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# Offline Prayer Times System

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## Abstract

This paper is about developing an android application that can be used by any Muslim in this world. This application will be used as a prayers time's reminder and guider throughout their smart phones. The application will provide some features and functions needed for helping to perform prayers on time, which brings comfort for the users. Moreover, the application will allow the users to update their location by GPS without internet. The users will be able to display Hijri calendar if they need to do so. The application also allows the users to set a reminder that notifies when prayer time in his area. Furthermore, the application will be in two languages, which are Arabic and English.

***Keywords:*** **Speaker recognition; biometrics; verification; identification; Feature extraction**

## 1. Introduction

Islam is the religion that sends by Allah S.W.T to be the last religion in this world. It has been built on five pillars, which are: tow Shahadah, prayer, fasting, alms and pilgrimage. Prayer is the most important pillar that every Muslim should take care about it, because it has been said by the prophet Muhammad (Peace be upon him):' if the prayer became good all the rest worships will be good'. Therefore, it is a very important task for every Muslim to help each other to perform prayer fullest. Every prayer has its specific time that has been clarified. Therefore, knowing it is very important. To help Muslims, so many App developers introduced many applications those can be remind the time of prayer. Those Apps have huge number of users those rely on these applications to know prayer times and so on. After looking on those apps, it seems that almost all the applications are based on internet. In little more detail, these applications use the internet to find the location and then give the prayer time for each specific place. In the places like the airplanes or any place that does not in internet coverage, these applications will not work. Thus, because of this problem, this paper

came to solve this issue by using the GPS that all smart phones have to fetch the user location offline without needing for any internet access and provide the user the prayer times.

This system will be an Application in Android platform. The name of this Application will be "Ma'a Almusalli – *مع المصلي* ". This system aims to make Muslim's life easier and make the Muslim always aware about his prayers.

According to the developer experience as a user of Prayer time's applications since long time, it is very difficult to know prayers times in the places that does not have internet specially during the travel on the sky, land or sea. Therefore, sometimes because of the no internet coverage some prayers are being missed (Isa et al., 2006). The primary objective of the paper is to create an android application that helps Muslims to know prayer times and to perform their prayers on the time regardless they have internet access on their phones or not. The next important objective is to study the current practice of prayers times application and improve the services are providing with the applications.

This mobile application should be able to work anywhere, since the user has a mobile that supports GPS feature (Isa et al., 2007; Khalaf-Allah, 2008). This App is friendlily to be used by every Muslim in the world. This application has several limitations. Firstly, this application can only be supported by Android operating system. Secondly, the application does not have an option to choose the tone of the Prayer call. Finally, the last limitation is equipment used, which is android phone with GPS feature.

## **2.** Literature review

Based on what have been searched, there is no existing Application that provide prayers times' offline based on the location that has been fetched by GPS. However, there are many similar applications but most of them are based on online. Thus, seven applications have been chosen that have similar functionalities with this system which are:" Prayer times – أوقات الصلاة ", " My prayer – صلاتي ", "Saltuk - صلاتك"," Athannotify - المؤذن", " My prayers - صلواتي", "ipray - صلاتي ", "Al-Moazin Lite - المؤذن" and " Al Mosaly - المصلي". Therefore, this paper will focus on the features that need to be included and applied in this system after we compare all those applications to make it easy for us to choose the best one.

As mentioned above that there is no existing product for prayer times Alarm application that works offline in fetching the location. However, some applications have similarity of features and functions. The following table is to compare the features and functions of the seven sample Applications those that been chosen for literature review. There are several various features and functions of the applications listing down below:

Table.1 comparative between Applications

| Application\ Features | Offline locater | Notification | Hijri Calendar | Multi Lang |
|---|---|---|---|---|
| **Prayer times** | √ | √ | √ | × |
| **My Prayer** | × | √ | × | √ |
| **Al-Moazin Lite** | × | √ | √ | √ |
| **My Prayers** | × | √ | √ | √ |
| **iPray** | × | √ | × | × |
| **Athanotify** | × | √ | √ | √ |
| **Salatuk** | × | √ | √ | √ |

## 3. The Process of the Proposed system

Many techniques can be used in eliciting and gathering the requirements from the users such as through interview sessions with stakeholders, observation on current work process, questionnaires, surveys and analysis on the current industrial practices. As for Offline Prayer Times Android based Mobile Application, a quantitative methodological approach was used in this research. The instrument used in this study was a set of questionnaire, which designed, based on the research questions developed from the study.

For developing this application, iterative and incremental development lifecycle were practiced. The development process starts with an initial planning and ends with the deployment of the application. There were five stages involved in these iterative incremental approaches, which are the planning stage, requirement analysis, system design, development, integration, and testing. Several requirements are needed in this system such as:

- Development environment: Sublime with ADT Plugin for Windows.
- Open source Library: phone gap, Cordova Plugins, Bootstrap, font awesome and Goratchet.
- Android OS: This application supports any Android powered devices with Android version 2.3.3

"Gingerbread" (API 10) up to Android version 6.0 "Marshmallow" (API 23). Fig.1 shows the user case diagram for the user with what function user can do.

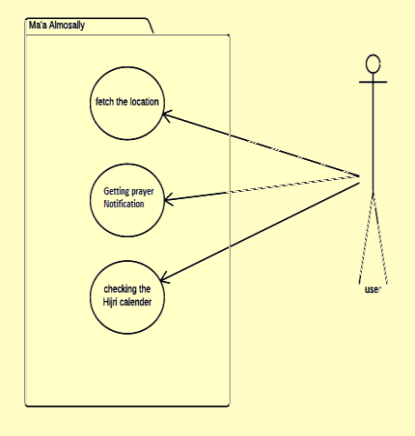


Fig. 1. Use Case Diagram.

In Fig.2, shows sequence diagram for fetching and initializing the prayer time, while the activity diagram for the same function is shown in Fig.3.

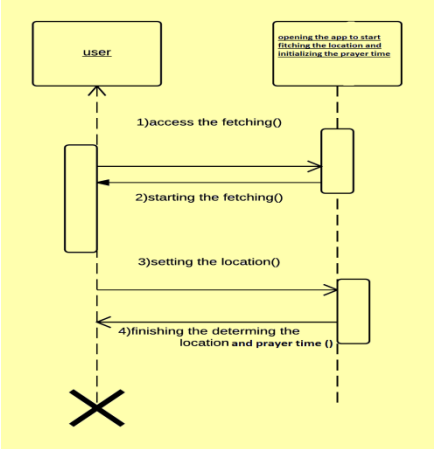


Fig. 2. Sequence Diagram for fetching and initializing the prayer time.

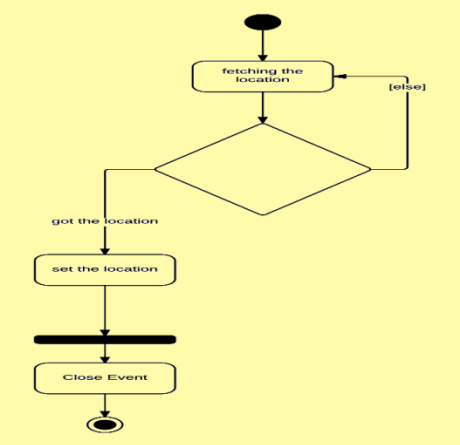


Fig3. Activity Diagram for fetching the location.

## 4. Results and Discussion

The app has been developed successfully, it works smoothly and no interruption recorded yet. The min problem was how to get the location, so for that problem a cordova plugin has been installed to solve that. Then the outputs of the location used again as an input in the prayer time's calculation formula. The variables are used in this app provide the prayer times are (Isa et al., 2006; Isa et al., 2007)

- Latitude,
- Longitude,
- Altitude,
- And System time.

The formulas that used to calculate the prayer times are as following (Ilyas, 1984; Meeus, 1991; Niweateh, 2002):

- **Dhuhur:**

Dhuhr = 12 + TimeZone - Lng/15 - EqT.

- **Sunrise and Sunset:**

$$T(\alpha) = \frac{1}{15}\arccos\left(\frac{-\sin(\alpha) - \sin(L)\sin(D)}{\cos(L)\cos(D)}\right)$$

Sunrise = Dhuhr - T(0.833), Sunset = Dhuhr + T(0.833).

- **Asr:**

$$A(t) = \frac{1}{15}\arccos\left(\frac{\sin(\operatorname{arccot}(t + \tan(L - D))) - \sin(L)\sin(D)}{\cos(L)\cos(D)}\right)$$

Asr = Dhuhr + A (1)

- **Maghrib:**

Maghrib = Dhuhr + T(4)

- **Ish'a:**

Isha = Dhuhr + T(17)

- **Fajr:**

Fajr = Dhuhr - T(18)

The above formulas gave the prayer times after calculating them based on the location (Nassau, 1948).

The reason of use the iterative development is due to the nature of the application. As there were many work involved, we apply this method to finish them iteratively. We finished the field work of making interface first. Then we moved on to developing basic functions of the application. This step was done iteratively as many versions are released based on certain upgrade that have been added to the previous version. Finally, some designs have been addedto the user interface part of the application. One of the main advantages of using this approach is that it can reduce the level of complexity in the development process. Plus, since

the many versions of the application were released based on upgrade, it can also improve the maintainability of the system as any additional requirements, improvements, or changes can be easily implemented in the future. The users also find that the design, user interface and function menu is very straight-forward which increase the usability of the application.

## **5.** CONCLUSION

The iterative development methodology really helps ease the work to complete this system. It helps the system to be done in a very systematic way. The user acceptance test survey indicates that most of the users find the application useful. They believed that the application can help them to perform their prayers on time and this is very helpful during travelling and the areas are out of the internet coverage. They also suggested some ideas for future development that can be done with the application. As for future development, some extra scopes and functionality have been suggested to be included based on the feedback given by the users after the user testing, and also the additional ideas. Firstly, for future works, we recommend developers to use better equipment for fieldwork. Then, users also suggested direction of Qiblat to be added. Last but not least, this application can have some prayers such as prays of day and night, after pray, and before and after waking up from the sleep.

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