Preliminary Usability and User Experience Study of Mobile Recommendation System

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Abstract: Mobile technologies have penetrated the fabric of the urban society in an unprecedented rate, making its presence eminent in individual's daily lives, at a personal and professional level. The transformation it has brought is limitless, from businesses to entertainment and most importantly to connecting a network of users, transcending time and space. Capitalizing on the capabilities that it offers, it is widely used as a tool in the tourism industries to provide an array of services to travellers and in the course of doing so, it has re-engineered the value chain in the tourism industry. This paper draws upon the ability of a traveller's application called "FEAST" aims at providing useful information for self-guided tourists. This paper delves specifically into the usability study of the application evaluating on the functionalities of the system, user's behaviour and the cognitive load using the existing heuristic evaluation method. From the study, "FEAST" can provide a new insight of tourist spots to tourism and it is useful to the public.

Keywords: User experience study, mobile application, usability study

1. INTRODUCTION

One of the important essences in facilitating ICT in tourism, travel and hospitality lies in the understanding of the changing trend in these modern societies. Travellers are getting independent and prefer self-guided tours, drifting away from traditional pre-packaged tours. Therefore, the need for accurate, reliable and timely information is paramount to meet the expectations of diverse travellers (Bethapudi 2013). The whole system should connect the product to the consumer directly, ensure information flows both ways to facilitate information exchange and at the same time able to perform business transaction. As tour products are palpable, travellers rely heavily on reviews, comments, rating and recommendations. Referring to Condratov (2013), Google survey 2011 has revealed that 50% of the travellers sought online reviews and experiences while planning for a trip. With a large amount of information floating on the internet, it is a challenge to consolidate them

and present it through a channel in a clear and organized manner.

In line with this trend, FEAST is introduced to support the tourism industry in Johor through recommendation technology. FEAST intends to provide a platform as a channel to effectively draw and disseminate touristic information with ease to improve travellers' satisfaction.

Grounding from the data mining principle, FEAST will recommend the interest place to visit, place to stay and place to eat based on the user preferences. By selecting either one of the options from the FUN or EAT or STAY icon, a personalized list of places and addresses will be dynamically displayed based on the user's preferences. The list and details of the places are pulled from the server hosted on the web, which stores a collection of data mined from many related tourism websites and databases. All the functions on the main screen can also be accessed from the navigation drawer with additional functions such as "Casual Search for Places" and "Update Saved Preferences". The

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adjacent screenshot is triggered when "Update Saved Preferences" is clicked. Apart from allowing the user to customize his preferences, the user will also be able to edit his profile.

Although FEAST has been developed, its potential and impact still unexplored. The extent to which the prototype is useful in improving service quality leading to elevated traveller's satisfaction is yet to be investigated. This paper focuses on the usability study of a mobile recommendation system, known as FEAST, which is an acronym of Fun, Eat, Stay. It attempts to introduce a framework to evaluate and measure the usability of the system based on human computer interaction guidelines. From the findings, FEAST can provide a new insight of interesting place among the new comer to Johor. Meanwhile, improvement need to be done to provide more accurate recommendation and more user friendliness of the FEAST.

Section two review on the existing methods to evaluate mobile applications. A methodology to conduct the usability study of mobile application is presented in Section three. The results of the analysis are presented in Section Four. It showcases the functional analysis of the FEAST as well as user experiences analysis. Section five presents the theoretical implication and practical implication of the study. It elaborates the consideration when developing a mobile recommendation system. This paper is concluded in Section 6.

2. USABILITY STUDY OF FEAST

The methodology for usability testing in this research is adapted from well-known experts who authored the "Handbook of Usability Testing (Second Edition)" (Rubin et al. 2008) and coupled with a combination of approaches as reported in the section 2. In the following section, we elaborate on the usability methodology in evaluating FEAST. The outline of the usability study is organized according to the following flow sequence: the purpose of the study, research questions, test design, data collection and evaluation measurement.

In this research, users were asked to complete predefined tasks using results generated from various online sources and the results generated from FEAST. Surveys were

conducted on the users' subjective views of the FEAST through a series of questions. The questions were based on the constructs tailored for mobile application usability (Hoehle & Venkatesh 2015), in which it touched on the construct at the application design, application utility, user interface output and structure, continued intention to use and mobile application loyalty. In addition, the questions covered the criteria to capture user experience in using the recommendation system (Polatidis & Georgiadis 2014) in terms of perceived accuracy, familiarity and novelty, and attractiveness.

3. FINDING FROM THE USABILITY STUDY

To provide a short demographic of the 33 participants in this test group, 64% of them were male and the rest were females. All the participants were within the age group of 18-29 years old with experience of using Android. 85% of participants have less than 7 years of exposure to using smartphones. Only one participant had ever travelled to Johor. Meanwhile, all the participants have travelled at least once outside their hometown for the past few years. 37% of the participants travelled 1-2 times; 27% of the participants travelled 3-4 times and 36% of the participants travelled more than five times.

3.1 Usability of FEAST

Based on the functionalities testing, 30% of the participants were not able to register with the FEAST partly due to malfunction of the app and technical difficulties of their smart phone. Malfunction of the app occurs when it halts and crashes suddenly with or without error messages. Technical errors refer to different external hardware issues that prevented the app from being used. Examples of external events include loss of mobile data connectivity, loss of Wi-Fi connectivity and insufficient memory storage. Averagely, 84% of the participants could access the recommendation results from the FEAST.

Fig. 1 and 2 present the relevance of recommendation results among the participants. As high as 52% of the participants claimed that the FEAST can provide fun relevant recommendations to them; 33% remained neutral with no opinions and 15% of

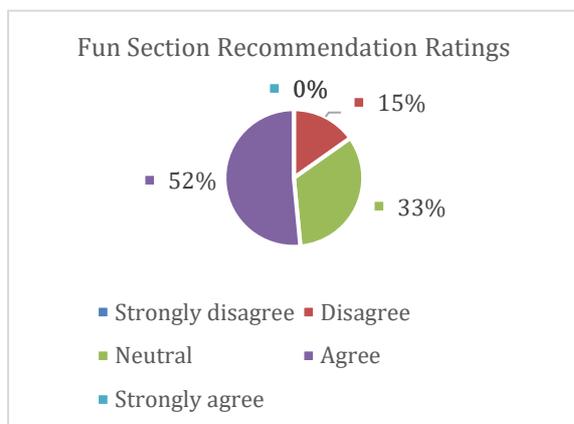the participants disagreed on the recommendation results.

Fig. 1. User satisfaction of recommendation results for fun information provided by FEAST.
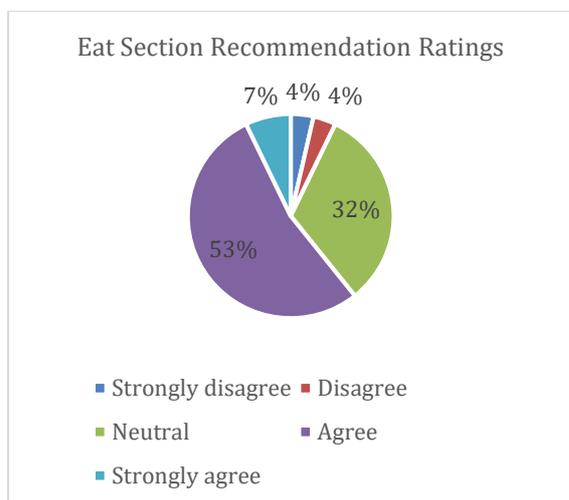

Fig. 2. User satisfaction of recommendation results for eat information provided by FEAST.

In total, 70% of the participants agreed and found the app to be useful. While 27% had no opinions on it. However, a small percentage was not in favour of it.

It is evident that the app requires much improvement in many aspects with 30% of the participants projecting a negative sentiment and not finding the app useful. Feedback on improvement were collected and majority suggested that the app should fine-tune the recommendations. Generally, the proposition by the participants focused on enhancement of the search to provide a better personalized customization, more intuitive and structured layout and offline support.

3.2 Quality of Experience

Apart from conducting functionality study and user acceptance test, user experience is incorporated as part of the qualifier in usability study. For mobile application, multi-sensorial design is playing a vital role in user experience, impacting end-user value. Therefore, it should be taken into consideration when evaluating the user experience result. From the result collected, users' behaviour is modelled to reflect the quality of user experience as shown in Figure. 3 and Figure 4.

The popular tourism activities available in the destination have been identified and categorized under several classifications to contrast and compare users' preferences. For the pre-test, the users showed a consistency in their choices, growing at a steady rate for all the activities depicted in Fig. 3. However, the post-test projects a different result showing a positive spike for entertainment-based activities. The drastic shift shows an increase in interests and excitement when using the app which is evident with the growing volume of hits.
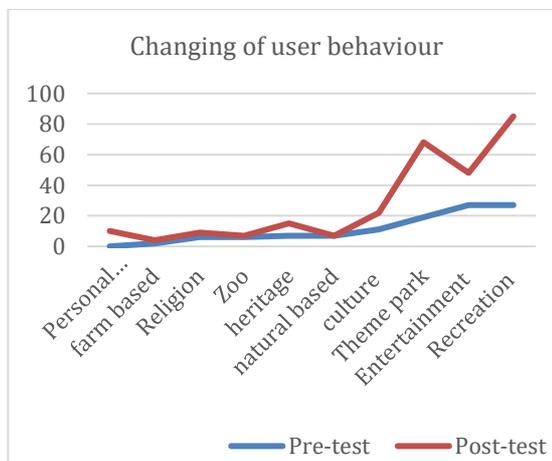

Fig. 3. Graph presents the user behaviour prior and post usage of FEAST.

From the Fig. 3, a total number of activist has increase from 112 times to 154 times after the usage of FEAST. Meanwhile, there is a change of behaviour in which visiting to zoo has drop significantly from 6 times to one times; natural based tourism has dropped from 7 times to zero time after the adoption of FEAST. On the other hand, there is a increment on visiting theme park from 19 times to 49 times; recreation from 27 times to 58 times; personal

development (10 times). Altogether, they are 43 places have been identified by the participants prior using FEAST. On the other hand, 29 places have been identified upon the usage of FEAST. Although the number of selection is reduced, there is a significant jump on certain places. Hence, we can conclude that the FEAST is able to form a cluster among the participants.
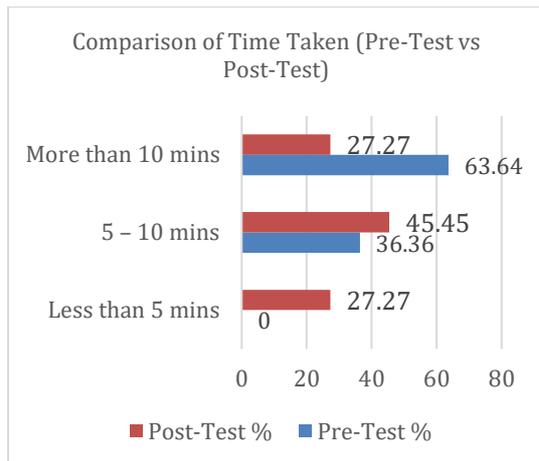

Fig. 4. Comparison of Time Taken (Pre-Test vs Post-Test).

Fig. 4 shows the comparison of time taken to plan for a 2-day trip in Johor using other methods versus the FEAST app. Approximately 27% of the participants managed to complete the task within 5 minutes by using the app while this could not be achieved through other methods. Majority of the users took 5 to 10 minutes to achieve the intended task with FEAST as compared to other methods, which took more than 10 minutes.

The app does optimize the planning process by adapting the content to suit the users and elevate users' experience. The ability of the FEAST to recommend tourists attraction spots dynamically is a value-added quality that is important to travellers. Other essential qualities expected are to provide updated, correct and useful touristic information relevant to the travellers. These intrinsic features are vital to encourage greater user adoption.

4. DISCUSSION

4.1. Theoretical implication

As stated in section 2.0, several factors hailed as the crux of usability should be present to ensure that all dimensions of usability are fulfilled. Context awareness refers to the agility of the system to adapt or react to changes in the surrounding environment (Bisgaard et al. 2004). Contextual factors such as time, location, weather and user's emotional state normally obtained from environmental sensor should be taken into consideration. Based on these contextual factors, the system should be able to render relevant services and information specific to the user (Bisgaard et al. 2004).

Privacy- It is an issue especially when the app tracks the location of the user automatically or the app captures sensitive information from the user. It is important to identify sensitive information and keep it secure from intruders. Therefore, there is a need to strike a balance between context awareness and privacy.

Perceived accuracy- It refers to the performance of the recommender system and the extent to which it could match the results of user's preferences (Pu & Chen 2011). When the user's expectations and the results generated are almost identical, it can be deduced that the algorithm used is accurate.

Familiarity and novelty- Possess the characteristic that are slightly like other apps to allow the user to get accustom to the app with ease and at the same time be distinguishable. It should provide new selections based on the recommendation results while preserving the original choice.

4.2. Practical implication

The usability tests conducted had yielded positive results. The FEAST managed to draw users' interests and provide new tourism spots relevant to the users' preference. It has proven to optimize itinerary planning and made information easily accessible to travellers at the finger tips. This app is useful not only for travellers but for the locals as well to provide suggestions on eateries and places of interests. With proper adoption and by establishing a strong app presence, FEAST will be able to uplift the tourism industry in Johor bringing tourism products and services through a single platform. The ubiquitous nature of mobile devices makes it the best choice to reach out to travellers from all walks of life.

5. CONCLUSION

This paper reports on the usability study of FEAST as a recommendation system. From the analysis of the evaluation conducted, we can infer through shifts in users' behavior that the FEAST is serving its purpose. It eases itinerary planning, maintaining diversification and at the same time reducing time needed to do the planning. Developed with simplicity and minimalist philosophy, the FEAST is easy to use, well focused and able to provide accurate and personalized recommendations. As mobile technology for tourism in Malaysia is still at its infantile stage, this app will be a stepping stone for the tourism industry to move forward and seize the immeasurable opportunities this technology can offer. Usability and user experience are two important criteria in evaluating a mobile application. Lots of usability studies have been conducted to date. We argue that the evaluation of mobile application should diverge into user experience study. In this paper, user changing behaviour and context (e.g. time) are two parameters that we considered on user experience study. How to model and method to design an user experience study for mobile application is worth to further study. An initial idea to adopt agent modelling (WaiShiang et al., 2016; CheeWyai et al., 2015) is worth to further explore.

To conclude, this usability test on Travel Johor Fun, Eat, and Stay (FEAST) has achieved its objectives in determining its usability aspect in terms of app performance and user's preference with respect to the app's personalized recommendation. Additionally, some pitfalls were discovered and benchmark data was collected to help in improving the FEAST. Overall, the FEAST could be a mechanism to drive the growth of the tourism industry in Malaysia, changing the business models along the value chain.

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