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Family Location Tracking Application Based on Android Platform

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Abstract

This paper presents a family location tracking application that uses GPS to provide accurate location of every user of the group in the application. The application installed on the client's android device communicates with Firebase Real Time database to store the location history of the user and also alerts the other users of the group when a family member arrives within a pre-defined zone closer to the user. The application also enables the users of a group to create and manage tasks efficiently.

Keywords: GPS Location Tracking, Firebase, Task management.

Introduction

With the advancement in mobile Internet technology and wide use of smartphones, more focus has been laid on network access technologies and interactive applications that are being developed to benefit the users in various ways.

In a busy and sophisticated lifestyle where it is difficult for us to stay connected with our loved ones and keep them informed about our whereabouts, there arises a need for an efficient autonomous system that could provide an automatic update about our location to our family/friends and save them from getting into an anxious state of mind.

Location based service application that provides information to the user based on their location are growing business and has been extensively used by the mobile clients has it becomes really beneficial in times when the user's near or dear ones are off the radar.

Tracking and maintaining a record of the location of every user of the family is very much beneficial especially in situations of emergency or immediate help where a user can be easily located with the help of the user's previously recorded locations. This system tries to achieve the same and present an efficient application that helps to detect and record the history of the location periodically of every user of the group.

In addition to the mentioned features the application also helps the user of every group to create and manage tasks related to the group.

System Architecture:

Authentication

This module aims at developing the authentication procedures that are to be provided by the application when a user uses the application. The application provides signing up activities where a user registers himself with the application by providing basic information required .Once the user signs up, the user is directed to a page where the user needs to sign in with the username and password. Once the user has been authenticated, the user is guided to the rest of the application.

Location Tracking and Task Management

The module also aims at locating the different users/members of a group and storing their information in a database which can be later retrieved for different uses provided by the application. The module aims at developing a task management feature which allows the user to set the tasks common to the group/family. Once the tasks has been scheduled, the application sends reminders to all the group users about the task that needs to be completed. Once the task has been completed, the

task can be removed and the next task to be done can be set.

Notifications

In this module, we try to develop a notification feature which alerts a user when a fellow member arrives within a pre-defined radius. Once a group user arrives within the location radius, automatic notifications are sent by the application the module also aims at sending an automatic last updated location of the user of the group whose battery level falls less than the critical level and notifies the same to all the group members.

Battery Optimizations

In this module we try to develop a feature in which the user gets to choose the frequency of the user location history that has to be updated in the real time database with respect to each user, thereby reducing the power consumed of the user's device and achieving an optimized battery performance. The applications also aims at using less memory thereby making it light weight not greater than 05 MB.

Related Works

[1] This Paper introduces a mobile tracking application based on location based service to track and locate the mobile device using geographic co-ordinates of the user as the location provider. It helps the user to locate their friends and receive alerts. The application also ensures the security of the user. The proposed system implements a client server system that helps to locate friends and also provides the user with a notification when his friend is located within a couple of meters to the user. The system uses J2ME APIs to develop the application, which is beneficial to make applications on wireless devices. The radius is externally maintained by the administrator which limits the efficiency of the application as it is a radius oriented and does not function outside the defined radius.

[2] The proposed system is an enhanced work of an indoor navigation and location tracking system using android based devices and Wi-Fi access points. The

System is developed in three stages i.e. Client application, Web service development, Server design. The other objectives in addition to the main working of the system are that the device uses signal strength measurements of the available Wireless networks to accurately locate itself in a particular location. The proposed system is based on the organizational infrastructure which is currently used for providing internet based services to the mobile users.

[3] The paper portraits an android application which is used to track children based on GPS location or SMS service facilities available on android mobile devices. The application uses android devices of the parents as server and that of the children to act as a client. The server uses SMS services for communicating with the client and with the help of GPS tracks down the client's location. Parent's side phone uses SMS service for communicating to child's mobile with the help of a map. The child's android phone uses telephony services to communicate with parent side.

[4] The paper presents a localized intelligent algorithm that is developed in the field of location tracking where user can define a particular area which is not provided in the existing systems through satellite. It also provides a complete location detail of the other members of the group using various techniques and applications of location tracking such as Cell Identification, Global Positioning system, Assisted GPS, Various Radiolocation systems, Geographic Information system, Accelerometers and Electronic Compass but location tracking using Cell Identification is less precise and the precision can be increased by Time advance and Signal strength.

[5] The paper proposes a model that provides option to track the location of second party through their smart phones via SMS and mail. It also provides facilities to receive information of incoming calls and messages. The application maintains a log file which contains user messages and call details and their mail to the concerned party. This application is a hidden application which is launched by a security code through the phone. The requesting user sends a simple message which has a hidden code that automatically gets detected by the receiver and transmits the location of the client user to the requester without turning on the GPS.

[6] The author intends to develop an application (Indoor mobile tracking application) which tracks the location of the mobile devices using Bluetooth terminals and a Bluetooth access point that provides an interface to a mobile network. The implementation of a mobile indoor application delivers maps and linked database information to indoor wireless devices such as mobile phones and PDAs. Users can then interact with the web pages through their phones .and if the mobile is located outside the security zone which are divided into three priority zones. The application divides a geographical area into three priority zones which are

safe, risky and highly risky. In case of a security breach, different alert messages are sent depending on the positioning of the user in the three different mentioned zones. The application provides the location of a user on request. The application also ensures that the user does not enter the highly dangerous zone.

[7] The author describes a system for the Design and implementation of android phone based location and file sharing system by adopting a client server scheme in which a user obtains the current location of the fellow-member using GPS enabled android device and send the same fetched location information to a web server. The application connects with an external database such as MySQL in order to maintain a centralized database. The application shares locations and messages by interacting with the web server. The web server is responsible for the storage and management of registered user information and the data that has been forwarded to it. A regular monitoring/tracking of the users are done which hampers the overall system performance and reduces the efficiency of the system.

Design and Implementation

System Design acts as a technical solution to satisfy the functional requirements of the system. The term Design is a creative process and a good design specifies the key to an effective system. The System Design is a method of applying numerous techniques and ideologies for defining a system in detailed description to permit the physical relation. This is the important part of the project lifecycle in which functional specification requirements produced during system requirement analysis is transformed into a physical architecture. The goal of this document is to create a blue print for the development of the project. System design is a semantic approach to create a new system.

Users:

Users are the main characters of our application. They install the application and sign up by providing basic details required to monitor the user.

Groups:

Every group contains users and every member of the group can monitor other members of the group. A user can add other members to the group or can willingly exit the group.

Location Manager:

Every user's location details such as geo location details along with the time are updated to the Firebase database in real time. The user needs to keep the GPS turned on his phone and must be connected to the internet for the location to be stored on the database.

Firebase Framework:

Google's Firebase frame is used to build the application which provides us with API's to Firebase Real Time database and Firebase Authentication.

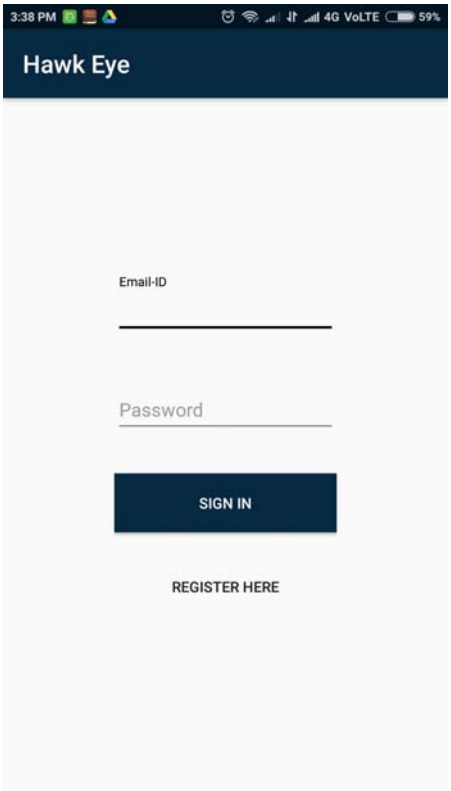
Notifications:

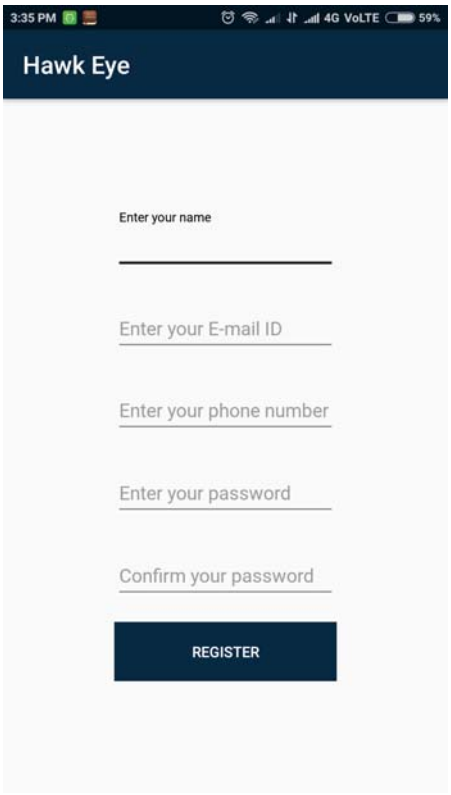
When the user is located within the specified radius of another user, both the users are notified about this, which will help the users to find each other.

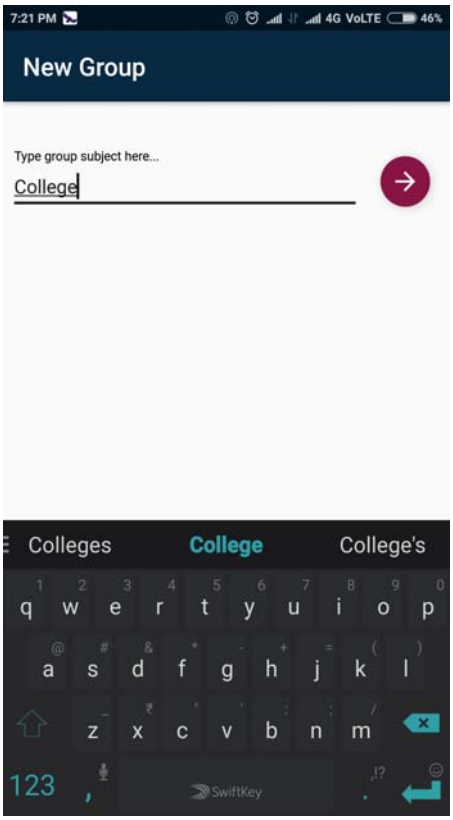
System Workflow

Registration of the user

The application provides an application sign up page that allows the user to sign in with the specified credentials i.e. user name, user E-mail ID, user phone number, user unique password.







Once the user has been registered, the user would been guided to a sign in page where the user has to enter the correct username and password to log in to the application.

Group Creation and attributes

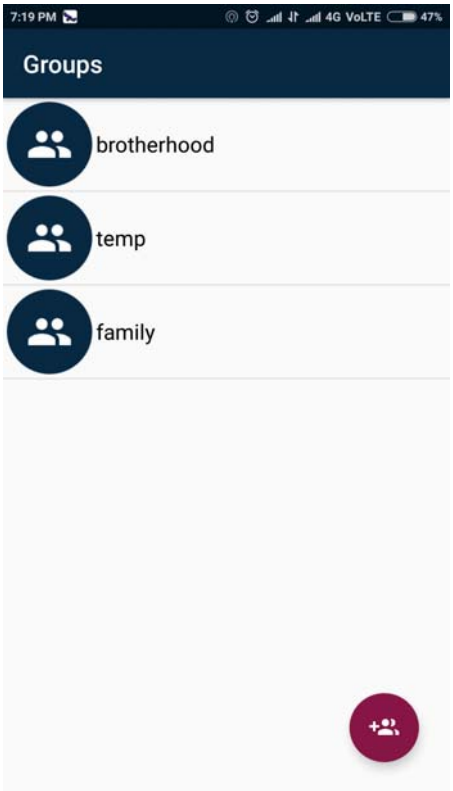
The user is asked to create a group giving in the group name and adding members from the contact list as per the users' preference.

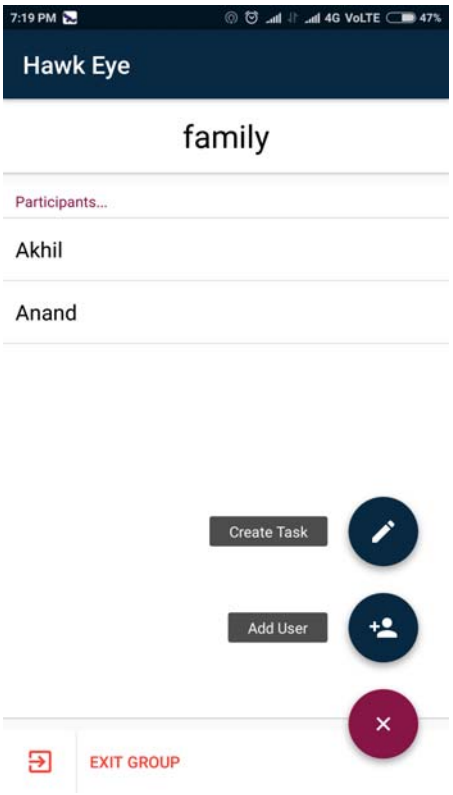
Once the group has been created, the user is guided to a group list page where the list of the groups that the user is part of is displayed.

The group is provided with Add user and Task option common to that specified group.

On clicking the group, the system displays the group member list. On clicking a particular member of the group, the system provides the location history of that particular user from a certain period.

The location history of every user provides an option where in a particular location can be viewed using Google Maps.

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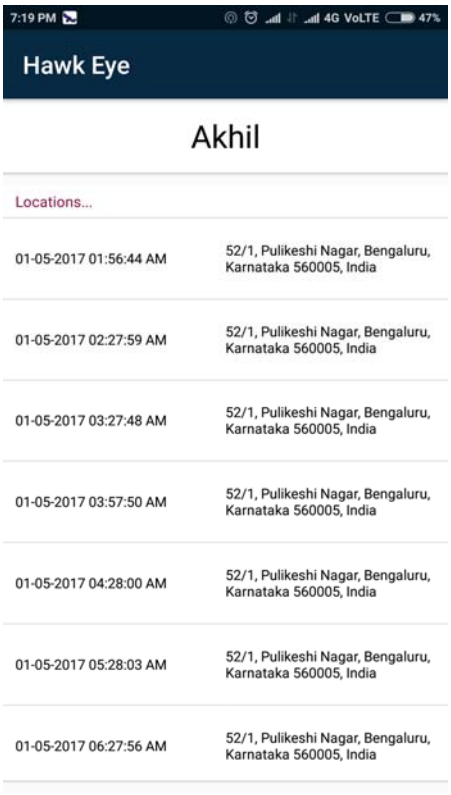
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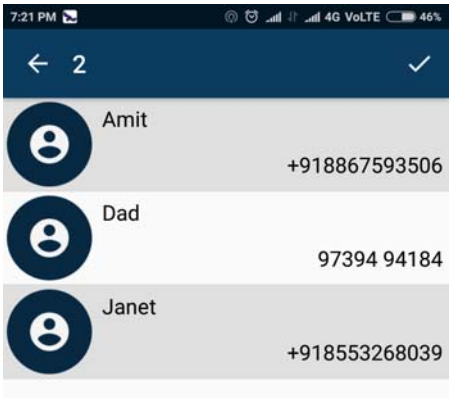
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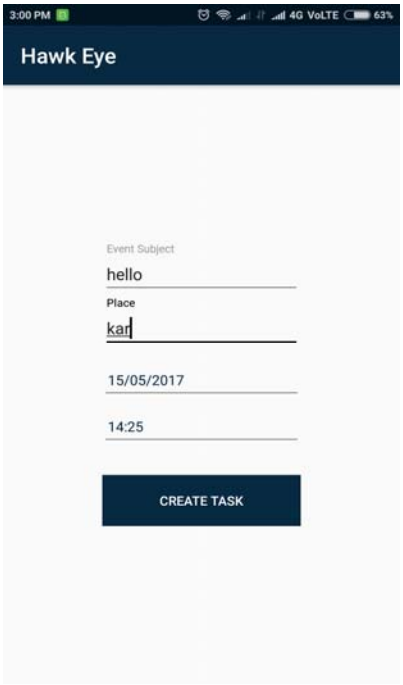
Task Management

On clicking the task option provided for each group, the user is navigated to a Task list which displays the existing Tasks created by the users of that group. It also provides an option to create a task by providing the necessary credentials i.e. Task name, task place, event date and time



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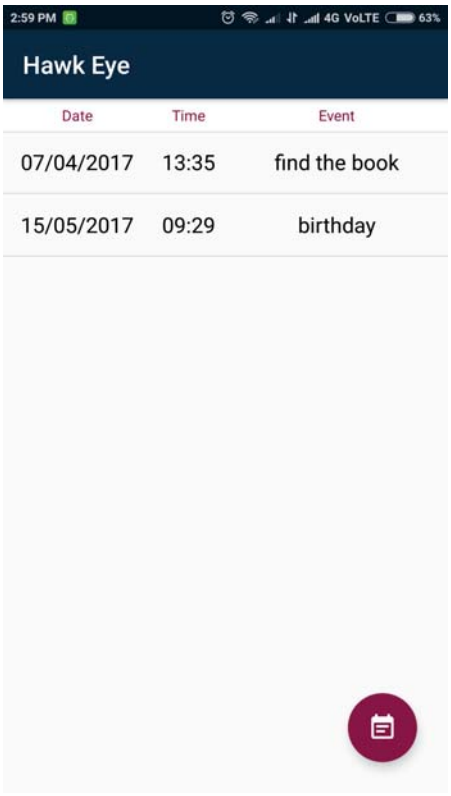

Conclusion

The proposed system uses GPS technology in order to provide accurate information about every user of the group/family. In this paper Java programming language has been used to develop the client side and Firebase for the backend storage. With the help of GPS enabled smart phone it is possible to retrieve the latitude and longitude of the user device giving the most accurate location. The application also provides an efficient task management system that helps to create and manage tasks related to every individual group's. This application can also be developed for windows and iOS devices as a further enhancement.

Acknowledgements

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References

[1] Abhijeet Tekawade, Ahemed Tutake,Ravindra Shinde, Pranay Dhole, Sumith Hirve,"Mobile Tracking Application for Locating Friends using LBS", "International Journal of Innovative Research in Computer and Communication Engineering",Volume 1,Issue 2,pages 1-6,April 2013.

[2] Mohit Rathore, Narendra Rathore,"An Implementation of Android mobile based location finder", "International Journal of Soft Computing and Artificial Intelligence", Volume 1,Issue 2,pages 1-4,Nonember 2013.

[3] Maghade Satish, Chavhan Nandlal, Gore Sandip, "Child Tracking System using Android phones", "International Journal of Advanced Research in Computer Engineering and Technology", Volume 4, Issue 4,pages 1-4,April 2015.

[4] Shaveta Bhatia, Saba Hilal , "A New Approach for Location based Tracking ","International Journal of Advanced Research in Computer Science Issues", Volume 10, Issue 3, May 2013.

[5] Arushi Jain, Puja, Mudgil, RachnaDabla, KalyaniSatapathy, "Android based Tracking Application – Dope Hunt", "International Journal of Soft Computing and engineering", Volume 4, Issue 1, pages 1-4, March 2013.

[6]RadhikaKinage,"MobileTrackingApplication","Internation al Journal of Innovative Research in Science, Engineering and Technology", Volume 2, Issue 3, pages 1-7, March 2015.

[7] Krishna Handge, "Design and implementation of android phone based location and file sharing system", "International Journal of Engineering Sciences & Research Technology", Volume 4, Issue 5,pages 1-5,May 2015.

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