Task Alarm – An Application for Location-based Reminders

Aquib Shaikh[1], Ayaan Shaikh[2], Faisal Ansari[3], Haani Ansari[4], Prof. Anand Bali[5]
Students, Department of Computer Engineering[1,2,3,4]
Professor, Department of Computer Engineering[5]
M. H. Saboo Siddik College of Engineering, Mumbai, Maharashtra, India

Abstract: *Smartphones have advanced rapidly over a very short time and one of the products of this advancements is the ability to accurately track location using GPS hardware present on phones. We can take advantage of this by using it to allow the user to make location-based reminders. In this paper we look at a solution developed by our team. We believe that our solution will help users to keep track of their tasks effectively. The application will be targeted towards people with an active lifestyle who prefer to do things in person or at location. This report goes in detail about our team's motivation and reason to develop this application. It also goes into the working of the designed application.*

I. INTRODUCTION

With the wide market adoption of smartphones, users have gained access to incredibly powerful and capable hardware. One of the features of smartphones is the access to accurate and real-time location data, using technologies such as GPS, Wi-Fi, and mobile networks. This information can be used for a variety of applications, one of them being the ability to provide location-based reminders to the user.

A location-based reminder works in the location dimension. It reminds the user of a task or activity based on the place they are currently at. This can be done on modern smartphones by tracking the user's location and providing them reminders as they reach a particular location. This kind of reminder can potentially save the user both time and hassle as they can be reminded of things on their to do list before the condition for date and time is met. Furthermore, the data collected from a user's reminder and location can be used to suggest new places to carry out their activities.

II. METHODOLOGY

We started our project by consulting our project guide and with his help and inputs we started work on our project. Firstly, we started with the planning stage, which involved discussion over the overall design and basic implementation of our application. After the basic planning was finished, we started the development of our project, under the guidance and supervision of our project guide. Throughout the entire process, our team took feedback from external sources such as other teaching staff and with the help of their review and feedback we were able to implement improvements to our basic design and build a better application than we could have on our own.

III. LITERATURE SURVEY

Relarmy - A Location Based Alarm Reminder System for Mobile Application[1]
IEEE: Electronic ISBN:978-1-6654-0118-0, DVD ISBN:978-1-6654-0117-3, Print on Demand(PoD) ISBN:978-1-6654-0119-7, 25 February 2022: The authors Aftaabahmed Sheikh, Bushra Shaikh, Shubhadarshini Ramkumar Nadar and Vanitha Shunmugaperumal have built an application, called Relarmy, that allows users to set reminders based on locations. Users can later update this or change information about this reminder. Furthermore, users can favorite certain locations and also set multiple locations for one reminder. They suggest this kind of system would be helpful to travelling salespersons, students and working professionals

Task Trigger: Reminder Application based on Location [2]

International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 p-ISSN: 2395-0072 Volume: 05 Issue: 03 | Mar-2018: The authors Prachit Patil, Kaustubh Sawant, Suraj Desai, Aditya Shinde, Mr. Manish Bhelande proposed that today's smart phone have many location tracking services like GPS, GPRS which can be helpful to detect the user location. Using these location detection services it is easier to track down the location. Existing system is work on GPS based tracking which provide location of user.

Location Based Reminder [3]

International Journal of Advance Research in Science and Engineering (IJARSE) ISSN: 2319-8354 Volume No.07, Special Issue No.03, February 2018: The authors Sushant Shamrao Patil, Akshay Arvind Jadhav, Prof. S.R. Kadam proposed a system to help current individuals to remember something at a particular time and area, Smart Location Reminder is a boon. To fill the need, implementing an application for Android-based Smartphone's and tablets which isn't just time based yet additionally area based. The system uses free, open API benefits from Google Maps.

Location Based Reminder Using Mobile GPS System [4]

International Conference on Recent Innovations in Science, Technology, Management and Environment (ICRISTME-16) ISBN: 978-81-931039-1-3, June 2016: The authors Vasileios Zeimpekis, George M. Giaglis and George Lekakos proposed a technique based on location-based services for indoor and outdoor positioning system to get the user's location. The services for location-based system are based on wireless communication system with mobility. There also described the different types of location based on positioning technique for self-positioning, remote positioning, and wireless positioning technique.

IV. WORKING

The application continually monitors the time and location of the user. If the time of reminder matches, or the user's location is within the specified radius of the location, then a notification is sent to the user.

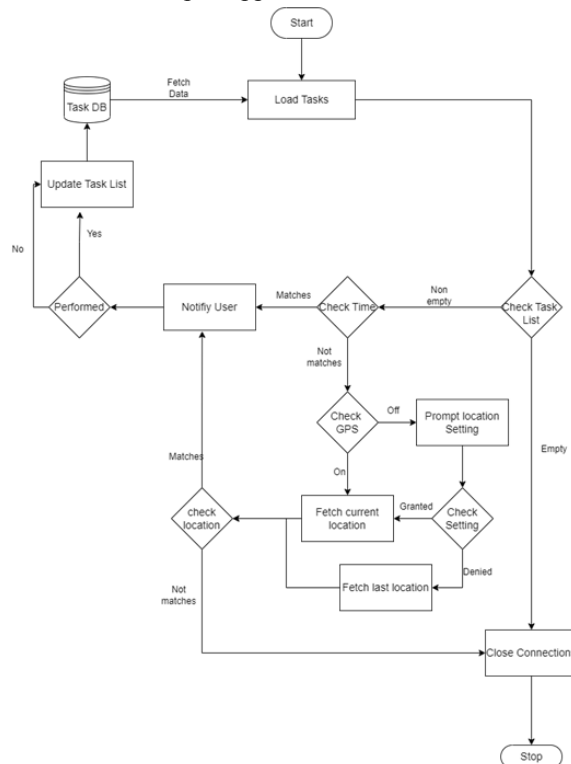The following is the activity diagram for the developed application:

Fig 1: Activity Diagram for the system.

4.1 Google Maps Platform

The application relies on data from Google maps platform, specifically for Geocoding and Reverse Geocoding. API calls are made to get the co-ordinates of an address and vice versa.

4.2 GPS and Location Services

The user's location is gathered from the phone's GPS and other location services. In case, the user does not have access to location services, their last known location is used. The user cannot make use of the app if they never had their location services enabled. GPS and location services are the most important pre-requisite and are vital to the working of location-based reminders.

4.3 Database

A database is used to store the current and past reminders set by the user, along with the locations of said reminders. All the data is stored locally in the user's smartphone. For our implementation, Room database library was used, which works on top of an SQLite database.

4.4 Kotlin and Jetpack Compose

Kotlin is a popular programming language used for the development of android applications. Kotlin was our programming language of choice when it came to developing Task Alarm. The backend of the application was programmed in Kotlin and the frontend was developed using Jetpack Compose, which is a UI development toolkit based on Kotlin.

V. RESULTS AND DISCUSSION

Our team has successfully developed a working model of the application. The application successfully tracks the user and reminds them of tasks to do at the specified locations. The app however is more a proof of concept than a final product. Several improvements can be made to the application and new features can be added over time. The application still needs tobe thoroughly tested in the real world to find out the flaws and the areas that require improvements. Furthermore, the application could have several positive real-world implications. One of them, we believe could be that it would promote an active lifestyle while, reducing the time wasted by constantly having to go to a place repeatedly.
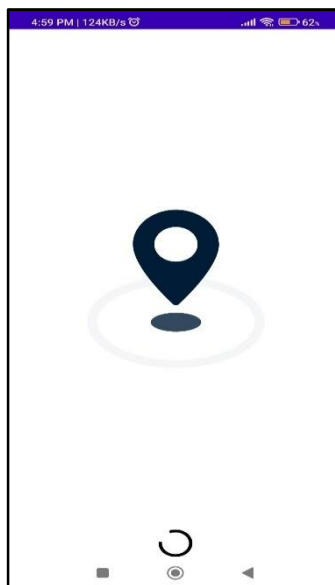
5.1 Results

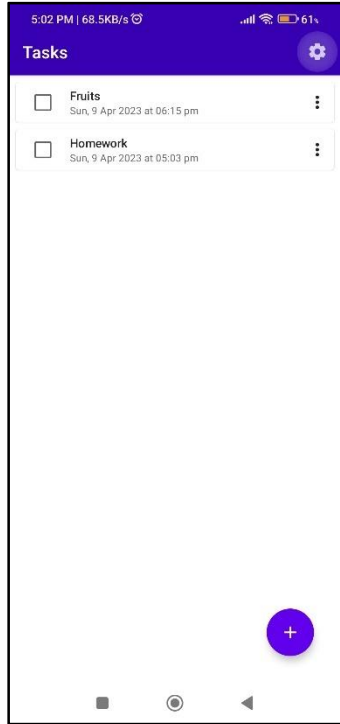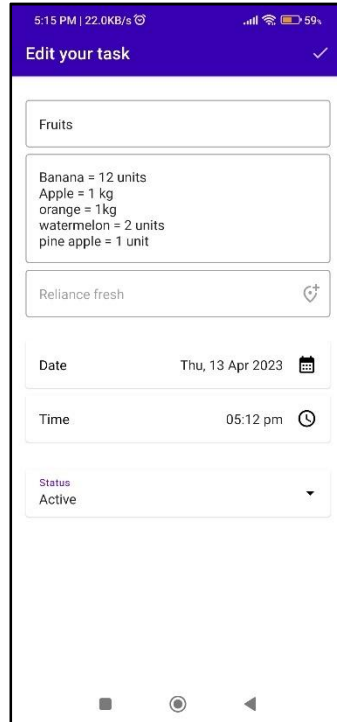Fig 2: Application splashscreen.

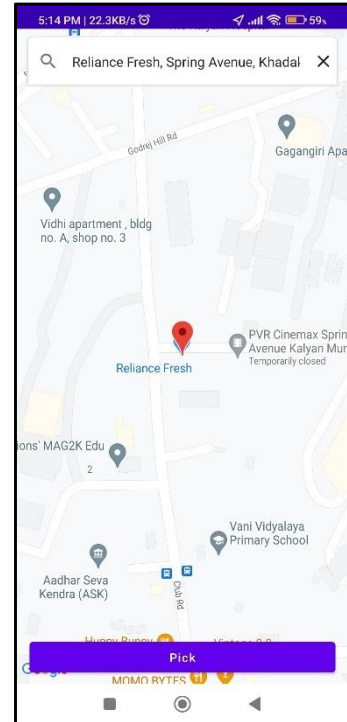Fig 3: Task list.　　　　　Fig 4: Adding a new task　　　Fig 5: Picking a location for a task.
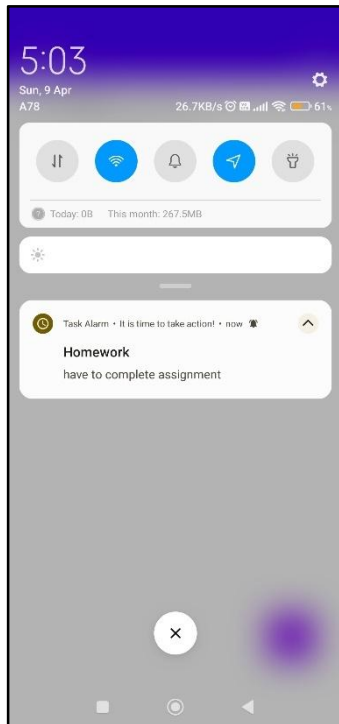

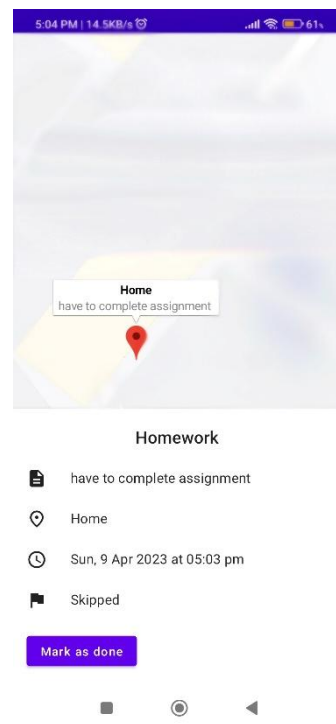Fig 6: Notification for a task that has been triggered.　　Fig 7: Notification details (image blurred for privacy)

5.2 Future Scope

As mentioned earlier. The application has areas that could be improved upon, and new features can be added to enhance the user experience. From our testing, we came up with the following points:

- Porting to iOS.
- Increasing the accuracy of reminders.
- Optimizing the application for a longer battery life.
- Devising a way to monetize the application without hindering the user experience.

VI. CONCLUSION

The goal of this project was to add another dimension, location, to the traditional date and time-based reminders. As of now, we have succeeded in reaching this goal. A working model for an application that provides location-based reminders was developed, for android devices. However, we do have to acknowledge that our model could be further improved and expanded upon. Furthermore, the real-world implications and impact of the application still needs to be analysed.

VII. ACKNOWLEDGMENT

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