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# Full Stack Mobile Application for Scheduling Prayer Based on Local Time

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**Abstract**: The five daily Muslim prayer times namely Fajr, Zuhr, Asr, Maghrib and Isha vary from place to place and from day to day.The timings of those five prayers aren't even for places with equal time zones[3] .The actual timing of every of the prayer is important, due to the fact it's far compulsory for each Muslim to carry out those prayers at the perfect time . The prayer time for any given place can be mathematically determined if certain parameters such as the coordinates of the location are known[3]. The aim of our project is to build a mobile based application that serves an objective of providing features like calculating accurate prayer time, allows the users to set a reminder or set a timer on your smartphone so, that they can easily access time for prayer, keeping a track of user's prayer, fasting tracker, Islamic calendar, site of halal food and shops in non-Muslim countries, qibla compass and also allows the users to set a reminder that notifies the user with adhaan when the respective prayer time is in his area. This application will be used as a guide and prayer time reminder through which users can get their current location and current Gregorian as well as Islamic date and month. Our app will provide these mentioned features and functionalities needed for helping to perform prayers on time, which is user friendly in order to bring comfort to the users.

**Keyword**: mobile based application, prayer times, prayer tracker, fasting tracker, Islamic calendar, halal shops, qibla compass.

## I. INTRODUCTION

Salaat is that the most important pillars of Islam. Praying pray 5 times every day is that the essential obligatory on each Muslim on this planet. The primary question Muslims are asked on doomsday is concerning salat.Being regular with prayer is so extremely vital. In this fast-moving world, Muslim prayer timings apps is definitely the most effective initiative to stay a track of your prayer timings in varied elements of the planet. These apps enable you to find out the salat timings in step with the geographical locations wherever you reside. These prayer time apps inform you of the time of prayers beforehand, and you'll be able to push notifications to prayer on time. You'll be able to hear beautiful Azan; and also know the Islamic calendar dates,sunrise and sunset temporal order.[2]

Islamic applications for smart-devices have become an integral part of our daily activities, particularly in times of worship and good deeds. For example, during the holy month of Ramadan, or during the months of Hajj or Umrah, and other rituals, it would be helpful if such applications could be employed in an effective way for the user. The most demanding application for Muslims to perform prayer based on the local prayer time along with this it will also track daily prayers, fast and helps the user to find the nearest mosque and the user can also find the qibla direction.[2]

All namaz alerts based on prayer time are set with notifications for the timely offering of prayer. It is a five-time prayer alerts app with the voice of azan. Prayer time is a complete guide for namaz time, Adhan, next namaz timings display and timely accurate notifications for remaining time of next namaz.[2]

## II. LITERATURE SURVEY

The purpose of the literature survey is to identify various studies, models, and research papers in our proposed research area in an attempt to appreciate, make use of as well as bridge a missing gap, if any, between different research. Many researchers have worked and researched on various prayer time applications .The purpose of this research is to conduct a survey and to classify Islamic apps that are available on Google Play Store. The user surveys were conducted to evaluate and investigate the usage pattern of the Islamic apps in everyday life of the Muslims. The results identify the need for authentication of the app content that gives rise to many critical issues and myths. Also, it stresses the need for a "Religion" category in Google Play Store. The benefit of this research is twofold, as it focuses on identifying which app features Muslim users are more interested in using and secondly, the Islamic apps/features that need to be developed.[1]

  

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Consequently, numerous religious people specifically Muslims and Islamic communities are taking advantage of this occasion to use mobile apps for teaching and learning Islam. This further aims to provide easy accessibility to Islamic information, hence bringing spirituality to the fingertips for today's young generation. There are many apps available on Google Play Store for different religions which can be downloaded and used by a number of users. An analysis was conducted to identify which religious apps are downloaded mostly; Islamic apps were found to have the largest downloads than any other religious apps. When asked in a survey about the reason for the frequent use of Islamic apps, many Muslims answered that they find it more easy and feasible and it also enables them to find accurate Islamic information faster than any other source. (Kittler & Mitchell, 2015). The main reason such apps were developed is to provide an ease to Muslims who lead a busy life. Therefore, despite being anywhere these Islamic apps enable them to exercise Islam in a more feasible manner.[1]

In the work proposed byAnum Hameed, Hafiza Anisa Ahmed & Narmeen Zakaria Bawany, Qibla / Prayer apps not only enable users to identify the correct Qibla direction (direction where Muslims are supposed to perform Salah i.e., towards Mecca by using a compass) but it also helps them to keep track of prayer timings. These apps are the most favorite ones amongst users. They help to find the Qibla direction when a user is at a new place and there are no mosques around. Also, Prayer timings reminders according to the location helps the user to know the exact timings of prayers when they are living in areas where there are no signs of mosques around them. (Gunawan et al., 2012). There are about 250 Qibla / Prayer apps in Google Play store out of which approx. 78 apps are paid while approx. 172 apps are free, with 86 apps having more than 4+ stars rating. Amongst these "Muslim Pro" app was found to be the most downloaded one, having 892,777 downloads (See Table 2). Due to "Muslim Pro" app popularity, a survey was conducted in which 15 Muslim Pro users were asked the reason for downloading this app. All the users gave the feedback that they found this app to be an "All in One" app having features like Qibla direction, Prayer timings reminders, Quran, daily supplications and much more. (Tayan et al., 2017).[1]

**Table 2.** List of most downloaded Qibla/Prayer time apps

| 2. Category: Qibla/Prayer time | | | | Features | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No | Application Name | Category | Downloads | Qibla Direction | Prayer Time | Prayer Alarm | Language | Adhan | Salat Tracker | Hijri Calendar | Nearby Mosque | Halal Finder | Daily Ayah | Daily Hadith | Sehr & Iftar Timings |
| 1 | Muslim Pro | Lifestyle | 10 M | Y | Y | Y | English and Urdu | Y | N | Y | Y | Y | Y | N | Y |
| 2 | Al-Moazin Lite | Lifestyle | 10 M | Y | Y | Y | English | Y | N | Y | N | N | N | N | N |
| 3 | Salatuk (Prayer Time) | Lifestyle | 10 M | Y | Y | Y | English | Y | N | N | Y | N | N | N | N |
| 4 | Qibla Connect ®Find Direction | Lifestyle | 10 M | Y | Y | Y | English | Y | Y | Y | Y | Y | Y | N | Y |
| 5 | Prayer Times | Tools | 5 M | Y | Y | Y | English | N | N | N | N | N | N | N | N |
| 6 | Muslim Assistant | Lifestyle | 5 M | Y | Y | Y | English | Y | N | N | N | N | N | N | N |

Although there are numerous Prayer Time applications (Muslim Pro, Salah time, Athan, etc.) available on the app stores, there is always a desync between the actual prayer time at a mosque and the application. Therefore, it becomes difficult for the people to know accurate prayer times at local mosques when they come to a new area or in their area of residence. No mobile app provides this feature today.

99% mosques in the UK and Europe have websites where they display prayer times which are downloadable in PDF format. People download the pdf files and follow those times or update the existing prayer times with manual adjustments (which needs to be calibrated regularly). Google is used to find the local mosques in a new area.

These are some of the limitations in the existing system which we will be overcoming.

## III. PROPOSED SYSTEM

Typically, the time of prayer was being announced through mosques. Nowadays, there's a special time table in cities of Muslim countries, known as prayer times table. Meanwhile villages lack such division or table, they use the Prayer times of nearby cities. In non-Muslim countries, such tables just belong to big cities and other areas have difficulties to find out (precise) prayer times. Quantitative computation of Prayer times is totally dependent on geographical coordinates of that place and space/time position of the Sun. Residential areas were determined as polygonal shapes and each of them are located in a specific geographical coordinate. It's not possible to use the Prayer time of one point for another point far from that point[7].

The purpose of this prayer time application is to ease people from the tedious task of visiting the mosque website again and again for knowing the prayer time of the mosque (which needs to be calibrated regularly) and along with that people

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have to use Google to find the local mosque in the new area. This prayer time application will be the solution to all the problems that people face now-a-days along with that it has many other features such as halal food search, fast tracker, prayer tracker, etc.

Mobile devices like Smartphones, tablets and PDAs have become an essential part of every person's day to day activities. The growth and expansion of the smartphones has created new opportunities for religious app developers to develop apps that will provide utilities and an easy accessibility to religious information.

Therefore, in our app we are providing special features and functionalities that will overcome all the challenges and difficulties that Muslims are facing today to offer the obligatory prayers on time based on their current location.

## IV. IMPLEMENTATION

The objective of our project is to develop computational logic in order to calculate the respective prayer times to provide accurate prayer time based on their local mosque. The utilization of GPS and digital compass to develop a portable qibla which can give an exact location of the user. Following are some of the objectives of local prayer time app: -

1. To check prayer time in respective area based on location
2. To be able to set the prayer calculation method or select the respective local mosque that a user particularly follows.
3. To set prayer time accordingly.
4. To retrieve the mosque prayer time from their website and align the app with those timings.
5. To be able to track my prayers, fasts etc.
6. To be able to identify qibla direction.
7. To be able to check local halal food shops and restaurants.

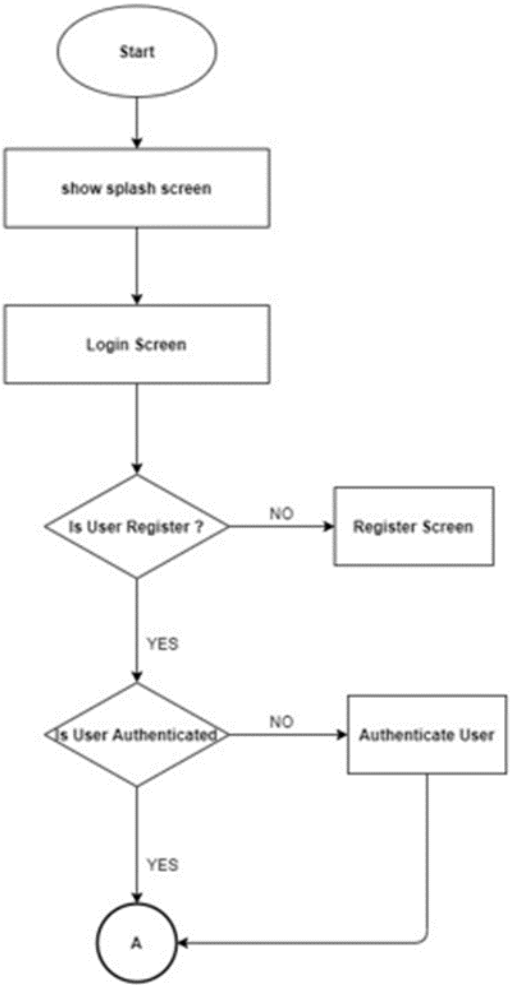


*Fig 1. Flowchart*

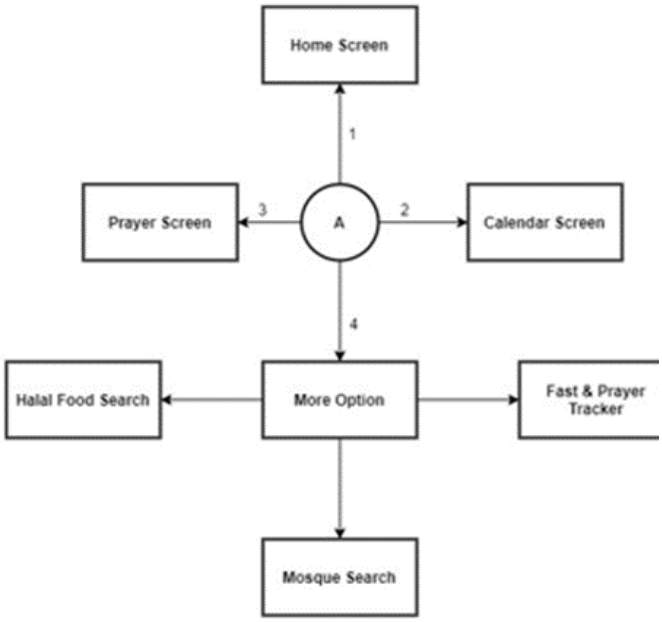


*Fig 2. Functional Layout*

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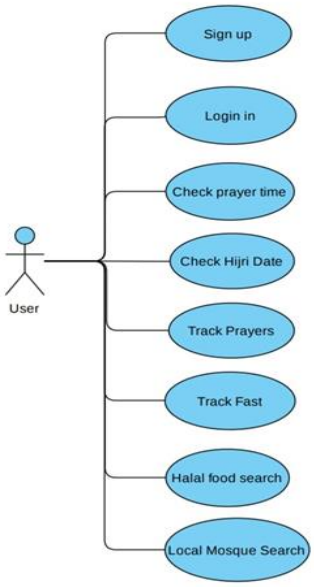


*Fig 3. Use Case Diagram for Prayer Time Application*

A. Prayer Times:

The five daily Muslim prayers are namely, from beginning of the Islamic day prayer Magrib (the sunset prayer), Isha (the night prayer), Fajr (the Morning Prayer) that is performed at true dawn until sun begin to rise, Zuhr (the mid-day prayer) that is performed when the sun just declines after reaching its highest point and finally Asr prayer that begins once the shadow of an object is equivalent to its height plus the length of its shadow at noon for standard method[11]. The features relating to Prayer Times should enable the users to remember when they are supposed to pray and arrange for it in advance. If the user forgets about it while they are busy, the app should send them a reminder at the time of prayer[3].

B. Prayer Tracker:

The Prayer Tracker is a way to cultivate a path towards achieving your Salah Goals successfully. It is a prayer tracker divided into 52-weeks (1-year) to daily and weekly motivates you towards a path to achieving your salah goals successfully. It is a tracker designed to focus on your salah consistency each day of the week for one year. Each well-designed spread contains checkboxes for every Farz prayer namely, Fajr, Dhur, Asr, Maghrib, Isha for seven days of the week[12].

C. Fasting Tracker:

This feature is designed to easily track the number of fasts we miss during the month of Ramadan and then make up during the year and in a week, the two important fast that are kept on Monday and Thursday along with the necessary fasts in the month of muharram, zil hajj, etc.

D. Islamic Calendar:

It is called as Hijri Calendar which basically has 12 months namely Muharram Safar Rabi' al-awwal Rabi' al-thani Jumada al-awwal Jumada al-thani Rajab Sha'ban Ramadan Shawwal Dhu al-Qi'dah Dhu al-Hijjah. The current Gregorian date and the corresponding Islamic date and day will be displayed on the home screen and on the prayer screen as well.

E. Halal Food Search:

Halal is an Arabic term which implies permissibility. In Islamic terms, it means permissible (allowed) according to the rules of Islam. It is mostly referred in regards to food, but it includes any type of action permissible in Islam. The opposite of Halal is Haram or sometimes referred to as non-Halal/non-permissible. This refers to anything considered unlawful under teaching of Islam[5]. Therefore, in order to follow the rights of Islam, our app has a feature where it will search the nearest halal shops and restaurants based on the current location of the user.

F. Qibla Compass:

A Qibla compass was a must-have feature since the beginning because of its generality. Sometimes, it can be very difficult for Muslims to find the right direction (Kaaba) for their namaz. This Qibla compass helps them find the direction of Kaaba within a couple of minutes.

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G. Mosque Search:

As an area of worship for Muslims, the mosque is the most vital place for someone who is traveling long distances. Usually, they will rest and worship at the mosque when they are outside of the house[9]. However, what if you are traveling in an unknown area and do not know the area you are passing, but have entered the prayer time, such as the midday, asr, or maghrib prayers. Of course, you need to find out the nearest mosque so you don't miss your prayer. This Search feature here allows users to more easily find places of worship or other public places that are often sought after by newcomers or people who do not know the area they are visiting.

## V. DETAILS OF HARDWARE AND SOFTWARE

The following is the list of hardware and software requirements for the proposed system to be implemented.

- **Hardware Requirements**

a) Processor: Intel corei3 3rd Generation and above
b) Speed: 1.7 GHz and above
c) RAM: 4 GB (Minimum) and above
d) Hard disk space: 10-15 GB
e) Android Smartphone

- **Software Requirements**

a) Operating System: Windows 7/8/8.1/10, Linux, macOS
b) Database: Firebase
c) Tools: Android Studio, Visual Studio Code
d) Language Requirement: Flutter.

- **Technology used**

a) Flutter (frontend):

Flutter is a free and open-source user interface software development kit from Google. From a single codebase, it is possible to create cross-platform apps for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web[6]. The major components of Flutter include:

➔ Dart Platform
➔ Flutter engine
➔ Foundation Library
➔ Design-specific widgets

b) Firebase (backend):

Firebase is Backend as a Service (Baas). Developers provide a variety of tools and services to help you build high-quality apps, expand your user base, and generate revenue. It is based on Google's infrastructure. Firebase is categorized as a NoSQL database program that stores data in JSON-like documents. In a document in Firebase is a set of key/value pairs that are defined by a schema. A group of documents form a collection. This is the application backend software. Firebase is Google-supported application development software that allows developers to create iOS, Android, and web apps. Firebase provides tools for tracking analytics, reporting and resolving app crashes, marketing and creating product experiments.

## VI. METHODOLOGY

We have used Agile Scrum Methodology to carry out our project. The Agile Scrum method is a sprint-based project management system that aims to provide the highest value to stakeholders.

- Scrum is a framework that enables more effective collaboration between teams working on complex projects.
- Agile and Scrum are two similar project management systems, but with some important differences. Agile encourages more flexible and leadership teams, while Scrum encourages more rigorous and trans-departmental teams.
- The Agile Scrum method is a project management system based on step-by-step development.
- Each iteration consists of 2 – 4 weeks sprints, and the goal of each sprint is to build the most important features first and release a ready-to-ship product.
- Additional features will be incorporated into the product in subsequent sprints and coordinated between sprints based on stakeholder and customer feedback. [4][10]

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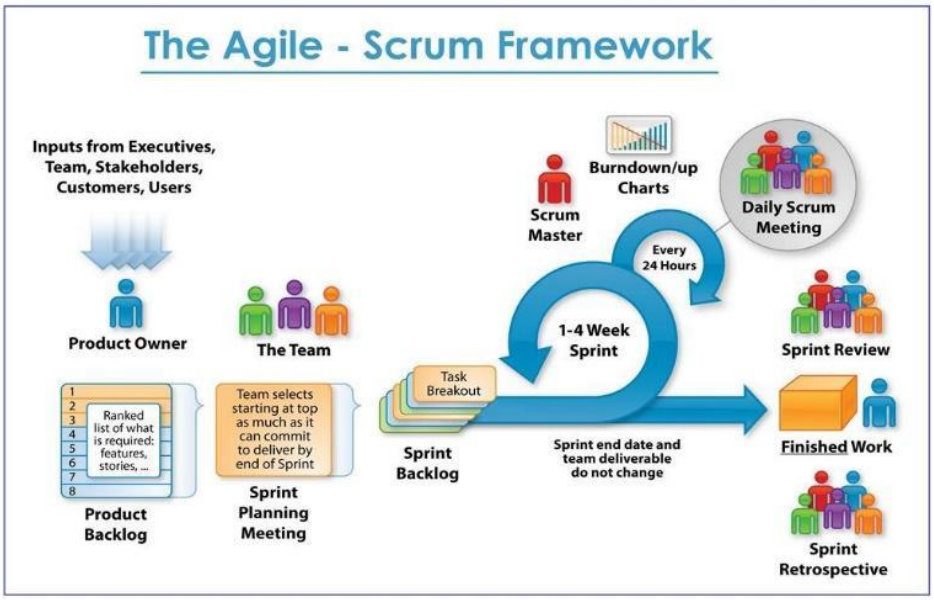


*Fig 4. Agile Scrum Framework*

## VII. CONCLUSIONS

There was a time when people spent a significant part of their day doing prayers, following their religious practices. It was easier in the earlier days because, well, work schedules were not too busy . There were smaller distractions in life after work. But now people have 10-hour workdays, side gigs, cafes to go to after work, pictures to watch, and whatnot! Naturally, it has become harder to accommodate all of those plus religious practices into a 24-hour day[8]. The challenge is harder, particularly for Muslims. Waking up at dawn to do the fajr, offering namaz five times a day, reading the Quran, offering duas throughout the day are just a few things the followers of Islam practice. Plus, the fact that many of these practices have to be done at particular times makes it all the more difficult for professionals leading a busy life. The purpose of this was to provide an accurate prayer time as traditionally, the time of prayer was being announced through mosques. Nowadays, there's a special time in cities of Muslim countries, known as prayer times table. Meanwhile villages lack such division or table, they use the Prayer times of nearby cities. In non-Muslim countries, such tables just belong to big cities and other areas have difficulties to find (precise) prayer times.

Therefore, in our app we are providing special features and functionalities that will overcome all the challenges and difficulties that Muslims are facing today to offer the obligatory prayers on time based on their current location.

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