Location and Time-Based Reminder Android Application – A Survey

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Abstract: *In this study, a location and time-based reminder android application is developed to help people remember their daily tasks which are location specific. Also enabling them to provide a time context to these reminders. Many times, it cannot be predicted when we will be at a particular location and at what time to perform tasks that are location specific. It is beneficial if we get an alert when we are actually present near that location. When combined with the context of location and time reminders can be much more efficient and drastically increase the productivity of users. The system uses Google Maps API, GPS, and Geo-Fencing Algorithms to provide accurate reminders. Timely reminders increase productivity by reducing the chances of the missing location of interest and the task to be performed..*

Keywords: Location-Based Reminder, GPS, Geo-Fencing, Flutter, Android

I. INTRODUCTION

A location-based service is a software service for mobile device applications that requires knowledge about where the mobile device is geographically located. The location-based application collects geographical data, and geo-data is gathered in real-time using location-tracking technologies.

Geofencing is a location-based service in which an app or other software uses GPS, RFID, Wi-Fi or cellular data to trigger a pre-programmed action when a mobile device or RFID tag enters or exits a virtual boundary set up around a geographical location, known as a geofence.[4]

Location-based reminders use your location to provide you with geographically relevant alerts, such as a reminder to call someone when you get to a specific place and when to leave for your next appointment, or an app or shortcut recommendation based on where you currently are.

Today people have to perform a variety of tasks in their day-to-day life like arranging meetings, scheduling meetups, buying groceries, filling fuel, etc. Generally, we use a diary to keep track of these things or a software application.[1][3]

Location-based tasks are performed when we reach or are around a particular location. Usually, the time of occurrence of such events is not fixed thus time-based reminders are not enough. When combined with the context of location and time reminders can be much more efficient and drastically increase the productivity of users.

Reminder application systems are now widely used for proper time management and increased productivity and reduced frustration. The majority of applications use time-based reminders which are not always useful. Not all tasks are time-based.[2]

Today with increased levels of multitasking only time-based reminders are not always enough. Traditional reminders are available but they cannot be efficiently organized. In many situations, there is a need for location-based alerts which take into account location as well as time.[1]

Timely location-based reminders reduce the chances of missing the location of interest and the task to be performed at the desired location during a specified time.

II. LITERATURE SURVEY

Pradnya Battin and Dr. S.D Markande in their paper [1] titled "Location-Based Android Application Using Google Maps API" proposed a system that runs on an android smartphone and provides location-based reminders using GPS. The application locates the user's device based on GPS to detect the current location of the user. The desired locations and tasks set by users are stored in the database.

The application will perform the comparison of the current location which is identified using GPS and the location specified in the reminder. If the mobile device is physically near the defined location, then a reminder alert will be given to the user about the task.
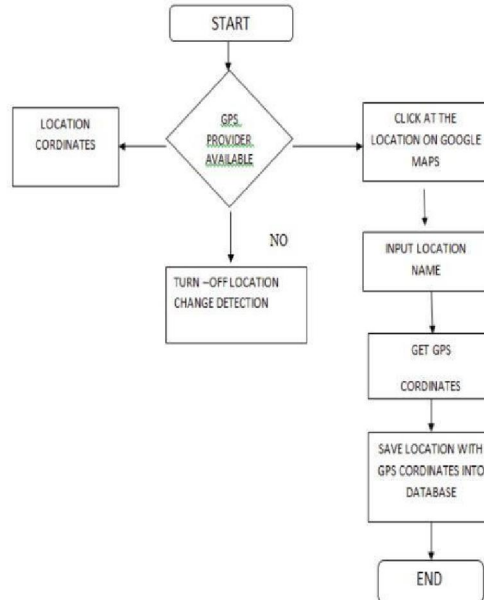

Figure 1: Courtesy [1]

Flow chart of identifying locations with respect to the tasks to be done

For adding location the system uses Google Maps. Users can add locations to the database by picking the desired location shown on Google Maps. This location will be used to provide reminders in the application.

Ritu Raj Madhup in their paper [2] titled "Location Based Reminder System Using Android Mobile" proposed a system in which the user is able to get his current location and is also able to browse any of the locations and add task reminders at the desired location using an android application.

When the user reaches the desired location the application will check the reminder's specified location and its latitude and longitude, if the current location matches with the location of the reminder an alarm will be triggered alerting the user about the task. These activities will be carried out using Google Maps and GPS.

The proposed system allows users to add multiple reminders at the same location. The application displays the task reminder until the user declines the notification or marks it as complete. It doesn't collect any user records. The locations are stored on the android device's internal storage. Google Maps provides service to android applications for adding task reminders on a specific location.

The android mobile device tries to fetch the current location using GPS and Wi-fi provides connectivity. The user can change the location to a different location desired by the user using a drag pointer.
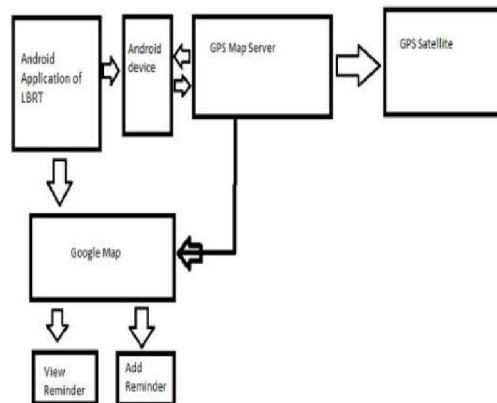

Figure 2: Courtesy [2]

Flow of "Location-based task reminder system using Android Mobile"

Nur Rokhman and Lubab Saifuddin in their paper [3] titled "Location and Time-Based Reminder System on Android Mobile Device " proposed a system that runs on a mobile device that can be accessed anytime and anywhere. The system uses Foursquare and Google Maps for searching nearby locations. The reminder system requests Foursquare API for venue and Google Maps API for spatial data. After receiving the response from Foursquare API and Google Maps API the system processes and displays the result on the screen.

The reminder application uses GPS to request the user's location. The application allows users to add notes, view notes, change or delete stored records, search the venue and start or stop services running in the background. The application stores the title of the note, containing the name, address, category, longitude, and latitude of the location in the database. The system allows users to search locations based on their name or nearby locations from a designated point. The system requests the Foursquare API by using input from the user.

A request is sent to Google Maps API for spatial data.

The system calculates the distance between the user's location and the location of the venue stored in the database. When the distance is smaller from the specified parameter an alert reminder is sent to the user. The system tracks the user's location by frequently activating the location algorithm within the specified time frame. The checking is repeated for all the records stored in the database system. The user can set a reminder to be activated either by location, time, or both location and time.
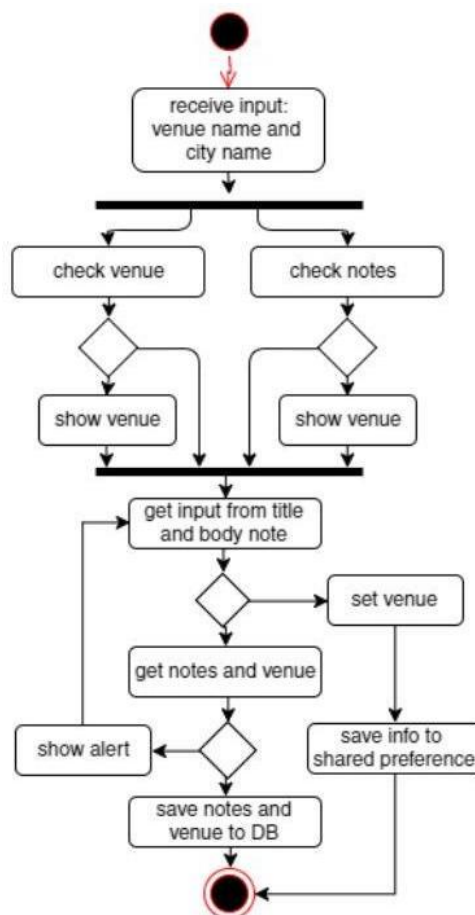

Figure 3: Courtesy [3]

Activity diagram of adding note process

Srihari Pamulapati and Longzhuang Li in their paper [4] titled "iDoRemind: A Location-Based Reminder Application for Android" developed an application iDoRemind to assist people in managing their everyday activities by repeatedly alerting users and suggesting alternative locations based on their preferences and current locations. It allows users to create location-based reminders and provides features to make these reminders based on time and date. The system also

suggests the nearby locations to the user based on his preference and current location.

When a user creates a new reminder, it is processed by a server on AWS and the request is recorded in a centralized database. The information includes reminder titles, location information, time restriction, and other users with whom the location is shared.

The system uses Google Maps API, Google places API to get users' current location and nearby places. The user can also share the reminders on social media and the reminders can be shared in a group, so every group member gets the alert if any of the group members travel nearby that specific location.
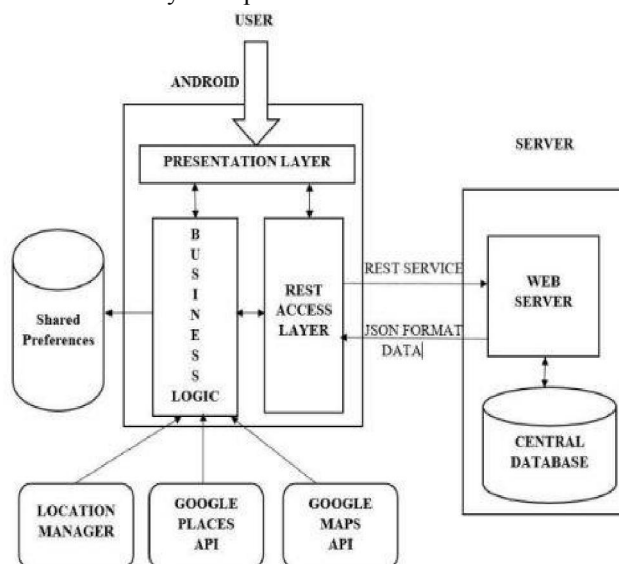

Figure 4: Courtesy [4] Architecture diagram

III.COMPARISON BETWEEN LITERATURE PAPER

Features	[1]	[2]	[3]	[4]
Provision of Time Constraints	Yes	No	Yes	Yes
Provision of Date Restriction	No	No	No	Yes
Repeat Same Reminder	No	No	No	Yes
Battery Consumption	High	Very High	High	Low

IV. PROPOSED METHODOLOGY

4.1 Limitations

The systems proposed by surveyed papers have certain limitations.

- Most of the existing systems keep tracking the location of the user's mobile device through GPS, which requires them to keep the GPS on all the time. This drains the battery faster and is unnecessary.
- The existing systems do not have the functionality of repeating the same reminders over a period of time. Thus the user has to set the reminder again every time.
- The existing systems are mostly location-based and do not have time constraints. This may sometimes make the reminders annoying as the user may not want to perform that task at that time.
- The existing systems do not have the functionality to suggest the different hot places near his desired location

while setting reminders.

4.2 Proposed System

1. The proposed system uses the accelerometer embedded in mobile devices to determine whether the mobile device is in motion.
2. The system also allows users to provide time constraints to location-based reminders.
3. The proposed system provides functionality to repeat the same reminders over a period of time as per the user's convenience. The user can also select the specific days on which the reminder would be active.
4. The system uses Google Places API to suggest users nearby places according to his search around desired locations for reminders.

V. CONCLUSION

In this paper, we surveyed different papers to compare different approaches to providing location-based reminders. The papers suggested that time-based reminders are not enough as all the tasks cannot be governed by time and are location specific. With the widespread use of smartphones and the availability of GPS modules in them, users can be provided with location-specific services like location-based reminders increasing their productivity and management abilities.

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