An Application of Wireless and Internet technologies for Convenient Store’s E-Commerce

Mr. Apiwat Sangnoree

Electronics and Telecommunication Engineering Department, School of Engineering, The University of the Thai Chamber of Commerce
Vibhavadee-Rangsit Road, Dindaeng, Bangkok, 10400, Thailand
Tel: 02-697-6707, Fax: 02-275-4892, Email: apiwat_san@utcc.ac.th

ABSTRACT
In Electronic Convenient Store, customers need automatic purchase-sale system that is workable anytime and anyplace. This paper proposes WAP-based automatic purchase-sale system for Convenient Store’s E-Commerce to help Small and Medium Enterprises (SMEs) in local competitive sale and energy saving by ordering goods via client’s mobile phone. This system comprises of client, WAP gateway and server units. The modification of PHP, Visual Basic and Mysql database which used world wide for Internet system, WML in wireless protocol are employed to create client-WAP gateway and WAP gateway-server interfaces. Stock control, product sale and bill processing units with multimedia are provided at the server side in order to automatically handle purchase and sale whenever and wherever the customers access. To evaluate the performance of proposed system, we performed simulation and experiments by on-line via www.utccmart.com domain. The results reveal the proposed system is workable and mean satisfactory from sample customers.

Keywords: WAP, Convenient store, E-commerce via mobile phone.

1. INTRODUCTION
Due to the high competition of convenient store in Thailand which people can see them around the corners, how to increase incomes if you are the owner of such SMEs’ store among those. An important factor, customers’ convenience is concentrating concerned. One way to achieve is E-commerce via mobile phone, as everybody knows in the present most people use mobile phone for data communications, i.e. Short Message Service (SMS) and Internet via mobile out of solely converse. As the reason, if we provide such familiar technology for local convenient store’s customers it should be an effectively competitive option for the investor who has this weapon in hands.

2. REVIEW OF LITERATURE
Nowadays, the E-commerce business which is increasingly popular have been implementing into information technologies’ world in both wirer and wireless channels. So far, such businesses have been developed mainly for wirer technology via World Wide Web channel, such as air-ticket bookings [1-3], products’ sales [4], services [5], etc. Besides, some businesses provided wireless E-commerce via mobile phone in (SMS) manners [6], movie-ticket reservations [7], E-banking [8]. According to the third generation or 3G for wireless communications, in the present we are able to access to Wireless Application Protocol (WAP) via any mobile phones like internet on mobile. As the reasons, this research was undertaken to combine wireless information technology to a local convenient store for optionally competing to the others which have similar enterprise. Usually, most of convenient stores apply the computer systems to their stock control, product sale and billing processing units, all systems which are mentioned above acted as the server-site of general internet system. The modification of the server-side to wireless accessibility from users via WAP-based which is implemented in this research able to facilitate customers who need to check and buy goods of the store on their mobile phone’s screen without walk-in process in other hand, we are able to save energy from the user’s vehicles indirectly. The research was uploaded to www.utccmart.com domain and tested by 100 sample customers who always walk-in to check and buy convenient store’s goods.

3. CONCEPTUAL DESIGNS OF THE RESEARCH
In the research, as in Fig 1 database systems and wireless programs are used to build server database, server-client databases and communication patterns between both sides. For server database, Visual Basic have been used to be the system for collecting and updating data into the
database. About the server-client database, WML, PHP and Mysql have been modified as wireless language, internet language and database for data communications between the convenient store and mobile phone users. Internet protocol via HTTP and WAP-based have been used as the medium of the wireless communication patterns in the research.

4. PROPOSED MODEL OF THE RESEARCH

This section covers the proposed model of this research, there are three models that able to communicate each other in order to complete the purchasing systems between the convenient store and customers who use mobiles phone to order goods. The first model in figure 2 is for server’s database, there are four separated sub-databases comprise goods’ types, goods’ details, member’s details and billings’ database. The reason to separate them is for categorizing and effectively updating data in and out of server databases. For goods’ type database the samples are snacks and beverages, the server can update types when new products is available to purchase or delete the old items which will be no longer for sale. The most relationship to goods’ type database is goods’ details database there are details of goods in each type to declare the information of available goods and this database is also able to update relatively to the goods’ type database. The other one is members’ detail database which provides the information of customers who has registered via mobile phone to the database, as the reason it is able for blocking unknown customers to the purchasing systems. For the billings’ database, it has details of customers’ profiles, purchasing goods and amounts. This database will be updated simultaneously with the goods’ type database in order to adjust goods’ amounts in the store’s stock.

Fig 2: Server-site organization and interfaces.

The second model as in Figure 3, is for server-site and client-site communicating process, the first operation is started when the server-site receives data from any customers’ mobile and then the data which comprises member’s user-name and password will be verified for separating registered customer so called ‘member’ from unregistered. The unregistered customer can only access to overview goods’ details from the server’s database and after that designed process will command the customer for terminating to the first WAP-page of the store by clicking a provided button in order to allow the customer for registering as the authorized member. Alternatively, the mobile phone user who is registered member can proceed to order goods in the case of known codes. However, if the user needs to recheck goods’ codes in the server database for ensuring purchasing orders the provided button is available to do so and will guide the user back to order goods if it is needed. In the process of goods’ ordering, designed procedures will go to the server’s billing database for making an electronics receipt as well as goods amount updating which was discussed previously. Hereafter, when the user check reply’s corrections on the mobile phone monitor, procedures of purchasing confirmation is needs for completing the order. Otherwise, the designed procedures will guide to either back for new order makings or abortion. For a user who is unregistered member and does not need to access in the ordering process, a provided button will take customer to abort the WAP-site as shown in the diagram.

Fig 3: Server and Client-site communicating process.

The last model is shown in Figure 4, it is for server-site and sub-databases communicating process. The procedures start when receiving customer’s requests if it is unregistered one that means there are no username and password in the data which sent from client-site, the designed process will allow to connect to the goods’ details database solely, as a result customer can only check the goods’ details without making any orders. For the registered one, the purchasing process will be permitted by returning information to the mobile user’s monitor in order to let the customer makes orders. Hereafter the orders are made, the designed process will access to the billings’ database in the server-site for making an unconfirmed electronics receipt and return the
information to user’s monitor again to ask for confirmation. In the case of confirming, the electronics receipt will be sent back to the server-site by pushing the provided button in order to update all relative data in the server databases comprises goods in the store’s stock, purchasing and billings’ amounts. For the unconfirmed case, the electronics receipt will be cancelled automatically when customer either disconnect to the WAP-site or back to the Main-menu page by pushing the provided button, as the result there will be no any amounts’ mistakes in the stock if the order is not made confirmedly. In the model, there is a channel to access the process where from the server’s operator inputs. This channel is opened for updating goods’ amounts in the store’s stock which made from the server’s operator when the store needs to add in or remove the current amounts for selling.

4. EXPERIMENTS AND RESULTS

After the designed models were undertaken, including the survey on 100 samples of customers’ satisfactory who live in apartments where many convenient stores are surrounded, results are as the followings.

4.1 The sample of server’s database screens, in figure 5 shows the server’s screens in named, “UTCC MART” which the store’s operator can check goods’ stock and registered customers, including add and delete them from the database for updating data whenever there will be changed from both client and server-site.

4.2 The sample of mobile phone’s user screens, in figure 6 shows the access steps from user’s mobile to the convenient store WAP site. It is started from going to www.utccmart.com, then products are checked and when the user decides to purchase a wanted product and amount after selecting and keying the mobile screen all information will be sent to server-site and the confirmation returned back to user for completing the purchasing process.

4.3 The table of satisfactory from sample users, in table 1 is the satisfied conclusions of 100 users who are living in apartments and always purchasing for goods in convenient stores. From details in the table more than 50 percents satisfied of using this service, however around 30 percents are unsatisfied for it because of unfamiliar and the using difficulties.

Table 1: Satisfactory from sample users

<table>
<thead>
<tr>
<th>Title of the satisfactory</th>
<th>Amount of satisfied users</th>
<th>Amount of unsatisfied users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to use</td>
<td>72</td>
<td>28</td>
</tr>
<tr>
<td>Purchasing convenience</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Time consuming in access the server-site</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Suitable of their lives</td>
<td>88</td>
<td>12</td>
</tr>
</tbody>
</table>

Fig 4: Server-site updating process.

Fig 5: The sample of server’s database screens
5. CONCLUSION

The model presented here is expected to offer an option for mobile phone’s users to purchase convenient store’s goods comfortably as well as the competitiveness of SME’s enterprise which has mobile E-Commerce in hands. All well known internet’s environment methods, including Visual basic, PHPs, and Mysql are modified into wireless’s world via WAP-based communication process. As the result, mobile’s users are able to communicate with the convenient store’s database wirelessly and make purchasing decisions without walk-in pattern.

6. REFERENCES