Implementation of C2C Trade Information Application Based on Mobile Technology

Shahrzad setayesh

Master of Information Technology Engineering E-Commerce, Department of Computer Science Engineering and Information Technology, Faculty of e-learning. Shiraz University, Shiraz, Iran.

ABSTRACT

The extant study aimed to investigate the advantages, disadvantages, and challenges of the mobile business (M-Business) development by providing fundamental concepts of this modern business and identifying its requirements and infrastructures. This research was also conducted to propose an appropriate solution for informing C2C[1] businesses on the mobile technology contexts to meet society's needs and provide a structured and classified base for search needs through C2C business advertisements and information. In this case, time and place constraints were removed, and costs were minimized. Furthermore, the organized information of daily C2C business led to some advantages in purposeful marketing and advertising and identifying individuals. Therefore, the present paper took a step to eliminate unexpected and irrelevant advertising.
Keywords: C2C, M-Business, Organizing Mobile Advertising, User Interface (UI) Adaptation

Introduction

Mobile Business, also known as M-Business, is a kind of electronic business through mobile devices. This technology is used for many applications, from communications to business transactions and services provided for subscribers via M-business [1]. C2C business is an e-commerce model in which consumers sell their products directly to other consumers. This kind of trade is done daily among different walks and classes of society. Hence, the government must take measures to facilitate M-business, control, and monitor these tradeoffs [2].

Research [3] introduced M-business, the difference between M-commerce and M-business, applications of M-business in different trade contexts of B2C, B2B, and other services in different countries. Furthermore, this study assessed the future needs of M-business and introduced some operating systems that provide mobile-business and marketing services. The study [4] reviewed the concepts of creating M-business applications and factors affecting each application. Moreover, this research determined the most

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[1] *consumer to consumer*

important challenge for creating a successful M-business application and its interface and introduced a methodology for the design and implementation of M-business services.

The extant study was conducted to identify and classify problems and challenges in implementing C2C M-business by reviewing the same operations performed in other countries. In the next step, this research examined the telecommunication amenities and infrastructures and problems and bottlenecks of M-business in Iran. It was aimed to introduce a suitable solution for C2C business informing based on M-business regarding the exiting models and respective opportunities and threats in Iran. The different ways of sending information via cellphone, such as SMS, WAP, etc., to implement and run this model and select the best method based on the survey of users, amenities, and telecommunication infrastructures to provide an appropriate database for C2C business information and advertisements.

Method

The descriptive-applied method was used to achieve research goals in the extant scientific research. Following methods were applied to collect data:

- Study of the papers published in national and international conferences (www.civilica.com)

- Using statistical data published in UNCTAD and IUT websites

- Searching through various websites and gathering related information and data

- Using the result of a 7-item questionnaire distributed among the randomized society of cellphone users

The model proposed for implementation of C2C business information application

According to the discussed techniques and common methods used in other countries in the Region, the best solution is to choose a combination of mentioned methods. Evidence indicates that customers do not use complex methods [5].

The proposed model can be implemented by using an application installable on a mobile phone. Information is sent and received via SMS and GPRS. The best method has been suggested herein after calculating cost and determining other features of each technique.

The first proposed method: design a website in which information is saved on the site database, and the installed application on a cellphone sends information via GPRS to the website that its URL address has been selected in the mobile application. The volume of sent information equals 1kb, and then the information is received on the website, then the required operations are applied to it. In the next step, the search result is sent to the mobile user in the form of a file, delivered to the application, and the structured information is shown to the user. It is worth noting that connection is unnecessary for every information transfer since mobile is permanently connected to the internet. Moreover, the cost is calculated based on the volume of transferred information, not on the duration spent on the internet, and this is the outstanding advantage of the GPRS method.

The second proposed method: use of SMS to share information. A system must be used as a server to implement this technique. The server receives the information sent by the mobile application in short message form by the GSM modem, operates and processes the information, and then sends the result to the user's cellphone. As reported in Table 1, the cost of information sharing through the GPRS method is less than the SMS method in both operators. The volume of shared data in this application equals 1kbyte with maximum cost (8Rls), while the cost of information transfer in SMS technique equals 106Rls. Therefore, the cost of data transfer in the GPRS method is less than SMS [6]. Moreover, data exchange speed in the SMS method is slower because of the few numbers of SMSs sent by GSM devices (about 6~15 SMSs per

minute). However, the number of these SMSs is affected by the telecommunication platform and bandwidth provided by the radio channel.

Table 1. Cost of data sharing via SMS and GPRS in the active operators

Short message (SMS) Hamrahe Avval[2]/ MTN Irancell	• Persian: 106Rls per page/100Rls in Irancell • English: 264Rls per page/160Rls in Irancell
Internet (GPRS) Hamrahe Avval/ MTN Irancell	• 8Rls per Kbyte shared data in peak time (8:00-23:00)/ 5Rls in Irancell operator • 2Rls per Kbyte shared data in off-peak time (23:00-8:00)/ 1Rls in Irancell operator

Designing and running a user interface (UI)

The programming language of J2ME is required to implement an application that must be installed and run on the cellphone. It is possible to set users' predetermined demands and needs as a menu. The user can enter the demanded information by selecting each option of the menu, and then all data are prepared in the frame of a protocol (that is detectable by the server) then sent to a certain number (the mobile number by using GSM Modem and or number 1 of SMSCenter) [7].

Methods to design and adapt mobile UIs

All mobile phone manufacturers install CLDC configuration and MIDP profile on all products. When MIDP classes and functions and CLDC configuration are used in the programming language of Java, it is called MIDlet. This profile supports at least a 96*54-pixel screen with a minimum of one colored bit. The input equipment includes different keyboards or touchable screens [8].

The connection between mobile application and computer

As shown in Figure 1, a GSM[3]that is a wireless modem working with the telecommunication network of GSM is needed to connect mobile and computer. GSM performs as an ordinary dial-up modem; the difference between these two modems arises from information sending and receiving. The data are sent and received via phone line in dial-up Modem, while data are shared through radio waves in GSM. GSM is connected to the computer as an external modem with a Serial cable or USB port. GSM modem is connected to a telecommunication wireless network by a SIM card. Few SMSs are sent by GSM, about 6~15 SMSs per minute, but this amount may vary depending on the telecommunication platform or bandwidth provided by the telecommunication radio channel. Because of the limited telecommunication bandwidth of GSM, it is not possible to send more than 6~15 SMSs [9].

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[2]*Mobile Telecommunication Company of Iran*
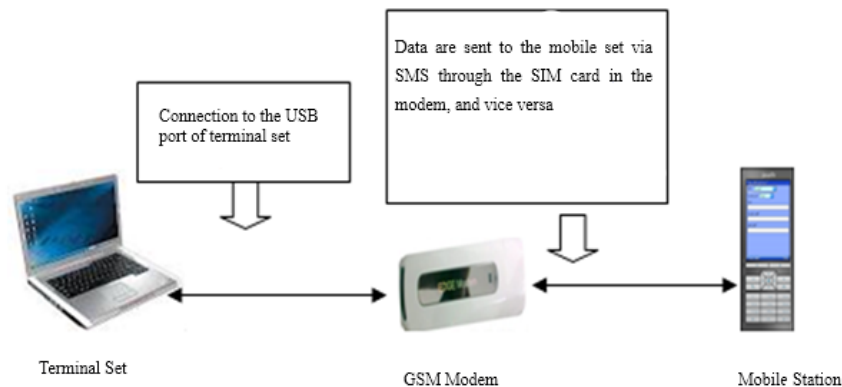
[3]*GSM: Global Service Modem*

Figure 1. Mobile station-Terminal set connection

In this case, the user presses the search key, and then the inserted information is sent in the form of SMS to the SIM card in the GSM modem connected to the computer. The computer uses AT Command[4]to connect to the modem that receives information from the modem using the NrCommlib component that helps work with AT commands then converts it to the data applicable in the Delphi programming language. However, the received data must be based on a PDU[5]because the information is in Persian. As we know, every application can use Text Mode or PDU to read and write SMSs; hence, the application will be limited to the default-coding mode if Text Mode is used. In this case, only Latin text can be sent or received. Text Mode is not usable for the Persian language, while PUD Mode can be applied to any implementable coding system. The TNT component converts the received message into Persian and sends the information to the predesigned database. In the next step, the search result is resent to the modem and then to the user mobile set through the NrCommlib component [9].

The software needed to implement and run

The mobile programming software, called NetBeans6.8, was used in the implementation step to design the pages and menus structured on the mobile set. NetBeans6.8 software was chosen because it allows creating mobile page dialogues and proving the default package of mobile functions related to Sun Company through the software. On the other hand, it is one of the most advanced open-code environments. This software is indeed in java language, which is independent of being a platform, i.e., the applications created in java language in different cellphones can be run without considering their type and operating system. In this case, the application is easily run if JVM[6]exists in the operating system of a cellphone [10].

The Delphi7 programming language has been applied to receive information from the database and send it to GSM, cellphone, and vice versa. In addition, two components were used to connect the application and modem.

The TNT component was used to write the received and sent information in Persian; moreover, the NrCommlib7 component was used to receive information and send it to the GSM modem through Delphi software. SQL Server was also used to design the database.

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[4]*Attention Command*

[5]*Protocol Data Unit*

[6] *Java Virtual Machine*

Description of designed application

This application is runnable on most cellphones with the capability of running application software. This application has been structured to provide accessibility for users to their daily needs simply and without training. This application was programmed using a Java program, so it can be easily installed and run on the cellphone after downloading it via Bluetooth, while additional settings are not required.

Users can choose one of two menus on the first page of the application; the first one searches individuals' needs, and the second menu is used to insert the new products for sales in the database. The latter has been illustrated in Figure 2(A).

When the user selects the menu of a new product for sales, the menu is shown in Figure 2(B) is shown, the considered product is selected from the drop-down box. The user inserts the product specifications in the next step, as shown in Figure 2(C), and presses send key. The message "your message sent successfully" is shown to the user. In this step, the application of needs installed on the user's cellphone sends information of the new product as predefined code of each product to GSM. The information is accessible through AT commands. An application in Delphi language was designed to implement AT commands to receive information from and send t to the database, as shown in Figure 3. The format of the received information is as follows:

"FROM:09171209607 TEXT:21+100+150000000+6486983+"

First, a user's phone number is found, and then the text message starts with some numbers, such as "21," i.e., inserting data of new cell in database. However, this number has been assumed to work with the application easily to be any other figure. The sign "+" is used to separate information. The next numbers indicate the user's area, price, and contact number, respectively saved in the database. It should be noted that the order of information is set in programming to facilitate the process. The size of this format (sent data) equals 1kbyte. A new record is automatically created in the needs database when inserting data into the application.
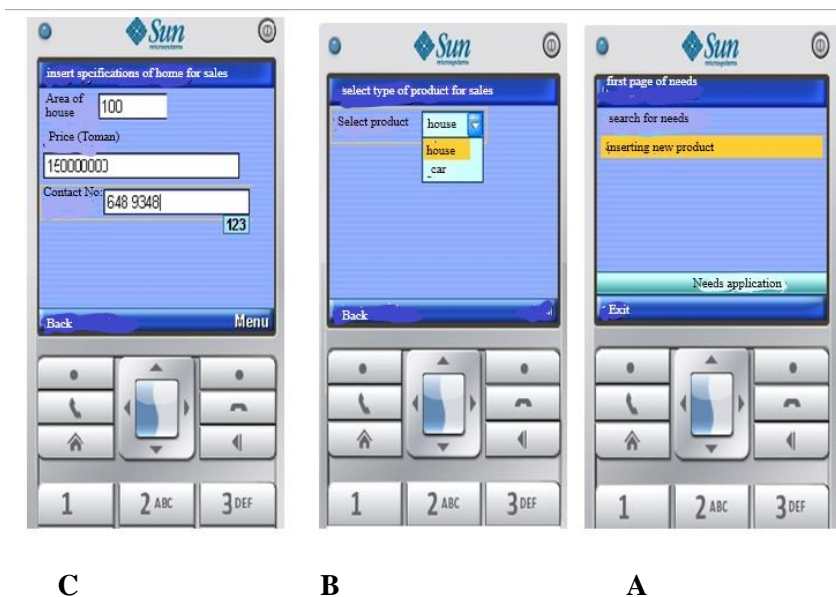

C   B   A

Figure 2. A) Menus of needs application, B) menu of selecting the type of product for sale, C) men of inserting product for sale
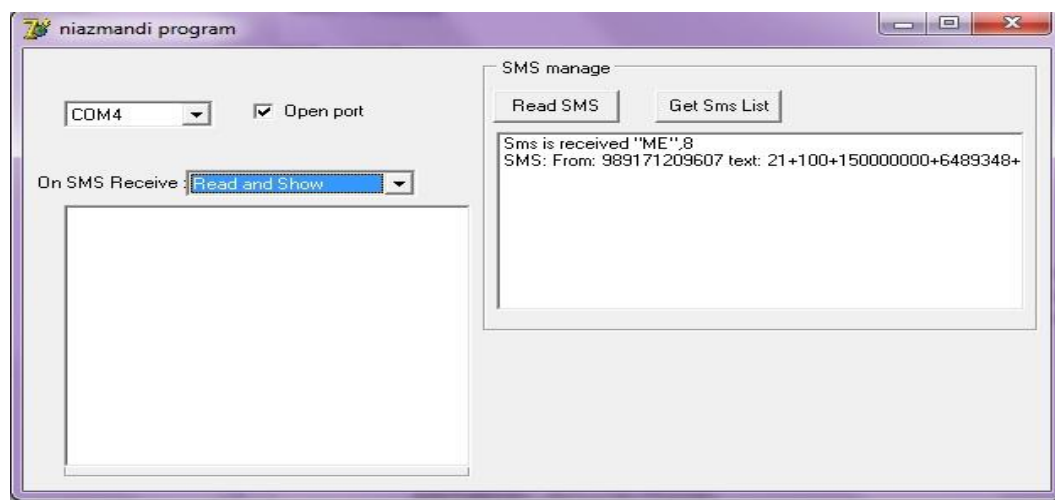

Figure 3. Delphi application, while receiving information of the product for sale from GSM

Since then, every user can have access to information of the record by selecting the needs search menu and inserting information of a house with an area of 100m and 150000000 million Toman. As shown in Figure 4, the information is sent to GSM and computer in the format explained on the previous page, and the only difference is that number "11" in message text means searching the house sent to the application, which searches through databased automatically when the message with code 11 is inserted. In the next step, an SMS with an advertising text about the searched product existing in another table is sent to the user's cellphone (Figure 5). Finally, the chart of the application running process is depicted in Figure 6.
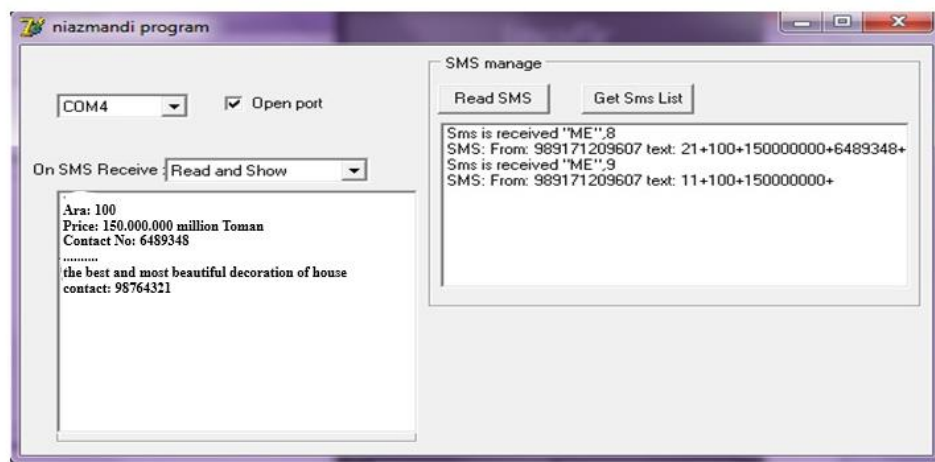

Figure 4. Delphi application, while receiving information of product from GSM
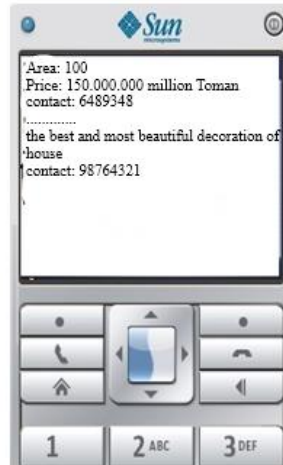
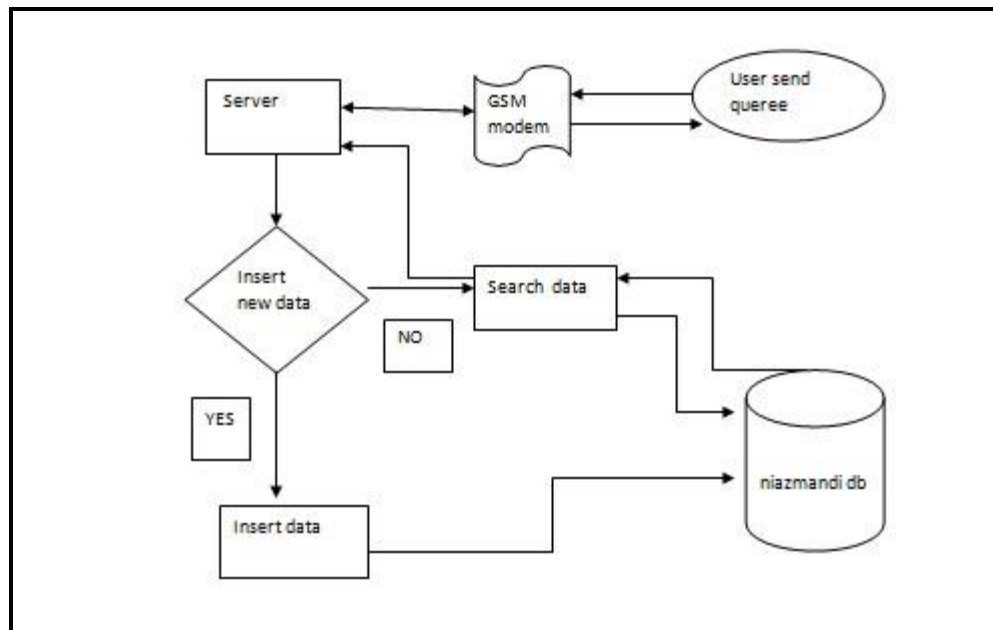**Figure 5. SMS text received by the user in response to product search**

Figure 6. C2C commerce's information application chart

Discussion and Conclusion

Requirements for running a business based on the mobile networks are at a higher level of e-business, including technical infrastructures and legal-pragmatic knowledge [11]. Java must program applications to be run on the majority of cellphones, and the MIDP profile matches the designed pages based on the types of cellphones. In terms of providing the mobile application in society, it is recommended to introduce the free version of the application to users. In this case, applicants are encouraged to use services, and users' feedbacks find problems so that solutions can be presented. Moreover, more applicants use free services in this way, and then they can choose the application forever. In the next step, you can receive cost for more provided services and advertisements through your mobile application that is popular among people. Therefore, users pay cost more eagerly because they know its use and application in daily life.

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