Overview of Mobile Help for Performing Hajj Rituals

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Abstract—**Hajj (Pilgrimage) is one of the five main pillars of Islam.AMuslim is obliged to perform it once in a life time if able. The practice includes many rules and procedures (rituals). It is challenging for a pilgrim to remember and perform all of these rituals. IT can be used to simplify and overcome many of the difficulties in performing Hajj rituals. In spite of the countless guidelines and booklets printed in various languages and distributed among pilgrims before after and during the Hajj season, still many pilgrims lack the knowledge of performing the Hajj rituals. This paper covers the overview of mobile Help for Performing Hajj rituals through Mobile dictionary applications.**

Keywords—**Mobile dictionary applications for Pilgrims, Hajj rituals.**

I. INTRODUCTION

As the worldwide usage of mobile phone is rising so as its technology has risen as well. Everyday mobile computing capabilities have been improving and approaching regular computer's capabilities. All types and technology of Mobile phones are now affordable. Mobile phone technology may help and facilitate pilgrim rituals because those handheld devices are available with almost all nowadays pilgrims. Mobile devices will not hold back pilgrims from performing Hajj rituals and will minimize the need for pilgrims to ask for help. Hajj pilgrimage is an annual event performed by millions of Muslims from all over the world with different languages and rarely trained to do pilgrimage's rituals. Many issues may ariseduring this massive gathering regarding how accurate are the rituals performed by pilgrims are. There is great need for having intermediate communication among pilgrims themselves and between them and organizers as well as the guidelines to the various ritual places. Large efforts have been instituted by the government of Saudi Arabia to facilitate pilgrimage and communication using many means such as instruction booklets on how to perform pilgrimage rituals in many languages, multi-language road signs, translators and etc.

Advanced technology are used during the Hajj season to monitor and control pilgrim activities, however more effective means to make the Hajj experience easier and safer are needed. This paper will present a survey of Mobile Help for Performing Hajj Rituals and it is organized as follow: section 2 Existing Hajj Mobile Applications; Section 3 Section 4 Summary of related works Section 4 conclusions and future work

II. EXISTING HAJJ MOBILE APPLICATIONS

Hajj has many available mobile applications. Some of the mobile software applications will be presented in this section.

A) Panduan Umrahbergambar (Androidrich) [1] was developed in Bahasa Malaya language. The application provides text for the ritual rules using a Map for guidance. Figure 1 shows some of the interfaces of the application.
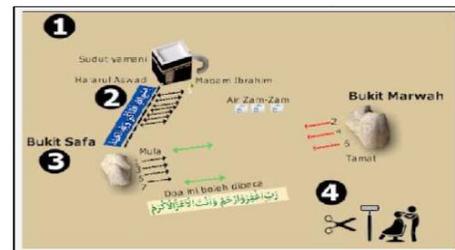

Figure 1: A Guidance Umrah with image

B) Mutawef2[nd] edition a web published in 2014, includes a mobile application to provide and facilitate the pilgrims with information about Hajj. The system uses the J2ME Mobile application and Java MIDP 2.0 [2]. The system also uses 3D graphs to provide the users with the geographical information for Hajj rituals and places.

Figure 2 Mutawef

C) A Hajj guideline system has been published in 2008 by Nokia [3]. This system supports four different languages which are English, Arabic, French and Urdu to provide information about Hajj. Moreover, it contains multimedia features such as flash consisting of some simple movements that synchronized with the narration by voice describing Hajj information. The information inside this system is very efficient for the newer Hajj. This system assists a lot of pilgrims while doing their Hajj. .

Figure 3: Hajj guideline system[3]

D) The Hajj &Umrah Guide (yuumedia)[4] provides audio and video lectures as well as the manual to perform Hajj. It provides a one page summary of the whole performance as a guide, nevertheless, to get the full details the user has to refer to the manual.

Figure 4: Hajj and Umrah Guide [4]

E) The Rituals of Hajj and Umra(Tork) [5] is a mobile guide for both Hajj and Umrahjourneys with multimedia content in addition to the most famous places to visit during the Hajj season. One of the unique features of the application is shown in Figure 5.

Figure 5: The Rituals of Hajj [5]

F) Knowledge-based expert systems (KBES) known as Hajj-QAES to support hajj pilgrims in any stages of hajj (pre-, during,post-hajj). The main goal is to support hajj pilgrims in learning and decision making processes. Can capture experts' knowledge and organize it in a database. The approach requires an inference engine that can draw conclusions or solutions to the given problem based on the facts given by the users. KBES has been used to support queries in many areas or problem domains including power system [6], petrography or study of rock samples [7], andsearch engines [8][9][10][11].

Knowledge of experts retained extensively in the system to solve all possible queries. KBES involves threetypes of hajj: ifrad, tamatuk, and qiran. Each type of hajj. The problems can be furthercategorized based on genders (female, male) and Muslimgroups (mazhab or maslak) including Hanafi, Shafai, Maliki, Hambali, Salafi. Thus KBES for hajj domain allow filtering of queries based on the classification. KBES will be useful to hajj pilgrims in three stages: pre-hajj, during hajj and post-hajj. Such expert system can alsobe benefited during the hajj training (pre-hajj stage) in their respective mother countries. They can use KBES to test their knowledge by asking questions and predict the answers or solutions. Results have shown that the model has reduced searching time.

G)The M–Umrahapplication users of this application are the hajj and Umrah pilgrims [12]. This application provides a grading guide to performing Umrah; from the beginning of preparation at home up until the pilgrimage is completed. After the development of the application on the Android platform, and the first version of the application has been released to the market [12]. The main goal for the system is to minimize pilgrims' need to ask help from others. The challenge is how to provide portable, tri-language, easy to use rich multimedia that illustrates the practices to pilgrims and facilitates their interaction with local people, Arabic native and others around.

M-UmrahUses three languages: Arabic, English and pilgrims native language. English is used because it is the most common spoken language in the world, while Arabic is the language that supposed to be used during pilgrimage practices as well as it is the language of the place and the rituals.

M-Umrah on the Android platform, using Java programming.M-Umrah is consists of this modules: overview, step-by-step Umrah procedure, interactive DUA', interactive check-list function, GPS location tracking.

Figure 4: The Rituals of Hajj

H)Islamic E-health is proposed by [13] which defines and discusses various applications of this concept. The results showed that some Islamic E-health applications focus primarily on spiritual health, followed by Hajj systems for guidance and monitoring and the use of the Electronic Medical records to monitor the blood glucose levels of Muslim patients who fast during the month of Ramadan. For cases of missing Hajj pilgrims during Hajj, HajjLocator framework is proposed by [14] for Hajj Pilgrim tracking based on mobile phone environments as it is reasonably affordable and is extensively used by people.

Figure 5 a: e Tawaf

Figure 5 b: e Tawaf

I) e-Tawafis [15] proposed byIhabAbusafawhich definesand discusses various Hajj activities like Identifying the Hajj and Umrah. It also provided a counter that counts the number of runs wandering around the Kabba automatically and without the need to occupyyourself in any way.

It can also sets your prayer times and place or the whereabouts of your friends on the map and moment by moment sets towardsQiblah. It also guides you to the famous places in Mecca and Medina and displays them on the map.

J) Shaout et al. [16] introducedAL-Hajj app for iOS which is an interactive guide to Hajj, allowing users to walk through the process of the Hajj to develop a better understanding of the obligations, locations, dates and sequence they need to perform. It covers both pre and post hajj activities. It has a very simple User Interface (UI) and current version of the system has not been tested in a real world scenario.

III. Summary Of Relatedworks

Table 1 shows the characteristic and technique two Hajj tasks.Although the given examples shown in table 1 are not extensive do provide a comprehensive guide to the Hajj and Umrah as well as providing location tracking and a quiz to help the users. However, all the mentioned works there is none that approach the problem with semantic technology. Furthermore, there is no study done on the complication and natural language patterns that naturally is used by the user to formulate the question.

Table 1: Summary of related works in the Hajj mobile application

We are currently in the process of developing professional version of Easy Hajj application. In thenear future, we are planning to develop Easy Hajj application which is mobile application for Hajj ritual. Easy Hajj application is an intelligent system able to track Pilgrims current position or their position at any specified time and date. The proposed system is also capable of sending automatically SMS notifications and alerts to pilgrims at the right time and the right place (Arfa, Muzdalefa, or Mena) when they need it. The target users of this application are the Hajj pilgrims. Also by monitoring this information in real-time, authorities can have fully updated information regarding Pilgrims movement. This gives the authorities the option of using this information to locate missing or lost pilgrims. The development of a system designed to tracking and identification of pilgrims in the Holy areas, in Makkah-Saudi Arabia during the Hajj occasion (Pilgrimage). Mobile phone sends UID, latitude, longitude and time stamp frequently or as requested .On Google map there is a server that maps the longitude information and latitude.

In case the internet connection is lost the mobile phone saves the location information in its memory until the connection is restored, then it sends all saved location information and clears this information from memory .The developed system works collaborating with a GPS system.

REFERENCES

[1] https://play.google.com/store/apps/details?id=gnu.umrah.androidvisited 8/2/2015

[2] https://www.**mutawef**.comlast visited 8/2/2015

[3] http://www.mobileground.net/mobile-applications/hajj-and-umrah-free-nokia-applications/ last visited 8/2/2015

[4] https://play.google.com/store/apps/details?id=com.andromo.dev27966. app131759

[5] http://www.mobileground.net/mobile-applications/hajj-andumrah-application-free-nokia-mobile-applications/389

[6] Yuan-Yin Hsu, Chung-Ching Su, "A Rule-Based Expert System forSteady-State Stability Analysis [of Power Systems]", *IEEETransactions on Power Systems*, Vol. 6, Issue 2, May 1991, pp. 771 –777.

[7] Santos, C. P., "Querying Petrographic Descriptions in an IntelligentDatabase System", *IEEE International Conference on ArtificialIntelligence Systems (ICAIS 2002)*, 2002, pp. 18 – 23.

[8] Kienreich, W., Sabol, V., Granitzer, M., Klieber, W., Lux, M., Sarka,W., "A Visual Query Interface for a Very Large Newspaper ArticleRepository", *Proceedings of Sixteenth International Workshop onDatabase and Expert Systems Applications*, 2005, pp. 415 – 419.

[9] Lovic, S. Meiliu Lu, Du Zhang, "Enhancing Search EnginePerformance Using Expert Systems", *IEEE International Conference*on Information Reuse and Integration, 2006, pp. 567 – 572.

[10]] Shao, W. Z., Soon, H. S., "Intelligent Query Mechanism for ExpertSystems", Proceedings of Fourteenth Annual International ComputerSoftware and Expert System Applications Conference COMPSAC90,1990, pp. 599 – 604.

[11] Lopatenko, A., Bertossi, L., "Consistent Query Answering byMinimal-Size Repairs", *17th International Conference on Database*and Expert Systems Applications DEXA'06, 2006, pp. 558 – 562.

[12] https://play.google.com/store/apps/details?id=com.mcrg.hajiumrah&hl=en last visited 8/2/2015

[13] "Islamic E-Health: Definitions, Applications and Challenges", M Househ - Studies in health technology and informatics, 2012.24thInternational Conference of the European Federation for Medical Informatics Quality of Life through Quality of Information –J.Mantas et al. (Eds.), MIE2012 / CD / Short Communications (Poster).

[14] Mantoro, Teddy, et al. "Hajjlocator: A hajj pilgrimage tracking framework in crowded ubiquitous environment." MultimediaComputing and Systems (ICMCS), 2011 International Conference on.IEEE, 2011.

[15] https://play.google.com/store/apps/details?id=com.phonegap.etawaf last visited 8/2/2015

[16] Adnan Shaout and, Khan Shahzeb (2015), "AlHajj – Hajj App for iOS" the International Islamic University Malaysia Engineering Journal (IIUME).

Table 1:
Summary of related works in the Hajj mobile application

No	AUTHOR	Application name	Solution	ADVANTAGES	LIMITATIONS	TECHNOLOGY TYPE
1		PanduanUmrahbergambar.	provides text for the ritual rules using a Map for guidance	Presented a solution for pilgrim tracking.	Not fully implemented on large scale.	
2	Dar Albrmaga company	Mutawef 2nd edition a web published in 2014.	mobile application to provide and facilitate the pilgrims with information about Hajj	• Easy to deal with maps and the possibility of movement and easily browse through the arrow buttons. • ease of download and installation on the device. • The program is compatible with all Java Enabled Mobiles, such as Nokia and Sony Ericson and others.	In Hajj pilgrimage situation where the pilgrims will only be there for maximum of around a month, getting Internet services from ISPs might be troublesome and therefore might results in inability to use the localization service	The system uses the J2ME Mobile application and Java MIDP 2.0
3	Nokia	Hajj guideline system.	This system supports four different languages which are English, Arabic, French and Urdu to provide information about Hajj	• contains multimedia features such as flash • Consisting of some simple movements that synchronized with the narration by voice describing Hajj information. • The information very efficient for the newer Hajj.		
4	yuumedia	The Hajj &Umrah Guide (yuumedia)[4]	provides audio and video lectures as well as the manual to perform Hajj	provides a one page summary of the whole performance as a guide, nevertheless	To get the full details the user has to refer to the manual..	
5		The Rituals of Hajj and Umra(Tork) [5] journeys	is a mobile guide for both Hajj and Umrah	support multimedia The most famous places to visit during the Hajj season.		
6	ShahidaSulaimanetal	Knowledge-based expert systems (KBES) known as Hajj-QAES[6]	Knowledge-based approach that can capture possible problems and solutions from the experts in a prototype known as hajj Q&A expert system or	Support hajj pilgrims in learning and decision making processes. The approach requires an inference engine that can		

			Hajj-QAES. It provides an interface that enables experts to capture both simple and advanced questions to support hajj pilgrims in any stages of hajj (pre-, during,post-hajj)	draw conclusions or solutions to the given problem based on the facts given by the users. Can learn different scenarios in hajj mainly Its rituals by providing different questions and learn from the possible answers inferred by the inference engine. Suitable in pre-hajj stage to allowpilgrims learning by examples of scenarios that involve decision making such as paying fine or dam.		
7	Prof. Madya Muhammad RafieHjMohd Arshad (Ketua) et al	M-Umrah[12]	This application provides a grading guide to performing Umrah; from the beginning of preparation at home up until the pilgrimage is completed	application can be accessed free of charge by All interested users of phones, such as HTC, Sony and Samsung via download in the *Play Store* market. Android	this M-Umrah is available in the just two languages Malay and English	M-Umrah on the Android platform, using Java programming
8	Shaout et al98)	Interactive guide to Hajj.	Gives a process to better understand the Hajj ritualsand obligations.		The system has not been tested in a real world scenario	
9	E twaf	IhabAbusafa	eTawaf is[14] proposed by IhabAbusafawhich definesand discusses various Hajj activity like Identify the Hajj and Umrah and a letter counter. It can also Sets your prayer times andyour place.	seeking automatically and without the need to occupy yourself in any way		*1) Android Apps*
10	Shaout et al	Interactive guide to Hajj.	. The idea of AlHajj is to have a more interactive guide to Hajj, like an interactive map allowing users to walk through the process of the hajj to develop a better understanding of the	Gives a process to better understand the Hajj ritualsand obligations	The system has not been tested in a real world scenario	Applications on Mobile Phones