

Mobile Web-based Rural Information System for Tropical Fruits Diseases

Khalid Waleed Hussein
Faculty Computer Science & IT,
University Putra Malaysia (UPM),
Khaled_it77@yahoo.com

Prof. Dr. Wan Rozaimi Sheik Osman
Director, ITU-UUM
Asia Pacific Centre of Excellence
rozai174@uum.edu.my

Abstract- The agricultural sector is essential to every country, particularly for those countries in which it is the main source of income. The application of modern technology in the agriculture sector and the delivery of information on how to care for protect tropical fruits from diseases are useful to development and generation of wealth in rural areas. Farmers rarely have access to computers and the Internet. They do not have the time to use computers, and they reside far away from places where internet services are available. This paper will focuses on the development of mobile web-based rural information system to help the farmers identify and seek solution to problems such as agricultural diseases.

Keyword-Mobile web based; development rural areas

I. INTRODUCTION

The World Bank has been spending over \$ 400 million in agricultural education in developing countries for more than 20 years. This amount has assisted numerous countries in building their local capacity to prepare technical staff and managers in the rural development sector [1].

Agriculture has become a science in which a series of operations based on scientific observations is repeatedly tested. This procedure helps farms in producing quality tropical fruits in sufficient quantities at reasonable costs. Industrial and agricultural products are sold in the markets, and their prices are affected by several factors, which require farmers to be aware of the technology for protecting their produce from climatic conditions and agricultural diseases[2],[3].

Agriculture has a vital role in the economy of developing countries in which it is the main source of food, income, and employment for the rural population. The development of agriculture and land use is essential for alleviation hunger and poverty [4],[5],[6].

These days, the mobile phone has developed into an important tool for Information and Communication Technology (ICT) not only in cities but also in remote and rural areas. Rapid advances in technology have eased the use and reduced the cost of these mobile devices, which transform them into flexible tools for rural development[7],[8],[9].

Continuous developments in the field of mobile computing allow the mobile device to become a candidate in addressing the hardware predicaments of people in rural areas. Wireless communications, long battery life and low prices transform the mobile device into a more suitable tool than a computer for rural residents.

Rural information systems are generally used in delivering information to rural poor areas and providing information about these rural areas to policy makers. However, previous rural information systems have been mostly unsuccessful in addressing the needs of the rural poor. The spreading of agricultural information, in particular, requires more processes aside from merely transmitting messages [10],[11].

II. RELEVANT RESEARCHES

A. Mobile-Learning

Mobile Learning (M-Learning) is the art of learning with the aid of mobile technology to enhance the experience. It is a new technology for learning. This method focuses on learning through mobile devices, which is practiced in several places, such as schools, workplaces, cities, and rural areas. M-Learning boosts portability by replacing books and notepads with small RAMs [12],[13],[14],[15]. M-Learning develops a new tool in the field of pedagogy that can help students and teachers to easily navigate their learning process. The entire learning process can be fulfilled using mobile devices only [16],[17].

B. Mobile web based applications in the health care sector

Mobile-health (M-health), also referred to as wireless telemedicine, involves the use of mobile telecommunications device and multimedia technologies that are integrated with mobile healthcare delivery systems [18],[19],[20]. ICT, particularly mobile technology, has made vast advancements in nearly every field of the developing world. Mobile health is a subset of electronic health, which refers to the delivery of health-related services through mobile communications technology[21],[22]. Patients can set appointments with their doctors through mobile phones or the Internet. This development Changes the previous situation in which the only means for people to secure an appointments with their doctors was through a phone call. These mobile devices can also significantly reduce the amount of paperwork and improve the entire service [23],[24].

C. Mobile web based applications in selling products

People can sell products in Bangladesh using mobile devices. The cellBazaar has over one million users, in which roughly 25% are regular users. Up to 550 new items are displayed every day, although the majority of the population in Bangladesh do not have electricity or access to the Internet. Farmers can directly sell their products to customer through a mobile web-based application. This process can help farmers to increase their income, and at the same time, encourage people to use such technology in reaching out to the world[25],[26].

III. PROPOSED SYSTEM

The rapid development of ICT has widened the digital divide between cities and rural area. Mobile web- based applications can be used to deliver agricultural information and enable farmers to obtain knowledge and information from the outside world. Knowledge on agricultural science and technology and market information can be transmitted to a farmer's mobile phone through wireless communication networks. Mobile phone can help farmers to conveniently and efficient acquire agricultural information. Farmers can learn how to protect their crops from diseases. Therefore, mobile web-based applications can help farmers increase their production by providing them with agricultural information.

A. System Requirements

The requirements for this system are organized according to different aspects of the system as follows.

- The system should allow the administrator to add, delete, update and view the available fruits in the system.
- The system should allow the administrator to add pictures and detailed description of the fruits.
- The system should allow the administrator to add, delete and view the diseases for each fruit that is available in the system.
- The system should allow the administrator to add, delete and view details about the diseases of each fruit.
- The system should allow the administrator to add, delete and view the treatments for each disease and recommendations for farmers.
- The system should allow the farmers to view a list of fruits, which allow them to select a particular fruit to view its details.
- The system should allow the farmers to initially view the details and pictures of a first in case they do not know the name of a certain fruit before proceeding to view its diseases and treatments.
- The system should enable the farmers to view a list of diseases of any fruit and details of any disease that is listed in the system to know more about them, and enable the farmers to recognize such diseases that are unknown to them.
- The system should allow the farmers to view treatments and recommendations to be followed for each disease that is listed in the system. The system should order the treatment methods by importance.
- The system should not require any login/registration information from the farmers before they could use the

system. Login should only be required from the administrator.

The class diagram shows the administrator manages the data in the web page after logging in, and he/she can edit, delete and add all of the information that is necessary for the farmer to view. Figure 1 illustrates the main classes of fruits displayed in the homepage of the mobile web-based application, in which farmers can freely select any fruit to view its information.

B. Rural Information System (RIS)

Farmers are the main users of the mobile Rural Information System (RIS). Figure 2 show a homepage welcomes the farmers to the RIS. For them to continue, farmers simply have to click on pictures to start browsing fruits and information about their respective diseases. No login credentials are required for farmers to use the system.

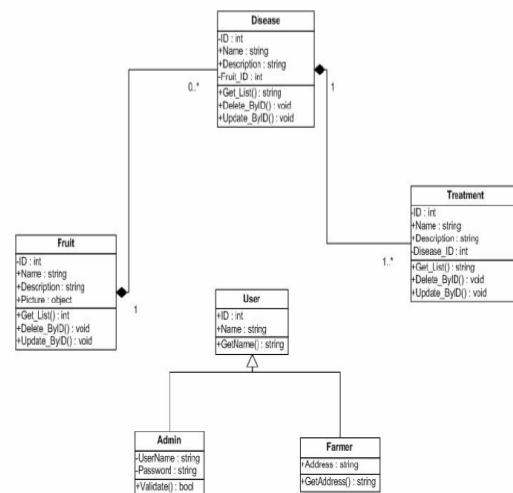


Figure 1: Main class Diagram

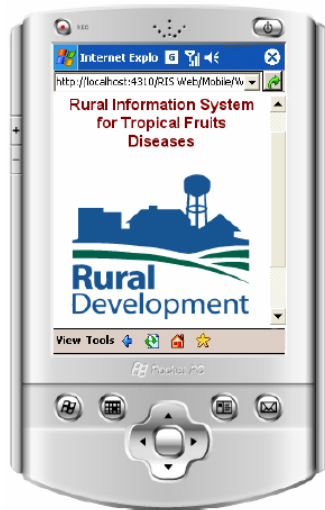


Figure 2: Home Page for Farmer

Fruits page: As shown in Figure 3 and 4, this system presents to the farmers the list of available fruits. For them to know more about any fruit, the farmers simply click on a fruit's name to show the details regarding that fruit.



Figure 3: List of Fruit



Figure 4: Durian Details

Diseases page: As shown in Figure 5 and 6, this system presents to the farmers the list of available diseases for the particular fruit that they have selected in the previous page. For them to know more about any disease, the farmers simply have to click on the disease name to show more details regarding that disease.

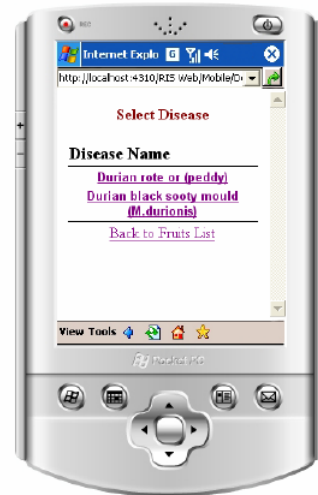


Figure 5: List of Diseases

Figure 7: Treatment Page for Durian Disease

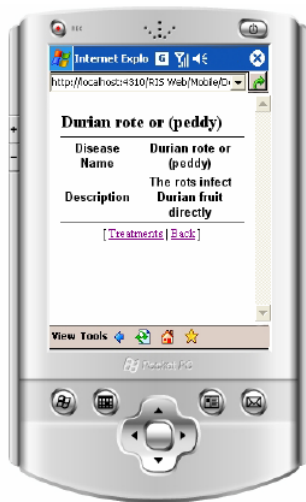
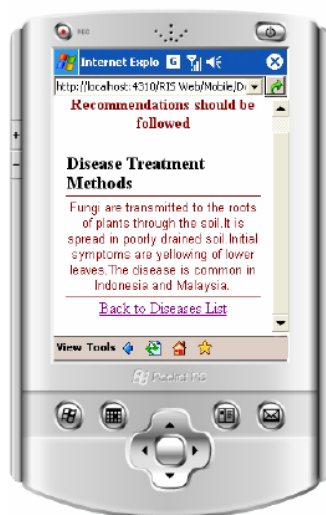


Figure 6: Details of Diseases

Treatments page: As shown in Figure 7, this system presents to the farmers the list of treatment methods that should be followed for the particular disease that they have selected in the previous page.



IV. COMPARISON ANALYSIS

Interviews were conducted with fruit farmers in Kampung Changkat Setoi (K.C.S) in Kedah, Malaysia, and officers from MARDI, particularly Mr. Ithnin Badri, a Senior Research Officer from MARDI in Bukit Tangger, Malaysia. These interviews aimed to know more about the current system and define its problems.

Through the current system, farmers can quickly learn about the present diseases in their farms, which they must report to agricultural experts or engineers in MARDI for them to determine the precise treatments for these diseases. The proposed system will help the farmers to obtain information about fruit diseases and treatments without requiring them to leave their farms. This proposed system will also keep these farmers connected with the MARDI Center for them to receive the latest information or tips for tropical fruit diseases. Moreover, the proposed system will help farmers to increase their production of tropical fruits, and at the same time, enable them to quickly gather information about crops or the treatment of diseases.

V. CONCLUSION

This project focuses on the delivery of information to farmers in the easiest possible way to keep them informed about important fruit diseases or other problems that they may experience. The prototype still needs to expand its selection of fruits that grow in Malaysia. It can also help the farmers by giving them agricultural information on how to treat crop diseases. All of the agricultural information used in this study was obtained from the MARDI Center in Malaysia. This project substantially supports farmers and concerned authorities in terms of spreading knowledge and

providing guidance. Microsoft ASP.Net was used in implementing the project. The mobile web-based application was tested on a Pocket PC simulation and not on an actual mobile device. The system database was built using Microsoft Access 2003 for easier development and mobility.

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AUTHORS PROFILE



Mr. Khalid Waleed Hussein Algburi. Bachelor's degree from Baghdad University 2001, master's degrees from University Utara Malaysia (UUM) 2009, PhD Candidate at University Putra

Malaysia. (UPM) in Department of Security Computing. Previously lecturer at Arab Academy for Science and Technology- Syria Arab Republic.

Prof. Dr. Wan Rozaimi Sheik Osman

Director, International Telecommunication Union (ITU)-
University Utara Malaysia (UUM), 06010 Sintok, Kedah
Darul Aman, Malaysia