An analytical study of mobile applications for Hajj and Umrah services

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ABSTRACT

Millions of Muslims come to Makkah in Saudi Arabia annually to perform Hajj, an Islamic pilgrimage ritual. Many government, private companies, and individuals provide various services and facilities to overcome difficulties that may be encountered by pilgrims. Currently, technology has gained increasing attention as a major means to provide services. In particular, mobile applications (apps) are contemporary technologies used provide various services. Several organizations and individuals developed a number of Islamic apps that can be used on smart mobile devices to assist pilgrims to comfortably perform their Islamic rituals. This paper presents an analytical study of Hajj-related mobile apps offered by Google Play. The collected apps are analyzed using four main criteria, namely, services offered, languages supported, installation rates, and repetition of services and names of the app. The "Hajj ritual" service is found in 68.7% of the target apps, with English as the main language (51.7%). Apps supporting live video services are the most downloaded, with frequency exceeding one million times. Results also reveal a number of repetitive apps in terms of application names and services; for example, 12 apps use the same label "Hajj Guide," and 11 application versions issued by the same publisher are found. Finally, a case study is performed to rate the quality of 10 apps selected based on five basic criteria, namely, engagement, functionality, aesthetics, information, and subjective quality. "Mutawef" and "Manasikana" apps have achieved the highest average scores, with 2.69 and 2.62 out of 3 acceptance rates, respectively.

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1. Introduction

In Islam, all Muslims worldwide are requested to perform Hajj once in their lifetime as long as they have the capability to do so. Hajj is a ritual journey to Makkah and considered the fifth essential pillar in Islam. This ritual is conducted on the 12th month of the lunar Islamic calendar, namely, "Dhul Hijjah." Hajj includes many rites, which must be performed according to the sequence of events. The rituals start by making intentions and wearing Ihram at Miqats before arriving in Makkah. Pilgrims then wait for the eighth day of Dhul Hijjah to move to Mina. On the ninth day of Dhul Hijjah, all pilgrims proceed to Arafat and stay until sunset before moving to Muzdalifah. Throwing of stones is performed in Al-Jamarat the 10th to 13th days of Dhul Hijjah. Finally, Hajj ends by performing farewell circling (Tawaf al-Wadaa) around the holy house (Ka'bah) and leaving Makkah. During this holy journey, many rituals must be performed in different places at a specific time. Fig. 1 shows a map of places where the Hajj rituals should be performed.

Many pilgrims also aim to visit Al-Madinah (the city of the prophet Mohammed, peace be upon him) before or after performing Hajj. The Umrah, another ritual related to Hajj, can be performed anytime through the year; however, many pilgrims perform this ritual directly before Hajj.

Many services, such as guidance, awareness, transportation, and accommodation, are required during Hajj and Umrah seasons because of the huge number of pilgrims and the diversity of rituals that they have to perform. Government and private agencies and individuals compete to provide services in different ways. Every year, new services are developed by exploiting advances in technologies and service industries.

One of the modern technologies evolving is software applications, commonly known as "apps," for mobile devices. Hundreds of apps are available online on iPhone and Android platforms to help people who are planning to perform Hajj or Umrah. These apps should be studied and evaluated using specific criteria to maximize their benefits. However, different criteria of Islamic apps

have been rarely investigated and are thus the focus of the present research.

This paper is organized into two major parts. In the first part, all apps designed for Hajj and Umrah services and published by "Google Play," are surveyed and analyzed. In the second part, the criteria of 10 apps selected are evaluated using a recently developed method, namely, mobile app rating scale (MARS) [15].

The rest of this paper is structured as follows. Section 2 discusses previous related works. Section 3 presents the proposed methodology. Section 4 provides an analysis and comparison of apps dedicated for Hajj and Umrah. Section 5 displays the results of the assessment of the apps. Section 6 concludes the paper.

2. Literature review

Scholars have designed and evaluated a number of mobile applications. Delikostidis et al [26] study the usability of mobile applications in virtual environments according to some criteria, such as efficiency and effectiveness of task completion, number of errors made by the users, and satisfaction while using the application. Moumane et al [27] performed an empirical study using a set of measures to evaluate the usability of mobile applications running on different mobile operating systems. A previous study by Harleen et al [28] elucidated key characteristics that define mobile applications to facilitate the delivery of exceptional, valuable, and user-friendly mobile apps that satisfy the requirements of users.

A systematic literature review was conducted by Méndez et al [30] to identify and accumulate evidence regarding automated testing of mobile applications. Usability is measured in terms of three attributes, namely, effectiveness, efficiency, and satisfaction; as such, other attributes, such as cognitive load, may be disregarded. To address the limitations of existing usability models when applied to mobile devices, Rachel et al [31] proposed a usability model, namely, people at the center of mobile application development.
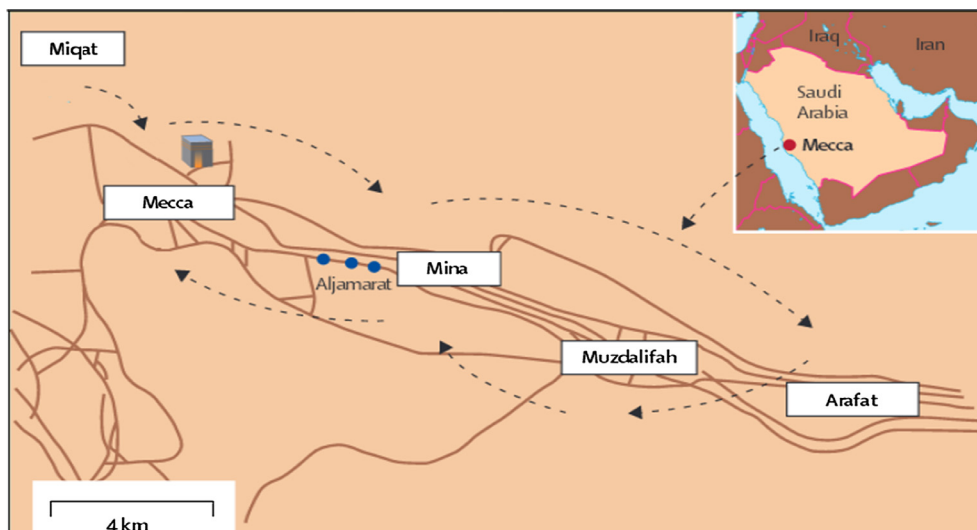

Fig. 1. Hajj journey [Ahmed, 06].

Scholars also reviewed mobile applications for a specific field. Various mobile applications have been developed for health services, such as cardiology [24], heart failure symptoms [25], and diabetes [35]. Another study conducted by Boudreaux et al [29] where seven strategies for evaluating and selecting health-related applications are proposed.

Mobile applications are also used in education, particularly in language learning [38,39], m-learning [41,42], and use of smartphone applications by undergraduate students [40]. These applications are also used to support children diagnosed with autism spectrum disorders to enhance their abilities to understand, interact, and communicate with other people by using the Arabic language [34].

Studies investigated mobile applications for tourism [32,33] and for religious and spiritual services [36,37]. However, no study has reviewed mobile applications for pilgrimage.

Some researchers developed mobile applications for different Hajj and Umrah services. A number of master theses were conducted to build mobile applications to guide Malaysian pilgrims [1,11–14]. In another MSc thesis by Mayada [9], augmented reality was proposed to guide pilgrims. Ahmed et al [2,3] developed a mobile applications to help pilgrims read Hajj and Umrah prayers and understand their meanings by translating them into the language of the pilgrims. Akhlaq et al [4] proposed a framework that serves as a crowd-sourcing platform to define the requirements of pilgrims for services. The proposed framework uses mobile sensory data to define the context of the users. This framework was used to develop a mobile application for many spatio-temporal services. Also, a mobile application was proposed in [5] to serve as a dictionary for pilgrims who speak the Malay language. This application can translate among languages, namely, Malay, Arabic, and English.

In another study, Aladdein and Qasem [6] proposed the use of a mobile phone as a tracking device. This strategy can be used by the guide (Mutawwif) of a group of pilgrims to recognize their movements and determine their location. Fathi and Christian [7] developed a dynamic signage system implemented as a mobile application to inform pilgrims about the crowd status around the Holy Ka'bah. This system can also be used as an automatic counter for the number of Tawaf rounds. Hasimah [8] proposed another mobile application that can be used to guide pilgrims when performing Hajj and Umrah services. The application also functions as location tracker and Tawaf counter. Location identification service for Hajj was proposed by Mohamed et al [10]. This mobile application service was developed to collect information about the location of pilgrims to identify and track them.

A recent study by Abdelazeez and Shaout [21] developed a mobile translation application to facilitate the communications between pilgrimages. This application is available in many languages and employs text and voice recognition technologies to assist pilgrims in finding and displaying the translation of the target words. Shaout and Khan [22] introduced the "Al-Hajj" mobile application to allow pilgrims to understand Hajj-related activities. The supported application exhibits four interactive features, namely, checklist, map, contact list, and motivational messages. The possibility of using smartphone apps to conduct surveys is studied by Alqahtani et al [23]. The study focused on collecting relevant data and information during mass gatherings, which play an important role in improving public health by reinforcing knowledge associated with disease prevention.

Based on this literature review, no study has evaluated and analyzed mobile applications for Hajj and Umrah services. Hence, this study is of considerable importance.

3. Methodology

The research methodology used in this study consists of two parts as illustrated in Fig. 2. The first part presents a review of the properties of the Google Play apps. This part starts by reviewing the literature about the apps that are directed to Hajj and
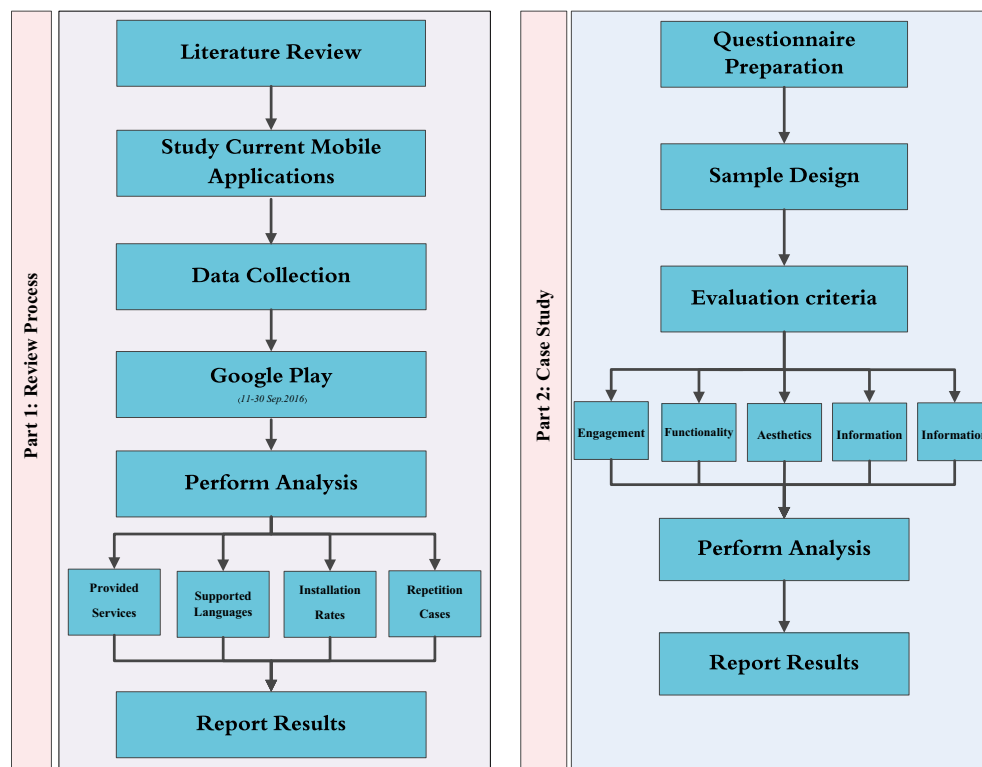

Fig. 2. Research methodology.

Umrah rituals. Then, the apps that include the word "Hajj" in the title or description of the apps are studied during the period September 9–30, 2016. Afterward, data collection is built based on the app features where each app has its own record, including access date, app names, supported services and languages, publisher name, the frequency of installation, and the reference that offered the apps. After the data collection, a statistical analysis is performed on four main criteria, namely, services provided, languages supported, installation rates, and repetition cases. Finally, an analysis study of the collected app records is performed, and the results are reported.

The second part presents a case study for ten apps selected according to particular criteria. A questionnaire based on mobile app rating scale [16] evaluation criteria is prepared and sent to a number of contributors. The contributors who participated in this study have different experiences, backgrounds, and educational levels, thus enriching this evaluation study. Then, the questionnaire data are collected to perform a statistical analysis. Finally, the achieved results are reported.

4. Hajj and Umrah mobile apps

A survey was conducted, during Hajj season (2016), for all apps supported by Google Play during the period September 9–30, 2016. The number of apps covered in this survey was 246, and the observed apps reached 51 services. Table 1 displays the various services provided by the apps targeted in this study and the number of apps that share the same service.

4.1. Offered mobile application services

The results show that the "Hajj ritual" service has the largest portion compared with other services provided by the apps where the "Hajj ritual" service is found in 68.7% of targeted apps, followed by "Umrah ritual" and "supplications" with 47.5% and 32.5%, respectively. Moreover, "funeral provisions," "Hajj portal," "statistics," and "crowd status" have the lowest portion of 0.4% for each. Each mobile application can contain one or more services, up to 23 services as found in the "Mutawef" apps. Fig. 3 shows the relationship between the numbers of apps that share a specific service.

4.2. Languages supported by mobile applications

The studied apps support 24 languages in total, covering the languages used by most of the Muslims around the world. In Fig. 4, more than 51.7% of the apps support the English language. Most of the apps support a single language. The results show that 87.4% of apps support only one language, 7.3% of apps support two languages, and 5.3% of apps support three to sixteen languages. The observed apps, the number of services supported, and languages supported are indicated in Appendix A, Table A.1. (Note that the keyword "multi" in the languages column means supporting more than two languages.)

4.3. Installation rates of mobile applications

A good indicator of the usability of a mobile application is the number of downloads, which is mainly due to providing a variety of services and languages. Fig. 5 shows the number of apps categorized by the number of downloads. This figure shows that most apps were downloaded between 10,000 and 50,000 times. We found that the least downloaded apps are non-free apps, such as the "Hajj player I URDU-INDIA" app.

Moreover, the results show that apps supporting live video services are the most preferred by users. The application "Watch Live Makkah 24 Hours HD," which supports live video services, has been downloaded for over one million times. Furthermore, apps supporting images and wallpaper services are widely used and downloaded by over 100,000 times.

4.4. Repetitive apps

The results show that a number of apps that provide the same services and emerge from the same publisher are presented in Table 2. In addition, some apps have the same name (i.e., exact names) as depicted in Fig. 6. The phrase "Hajj Guide" is the most frequent application name used, reaching 12 times with different publishers and supported services. We consider that the matched phrases, such as "Hajj and Umrah," "Hajj o Umrah," and "Hajj & Umrah," are different phrases.

Table 1
Mobile application services.

Abbr.	Service Name	No of Apps s	Abbr.	Service Name	No of Apps s	Abbr.	Service Name	No of Apps s
S1	Hajj ritual	169	S19	Compass	13	S37	Hajj program and scheduling	5
S2	Umrah ritual	117	S20	Do and don't	11	S38	Dictionary	5
S3	Supplications	80	S21	3D	11	S39	Tasbeeh counter	4
S4	Photos and footage/diagrams/wallpapers	60	S22	Religious or regular tips	10	S40	Hajj/Umrah handbook	4
S5	Maps	59	S23	Tawaf counter	10	S41	Audio tutorial	4
S6	Visit Al-Madina	33	S24	Temperature and weather	10	S42	Accommodation locator	3
S7	Prayer schedule & timing	26	S25	Lost & found services	10	S43	Hajj or Islamic History	3
S8	Video tutorial/ TV episode	25	S26	Communicate with the campaign	10	S44	Traffic conditions	3
S9	Places to visit/ services	24	S27	Messenger & SMS	9	S45	Hajj tour	3
S10	Q & A/ Fatwa	23	S28	Hajj news	9	S46	Track Hajj progress	2
S11	Information on Hajj (phone numbers)	21	S29	Complaint services	7	S47	Information about Tawafa institutions	2
S12	Audio supplications	19	S30	Hajj and Umrah agency services	7	S48	Funeral Provisions	1
S13	GIS/Bluetooth -based guidance	17	S31	Health services & information	7	S49	Hajj portal (links)	1
S14	Hajj tweets, social media	17	S32	Hajj in Quran	6	S50	Statistics	1
S15	Travel tips and checklist	15	S33	Currency conversion	6	S51	Crowd status	1
S16	Emergency services	15	S34	Hajj in Hadith	5			
S17	Complete Quran	14	S35	Translation and text to speech	5			
S18	Live video	14	S36	Photo editor/ frames	5			

4.5. Observation notes

In preparing this study for the apps offered in the Google store, we found a number of apps that are no longer available in the store during Hajj season 2016 (Table 3) despite some of these apps, such as "Mecca Hajj live wallpaper" app, having a high application download frequency. We found that some of the missed apps contain special and interesting modern services, such as "augmented reality." "Augmented reality" is not available in all studied apps. Moreover, the study relived a weakness in presenting interactive features, such as virtual communicating system (e.g., fatwa chatting), pilgrim crowd management, and real-time map updating.
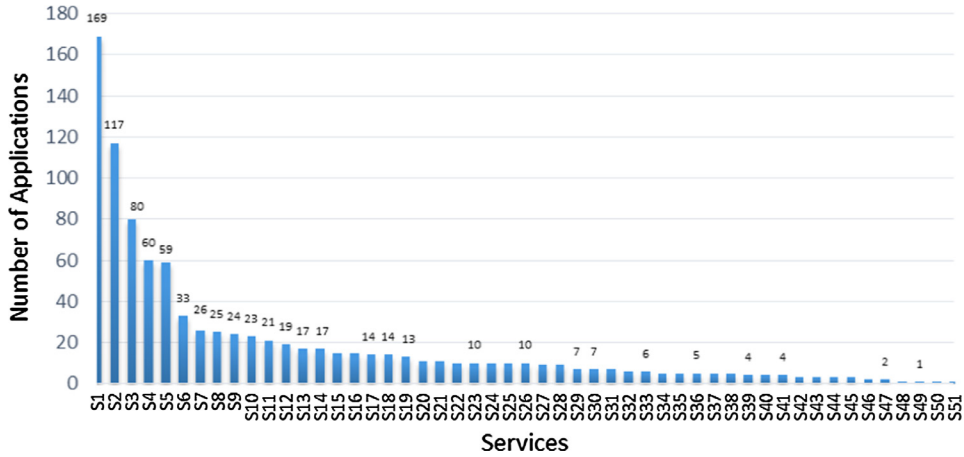

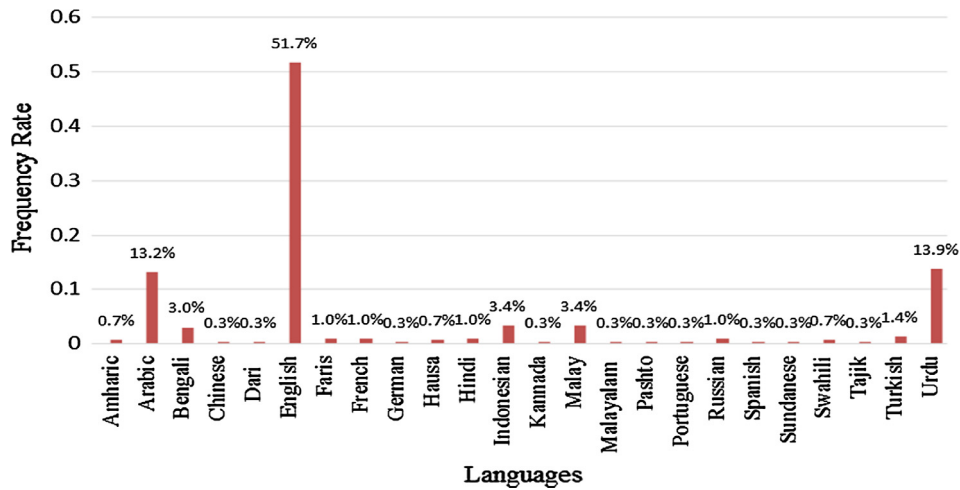Fig. 3. The number of apps providing a specific service.

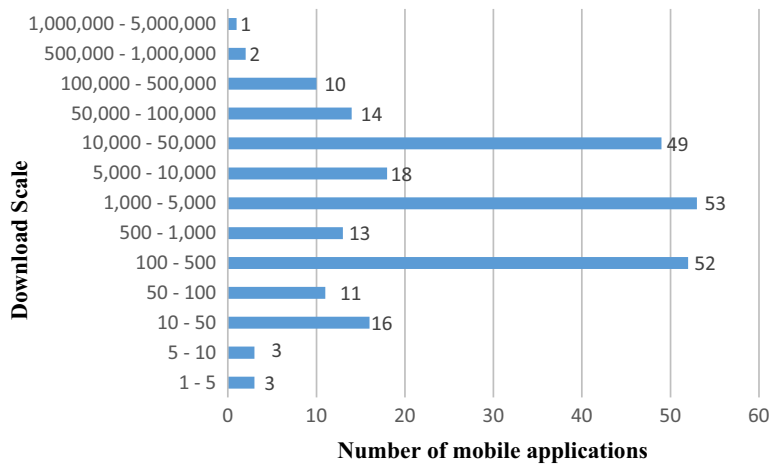Fig. 4. Percentage rates of the supported languages in all apps.

Fig. 5. The number of apps for each download scale.

Table 2
Classification of apps according to the publishers and supported services.

Similar Apps	Publisher	Number of supported languages	Number of services	Number of versions
Umrah Selfie Frames	AppGenie202	1	1	2
Hajj Selfie Frames	AppGenie202	1	1	2
Kaaba Wallpapers	CreativeOne	1	1	2
Mecca Hajj Live Wallpaper	CreativeOne	1	1	2
Hajj step by step	islaamlight	11	1	11
الحج خطوة خطوة	islaamlight	11	1	11
朝覲一步一步地	islaamlight	11	1	11
ধাপেধাপেহজ্জ	islaamlight	11	1	11
حج مرحلة با مرحلة	islaamlight	11	1	11
Хаджшагзашагом	islaamlight	11	1	11
Le Pèlerinage pas à pas	islaamlight	11	1	11
ADIM ADIM HAC	islaamlight	11	1	11
Hajji DakiDaki	islaamlight	11	1	11
Haji langkah demi langkah	islaamlight	11	1	11
HIJA HATUA KWA HATUA	islaamlight	11	1	11
eHajj	Mizan Applications	1	14–17	2
eHajj Plus	Mizan Applications	1	14–17	2
Virtual Hajj & Umrah Guide 3D	Special Android Applications	1	6–7	6
Virtual Hajj Guide and Umrah	Special Android Applications	1	6–7	6
Virtual Umrah Guide Pro	Special Android Applications	1	6–7	6
VR Hajj Umrah Guide Pro	Special Android Applications	1	6–7	6
VR Umrah Guide Pro	Special Android Applications	1	6–7	6
VR Hajj Umrah Guide Free	Special Android Applications	1	6–7	6
Hajj player I ENGLISH	YUSUF YİĞİTALP	5	4	5
Hajj player I MELAYU	YUSUF YİĞİTALP	5	4	5
Hajj player I ARABIC	YUSUF YİĞİTALP	5	4	5
Hajj player I URDU-INDIA	YUSUF YİĞİTALP	5	4	5

Fig. 6. The frequent of the mobile application names.

Another important missed service is that no app can offer services to blind or low-vision users.

5. Case study: assessment of Hajj mobile apps

This section is directed to study and to evaluate some of the surveyed apps. A questionnaire is prepared to collect data from users for the selected apps. The criteria for selecting particular apps are discussed in the following subsection.

5.1. Mobile application selection criteria

Ten apps were selected as the case study. We selected the apps that fit the two criteria as follows:

- Providing at least two services,

- Published by governmental or private organizations; i.e., we exclude apps published by individuals and non-organizational agencies.

The selected apps and their relative information are presented in Table 4. As can be seen in the table, four out of ten apps published their last updated versions after starting Hajj activities in Hajj season 2016, and two apps published their last updated versions during Hajj season 2015. The apps discussed in this study do not mean that they are the best among other offered apps.

5.2. Questionnaire design and data collection

After we determined the target apps, we prepared a survey to evaluate the quality of the selected apps. A number of methods are designed to evaluate different special purpose apps.

Table 3
Missed apps during Hajj season 2016.

Application Name	Publisher	Supported Language	Download time	No of Services
Aurto ka Hajj umrah in Urdu	Oracle Developers	Urdu	1000–5000	2
Hajj	Genesis Creative Applications	Urdu	500–1000	2
Hajj	Appsspacess	Bengali	100–500	2
Hajj & Umrah	Nanosoft Technologies	English	10,000–50,000	5
Hajj and Umrah	Smart devtech	Arabic	1000–5000	4
Hajj AR App	Mobily	Arabic	10,000–50,000	4
Hajj aur Umrah in Urdu	Oracle Developers	Urdu	10,000–50,000	4
Hajj Guide Urdu	Readers	Urdu	100–500	1
Hajj Guide(হজ্জ্ব গাইড)	Hello Tech	Bengali	5000–10,000	5
Hajj Ka Tariqa	Traditional Apps	Urdu	500–1000	2
Hajj ke 5 Din	On Demand Apps	Urdu	1000–5000	1
Hajj Mini Guide	Euphrates Media	English	10,000–50,000	3
Hajj Umrah - Hajj aur Umrah	On Demand Apps	Urdu	5000–10,000	2
Mecca Hajj Live Wallpaper	Peaksel	English	500,000–1,000,000	1
ВСЕ О ХАДЖЕ	Абу Халид Дагестани	Russian	5000–10,000	2
Mecca 3D - A Journey To Islam	Brainseed Factory	English	100,000–500,000	5
Hajj and Umrah Guide 2016	Muslim ELibrary	English	500–1000	4
Hajj Guide - دليل الحج والعمرة	M7com.com	Arabic, English	100–500	4

Table 4
Specifications of the selected apps.

	Application Name	Publisher	Provider	Reviews rate/# of Reviewers	Last Update	Download times
1	Smart Hajj	GIS Technology Innovation Center	Umm Al-Qura University	4.6/270	3/28/2016	10,000–50,000
2	Salam	Hajjnet	Saudi Arabian Ministry of Social Affairs	4.6/11,809	9/15/2016	100,000–500,000
3	Almurshid	Holymakkah	Holy Makkah Municipality	4.2/13	9/20/2015	500–1000
4	Hajj and Umrah	I.T. Department of DawateIslami	Faizan-e-Madina (Global Islamic Center), pakistan	4.8/1626	8/4/2016	50,000–100,000
5	Mutawef	Madar Software	General Presidency for the affairs of the Grand Mosque and the Prophet's Mosque	4.5/6167	8/30/2016	100,000–500,000
6	Manasikana	Ministry of Haj & Umrah	Ministry of Haj & Umrah	4.7/213	9/10/2016	5000–10,000
7	Tarwiah	National Water Company	National Water Company	4.7/84	9/8/2016	1000–5000
8	AlMaqsad	NaviBees	NaviBees company	4.7/1106	6/20/2016	50,000–100,000
9	Hajj and Umrah Navigator	Saudi Post	Saudi Post	4.3/109	9/8/2016	1000–5000
10	Navi Hajj	Urbsoft	Tech Company	4.7/176	9/18/2015	5000–10,000

One of the useful methods used to assess apps is the MARS proposed by Stoyanov et al. [15]. The criteria defined in the MARS evaluation method can cover the main dimensions of the app quality in our study. However, the MARS method is originally designed to rate the quality of mobile health apps and has been used in many recent studies [17–20].

The MARS method contains four categories, namely, engagement, functionality, aesthetics, and information quality, for assessing the quality of apps. Rating the apps according to these categories will provide better app evaluation compared with the user ratings in the app store. The subjective quality of each category contains a number of items as shown in Table 5.

The study is regarding the accuracy of the evaluation apps; therefore, the sample of this study is nominated according to their prior knowledge and experience in using different apps in general and for Islamic apps in particular.

Two groups of expert users were involved in evaluating the selected apps. Group A comprises of 10 specialists working as the custodians of the Two Holy Mosques Institute for Hajj and Umrah Research, whereas Group B consists of 11 specialists working in the Information Technology Center of the General Presidency of the Affairs of the Holy Mosque and the Prophet's Mosque. The participants of the questionnaire hold different academic degrees and practical experiences in their fields.

Table 5
Items of MARS Categories [Stoyanov, 15].

| Category	Items
Engagement	Entertainment
	Interest
	Customization
	Interactivity
	Target group
Functionality	Performance
	Ease of use
	Navigation
	Gestural design
Aesthetics	Layout
	Graphics
	Visual appeal: How good does the app look?
Information	Accuracy of app description
	Goals
	Quality of information
	Quantity of information
	Visual information
	Credibility
	Evidence base
Subjective quality	Would you recommend this app?
	Amount of time that you spend on an app?
	Would you pay for this app?
	What is your overall star rating of the app?
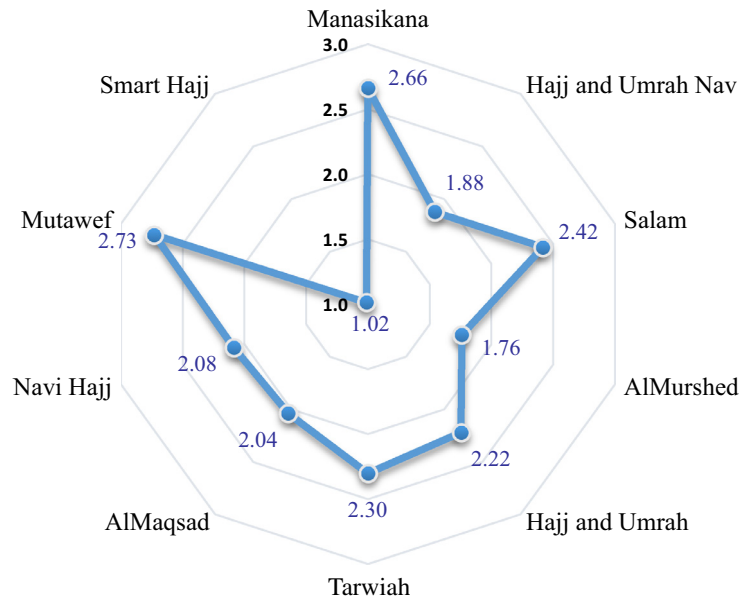
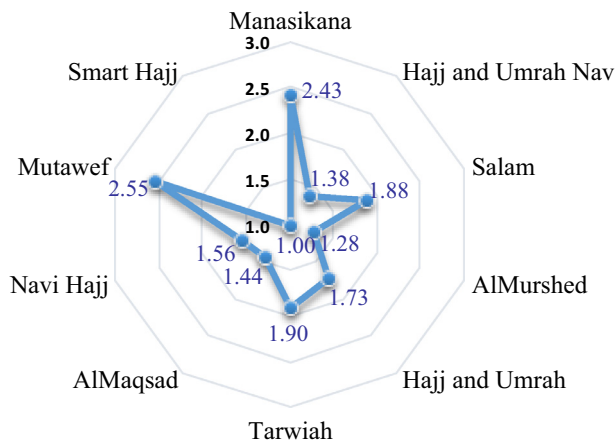**Fig. 7.** Total average score of four MARS categories.

Fig. 8. Average score of subjective quality MARS score.

5.3. Analysis and discussion

We averaged the scores of the collected application surveys according to the MARS categories. Each MARS item uses a three-point scale, a score for each category is calculated as the mean of all belonging items, and the overall score is calculated as an average across the categories.

Fig. 7 illustrates the total average score of each MARS category (engagement, functionality, aesthetics, and information) for the selected app. The results demonstrate that the "Mutawef" app has the highest rank MARS scores with 2.73, and then "Manasikana" and "Salam" apps with 2.66 and 2.42, respectively. Moreover, the results show that the "Smart Hajj" app has the lowest rank among others (1.02) because of disabling all its functions during the period of this study.

Fig. 8 depicts the average score of the "subjective quality" MARS score; the highest average is observed for "Mutawef" app with 2.55, then "Manasikana," "Tarwiah," and "Salam," which reflects the overall satisfaction and acceptance of a user while using the app. The results also show that the average score of 4 out of 10 apps is below 1.5, indicating that the users are not feeling enjoyable while using the app features.

6. Conclusion

In this paper, we conducted a survey for the available Islamic apps related to Hajj and Umrah. The paper provided a detailed study of all features and services of the surveyed apps.

The behavior trends of the mobile application providers and users are studied. The results showed that most of the app providers focused on developing Hajj and Umrah ritual services in a basic and non-interactive manner, whereas the attitudes of the users are directed toward the visualized app services.

The result demonstrated that the most downloaded mobile application is for the live video service application, namely, "Watch Live Makkah 24 Hours HD," with more than one million download times. Furthermore, the results for the popular downloaded apps (apps that were downloaded more than 100,000 times) showed that apps supporting images and wallpaper services are the most widely used apps and are preferred by users. Furthermore, the least downloaded apps are the non-free apps, such as "Hajj player I URDU-INDIA" app. Also, more than 87% of studied apps support only one language even though some of them include interesting features such as "Mutawef" and "Virtual Hajj & Umrah Guide 3D" apps.

This study also performed a case study for some apps selected according to specific criteria. The results showed that the "Mutawef" mobile application had the best average MARS score among the other apps with 2.73 out of 3, followed by "Manasikana" mobile application with 2.66 average MARS score. In addition, the observed results revealed important issues regarding the overall satisfaction of the users in using the selected apps, where the average subjective quality score for some of the studied apps does not reach the mid-average score (1.5), which should be considered in improving the provided services and functions in the future.

Finally, we expect that this study can provide good directions to researchers and application developers in improving the services provided for Muslim pilgrims and visitors and consider the most desirable features targeted and desired by users.

Appendix A

See Table A.1.

Table A.1
Apps and their features.

Abbr.	Application Name	No of Services	Languages	Abbr.	Application Name	No of Services	Languages
A1	Mutawef	23	Arabic	A41	Hajj Muaavin	6	English
A2	Smart Hajj	17	Multi	A42	دليل الحاج والمعتمر	6	Arabic
A3	eHajj Plus	17	Indonesian	A43	Virtual Hajj & Umrah Guide 3D	6	English
A4	Perform Hajj & Umrah	14	Multi	A44	VR Umrah Guide Pro	6	English
A5	Haji Pintar	14	Indonesian	A45	Telkomsellbadah	6	Malay
A6	eHajj	14	Indonesian	A46	Jaidi Hajj	6	English
A7	পলিগ্রমি গাইড (বিটা সংস্করণ)	12	Bengali	A47	Hajj and Umrah Guide	6	English
A8	Salam: Hajj & Umrah Guide	12	Multi	A48	Hajj and Umrah Guide	6	English
A9	Manasikana	12	Multi	A49	Hajj Mabror	6	English
A10	Noor Hajj w find me locator	11	Multi	A50	Al-Hajj	6	English
A11	كلاس حج Class Hajj	10	Farisi	A51	حج العاشقين	6	Arabic
A12	Hajj and Umrah	10	English,Urdu	A52	Hajj story	5	Arabic
A13	Al Hajj Guide	10	English	A53	Hajj Guide Step By Step Live	5	Urdu
A14	Navi Hajj	10	English	A54	Al Hajj Guide	5	Arabic
A15	Hajj and Umrah Guide with Dua	9	English	A55	Hajj & Umrah	5	English
A16	Hajj Help	8	English	A56	Hajj Guide	5	English
A17	হজ্জ সহায়কিা (Hajj Essential)	8	Bengali	A57	AplikasiPanduanIbadah Haji	5	Indonesian
A18	Makkah Explorer Hajj & Umrah	8	English	A58	HacUmreRehberi	5	Turkish
A19	HajjAp	8	English	A59	Hajj Messenger	5	English
A20	Hajj & Umrah with Audio	7	English	A60	مناسك الحج والعمرة	5	Arabic
A21	Al-Islam Hajj and Umrah	7	English	A61	Hajj Super Guide	5	English
A22	Rehnuma-e-Hajj	7	Urdu	A62	Hajj Umrah Guide Free	5	English
A23	Mecca Guide Map Hotels Weather	7	English	A63	Hajj Guide	5	English
A24	Ziyarates - Hajj and Umrah	7	English	A64	Umrah & Hajj Guide	5	English
A25	Sohba Hajj & Umrah Traveler	7	English	A65	Diary Of Hajj	5	English
A26	HAJJ GUIDE	7	English	A66	Hajj and Umrah Navigator	6	Multi
A27	أدعية الحج والعمرة	7	Arabic	A67	Hajj & Umrah Guide urdu	5	Urdu
A28	Durrar Al-Hajj and Umra	7	Multi	A68	Al Khair	5	English
A29	Islamic Life	7	English	A69	Hajj Umrah Guide	5	English
A30	Virtual Hajj Guide and Umrah	7	English	A70	Hajj Fiqh	5	English
A31	Virtual Umrah Guide Pro	7	English	A71	Hajj Companion	5	English
A32	VR Hajj Umrah Guide Pro	7	English	A72	Hajj Umramalayalam	5	Hindi
A33	VR Hajj Umrah Guide Free	7	English	A73	Zia e Hajj and Umrah	5	Urdu
A34	Wajibati - Hajj & Umrah	7	English	A74	Learn Hajj	4	English
A35	حج - Hajj	6	Arabic	A75	Hajjandumrah guide in english	4	English
A36	Easy Hajj Umrah Guide	6	Urdu	A76	Hajj Emergency Services Plus	4	English,Arabic
A37	Hajj and Umrah Guide - urdu	6	Urdu	A77	مناسك الحج والعمرة	4	Arabic
A38	HAJJ GUIDE	6	English	A78	Hajj Umrah Guide English FREE	4	English
A39	Hajj Health Companion	6	English,Arabic	A79	Hajj and Umrah Guide	4	English
A40	Tarwiah	6	Multi	A80	Mecca 3D - A Journey To Islam	4	English
A81	Indian Haji Accom. Locator	4	English	A125	Hajj and Umrah Guide	3	English,Urdu
A82	Le guide du Hajj et de la Omra	4	French	A126	LABBAIYK ALLAWHUMMA LABBAIYK	3	Urdu Latin alphabet
A83	Hajj Guide	4	English, Arabic	A127	Tawaf and Sai in Hajj and Umra	3	English
A84	Hajj e Mabroor	4	Multi	A128	Hajj Guide	3	Urdu
A85	Hajj Pilgrimage Guide	4	English	A129	Hajj and Umrah Guide app	3	English
A86	مناسك الحج – Hajj Rituals	4	Arabic	A130	Hajj african	3	English
A87	Fiqh al-Ibadat images- Hajj	4	English	A131	Panduan Haji dan Umrah	3	Malay,English
A88	Hajj 2016 - Five blessed days	4	English	A132	Hajj waUmrrahQadam ba Qadam	3	English
A89	حج -Hajj	4	Multi	A133	Hajj and Umrah Guide 2016	3	English
A90	Hajj Malayalam Guide	4	Malayalam	A134	Hajj Umrah Best Guide	3	English, Arabic
A91	ሰንበተ᱕ዮ᱕ - ᕃ᱑	4	Multi	A135	وجواب لحج والعمرة - 891 سؤال	3	Arabic
A92	Hajj Guide - دليل الحج والعمرة	4	Arabic,English	A136	Labbaik: Hajj & Umrah Guid	3	Bengali, English
A93	الحج	4	Arabic	A137	Bayyin Al Hajj	3	English, Arabic
A94	Manasik Haji dan Umrah	4	Malay	A138	Umrah Guide 3D	3	English
A95	Hajj For Women	4	English	A139	Keywords of Hajj &Umrah	3	English
A96	Manasik Haji dan Umrah	4	Indonesian	A140	Hajj & Umrah Urdu Guide	3	Urdu
A97	Hajj And Umrah Guide	4	English	A141	Hajj	3	Multi
A98	Manasek Al-Hajj - مناسك الحج	4	Arabic	A142	Smart Hajj Group	3	Indonesian
A99	Hajj Guide Complete	4	Urdu	A143	Хадж и умра	3	Russian
A100	Al Hajj wal Umrah	4	English	A144	Guide to Hajj and Umrah	2	English
A101	Makkah Window	4	English	A145	Walking Hajj	2	English
A102	Haj Tours	4	English	A146	Masail-o-Maloomaat-e-Hajj-Top	2	Urdu
A103	Hac player I TÜRKÇE	4	Turkish	A147	مناسك الحج وملحقاتها	2	Arabic
A104	Hajj player I ARABIC	4	Arabic	A148	Labbaik: Hajj and Umrah Audio	2	English
A105	Hajj player I ENGLISH	4	English	A149	سهلة مناسك الحج والعمرة بطريقة	2	Arabic
A106	Hajj player I MELAYU	4	Malay	A150	Hajj And Umrah Guide In urdu	2	Urdu
A107	Hajj player I URDU-INDIA	4	Urdu	A151	Umrah Guide 3D	2	English
A108	MZahid - Hajj Umrah Packages	3	English	A152	Mecca Live Wallpaper	2	English
A109	HAJJ DA UMRAH	3	Hausa	A153	Hajj Guide	2	English
A110	Hajj, Umra and visiting	3	English,Arabic	A154	حج گائیڈ	2	Urdu
A111	Al Hajj Wa Al Umrah	3	Arabic	A155	Hajj Kit	2	English
A112	Hajj and Umrah	3	Arabic	A156	HAJJ AMHARIC	2	Amharic (Ethiopian)
A113	Ahkam-e-Hajj	3	Urdu	A157	Hajj Guide with Places In urdu	2	Urdu
A114	عمرہ گائیڈ	3	Urdu	A158	Hajj Tech	2	English

Table A.1 (*continued*)

Abbr.	Application Name	No of Services	Languages	Abbr.	Application Name	No of Services	Languages
A115	Hajj and Umrah Handbook	3	English	A159	Hajj step by step	2	English
A116	Hajj & Umrah	3	English	A160	Hajj Umrah Guide	2	English, Urdu
A117	Hajj And Umrah Guide	3	English	A161	الحج	2	Arabic
A118	Kumpulan Doa Haji dan Umrah	3	Indonesian	A162	Hajj o Umrah	2	Urdu
A119	Hajj aurumrahkatariqa	3	Urdu	A163	المكرمة المرشد الجغرافي لمكة	3	Arabic, English
A120	hindi Hajj & Umrah guide	3	Hindi	A164	Salat and Hajj	2	English
A121	Hajj Maps	3	English	A165	Hajj Guide	2	English
A122	Hajj arabic Dictionary	3	Multi	A166	Hajj Guide (Islam)	2	English
A123	Hajj	3	Arabic	A167	Hajj step by step	2	English
A124	Hajj E Islam	3	English	A168	Hajj and Umrah from A to Z	2	English
A169	Hajj Ka Tareeqa	2	Urdu	A213	Hajj Tips in Bangla (হজ্জ টিপস)	1	Bengali
A170	Я - Халжи	2	Russian	A214	Hajj Live Auto Wallpaper Full	1	English
A171	Hajj Kwa Kiswahili	2	Swahili	A215	Hajj Guide	1	English
A172	Virtual Hajj	2	English	A216	Hajj Qadam Ba Qadam	1	Urdu
A173	Umra e-services	2	English	A217	ادعية الحج و العمر	1	Arabic
A174	مناسك الحج السيستاني	2	Arabic	A218	AdkarKitabBurda-Swalat-Dua	1	English
A175	Hajj StepByStep	2	Urdu, English	A219	Hajj Umrah Adkar (malayalam)	1	English
A176	AlMaqsad - AlHaram Navigation	2	Multi	A220	ALLAH Makkah HQ Live Wallpaper	1	English
A177	HariRaya Haji AidilAdha	2	Malay	A221	Mecca Wallpapers	1	English
A178	Muslim Dua Now - Dua&Azkar	2	English,Urdu	A222	Hajj Navigator	2	English
A179	Find your Travel mates (Hajj)	2	English	A223	الحج خطوة خطوة	1	Arabic
A180	Al Hajj	2	Urdu	A224	Kaaba Wallpaper	1	English
A181	Islamic-Ease:Utility App	2	English	A225	Hajj kaTareeqa	1	Urdu
A182	Hajj VR	2	English	A226	HAJJ UMRAH ADHKAR (KANNADA)	1	Kannada
A183	Green Hajj Indonesia	2	English	A227	Mecca Hajj Live Wallpaper	1	English
A184	Duas for Hajj and Umrah	2	English	A228	Zad e Rah (Al-Huda Int.)	1	Multi
A185	RafiqulHaramain رفيق الحرمين	2	Farisi	A229	Islamic Photo Frames	1	English
A186	Hajj Guide	2	English	A230	Hajj Guide	1	English
A187	Hajj aur Umrah Guide	2	Urdu	A231	Hajj Ka Tariqa Video	1	Urdu
A188	Hajj & Umrah Picture Guide	2	English	A232	Hajj and Umrah (Audio) Mp3	1	Malay
A189	Hajj & Umrah Guide	2	English	A233	হজ্জও ওমরাহ্	Hajj Bangla	1	Bengali
A190	VR Masjid Al-Haram Tour - Hajj	1	English	A234	A GUIDE TO HAJJ AND UMRAH	1	English
A191	Dheen Hajj Service	1	English	A235	Shohoj Bangla Hajj Guide	1	Bengali
A192	3D Hajj Photo Frames	1	English	A236	Mina Locator	2	English,Urdu
A193	Fatwa regarding Hajj and Umra	1	English	A237	Hajj Complaints Lodging System	1	English
A194	Hajj	1	English	A238	Hajj Umra App	1	English
A195	Pilgrimage (Hajj)	1	English	A239	Hajj Guide	1	English
A196	Makkah Photos HD مكة المكرمة	1	English	A240	Hajj and Umrah Duain	1	Urdu
A197	Panduan Haji Bergambar	1	Malay	A241	HAJJ kiAasaniyan (URDU)	1	Urdu
A198	Bismillah Hajj	1	English	A242	Hisnul Muslim arabic	1	Arabic
A199	Umrah Selfie Frames	1	English	A243	Islamic Questions Answers	1	English
A200	Hajj Selfie Frames	1	English	A244	Kaaba Wallpapers	1	English
A201	হজ্জ Hajj Details	1	Bengali	A245	حج میرور	1	Arabic
A202	Makkah Live + Madinah Live HD	1	English	A246	Hajj Live	1	English
A203	Supplications of Hajj & Umrah	1	English				
A204	حج و عمره کی دعائیں	1	Urdu				
A205	Mekka Hajj 3D Video Wallpaper	1	English				
A206	Makkah &Madinah live	1	English				
A207	Hajj Ka Tarika In urdu	1	Urdu				
A208	Hajj & Umrah Historical Pics	1	English				
A209	Kaaba Wallpapers	1	English				
A210	Mecca Hajj Live Wallpaper	1	English				
A211	Mecca Wallpapers	1	English				
A212	MarbelDoa Haji & Umrah	1	Indonesian				

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