Advances in Computer Science and Engineering
Volume 4, Number 1, 2010, Pages 37-53
Published online: February 13, 2010
This paper is available online at http://www.pphmj.com

A REQUIREMENT MODEL OF LOCAL NEWS WAP/WEB APPLICATION FOR RURAL COMMUNITY

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Abstract

Mobile news service can be obtained easily and provide flexibility to access the rural news criteria at any time in any location. This research introduces a prototype "local news WAP/WEB application" that provides the people in the rural communities with the appropriate news services that could help those people to view the various news via this prototype. By using this prototype, the user of this service from the rural communities can easily get necessary information that makes those users in touch with the different news updating in these areas. The proposed prototype provides the user to post the occurred news related for these areas.

1. Introduction

Most rural villages in the developing world do not have the economy or infrastructure required to support a computer. Therefore, rural people must travel to larger cities to access digital resources. In these areas, the normal method to save the events details or the information is by papers and depends on memory. This imposes severe limitations on the aggregation and dissemination of information; recent advances in mobile phone computing capabilities make this device better candidate to this community. Long battery life, wireless connectivity, and low price, all these

Keywords and phrases: rural community, requirement model, WAP protocol stack, *M*-rural community news system.

Received August 4, 2009; Revised October 13, 2009

characteristics make it the appropriate device to rural conditions better than a PC (Parikh and Lazowska [10]).

Mobile applications increasingly affect business activity and information distribution. They are gaining wide acceptance due to the increased need to support the mobile workforce and rapid enhancement in wireless communication devices and technologies. Many applications allow sending and viewing email, browsing the World Wide Web, viewing traffic and weather reports, watching movies, and accessing back-end database systems (Elalfy [6]).

1.1. Problem statement

It is difficult to provide computers to all rural communities, and there are many problems to access the internet services to this community, so because of the availability of coverage necessary to the mobile devices in these areas, it is possible to use WAP applications to help these communities, also the traditional way of reading the local news from the newspaper/television is not always available. Through the mobile devices, the rural people can read the local news and announcements in any time and anywhere quickly and easily. Some communities may be included people who do not know the local language of this community. Therefore, I will support this research with language options such as: Malay, Arabic and English languages. There are many traditional ways to publish news between the people in some communities such as: mosques, public announcements, short messaging service through mobile devices, smoke signal in the past, and from person to person. All these ways to publish the news might not be feasible because the majority may not be meeting, the news that is usually transmitted between the people is inaccurate news, and the continuity of listening to the local news will be limited.

1.2. Research question

1. What are the requirements for community news WAP/WEB application?

2. What is the appropriate method to distribute and to manage the rural community news?

3. How to evaluate the proposed application?

1.3. Objectives

The main objectives of this study are:

(1) To design a requirement model of local news WAP/WEB application to rural communities using unified modeling language (UML). In UML, the requirement

model consists of use case, use case specification, class, sequence, and collaboration diagram.

(2) To develop the prototype.

(3) To test the prototype and its usability.

1.4. Scope and significance of the study

This study focuses on the designing of the mobile rural community services with wireless application protocol (WAP), this research will focus in Kampung Changkat Setol area in Malaysia, the selection of this area is because this area does not provide the Telecenter for the people in this area.

The study is crucial in its approach and suitable to be implemented in rural community in any country, and considered as a starting point in mobile news applications for rural community, which could open the way for everyone to use these services in anytime and anywhere. Specifically, the user can see the local announcements for jobs, local news, the persons who died or married, and the users can add news to this application through mobile phone.

1.5. Rural community

Rural is an adjective which identifies the people who live in these areas, the places and the things that need to use in these areas, in another words it is the life outside of a big country or the city ([13]). In another words, the rural is defined as a county outside of a metropolitan area, or a county inside a metropolitan area that has no urbanized population ([14]).

The communities can be defined as, the people living in an area, also mean the area itself, otherwise the communities can be defined as, a group of people with common interests especially when living together, and the mean of urban is the people those who live in the big towns or the cities ([13]).

1.6. Requirement model

For this study it is important to identify and determine the requirements model, which is used to gathering and analysis of the requirements for any study ([12]). Requirement model means an information technology that is used to make it more flexible to track, view, analyse data, and manage a huge number of the hierarchical which is important for the large and complex systems. The advantages of modeling the requirements are to reduce the cost of system’s development and reduce the

probability and severity of cost and schedule growth (overruns) by enabling the description of human readable and "computer friendly". The benefits of modeling the requirements can simplify to: A requirements modeling can be used to reduce the time that need to develop the large or the complex systems by determining the requirements to make the system able to work. Otherwise, the requirements model will enhance the ability it improves, the quality of the specification of a system's requirements, the requirements can be used to control the specialists such as software programmers. Requirements modeling will improve the quality of systems because it improves the quality of the specification of a system's requirements (Darrell [5]).

2. Literature Review

The large and the huge use of the WAP application handset in both urban and rural areas, which can deal with the most facilities, e.g., (television, satellite, desktop, laptop, and internet) the computers, can follow in order of relevance. The mobile device in many towns and places contributes to enhance and develop the business transaction. The mobile phone becomes the most important tool that is used in the rural community, the mobile can present some facilities to use just to exchange of pleasantries by the messages. Otherwise, the rural can use this device for many applications in many fields, such as: reading the local news, health care, cases of weather, and many other things but this is still unused in the rural community (Yakasai [18]).

2.1. WEB and WAP definition

The mean of the WEB application is a computer programming system created by Donald Knuth as the first implementation of what he called (*literate programming*): the idea that one could create software as works of literature, by embedding source code inside descriptive text, rather than the reverse.

Wireless application protocol (WAP) is defined by International Engineering Consortium as an application environment and set of communication protocols for wireless devices to communicate with each other and with any external application. In another words, the WAP technology can be defined as an open international standard for application layer network communications for different communication fields, which aims to provide and support the users with the internet accessing from a mobile phone or PDAs ([16]).

2.2. The WAP protocol stack

The WAP application can be used to reduce the processing operation on the client side effect, which embraces the client and server approach in order, where a mobile phone equipped with other communications technologies such as a micro browser communicate with a WAP Gateway reside on a server, therefore only a simple browser capable of displaying contents was placed in the phone while all the intelligent and processing done by the server ([16]).

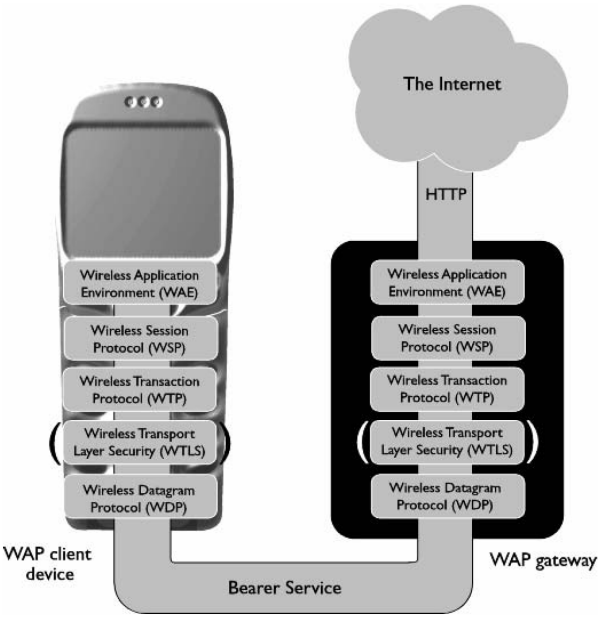

Figure 2.1. WAP protocol stack, [17].

According to Figure 2.1, the WAP layer stack contains the following:

- **Wireless application environment (WAE).** This protocol embraces the tools that the wireless internet content developers utilize. These tools include WML and WML Script, which is a scripting language used in combination with WML.

- **Wireless session protocol (WSP).** This protocol provides two types by work with WTP to provide connection oriented service and connectionless service that provides above WDP.

- **Wireless transaction protocol (WTP).** This protocol organizes the traffic. It also classifies the request of the transaction into three classes, the reliable two-way, reliable one-way, and unreliable one-way.

- **Wireless transport layer security (WTLS).** This protocol provides an optional layer. It relates to the security, data integrity and the user authentication, and this will be important for some applications like WAP-banking.

- **Wireless datagram protocol (WDP).** This protocol manages the transmission and makes it easy to adapt WAP to a diversity of bearers (network carriers) from the network layer.

2.3. Applications of WAP in the rural community

2.3.1. The usefulness by using the mobile device in the learning

The learning process will be going on while teacher doing their teaching stuff without any interference. It also will help in giving information that can help streamlining the student's daily routine. Mobile learning also can help student to select type of information that is valuable or needed in their studies. Students are given much information as possible and they can choose on their own. Mobile learning will also play an important role in setting up a communication between teacher and student using hand phone or PDAs. With easy and reliable communications the learning process will become more interesting (Nor et al. [9]).

2.3.2. How will life change in future mobile information society?

This study is focused on the opportunities for developing and enhances the economies and the information society in the rural of India, this study presents the using of the WAP technology to achieve the flexible communications between the people in this area (Ashok [1]).

2.3.3. Mobile community information systems on wireless mesh networks

The daily retrieve of the technology in the communities for the rural areas became more required than other integration technologies. Since the cost and the other purposes needs are very high, new information and communication technologies are greatly demanded in this field to obtain the new changing in these communities. For that mobile information and communication technologies may play special and less costly tools in rural areas and developing countries. All of these changes can obtain in these communities if the running applications based on low cost mobile network infrastructure are well developed in order (Cao et al. [4]).

2.3.4. Mobile telephony in rural India

The purpose of this thesis is to contribute to making mobile telephony more

available to people in rural parts of India who, for different reasons are intimidated to use the technology as of today.

In addition, the study presented the requirements that could help to provide these areas with the appropriate features that could satisfy with those peoples. The main result is, in other words, not a product, but advice on what changes should be made to the handset (device and software) to enable increased development.

2.4. Telecenter and its potential on the communication

Telecenter provides an alternative to the model of one-to-one individual access to computer that predominates in the developed world. As community resources, Telecenter offers opportunities for development that are predicated on improved access to information for whole communities (Brian et al. [3]).

3. Research Methodology

Research methodology is more than just collection of methods to perform a research; it is a systematic way to solve the research problem. The research methods refer to the methods and techniques used by the researcher in doing the research, for example, data collection techniques, data processing techniques and instruments. The research methodology used in this study is a general method, excellently chosen, described and accepted among many researchers in Information System Research Design (Vaishnavi and Kuechler [15]).

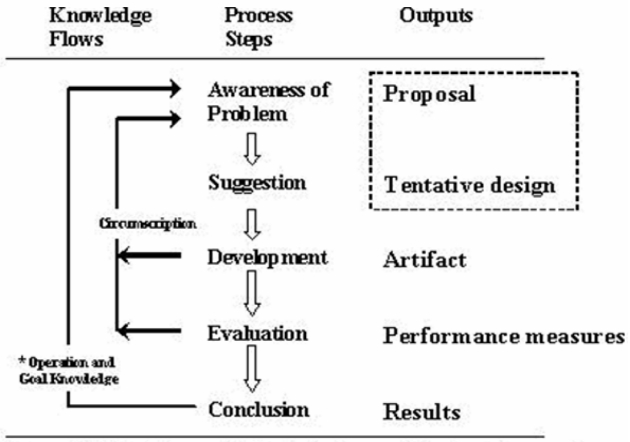

Figure 3.1. The general methodology of design research (Vaishnavi and Kuechler [15]).

Implementing this prototype will return in many benefits for both rural community and the WAP users at the same time. Through this prototype the users save time and effort and keep them informed of their information details anywhere anytime. Some works and further studies still need to be conducted for this WAP/WEB application in order to make it more functional and reliable such as expanding and generalizing the model to include all rural communities.

The research methodology is adapted by Vaishnavi and Kuechler [15] to this study in order to achieve the objective of this study. This methodology has been carefully chosen to make sure that it is suitable for developing the proposed application.

Table 3.1. General methodology phases

Awareness of Problem	Choosing the domain /Understanding of the problem to solve it/ Data gathering.
Suggestion	In order to develop a well-design for local news WAP/WEB application for the rural communities, I am using Unified Modeling Language-UML in this study.
Development	The system prototype developed through the ASP.NET technology and Microsoft SQL Server 2005 to build the prototype database.
Evaluation	Two techniques to evaluate and test the M-rural community news system: ➢ Use case testing: to minimize prototype from bugs and errors. ➢ User testing: questionnaire.
Conclusion	The WAP/WEB news application for the rural community is developing in order to enhance the services in this area.

4. Analysis and Design

The aim of analysis and design in this study is to provide a highlight about the system functionality which identifies the functional requirements and the non-functional requirements, and the UML diagrams (use case diagram, class diagram, sequence diagram, collaboration diagram, and the activity diagram).

4.1. Use case diagram

According to the use case in Figure 4.1, the diagram shows how the system components work and the job for each one in this system, the system will present the administrator to manage the user information by add, delete, and update the user information, the user in this system means someone from the rural communities, the system will support the user to add the news details by uploading the news to the database of the system, and later can view the uploaded news in order. Otherwise, the system will give the ability to both of the user and the administrator to login to the system by his or her username and password and change the login information after the login to the system. However the system makes it easy for the user to register in the system and to add both him and her to the guest list.

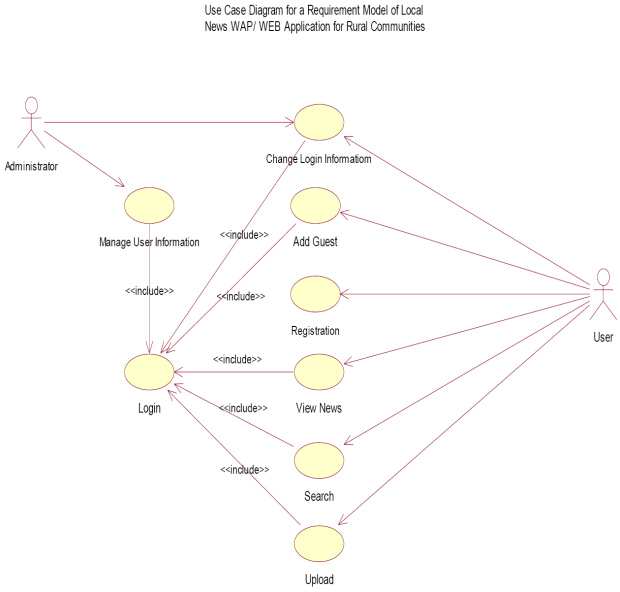

Figure 4.1. Use case diagram for the proposed system.

4.2. Development

4.2.1. Mobile rural community news architecture

Mobile news for rural community service is becoming a prominent leader in integration of information technology into applications. Wireless communication technology provides the pre-eminent infrastructure for implementing mobile news service application. Reliable and secure information sharing using a wireless communication environment is a key issue in health care scenarios.

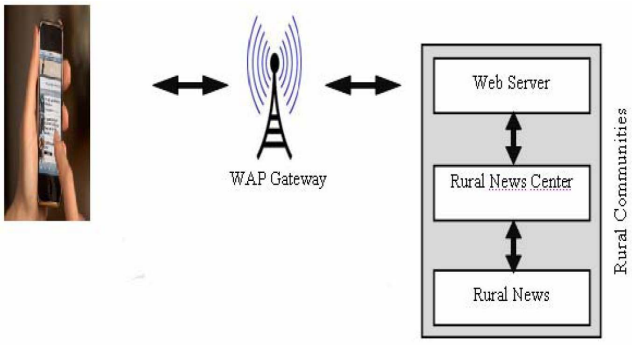

Figure 4.2. Simplify the three-tire WAP-based system architecture (WSA).

As shown in Figure 4.2, the user of the mobile news initiates' the request to the rural news center. Mobile application communicates with the WAP Gateway Server. The function of the WAP gateway is to route requests from the WAP client (user) to a web server. WAP gateway translates WML code (mobile request). The server accepts the request then gets the information from rural news center and builds a dynamic page. Finally, web server responds by sending acknowledgement. If there are any references included within the document, the WAP browser (mobile device) will request these from the servers on which they are located. At last the WAP browser will display all of the information on the screen. On the other hand, administrator also can connect via web browser instead of WAP browser. System can instantaneously update the database and admin able to add, delete, edit and view the information.

4.2.2. WAP and WEB pages

Figure 4.3. WAP pages.

The users in the rural area can use the mobile phone to read the news and to upload the news anywhere and at anytime quickly and easily. This study is very important because the most rural community around the world do not have the Telecenter and information. So this study can help them and support them to see different news about this area.

Figure 4.4. Read and upload the news.

Through this screen the mobile users in the rural community can add the news and read the different news without any problems just using the mobile device.

Figure 4.5. Rural community news website.

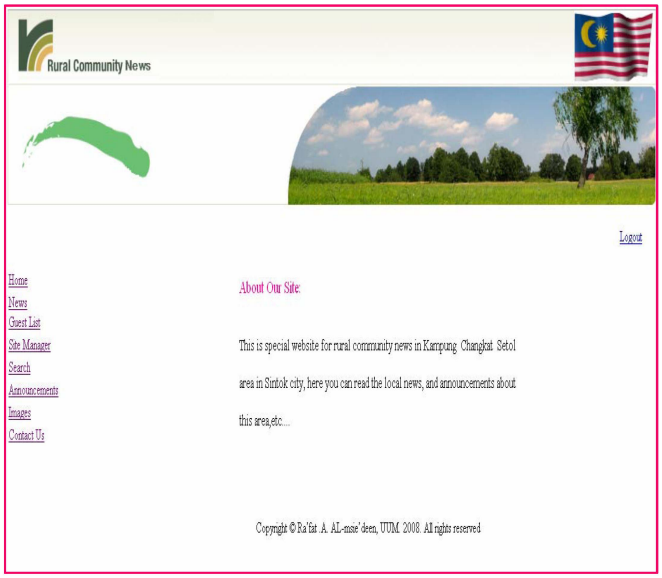

Figure 4.6. Main website page.

The aim of the website is to support and help the people in the rural community, we can use this web site in the knowledge station or Telecenter to help the people

and to give them useful and interesting information about the rural community. Also the user in this area can add the images and upload the traditional songs or video, all these things can make the people in this area very happy, and give them the chance to see the other world, because most of these people do not go outside the area because the limitations, and their works.

5. Usability Testing Result

According to Ravden and Johnson [11] usability is defined as the extent to which an end-user is able to carry out required tasks successfully, and without difficulty, using the computer application. Usability, in turn, can be decomposed into a number of attributes. According to Nielsen [8], usability is a multidimensional concept that is traditional associated with five attributes learns ability, memo ability, efficiency, errors, and subjective satisfaction.

Most of the points about the kind of the information that the rural people looking for were focus on the local news, which presented 78%, most of the answered about the facilities to get the news, that presented around (60% mouth to mouth).

The evaluation of the benefit and the user satisfaction were in highest agreement that mobile can provide the benefit and easy to use by those people (85%).

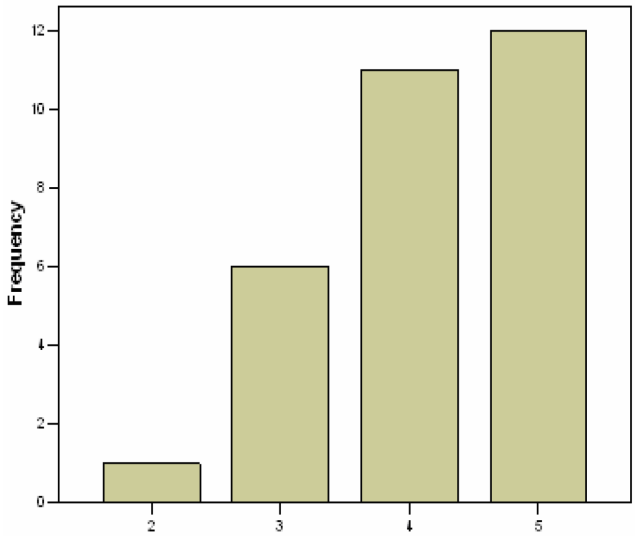

Figure 5.1. The user benefit and satisfaction.

6. Conclusion of the Study

As was explained through Section 1, the objectives of this study are to develop the prototype and do usability testing. As well as producing requirement model for Mobile News Application for the Rural Communities using UML.

The prototype will help the rural to do their enquire for the different news easily anywhere at any time using their mobile phones and that will comfort them from going to TC office and from the limitations to use the website of these TCs.

7. Study Contribution

Mobile news application for the rural communities helps the public from the rural by gaining an easier way to make their news view by providing them with the necessary information of the news such as the local news, sport news, death news, wedding news and etc. one way as they want. The prototype was developed using ASP.NET coding the mobile news application for the rural communities. The system completely developed using .NET framework using ASP.NET 2005. The study shows how the users can make their news enquire using the mobile device or the website, and the results show how the users were satisfied with this system. Microsoft Access Database is used to make the database that stores the necessary news information for the users. The prototype has been evaluated and the objectives have been achieved.

8. Problems and Limitations

Although this system provides the rural people with an easier manner for viewing the news, there are some significant disadvantages to the mobile news application for the rural communities which include the following points:

1. The developing of WAP pages is more complex than developing pages for standard web browser because of the limitation size of mobile screen space and internal memory in mobile devices. In development phase, developer needs to concern about the size of the screen.

2. The WAP prototype and web prototype was tested using local host server, namely IIS. But with limited financial resources no actual web server can be utilized in testing the prototype.

9. Future Works

The mobile news application for the rural communities is to enable the rural to watch the favorite news that they want as well as necessary information about the news update such as the cost of the tickets they reserved, and to allow them also to book for two ways (go and return). A lot of works still need to be done on this application in future such as browsing the news that support the multimedia features, and sending messages from the administrator to the rural in case there are some changes occurring for the journey that the rural reserve on it, to inform him/her about these changes this work.

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