

Development tools for mobile devices in market price information systems

Róbert Szilágyi ^a, Miklós Herdon ^b, and Péter Lengyel ^c

^a University of Debrecen Centre of Agricultural Sciences Faculty of Agricultural Economics and Rural Development Department of Business- and Agricultural Informatics, 4032, Debrecen, Hungary, szilagyi@thor.agr.unideb.hu

^b UD-CAS-FAERD DBAI, 4032 Debrecen, Hungary, herdon@thor.agr.unideb.hu

^c UD-CAS-FAERD DBAI, 4032 Debrecen, Hungary, lengyel@thor.agr.unideb.hu

Abstract

There are already several applications on mobile devices that can be useful in agriculture. For example: GPS-enabled map software, individual cattle identification and tracking software and even complex agricultural systems. These are just beginning to spread in the Hungarian agrifood sector. The possibility of using for agribusiness of mobile internet and mobile tools is increasing. Mobile tools are really suitable for tasks like inspecting the evolution of prices of agricultural products. One of our application development is a mobile extension to access the Market Price Information System run by the Hungarian Agricultural Economics Research Institute. The accessibility of information demanded by market actors can be ensured effectively by using mobile tools. The biggest limitation for PDA is screen size. If it is getting smaller from full screen to PDA-sized and yet further to mobile phone dimensions, user performance drops. The main reason for this is that smaller screens make it more difficult for a user to make good judgements about the usefulness of any particular information. The development methods and tools help us to solve one part of these problems.

Key words: mobile devices, mobile application development

1 Introduction

Since handheld devices are spreading software developers have to create programs and build web sites that are handheld compatible. The main difference between a PC application and a handheld device application development is the size of the display. There are also other factors influencing the work of software developers (i.e. lack of memory and user incompetency). Web sites and programs that would be used in handheld platforms should be simple, with a fast and well designed search engine.

2 Development platform

Not surprisingly the mobile technology plays an even increasing role in the world determining various aspects of our life. (Jensen and Thysen, 2004), (Bange et al., 2004), (Auernhammer, 2001) Nowadays not only communication and every day activities but also the banking sector, public administration, activity of companies and entertainment is hardly imaginable without mobile technology and mobile accessories.

The size of the Hungarian mobile phone market according to data from the 3rd quarter of 2004 is above 8 million subscribers. (www.nhh.hu). We don't know exactly how many farmers have mobile phones but because of the high number of subscribers it is probable that most of them do. Among the technological possibilities at our disposal we have chosen the WAP environment, because we thought that we could create a simple, easy-to-use application with it.

2.1 What Is WAP?

WAP means Wireless Access Protocol, a general term used to describe the multi-layered protocol and technologies that bring Internet content to mobile devices such as PDAs and cell phones.

2.2 How Does WAP Work?

The delivery of many protocols and technologies takes the same route - namely, through a proxy server that bridges the gap between the wired Internet and the wireless service provider's network. Figure 1.

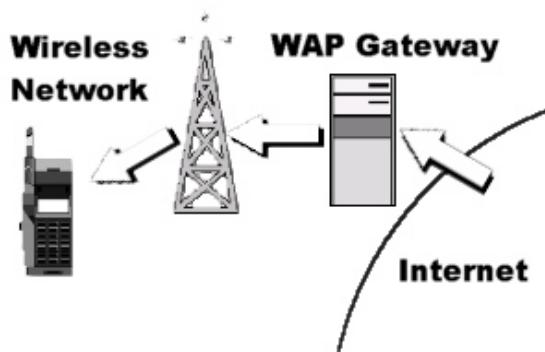


Fig. 1 The WAP transaction route (source: Schafer, 2005)

Many mobile devices have a built-in wireless browser. Most browsers support WML, either natively or translated into HDML. The Handheld Device Markup Language (HDML), is still supported on several mobile platforms. However, due to the limitations of HDML WML is becoming the most widely used mobile markup language.

2.3 What Is WML?

WML (Wireless Markup Language) is the dominant language in use with wireless devices today. It is a subset of HTML (Hypertext Markup Language).

There are several key differences between WML and standard

- WML is highly structured and very particular about syntax. Mistakes are not allowed in WML; the mobile browser will complain and generally won't display the page.
- WML is case sensitive. The tags and are treated as different tags, although they accomplish the same purpose (bold text).
- Many tags have required attributes. Developers accustomed to HTML may be used to including only attributes they need-in some WML tags, you must include a few attributes.
- WML pages are structured in "decks", allowing for multiple pages to be defined in each WML file.

A big advantage of WML is that – if completed with PHP – it makes possible to access databases with mobile devices. (Schafer, 2005)

Mobile tools are really suitable for tasks like inspecting the evolution of prices of agricultural products. (Sugahara and Omatsu, 2004) In Hungary one of the applications currently being under development is the possibility to access the Market Price Information System run by the Hungarian Agricultural Economics Research Institute.

For those interested the data collected by the Market Price Information System can be accessed on the MIS data of several countries can be accessed either by subscribing or free (<http://www.zmp.de>, <http://www.ismea.it/>, <http://www.snm.agriculture.gouv.fr/>). (Kapronczai, 1998) In many cases we need to know a certain product's price when and where no computer is available – that is when using a mobile phone to get this data is practical.

3 Development

Such systems are useful because the user can use the application with the handheld device and search for the required data right on the spot when and where it's needed.

The biggest limitation for PDA is screen size. If it is getting smaller from full screen to PDA-sized and yet further to mobile phone dimensions, user performance drops. The main reason for this is that smaller screens make it more difficult for a user to make good judgements about the usefulness of any particular information. (Jones et. al, 2003)

That means that the application developer for handheld machines should keep in mind that his programs will appear on a much smaller display than a regular PC screen. So these applications (and anything that could be appearing on a handheld display, i.e. web pages) should be adapted to make them more accessible to mobile device users. Here are some guidelines to help the developers create more useable software for handhelds:

3.1 Provide direct access

When users are using handheld, small displays they seem to choose and prefer direct access strategies over browsing approaches. So handheld content should be adapted the following way:

1. Providing a search mechanism: at least one direct search feature must be included in the software or web page.
2. Structuring information for focused navigation: developers should consider why a user might be accessing a particular page on a web site or a function in the application and present a framework to facilitate such access.

3.2 Reduce scrolling

Users have to carry many scroll action using small screen displays. Scrolling can be reduced by:

1. Placing navigational features (menu bars, etc.) on the top of the pages in a fixed place.
2. Placing key information at the top of pages.
3. Reducing the amount of information (only the essential information should be on the screen).

Simple tasks (such as reading or browsing) can be carried out on handheld devices without any bigger complication. However, other tasks that are on higher level than reading (i.e. information retrieval tasks) could be harder to complete on devices having similar display size characteristics to the current models. Because of the size of the handheld screens the applications complexity should be kept low and they should be designed to show all necessary information or menu on one page. Obviously the readability of the information on the screen is very important as well as simplifying data input which is quite troublesome. (Suliburk, 2003)

3.3 Our development

During the development we have used the following softwares and development environments:

Nokia Mobile Internet Toolkit 4.0, Nokia WAP Gateway Simulator 4.0, Nokia 3510i SDK v1.0, Macromedia Dreamweaver 2004 MX, Apache 1.3.33 webserver, MySql 4.1.9 database server, PHP 4.3.10.

3.3.1 Creating the development environment

As the first step of development we have created the development environment. We have payed close attention to the configuration of these applications. In this process the WAP gateway plays a critical role because it provides connection between the mobile tool and the Webserver. To be able to reach the database we had to “fine tune” MySql server and the Apache Webserver together.

3.3.2 Creating the database

During the next part of development we have created the database. After establishing data tables converted from the Market Price Information System of the Hungarian Agricultural Economics Research Institute, and edited to fit the relevant queries , we designed the queries. From the market informations we have processed the prices of vegetables and fruits. The following groups were taken in consideration in the queries:

Product: Fruit – Vegetable, Origin: Import – Hungarian, Place: Budapest – country towns, Price: Producer - Consumer

3.3.3 Editing a WML page

In this step we have created the WML page that manages the queries directed to the database. We have made the connection with the help of PHP scripts embedded with MySQL server. 3 cards were created during this process. The first (Figure 2-3.) is capable of choosing the product, place, price and origin. The second card (Figure 4.) establishes a connection with the data table corresponding to the given parameters, where we can ask the market price by product name and type. These prices will be shown on the third card (Figure 5.).

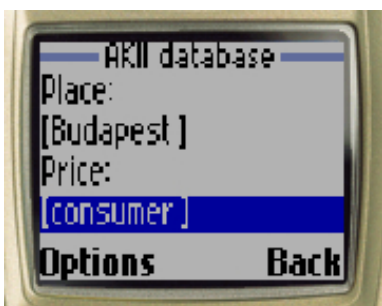


Fig. 2 Place, price selection



Fig. 3 Product selection

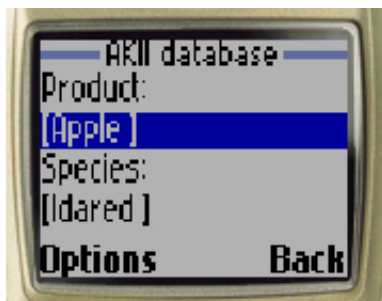


Fig. 4 Special product selection



Fig. 5 Price table

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