Mobile Price Comparison Application using Localisation Techniques

Alexiei Dingli
University of Malta
Msida
Malta

alexiei.dingli@um.edu.mt

Dylan Seychell
University of Malta
Msida
Malta

info@dylanseychell.eu

ABSTRACT
In this paper we are proposing an Android mobile application. The main idea behind this system is to make use of localisation techniques together with information extraction techniques in order to develop a localised mobile price comparison application. This system extracts information from the web given a particular location and a source and provides price-comparison information to the end user on the mobile device. This paper briefly shows the background, methodology and evaluation of this decision support system for shoppers.

Categories and Subject Descriptors
H.4.2 [Types of Systems] - Decision support
H.4.3 [Communications Applications] - Information browsers

General Terms
Algorithms, Management, Design, Economics, Human Factors,

Keywords
Mobile Technology, Localisation, Price Comparison

1. INTRODUCTION
Behaviour of consumers is strongly affected by temporal factors which might be economic, social or psychological [2]. This application ensures that the user is presented with location sensitive information in order to provide an effective tool for optimising the shopping tour while constantly considering the prices of products or services available in the area in question.

The application's main functionalities include enabling the user to find store outlets in a particular street or area by extracting the information from Yell, a local business listing website. Users can see the actual outlet locations on a map, through the use of Google Maps API. The application also allows users to perform product searches within a particular area and for particular product categories. Since this is a mobile application, users are able to directly contact the outlets for reservations or queries, as well as to find their way to a particular location by using the map.

The main objective behind this application was to extract precise

and complete information about outlets in a particular location and transmit the results to the end users on mobile devices. Such a system can also be used by local administration to encourage competitive prices and therefore stimulate the local economy where such a system is implemented.

2. BACKGROUND
2.1 Localisation
Localisation is about navigating a particular place with knowledge about the current location [4]. Steiniger et al explore the relation of Geographic Information Systems (GIS) and the concept of a localised service or location-based service whose philosophy is based on asking oneself about the current location, what possibilities are around at that point in time and where can that particular person go [3]. These questions are answered by a having a number of components working together. The mobile device is the component to which the user directly relates since it is the component displaying the final information and taking feedback. The Positioning component may be a part of the mobile device itself which would feed the geographic information (namely longitude and latitude) to the software which via the communication device would transfer the data from the mobile terminal to the backend infrastructure [1].

2.2 Purchasing
The scenario in which one may use such an application is the shopping environment. Studies show that there are different types of shoppers which mainly include those who shop for pleasure or the other utilitarian category [2]. In each scenario, the shopper always seeks to optimise the choice to achieve the best buy and negotiates to acquire an economic advantage [2].

3. METHODOLOGY
The system was based on the UK for the purposes of methodology and evaluation. Nonetheless, it can be easily adapted to other countries by producing a new wrapper for that country's particular website.

A wrapper had to be created for this purpose, which could extract information with at least 70% precision and recall figures. A secondary objective was to allow the users to directly contact the outlets. Therefore, it is important that the users can make a direct phone call from the outlet information that has been extracted. To achieve this, the application had to search for products within the outlets, without having access to the outlets' stock information. Secondly, an information extraction engine had to be used to extract product information from the websites.

Once the user is presented with the results, the user is given a choice related to how the results are displayed. Another goal of

the application was to give the user the possibility of choosing between different categories for his product search. The greater the number of relevant search results, the better the application. The success of the application depended on multiple factors. The first one is the design of the system. Without a robust design, efficient implementation cannot be achieved. The application's performance is highly dependent on the efficiency of the information extraction tasks.

This technique is based on scraping information from the source sites related to a particular location. The advantage of using such a technique is that all information for each shop and location is in the same format. Another strong advantage over a system which directly connects each individual user to the system is that the proposed system requires less maintenance from the retailers. Nevertheless, this safe approach provides constant information to the end user on the mobile device at the cost that it limits the active participation of retailers from actively changing prices several times in a short period.

4. EVALUATION

The best way to evaluate our application was to show the precision and recall measures for the tasks mentioned in section 3. A survey with a sample of 30 users was taken and the following results were yielded.

The first task consists in the extraction of outlet information from Yell website. These tests gave us a final result of 79% recall and 98% precision. The second information extraction task was also tested, and a sample of these tests is shown in Figure 1.
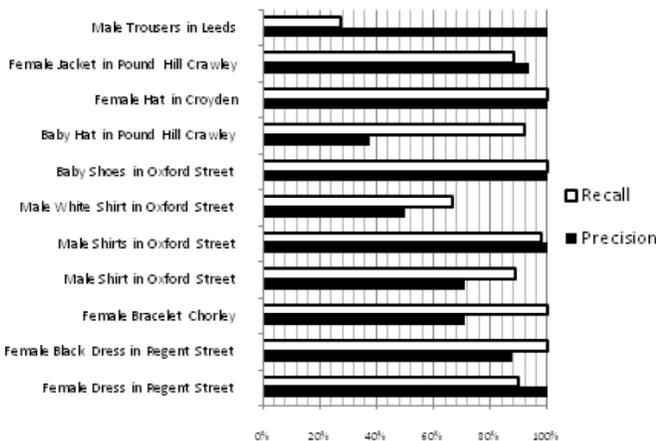

Figure 1: Product Information extraction task test result

These test results yielded a recall rate of 86.41% and a precision rate of 82.76%. When different users tested the application, to get feedback on its different aspects, most users liked the functionalities offered by the application. 96% expressed their interest in using it if it were available on the market. No test users found any difficulty with using the application, and everyone liked the design.

The major weakness of the system is the speed of execution, which was in fact criticized by 80% of those who performed a location search. The speed of execution for product searches

was satisfactory. However overall, all the goals set at the beginning of the application were fulfilled, and the application received very good feedback from the test users.

5. CONCLUSION

The evaluation showed that this system yields promising results particularly in the area of information retrieval in order to assist decision making process of shoppers. Once such a system is provided with solid sources, the recommendations can be more relevant.

The users who tried the system during the evaluation showed very positive interest in such a system. This shows the commercial potential of such techniques. Future research should be conducted in order to study how retailers can be more active in the process of presenting such information to the end users on mobile devices. If retailers are active and aware of such a system, the end result of the whole system would be stronger since end users can plan their shopping trip more effectively and finally get economic advantage.

Finally, another potential improvement for this system is the integration of the mobile application with social media. Social media can enable end users to recommend prices and offers and would make the economic environment more dynamic. If used wisely by retailers, this system can then also act as a platform of promotion and advertising.

6. REFERENCES

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