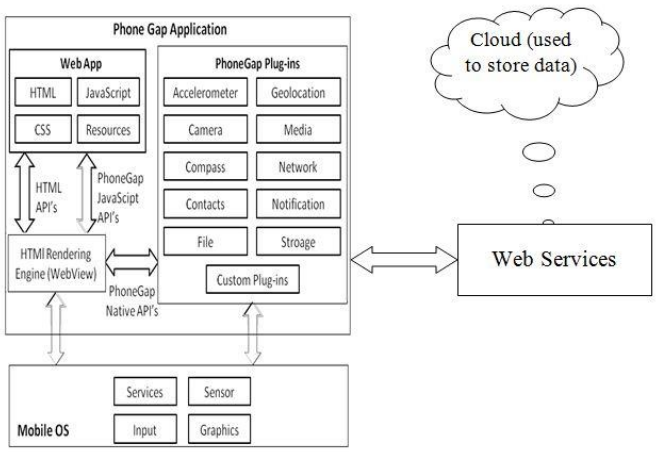


Figure 1. The architecture of the Application

The diagram shows how the application's architecture used ManipalWiki web server and a cross-platform application using PhoneGap to allow the same application run in different operating systems. This corresponds to the cloud which used web services to get data.

## III. SCOPE OF THE APPLICATION

Basic functionality of the app has two important features- Wiki and Social. The Wiki mainly provides the user with information such as Places to visit, Hotels and other services. The Social feature in the application enables the user to create a profile and feed news into the application via the shout box. Following changes were made to improve the functionality of the application:

- The ManipalWiki web services were modified in order to show complete data in the application.
- The functionality needed so that the application can fetch new data and update the counts on the shouts by

requesting the web services provided by ManipalWiki application was added.

- The functionality was further improved to show complete information on few other modules including events by requesting the second web services from ManipalWiki Application.
- For enhanced mobile app functionality, original UI-set, cloud and rest were employed for making the UI and mobile application.

## IV. RESULT OF THE APPLICATION

The first screen in the ManipalWiki is the login screen. It displays two login choices for the user. They are social login and ManipalWiki native login.

### *A. Login*

1. Social

There are three different options here- Facebook, Google and Twitter. The user is first asked for permission for accessing his/her public profile information via application. If the user permits, the corresponding server (Facebook [11], Google [13] or Twitter [14]) responds with the access token and user id which are then sent to ManipalWiki server. The user is successfully logged in once the application receives authentication key.

2. ManipalWiki

The email and password is sent to the ManipalWiki server in order to obtain the authentication key and login successfully.

### B. Dashboard

The main screen contains a dashboard with four tabs- shout box, wiki, events and rentals.

1. Shoutbox

This page presents the user with a news feed-like feature in which any user can shout or post news, wishes, pictures, etc. The users can also comment on the shouts by others. For each shout, the application sends the server, shout details which includes the authentication key.

2. Wiki

Wiki gives all the details about eat, stay, tourism, tariff, stores & services. Eat includes places like bakery cafes, cafeteria, ethnic restaurants, ice-cream parlors, etc. Stay gives information about guest houses, hostels, lodges, service apartments, resorts, motels, etc. Tourism gives details about places in and around like beaches, waterfalls, museums, religious places, historic places, hangouts, etc. The Wiki page also includes tariffs by Airtel, Idea, BSNL, Reliance Dish TV, Tata Photon, etc. Store includes departmental stores, pharmacy, grocery store, hardware store, etc. Service includes brokerage services, cable TV, carpentry, courier, electrician, laundry, packing & moving, painting, passport, plumbing, tailor, tiffin, water supply, etc.

3. Events

This page provides news about events which are further categorized into district-level, state-level, national-level and international-level. The information is provided by the server via JSON links.

4. Classifieds

Classifieds list the advertisements posted by the users.

5. Rentals

Rentals can be posted by the subscribers of the application and can be viewed by all users.

6. Market Place

This application has a very interesting feature using which users can order and purchase items used on a day-to-day basis such as groceries, stationary, etc.

### *C. iOS/ Android/ Windows Phone Demo Application*

The application was tested on Android and iOS (iPhone/ iPad/ iPod operating systems). The application provided two web services. Figures 2 and 3 depict the web service which enables the user to see the list of products/ items under the selected category. Figure 4 shows the new detailed page which is displayed when you tap (select) any of these products.

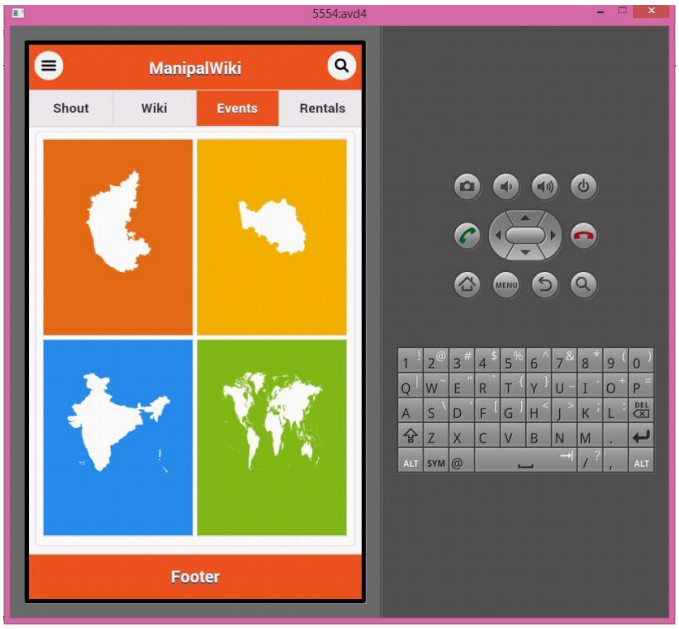


Figure 2. Screen showing the main categories

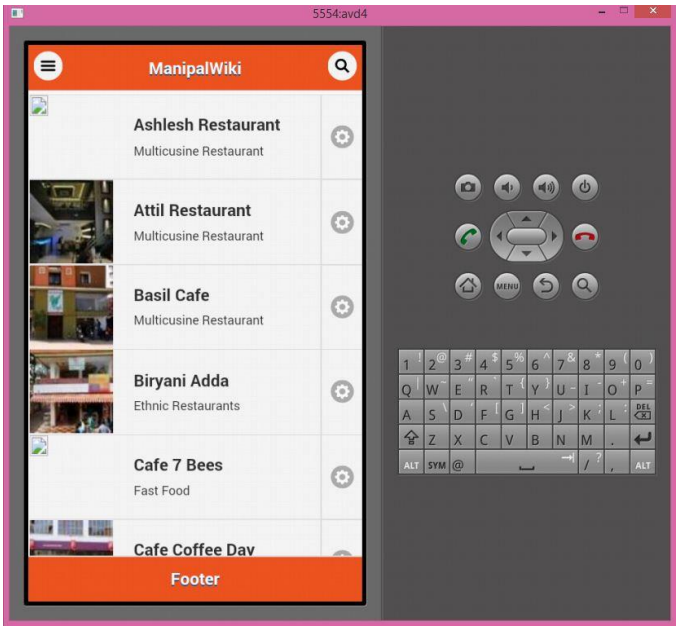


Figure 3. Screen showing the list of products.

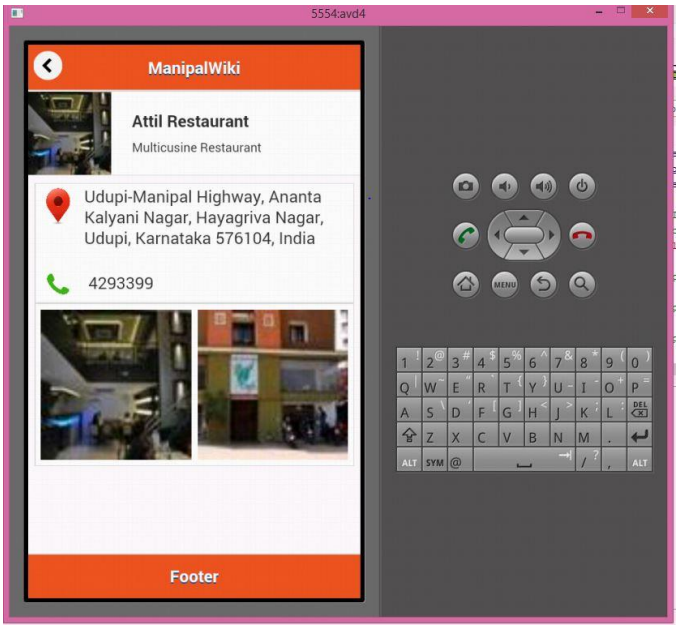


Figure 4. Product detail screen

## V. SET UP AND SETTING UP OF THE APPLICATION

### *A. Setting up the web application*

Before starting the Web application the following applications must be installed:

1. Add iOS Platform to the project:

a) Run Xcode and open iOS version of PhoneGap project

b) Deploy to actual iOS device

• Add your device to apple provisioning portal (remember that paid developer account is needed)

• Select device to be used in execution list and Click run button

c) Or run on iPhone simulator

• Select iPhone simulator in execution list and click run button

2. Add the Android platform to the project:

a) Download and install Eclipse Juno, Android SDK, ADT Plugin for Eclipse and a latest PhoneGap framework.

b) Setup the project and run the application in one of the available AVDs.

c) The application can also be run on an actual android device directly.

3. Add the Windows 8(wp8) platform to the project:

a) Download the Visual Studio 2012 or 2013.

b) On adding wp8 platform to the project build and run it on one of the emulators available.

c) Given that you have a Windows Developers Account, you can run the application on a Windows phone.

## V. DISCUSSION RESULT

Data functionality was provided by installing a web application on cloud. The research suggested that PhoneGap was one of the most cross platform applications to be installed on the various kinds of mobile phones using Android, Windows 8 and iOS majorly amongst others. This research also illustrated that JSON-based web services promoted data communication between PhoneGap and Web Application. JSON was selected instead of XML data format because it is light and native in operation.

The actual web application provided several web services but the research indicated that the web services broadcast too much unrequired information on module listing. Therefore, due to huge amount of data and network latency, the application slowed down in response to JSON data. All relevant information was obtained by overriding certain web services.

A further to research, the images posed a problem by being either too small or too large. A library was developed to regenerate the images after their thumbnails were introduced. The research also suggested that for the for the ui components of smart phone jquery-mobile was used. For the ui components css3 features were used making j-m the preferred option. For a robust code to be developed and tested jquery-based unit called JQunit was used. After building on PhoneGap, the application was exported on individual platforms as follows:

- Xcode for iOS
- Eclipse for Android
- Visual Studio for Windows 8.

For deployment the following accounts were created for corresponding platforms:

- Google Play Developer Account for $25
- iOS Developer Account for $100 [7]
- Windows phone Developer Account for $100

The development of the application in Android required the android studio to be installed. The android template was used to make a project, merging html5 in the template as well. Ultimately, the android simulator was used to compile and test the application. Similarly, the Xcode project template was used in iOS platform and the Windows phone project template for Windows platform. These projects could run correspondingly in the iOS and Windows 8 simulators.

## VI. CONCLUSIONS AND FUTURE WORK

Mobile Applications are of at most importance when sensitive data such as government related information, emergency numbers and wiki information with respect to physical establishment are in the public domain. An incredible opportunity is seen were in m-commerce, responsible wiki and social aspects are combined to create a system covering all aspects of the market. Screen size, input device are important aspects that the developers must consider while designing the application. The device screen size ideally proved to be of great importance.

To bring the analysis on the basic model to an advanced level the following points were proposed:

- M-commerce will be implemented throughout the application and a secure and a safe channel will ensure sound transaction system.
- A virtual market place in the making which will connect all verticals from productions to logistics through this wiki social application.
- A single social dashboard connecting all major social media brands such as Facebook, Twitter, Google and Instagram.

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