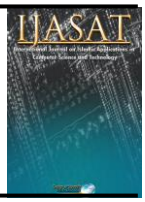

Multi-Languages Hajj Mobile Dictionary, Text and Voice Based

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ABSTRACT

Hajj pilgrimage is the largest gathering in the entire world annually takes place at the middle of the last month of Muslim's calendar. Millions of Muslims - with so many different languages - participate in this event. Usually contemporary dictionaries such as Longman attached pronunciation, images and small clips with the translation. Currently many specialized dictionary designed for specific purpose such as business, engineering and medicine. In this study, mobile dictionary application for Hajj using three different languages is proposed to assist the pilgrim performs their Hajj easily. This study tries also to utilize voice recognition with electronic dictionary designed for Hajj practices to give more flexibility to the electronic Hajj dictionary.

Keywords: **Voice Recognition, Hajj Mobile, Electronic Dictionary, Hajj dictionary.**

1. Introduction

Mobile devices pave way for a new generation of applications that exploit their intrinsic mobility, proximity to the user, and dependence on handheld devices, they create unique challenges for developers (Ocampo et al., 2003). The evolving technology communication technology particularly for handheld devices and wireless devices, improve the quality of mobile device's services. Developers needs to utilized communication technology facilities to communicate with many smart networks, ranging from near-field communication for those low mobile services to high end complex business solutions in order to provide new mobile device applications capable of taken the advantages of the technological facilities and provides end-users needs.

Hajj (pilgrimage) is the fifth pillar of Islam that must be carried out at least once in lifetime by every able-bodied Muslim. It is the largest annual convention of Faith in the world that requires traveling to Mecca. Hajj is performed based on predetermined dates, times, and places. It is a demonstration of the solidarity of the Muslim people, and their submission to Allah (Hameed, 2010). Over a millions and half of the one and half billion Muslims perform Hajj 'pilgrimage' annually. The Hajj Pilgrimage management utilizes a lot wireless communication technology and other wireless technology for crowd control, Therefore, developers can help to develop any mobile services that could utilizes the communication technology in order ease the work of Hajj Pilgrims management and help pilgrims to perform their hajj better. Besides that, pilgrims have not get any benefits from their own mobile devices to facilitate their practicing (Hafizuddin, et al., 2010).

This study discusses utilizing mobile device technologies such as voice recognition to introduce directory of pilgrimage's practices to the pilgrim. The proposed system is tries to develop an electronic dictionary for mobile devices and smart phones to illustrate pilgrimage practices using rich media to minimize the mistakes of practicing and the need for asking experts. The part, is covered in this study, discusses voice input to electronic Hajj dictionary.

2. Overview on Mobile Dictionary Applications

The time and information availability may lead paper-based and static dictionary to disappear and the way in which information published and formed have been changed and dynamically updated (Wehrli, et al., 2009). Perera, (2005) describe that experiencing electronic dictionary in terms of education and how the electronic dictionary helps students to study English encourages authors utilizing mobile computing in different fields such as Pilgrimage by providing translation of Pilgrimage's practices terminology as well as guidance and educational stuff that might be comprised rich multimedia content. It is almost by default; dictionary exists in every mobile, so it can be utilized in education (Perera, 2005). It is almost no future for printed version of dictionary.

Currently, there are around three types of electronic dictionary: portable electronic dictionary, DVD-based and internet dictionary. Online dictionary exceeds dictionary's classic work and links users to many related information supported by multimedia (Wehrli, et al., 2009). Besides that, (Wehrli, et al., 2009) revealed that western dictionaries utilize lexicographic platform which minimizes the process of updating dictionary to short period. However; Arabic electronic dictionaries are poorly designed and did not utilize technology effectively (Liang, et al., 2005). Eventually; dictionary installed in mobile devices or accessed from mobile devices improve the portability and access from anywhere wirelessly.

Apart, voice recognition is an adaptive technology to use microphone instead of keyboard to help disables or to implement special purpose operation in human computer interaction (Petersen, et al., 2009) (Tsuchiya, et al., 2007). In other hand, voice recognition technology used in mobile devices since early days to provide quick call by using voice tag. Therefore, voice recognition technology currently employed effectively in Smart phone to do other functions rather than quick call. The purpose here to develop mobile application that provides many options for input particularly voice in order to reduce input error as well as provide fast interaction with the user.

3. Voice Recognition Applications

Voice recognition has rapidly utilized within smart phones in order to compensate other input methods; nowadays, people become familiar seeing voice recognition embedded almost in every service within Smart phones from dial up to writing and sending SMS messages. Voice is a new comer to the world of Human computer Interaction and starts to change its principles (Lee & Grice, 2006). Voice recognition technology within mobile devices has been evolved remarkably (Cohen, 2008). Some studies see the advances in wireless communication as among factors of voice recognition expanding in mobile devices (Lee & Grice, 2006). Therefore, voice recognition system has and will be involved almost in every application of mobile devices (Lee, et al., 2009); even it may involve in ecommerce transaction security (Wujian, et al., 2011). For a list of domains that may voice recognition,

application can help is provided in (Lee & Grice, 2006) (Kurschl, et al., 2007). A study done by (Cox, et al., 2008) shows the superiority of voice over usual key-in methods in terms of speed. This speedy motivates utilizing this input method to minimize time to search Hajj practices by pilgrims in pilgrimage time when it is crowd. Actually, the bottom line is there is a potential market for voice recognition application from search to learning (Kumar, et al., 2012).

Even though billions of cell phones have been sold, however; rarely people pay attention to voice recognition as a result of lack of marketing and a reputation of requiring a training to use voice recognition software (Cohen, 2008). Besides that, commercial version of voice recognition dissatisfies users because of poor performance with accents as well as non-attractive user interface (Cohen, 2008).

In addition to above challenges; voice recognition quality remarkably produces diverse performance when non-Latin languages used as input, currently voice recognition software scores unequal performance when different languages are used, which in turn needs voice recognition vendors to develop a new mechanism to automate language identification from the voice (Iso-Sipilä, et al., 2006). In (Cohen, 2008) expected that a killer application such as search may bring a glory to the voice recognition, authors share that and try to employ voice recognition with application that may consider voice input as a necessary requirement such as electronic dictionary due to the truth that many people may memorize how to pronounce a word better than memorizing its spelling.

There is more affective and accurate approach to process voice which is client/server model where client collect voice and forward it to server to process it (Kim, et al., 2012;Bocchieri, et al., 2011). The effectiveness of this approach comes from the truth that: mobile power processing is much less than usual computers therefore the accuracy will be more when the processing takes place in server-side. Second, as a result of a huge support for internet access to mobile devices by mobile network providers, using internet-based mobile application becomes something regular nowadays. Therefore, this study adapts this approach with electronic Hajj dictionary, mainly reasons behind that are the accuracy and save mobile's power.

4. Dictionary System

Mobile devices do not help in matter of space, it is necessary to utilize it wisely. Consequently, the main and important terminologies have been stored in Data-Record in the mobile device. The main data is the Pilgrimage's terminologies in English, Arabic and Malay stored in database records provided by JME that is approximately supported by all modern mobile devices.

The tri-relationship among three tables will minimize the needed space and accelerate searching process that may affect mobile device performance in case takes so long. Besides Data-Record of main terminologies, the developed system stores some multimedia demonstrates Pilgrimage practices, it constitutes of pictures, and small clips. Apart, user interface is simple and interactive whenever user starts typing all possible terminologies displayed directly to minimize time to type and remove the burden to memorize spelling. This dictionary uses the common method of dictionary term lookup to find translation (Collier, et al., 1998); Mobile Hajj tries to be simple as much as possible then advanced techniques such as pivot language have been avoided to reduce developing time and not effect of mobile device performance (Goette, 1998). To add unique features, E-Hajj tries to focus on

pilgrimage practices only and provide useful and interactive information that assist pilgrims to perform Hajj with minimum physical assistant. E-Hajj utilizes voice-recognition technology to accept voice input and display the closest words to the input pronunciation.

Apart, some challenges that need to be overcome such as some mobile devices versions may not support certain language such as Arabic or display it in the text format similar to Latin languages- letters are not connected; while Arabic words need letters to be connected to shape the word. Moreover; voice recognition technologies provide result somehow close to the real pronunciation when it is configured to receive English pronunciation but give less accurate result when is configured to another language rather than English.

This study used the waterfall methodology. This is considering the important part in the development stage of the mobile application. It consists of four generic standard stages as the following: Requirements > Design > Implementation > Verification.

This study implemented the principle of waterfall mythology which has been discussed in (Ping-fang and Jia-li, 2010). We have chosen waterfall model since it is very appropriate for electronic mobile dictionary development. It is used comprehensively for its convenience in schedule and quality control at each completion of stages.

4.1 System Design

In order to design the mobile dictionary JME Mobile application has been used with some related software. During the design of the application, we followed waterfall methodology which discussed earlier. The following figures are the initial application.

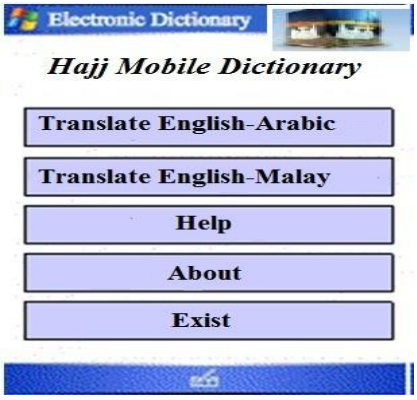

Fig 1. Main interface of the application

Fig. 1 shows the initial screen for the application. It consists of four buttons. Each of them performs different function without affecting the others.

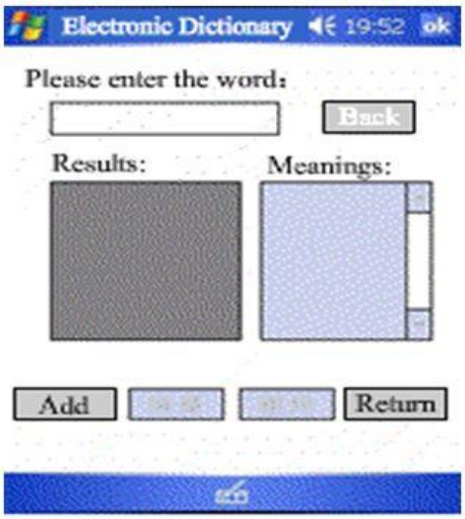

Fig 2. Translation page

Fig. 2 describes the translation page which contains four buttons to insert the words into the system and then look up into the dictionary.

4.2 Proposed Dictionary Voice Recognition

This study tries to utilize new input "voice" with dictionary beside regular method "key-in" to be quickly used by pilgrim. Since voice search application is rapid growing market (Feng, 2010) and electronic dictionary is mainly search-based application. The intended developing electronic dictionary is basically depending on database and voice recognition just as quite similar to voice search application (Feng, 2010) and almost follows the client/server architecture proposed by (Kurschl, et al., 2007).

The voice recognition has been exploited in hajj Dictionary as follow: first, hajj dictionary investigates whether voice recognition software installed and enabled or not; if so, this software will be activated to receive pilgrim's voice. Next, the collected voice forward to Google server responsible to recognize voice. Google' list of result is captured and processed to retrieve terminologies related to hajj; corresponding database entries will be displayed to the pilgrim. The process can be visualized as followed in Fig. 3.

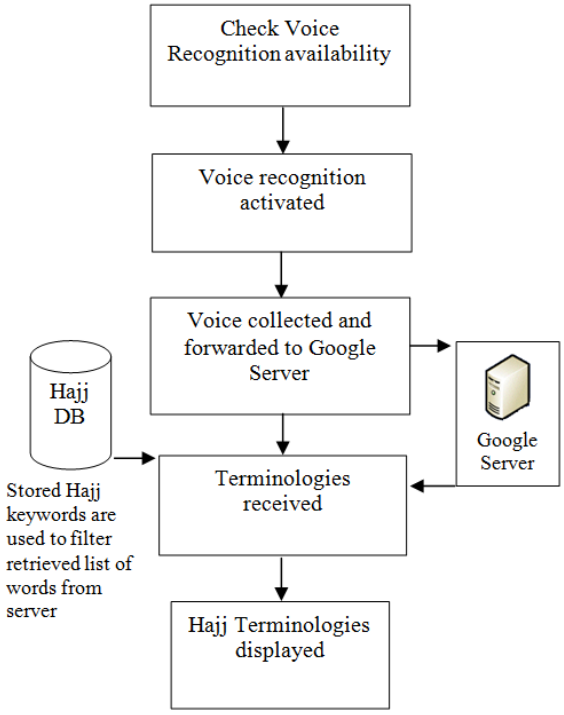

Fig 3. Voice recognition architecture in E-Hajj software

In some studies reported that user interface for voice recognition is a key player for its success and currently does not get the deserved attention; besides that UI for voice recognition is a considerable challenge because of invisibility nature of those application (Lee & Grice, 2006)]. This nature is not applicable here because the developed software is mixture between classic one where pilgrim may key-in words and voice recognition. In another hand, (Lee, et al., 2009) proposed using certain keyword to activate automatically voice recognition over mobile. However, this study simplifies user interface and allows pilgrim to activate voice recognition when he/she needs it only by click a button.

4.3 Development Process

This study involves five stages: First, check voice recognition availability, where voice recognition technology is detected; since some of smart phones are not fully supported voice recognition, detecting ability to use voice as input is necessary before going further. Second, voice recognition activated: voice recognition activated when user press the voice button, the system will recall any installed voice recognition software in order to receive pilgrim's voice. Third, voice collected and forwarded to Google Server, due to high performance and accuracy of server, it is better to send voice to be manipulated there to provide accurate result. Therefore, the proposed system forwards the collect voice to Google voice server to process it. Fourth: Terminologies received, the proposed system receives result from the Google server and before displayed, this list is processed to drop all words that are not related to and accurate spelling and supplementary words are retrieved from Hajj database. Fifth: Hajj Terminologies displayed: the processed list of practices is displayed to the pilgrim and waiting for his/her choice starts:

5. Conclusion

Communication technology has brought remarkable facilitates to so many sectors, and pilgrimage should get the benefit. Mobile dictionary applications have moved to the world of multimedia and merged other services rather than classic translation. Even though millions guidelines booklets printed in different languages and distributed among pilgrims even before they depart their countries, however many pilgrims have lack of knowledge about valid procedures of pilgrimage practices. This study is part of project that utilized mobile devices and voice recognition to introduce such a kind of educational dictionary to help pilgrims to practice Hajj perfectly. This system tries to provide sufficient information supported by images and illustrations to significantly facilitate hajj practicing.

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