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Assessing the Usability of Shazam Mobile App

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Abstract. Like searching for a "needle" in a "haystack", suppose that there is a large set of signals (finite sequences of numbers) fs1; s2; s3; g, and a special signal q that may or may not be in the collection. How can the signals be found in the collection that is similar, or identical to q, and how can this be done quickly? A solution to this question is the basis of the Shazam smart phone app, where a listener captures a short excerpt of a recorded song with the smart phone's microphone, and in a matter of moments the app reports the name of the song and the artist. Here, the "needle" is the excerpt, and the "haystack" is a vast corpus of popular music. The Shazam algorithm is powered by Fourier analysis. This paper presents a report on a usability evaluation of Amazon Shazam app. The researchers present the outcome based on a task-based evaluation that involved 15 users of different level of experience who performed 5 tasks using the Shazam mobile app. Post-test questionnaire was used to capture users' perceptions about the app. The results demonstrate that most of the participants were satisfied with services provided by the app.

INTRODUCTION

When a user hears music playing in the environment and calls up the Shazam service using a mobile phone with a sample of up to 15 seconds of audio obtained from the played music, identification is made on the sample at Shazam server, then the track's title and artist are sent back to the user via SMS text messaging. The information is also made available on a web site, where the user may register and log in with a mobile phone number and password. At the web site, or on a smart phone, the users may view their tagged track list and buy the CD. The users may also download the ring tone corresponding to the tagged track, if it is available. The users may also send a 30-second clip of the song to a friend. Other services, such as purchasing an MP3 download may also become available soon. A variety of similar consumer services has sprung up recently. Music Wave has deployed a similar mobile-phone music identification service on the Spanish mobile carrier Amena using Philips' robust hashing algorithm [2-4].

Using the algorithm from Relatable, Neuros included a sampling feature on their MP3 player which allows a user to collect a 30-second sample from the built-in radio, and then later plug into an online server to identify the music [5, 6]. Audible Magic uses the Muscle Fish algorithm to offer the Clango service for identifying audio streaming from an Internet radio station [7-9].

The Shazam algorithm can be used in many applications besides just music recognition over a mobile phone. Due to its ability to dig deep into noise, music hidden behind a loud voiceover, such as in a radio advert can be identified. On the other hand, the algorithm is also very fast and can be used for copyright monitoring at a search speed of over 1000 times real time, thus enabling a modest server to monitor significantly many media streams. The algorithm is also suitable for content-based cueing and indexing for library and archival uses.

BACKGROUND

Mobile applications, refers to software systems operating on mobile devices. These applications are evolving rapidly and are making the accessibility of ubiquitous information at anytime and anywhere a true reality. For example, many mobile applications have brought Internet services to mobile devices. In the business area, m-commerce (or mobile e-commerce) applications, such as mobile banking and advertising, extend electronic businesses to mobile devices. Customers can check their bank account balances and carry out business transactions through their cell phones [2, 11-13, 22, 24]. In the entertainment industry, mobile users can enjoy watching video or playing interactive games on their mobile devices. Advanced features in mobile applications enable users to carry out a variety of activities

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through their mobile devices. Because the achievement of a high level user satisfaction is critical to the success of mobile applications, usability testing and evaluation is a mandatory process to ensure that a mobile application is practical, effective, and easy to use, especially from a user's perspective [7, 13].

With the emergence and rapid deployment of mobile technologies, a number of additional studies have focused on the usability of mobile devices. Problems caused by the physical restrictions of mobile devices and wireless networks imply that while designing and conducting usability studies for mobile applications, these issues must be carefully examined in order to select an appropriate research methodology and minimize the potential effect of contextual factors on perceived usability when they are not the focus of studies. Mobile usability includes some of the new mobility-related challenges, such as: mobile context, connectivity, small screen size, different display resolutions, and limited processing capability and power, and data entry methods [17-18].

At the same time, mobile device manufacturers have been enforcing their own usability constraints. For example, the Apple iOS Human Interface Guidelines states that the following iOS platform characteristics should be considered during an application development process: interaction with multi-touch screen, displays of different resolutions and dimensions, device orientation changes and gestures such as tap, flick, and pinch. In addition, Apple reviews applications submitted to the App Store based on these characteristics. Furthermore, Google has developed Android user interface guidelines, which guide developers to take into account the following characteristics: touch gestures, size and location of icons and buttons, contextual menus and their responsiveness, simplicity, size, and format of text, and certain aspects of messages. These guidelines also explain how these characteristics should be considered during the development and testing of Android applications [16, 18].

In addition to storytelling and media specificity, building a long-term bond with consumers is an important spearhead within a company's strategy. This can be done by looking at usability as a quality criterion and as a customer loyalty enabler. Before telling about something, the function and place it holds in the life of the user must be checked. The usability of a cross media product means the extent to which users in a particular user environment can use a product to reach their goal. By keeping an account on this, the drive and aim is directed at consumer effectiveness, efficiency and satisfaction. A few typical terms that relate or refer to usability are as follows [10, 14, 15, 21, 23, 25]: Effectiveness: The extent to which the consumer is able to achieve his goals. Efficiency: The effort the consumer has to make to perform the operation. Satisfaction: It is a matter of someone having a feeling of good experience in the platform and that he or she does not have any problems or issues with it.

An example of a platform that integrates usability quality is the Shazam app. Shazam is an app that helps users to find certain songs they do not recognize. When a user records a piece of music with the app and Shazam recognizes the song, it lets the user know the name of the song and its artist. An aspect of the usability of this platform implies that it makes reference to, for example, YouTube video, listening to Apple music song, and buying songs on iTunes, easy. The user can easily get to another page or app by simply taping. Shazam also shows the artist's entire album and thus, the user can follow the artist on Shazam to find out more about the artist. Also, the app gives the user, recommendations of songs that are similar to the song they have "shamed". Shazam thus takes into account the effectiveness (finding the song for the user), the efficiency (the user does not have to make much effort to find his song) and the satisfaction of the app (the app only takes a few seconds to recognize the song, therefore the speed and other references are very nice and satisfying to the user). This makes the user happy and to have positive attitude towards the app. [19]

METHOD

This study was carried out at the Universiti Utara Malaysia (UUM). Survey method was used in eliciting information on the usability of the Shazam mobile application. A 10-item questionnaire was given to participants to capture their perceptions about the usability of the application. Fifteen (15) users of Shazam mobile app (who were UUM's students) were recruited for the study, out of which, 27% were studying at Bachelor degree level and 53% at Masters degree level and the remaining 20 % at PhD level. The age of most of the participants ranged between 18 to 29 years (87%) and the other remaining 13% are within the age range of 30 to 39 years. In addition, 47% of participants were male and the other 53% were female. Also, 7% of the participants used the Shazam mobile application weekly, while 13% used it monthly. The remaining 53% used the application sometimes. SPSS software was used for data analysis and data were presented as arithmetic means, and standard deviations. Five common Shazam mobile application's functions were used by participants, these include: 1) create an account and login; 2) discover music; 3) use Shazam in a noise-free place; 4) use Shazam in a noisy place; and 5) explore a favorite music. After using these

functions, the participants were given a 10-item questionnaire to elicit their perceptions on the usability of the application's interface.

RESULTS AND DISCUSSION

Comparing the usability of Shazam app to other similar applications used by the study participants in the past (Questionnaire item 1), the average rating of participants for the app was 4.67 (out of 5.00) with a standard deviation of 0.82. This rating is categorized as: "very high", see Tables 1 and 2. This implies that the usability rating of Shazam when compared with the usability rating of other similar applications used by the study participants in the past is very high. Shazam seems to be better than other apps of the same categories used by participants. In evaluating Shazam apps interface (Questionnaire item 2), the participants' rated the interface 4.80 on the average (out of 5.00) with a standard deviation of 0.41. This rating is categorized as "very high". The users see the app's interface as very highly satisfying and easy to use. In responding to questionnaire item 3: "The menu items were well organized and functions were easy to find", the mean ratings was 4.67 (out of 5.00) (i.e., "very high") with a standard deviation of 0.62. The implication of this rating is that menu items of the Shazam app were perceived as being very highly organized and that the application's functions are also very easy to find.

TABLE 1. Rating of the Shazam Application

Items	No. of Participants	Mean	Std. Deviation	Status
Q1	15	4.67	0.82	Very high
Q2	15	4.80	0.41	Very high
Q3	15	4.67	0.62	Very high
Q4	15	4.60	0.51	Very high
Q5	15	4.47	0.64	Very high
Q6	15	4.40	0.91	Very high
Q7	15	4.40	0.91	Very high
Q8	15	4.13	0.74	High
Q9	15	4.53	0.64	Very high
Q10	15	4.73	0.59	Very high

TABLE 2. Rating Range and Strength

Scale	Strength	Range
1	Very weak	1.00 – 1.79
2	Weak	1.80 – 2.59
3	Neutral	2.60 – 3.39
4	High	3.40 – 4.19
5	Very high	4.20 – 5.00

The participants responded to questionnaire item 4:"I immediately understood the function of each menu item", and their mean rating was 4.60 (out of 5.00) (categorized as a "very high" rating) with a standard deviation of 0.51. Based on their perception, the users of this app highly understood the functions of each menu item. In addition, the participants' perception on the item:"All the functions I expected to find in the menus were present" (questionnaire item 5) was very high. Their mean rating was 4.47 (out of 5.00) with a standard deviation of 0.64. The study users perceive very highly that all the functions they expect to find in the app were all present in the application. Just as in questionnaire item 3, the study participants responded similarly to questionnaire item 6: "The buttons were well organized and easy to find". Their mean rating was 4.40 (out of 5.00) (i.e., "very high") with a standard deviation of 0.91. This implies that on the average, the study participants perceive that the application's buttons were well organized and also very easy to find. In responding to the questionnaire item 7: "I immediately understood the function of each button", the participants' mean rating was 4.40 (out of 5.00) (categorized as "very high") with a standard deviation of 0.91. On the average, the study participants highly perceive that they understood the functions of each button of the app.

For questionnaire item 8: "All of the functions I expected to find on the button bar were present", the study participants mean rating was 4.13 (out of 5.00) with a standard deviation of 0.74. This implies that participants feel

highly that all the functions that they expected to find on the button bar were all present. In addition, with regard to the participants' response to questionnaire item 9: "I found navigating around the Shazam application's screen to be easy and simple", their mean rating was 4.53 (out of 5.00) (i.e., "very high") with a standard deviation of 0.64. The study participants very highly perceive that navigating in the Shazam mobile application's interface is very easy and simple. The participants overall impression about the interface of the application is satisfactory (questionnaire item 10) (i.e., "My overall impression of the Shazam application prototype is satisfactory"). The participants' mean rating for this item was 4.73 (out of 5.00) (categorized as "very high") with a standard deviation of 0.59.

CONCLUSION

With the Shazam smart phone app, a listener can capture a short excerpt of a recorded music with the smart phone's microphone, and in a moment the app reports the title of the song and its artist. Fourier analysis is a key mathematical tool that powers the app. However, usability evaluation of mobile applications is an emerging research area that faces a variety of challenges due to the unique features of mobile devices. This study attempts to evaluate the usability of the interface of the Shazam mobile application as perceived by users. Five common Shazam mobile application's functions were used by participants, these functions are: create an account and login; discover music; use Shazam in a noise-free place; use Shazam in a noisy place; and explore a favorite music. After using these functions, the participants were given a 10-item questionnaire to elicit their perceptions on the usability of the application's interface. Firstly, all study participants performs the study tasks on the application on a mobile device. Afterward, they respond to some questions about the Shazam mobile applications. The result of the study reveals that on the average, the interface of Shazam mobile app is perceived as easy to use, satisfying and usable by the study participants. Users felt comfortable with the use of the application and showed a preference for and a positive disposition and likeability to the use the application.

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