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Human Safety and Tracking Management Using Geo-Fencing

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Abstract: A geo-fence is a virtual boundary for a real-world geographic area. Today's smart phones are providing lots of technology which are developing rapidly for many services. GPS is one of the technologies of Smartphone which uses location based service. This paper is mainly focused on application which provides human safety and tracking management. This application ensures maximum security and live tracking of particular person for avoiding problems in human life. In this application, when triggers fires, notification is send to related person or particular action is taken out.

Key words: Geo-Fencing, GPS

I. INTRODUCTION

A geo fence is a virtual perimeter of interest that can be set up to fire notifications when it is entered or exited, or both. For example, a geo fencing app can alert us that our kid has left a previously specified area.

Now, with the new Location APIs, Google's location algorithm has been rewritten to be more accurate and use significantly less battery life.

Today smart phones are the basic need of the user today, these Smartphone provides a lots of features and services to make user's life easier like GPS, Bluetooth, Wi-Fi, fast connectivity features etc. By using these types of services we can implement new applications for different types of safety and tracking management purpose by using location based services. Today human safety is an important issue across the world. I have discussed how a smart phone provides safety and monitoring for the person so that they can easily track himself and other person according to their requirement. This proposed application is developed on android platform for this application the basic techniques required mentioned below:

Geo-Fencing

GPS (Global Positioning System)

Notification

We are focusing on three modules in this application.

A. Destination Tracking Module

B. Human Tracking and Attendance Module

C. Fisherman Safety Module

Sometimes traveller who travels in unknown area cannot easily identify destination. So traveller may miss that destination. This system is going to help the traveller to track the location on the way. He can set way-points on his way and when he will pass through that way-points, log will be recorded and when he will be near to destination notification will be send to user in form of pop-up message or alarm. The destination tracking application will be one best friend for traveller in journey. And when User will enter into decided geo-fence, user will get notification that you are about to reach.

The Human Tracking and Attendance Module is suitable for analyzing the location and boundaries of a GPS mobile enabled especially for staffs who are working away from the office or outstation. Mobile Attendance System by GPS enabled Android smart phone is the system that using GPS location provided by the staff smart phone to get staff's current location to enable the user to logged-in or logged-out their attendance record when the staff is in the valid location. Authentication of staff is done by the image captured by the camera during logged-in and logged-out. It is suitable to record staff working hours. The system provides ease of management for the administrators to view and track staffs' attendance performance.

Fishing very important business of coast line citizens. Fishermen need to have fishing regularly for earning. Many fishermen do fishing at deep sea. And many fisherman who lives near international border, like border of India-Pakistan or India-Shrilanka or India-Bangladesh, do fishing in deep sea near to international border or into the bay near sea which is wide near to international border. But because of lack of availability of information and current location, fisherman can get closer to international border and

sometimes they cross border and fisherman can be arrested by police. The Fisherman Safety application help to continuously track moving location of fisherman and if fisherman will move towards international border which will be danger for fisherman then alert to fisherman before some predefined distance from international border. That notification can be alert with some ringtone or any such type of notification which can take attention of fisherman.

II. LITERATURE SURVEY

Nowadays, applications which are working on location based service are emerging. These application gives location of the user or related user. Some of the applications are

A. Maps - Navigation & Transit

Map for Android provides an unrivalled way to find our way around using your mobile phone. With Google Maps installed on our device, we can view street and satellite maps of the whole World. The application automatically detects our current location and displays it on screen. We can move around by holding our finger and dragging the screen and zoom in and out by pinching with our fingers.

B. Family Locator – GPS Tracker

With Family Locator our family can share location safely using the one thing we always carry around – the Smartphone. It keeps us in touch and we can see where everybody is in real-time. Location History of your kids to increase the safety of our loved ones. Location History feature enables us to see the GPS location points and movement of family members during past 7 days.

C. GPS Phone Tracker

The GPS Phone Tracking Pro App makes it easy to keep track of life's essentials; use it to:

- 1) *Find Your Friends:* and get directions to their location.
- 2) *Find Your Phone:* check the app's Web site to find a lost device.
- 3) *Stay Connected:* discover your friends' whereabouts at any time simply by checking the GPS Phone Tracking Pro map.

D. Where Am I - Find My Location

This is the application which give our current location. Whenever user required to find current location then user can easily get his location on different map view.

Following are some features of this applicatio

- 1) Detailed information about your location.
- 2) Current location is displayed automatically.
- 3) Track your position as you move.
- 4) Different types of maps.
- 5) Easily share your location.
- 6) Full screen map option.

III. IMPLEMENTATION

A. Destination Tracking Module

In this module, location of the passenger will be continuously tracked, and user will add destination place with some predefined radius. So this will be geo-fence around destination. And user can also add some places of the journey as Way-Points. User can locate himself so he can see where he is. And when passenger will go through way-points, logs will be created and when he will be entered into geo-fence area i.e. destination then trigger will be fire and notification will be send to passenger's mobile. Architecture of destination tracking is shown in fig[].

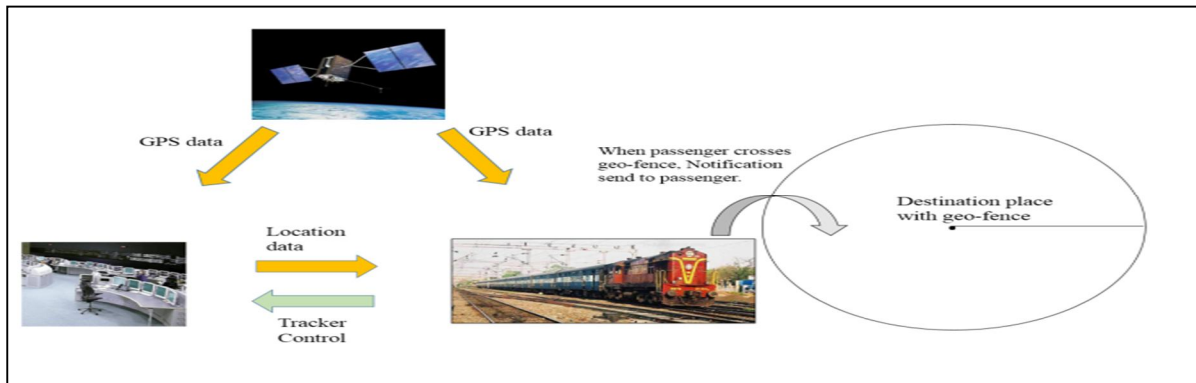


Fig 1: Architecture of Destination Tracking Module

- 1) *User Registration:* first user will register himself by username, password, email id, mobile number etc.
- 2) *User Login:* User will login with username and password which got at the time of registration.
- 3) *Add Destination:* User can add destination by entering place name or pointing on to the map.
- 4) *Add Way-Points:* If user want to add middle check points then he can add Way-Points between destination and his current location.
- 5) *Notification:* When moving user will reach to the destination or enter into geo-fence then notification will be sent to mobile user.
- 6) *Get-Logs:* After ending of journey user can view In-time and Out-time from way-points.

B. Human Tracking and Attendance Module

Admin can track his employees. This system is suitable for analyzing the location and boundaries of a GPS mobile enabled especially for staffs who are working away from the office or outstation. Mobile Attendance System by GPS enabled Android smart phone is the system that using GPS location provided by the staff smart phone to get staff current location to enable the user to logged-in or logged-out their attendance record when the staff is in the valid location. Authentication of staff is done by the image captured by the camera during logged-in and logged-out. It is suitable to record staff working hours.

This application works in two parts. First is admin side app and second is employee side app or app for person whose attendance is required for admin.

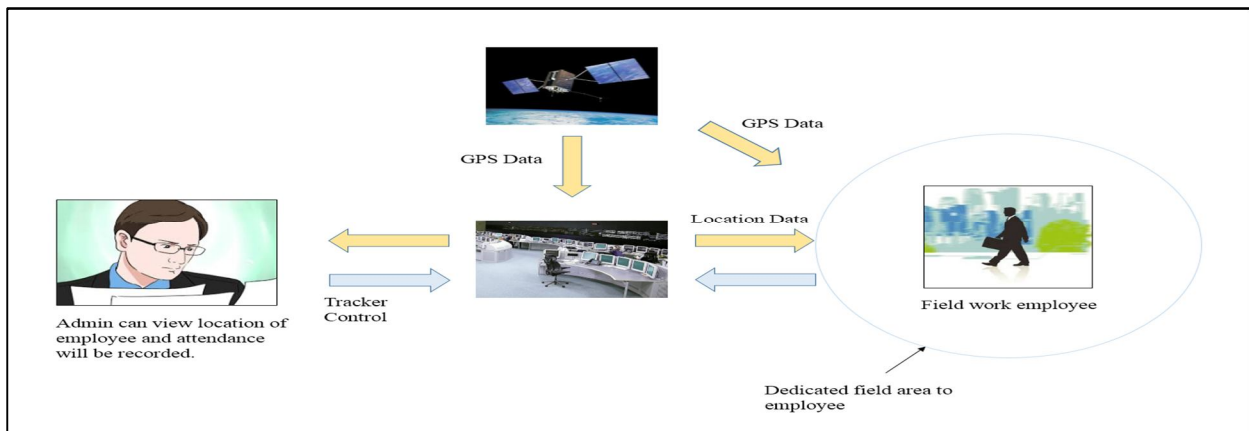


Fig 2: Architecture of human tracking and attendance Module

- 1) *Admin Side App:*
 - a) *Admin Registration:* User will first register himself like admin with username, password, mobile number, emailed etc.
 - b) *Employee Add:* Admin will add his employee with his name, mobile number, email id, password.
 - c) *Employee Location View:* Admin can view list of all employees. And by clicking on employee name admin can view employee's location on map and log-in time photo and log-out time photo of employee.

- d) *View Attendance:* Admin can view attendance of particular employee by selecting start date and end date.
- 2) *Employee Side App:*
 - a) *Login:* Employee can login by email id and password which is provided by admin.
 - b) *Image Capture:* After login camera of mobile automatically will starts and employee will capture his photo at log-in time and save into database so admin can verify that employee.
 - c) *Current Location:* this will display latitude and longitude statistics of current location.
 - d) *Logout:* When employees will logout, camera will automatically start and it will take picture of employee again, and save the picture in database so admin can check authentication.

C. Fisherman Safety Module

In Fisherman Safety module, Fishermen need to be alerted before crossing international border. For this location of the moving boat will be continuously track by GPS and according to that position of the geo-fence will match with line of international border. If any time geo-fence will coincide international border, trigger will fire and immediately notification will be send to fisherman's smartphone that "You are getting closer to International border, Stop". Notification will be in any form, like it may be SMS, It may be Phone Call, Pop-up notification on mobile, Alarm or Alert window with some ringtone which will catch fisherman's attention.

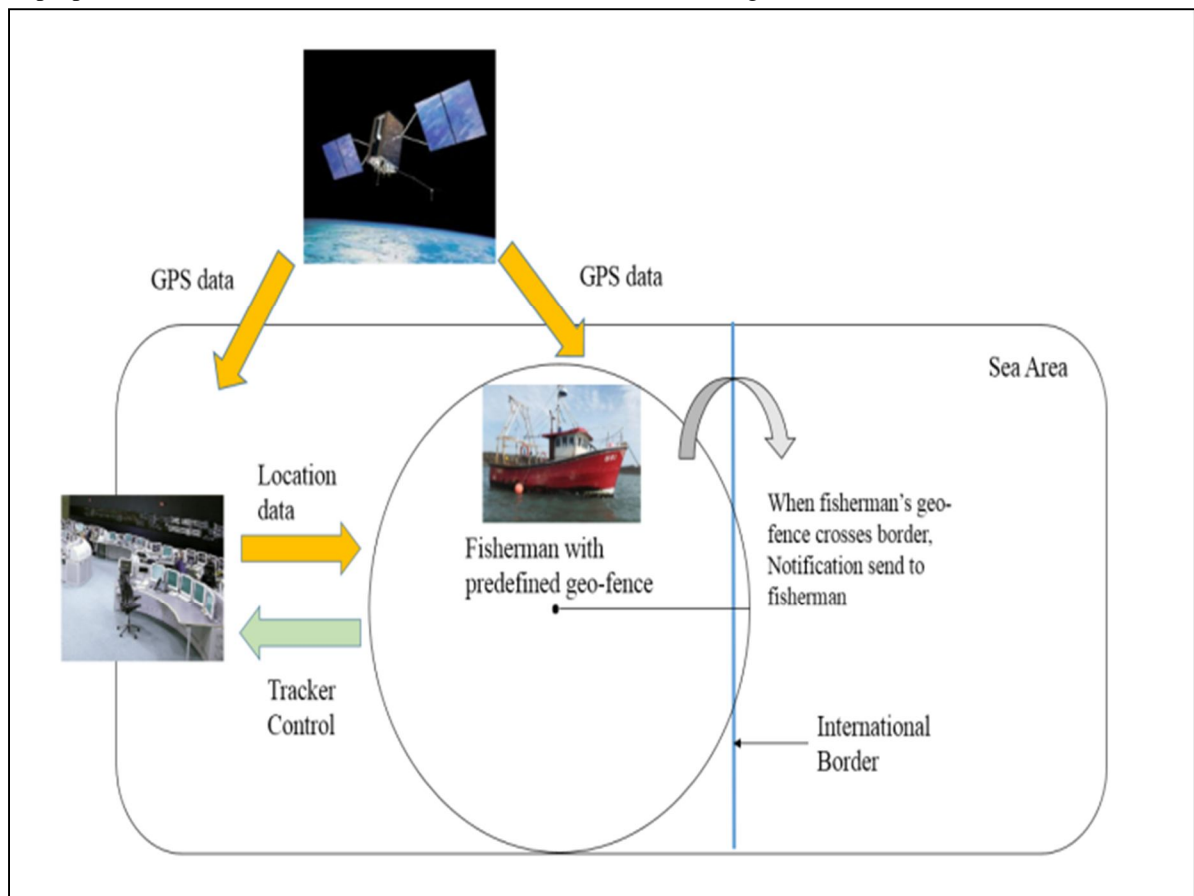
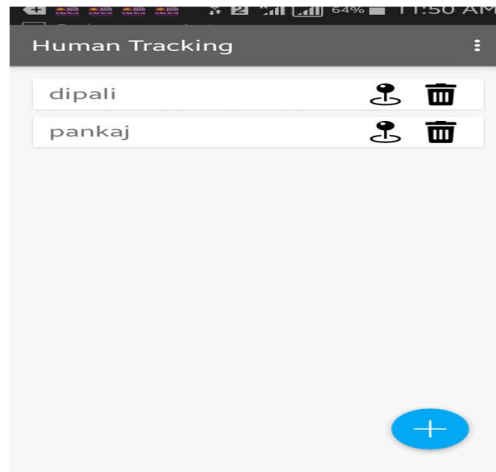


Fig 3: Architecture of Fisherman Safety Module

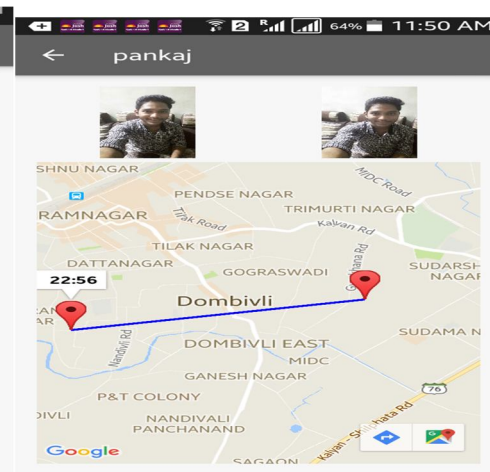
- 1) *User Registration:* Fisherman will first register himself as a user. He will enter Username, password, geo-fence radius, mobile number etc.
- 2) *User Login:* Fisherman will login by username and password which is acquired at User registration phase.
- 3) *Show Current Location:* By this fisherman can see current location of boat at any time for extra information.
- 4) *Notification Alert:* When geo-fence of the boat will coincide international border, notification will send to mobile. That will be alert to fisherman.

- 5) *Backend Process*: Continuous tracking of boat will be measured and it will be check with international border and if geo-fence will coincide then notification will be sent.

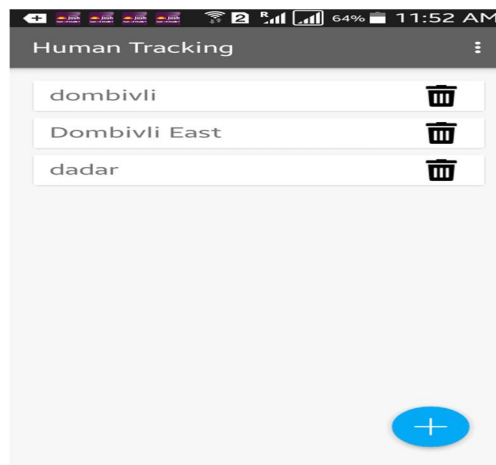
IV. RESULTS



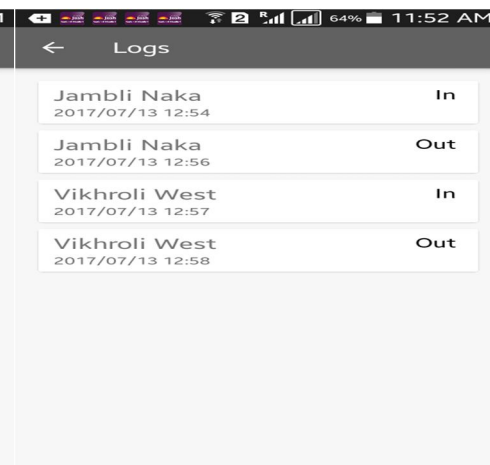
Human Tracking employee list



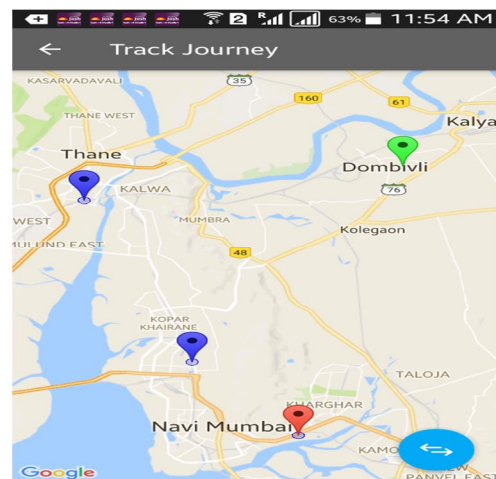
Employee Location details



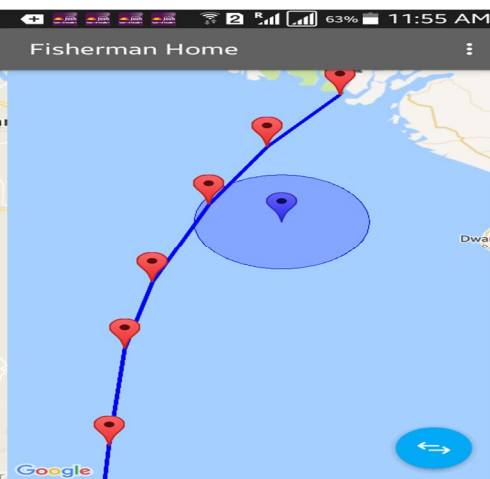
Destination plan list



Log details after journey



Journey details with way-points



Fisherman location in sea

V. CONCLUSION

This application is designed for human safety and tracking management with Fisherman safety module, child safety module, destination tracking module. The solution represented in this system takes the advantages of smart phones which offers rich features like Google maps, GPS, SMS etc. Our proposed system we have provided real time tracking. We have added Geo-fencing and Emergency notification services to enhance the system. Majorly human safety is concerned. Fisherman safety module will be useful for fisherman while fishing in deep sea and near to international border. Child safety module will be useful for parent for locating child so child security. Destination tracking module will be useful for traveller while travelling into unknown geographical area.

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