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.

Key words: Geo-Fencing, GPS

I. INTRODUCTION

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. In this paper, we focused on three modules.

1) Child safety module
2) Fisherman safety module
3) Destination tracking module.

In child safety module, nowadays child safety is very important. By this application parent can track child location and when child will enter into college campus and when child will leave from college campus, parent will get notification according to that. In second module, Fishermen goes for fishing near international border like India-Pakistan border. Sometimes fishermen crosses international border and patrolling international county's agencies arrest them and they kept into prison for many years. For avoiding this problem, proposed application help to continuously track moving location of fisherman and alert to fisherman before some predefined distance from international border. In third module, suppose one passenger is travelling for long journey and his destination is unknown, so he can get alert at predefined distance before reaching destination. For example, before reaching to place A, user will get notification that you are 2 km nearer to place A.

GPS (Global Positioning System) which is based on location based service is useful for tracking particular person and also provides the information where that person is currently located. And nowadays most of the Smartphone provides GPS feature. When particular action or triggers fires then notification is sent to respected person. For continuously tracking location Google map is used.

A geo-fence is a virtual barrier. Geo-fence apps and tools monitor when mobile devices or other physical objects enter or exit an established geo-fenced area and provide administrators with alerts or notifications when there's a change in status for a device. These alerts can be in form of text messages, e-mail notifications, phone calls or similar means of communication. Generally the geo-fencing refers to the idea in which the user defines the boundaries virtually over a geographical area, and once the transition is detected over a boundary the notification is send to perform the desired action.

II. PROPOSED SYSTEM

This system is divided into three parts

a) Child Safety
b) Fisherman safety
c) Destination tracking module

A. *Child Safety*

Expand this concept by pinpointing a location (GPS) and setting up virtual geographical boundaries around it. This is what geo-fencing is. Using devices with specific software with GPS and RFID capabilities, one can fence in or create invisible boundaries in a place, a virtual fence that shows up only on one's device. This way, the geo-fence operator is alerted as to who or what comes in or out the virtual boundaries, as long as these people, animal, or object carry a monitoring device. Smartphone and tablets work very well for this.

In child safety module, when registered person entered into geo-fence, particular person will get notification in form of SMS, E-mail, call etc. This notification is one type of communication between two people. In this paper, child safety is one sub module. In this when child will reach to the school, parent will get notification which indicate child is reached. And when child left school i.e. child is out of school campus then parents will get notification. Parent side use notification service and GPS service for communicating, positioning and comparing its positioning with dedicated zones.

This architecture is based on generally client server architecture. Parent side is act as server side and child side is act as client side.

1) Architecture-

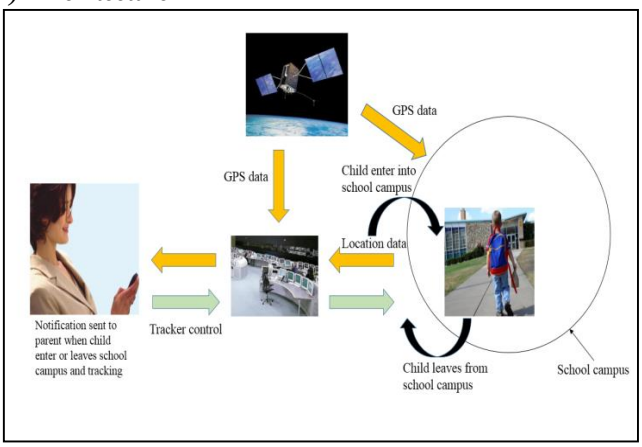

Fig. 1: Architecture of child safety application

2) Flow of child safety module-

a) Registration- here two types of registrations, parent registration and chid registration. In parent registration, parent can add email ID, mobile number, address. And

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in child registration, parent can add child with details like name, age, id, password, particular geo-fence with its radius in km.

b) Login- here also two types, parent login and child login. When Parent will login with username and password, parent will be display with his/her child list. And in child login, child will be display page which shows either he is in school campus or not i.e. he is in geo-fence or not. He can send alert message to added relatives in emergency.

c) Location tracking- When parent select particular child from child list, it shows location of the child in map.

d) Notification- If child is inside geo-fence, it shows message that child in particular area. If child is out of geo-fence then it shows child in out of particular area. And also send SMS or Email to parent to communicate or send information/ status about child.

B. Fisherman safety

The long-standing territorial disputes and military conflicts between India and Pakistan have led to vigilant and strict patrolling of territorial waters in the Arabian Sea and the coastline shared along the Indian state of Gujarat and the Pakistani province of Sind by the Maritime Security Agency of Pakistan and the Indian Coast Guard. The absence of a physical boundary and lack of proper demarcation leaves small fishing boats and trawlers susceptible to illegally crossing territorial waters. The problem is aggravated by the dispute over the Sir Creek in Kutch and the failure to officially determine the maritime boundary between the two nations. Most local fishermen possess no navigational tools and are unable or incapable of determine their location by longitudes or latitudes.

Pakistan government today repatriated 218 Indian fishermen through the border in Punjab, two days after their release from jails as a goodwill gesture. Pakistan had announced their release on Thursday bringing the total number of Indian fishermen freed from Pakistani jails as "goodwill gesture" in the last 12 days to 439, despite the chill in bilateral ties. On December 25, the Pakistan government had freed 220 Indian fishermen. Last March, the Pakistan government had released 87 Indian fishermen who had been languishing in jail in Karachi for the last two-and-half years. On December 30, Pakistan Maritime Security Agency arrested 66 Indian fishermen for illegally fishing in Pakistan's territorial waters. (News by NDTV, indianexpress, dnaindia). Many fishermen of India and Pakistan are currently in prison for crossing international boundary.

These type of news frequently comes and because of lack in use of technology or availability of application for resolving issues. Location based service can be used for it. So user will get notification or alert before crossing international border. This can be done by geo-fencing concept of location based service. If fisherman carries Smartphone with GPS service, he can track location continuously. International border is fixed. By keeping location of fisherman as center of geo-fence, one circle will be created. Suppose radius of geo-fence is 10 Km. so when user will be 10 Km long from international border, at that time circle of geo-fence will coincide border and trigger will fire so fisherman will get notification or alert which will indicate "You are moving towards international border, Be safe".

1) Architecture-

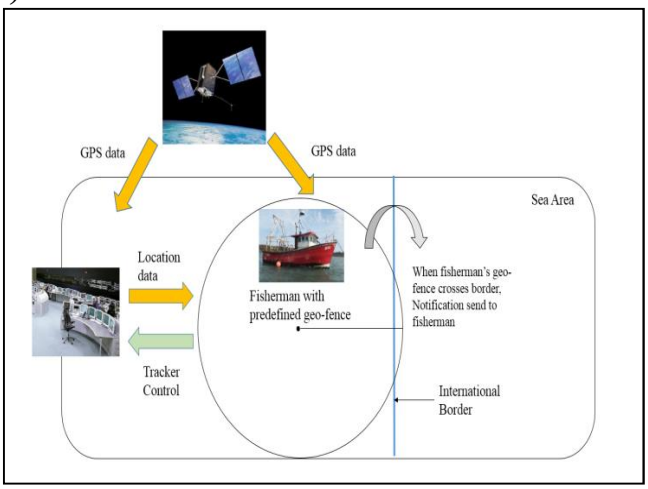

Fig. 2: Architecture of fisherman safety module

2) Flow of fishermen safety module-

a) Fisherman or user registration- Fisherman should register first by entering details like name, address, mobile number, geo-fence size.

b) Location and tracking- At backend of application, continuously location of fisherman will be tracked by GPS.

c) Notification/ Alert- When fisherman will get closer to international border, he will get alert that you are in danger zone, don't go forward. Whatever geo-fence had been set, when that distance is from international border remains by tracking GPS, then alert is sent.

C. Destination Tracking Module

Many times travelling in unknown area may cause problems or difficulties for traveler to find exact location/ destination. He may waste time because of wrong considerations. While travelling person may miss particular destination or task related to destination. For example, when a man decided to shopping at different places with different task, but while travelling man may forget one of the shopping place or any task related to place. Or in another example, if someone is travelling for long journey by bus or train, then journey may be at night. At that time passengers cannot easily track where he is. There will be problem to track how much destination station is long from current location or approximately how much time remaining to reach destination.

This problem may be resolve by using geo-fencing concept of location based service. Passenger's location will be continuously tracked, and when passenger will crossed geo-fence, whose center is location of destination. When passenger will be near to destination means when passenger's location will cross geo-fence which has predefined radius then trigger will fire and user will get notification that he is near to destination. Or in shopping tracking concept, when user will reach near to decided shopping place, then user will get notification that he is nearer and with decided task for particular shopping place.

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1) Architecture-

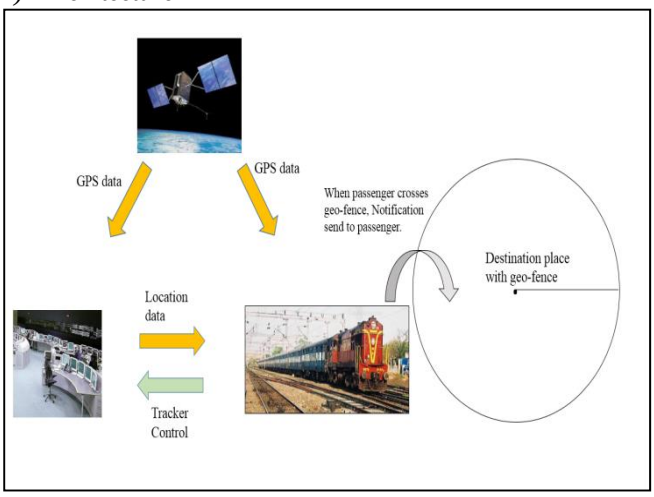

Fig. 3: Architecture of destination tracking application

2) Flow of destination tracking module-

a) User registration- user will first register with username, password, address, phone number, email id.
b) User login- when user will login with registered username and password, it will show all details and other features of adding tasks and relative place regarding task.
c) Add events details- After login user can add event details with event name, location, description, status and geo-fence radius by keeping destination location as centre.
d) Notification- When user/ passenger will be near to destination by decided geo-fence radius then user will display alert that you are near to destination and also display events or task related to that.

III. LIMITATIONS

1) Person who uses application must have Smartphone or device which gives feature of GPS.
2) For continuously tracking of location of device, its GPS should be enable.
3) Person should be able to handle Smartphone.
4) Battery consumption is more because of GPS use. There may be battery failure and may need external power supply which is not always possible.
5) Sometimes the GPS signals are not accurate due to some obstacles to the signals such as buildings, trees and sometimes by extreme atmospheric conditions such as geomagnetic storms.

IV. CONCLUSIONS

In conclusion, this application is designed for human safety and destination tracking management. It continuously locate particular person. The solution represented in this paper takes the advantages of smart phones which offers rich features like Google maps, GPS etc. We are using geo-fencing technology for application which is new technology and helps to achieve different modules requirements. The geo-fencing technology provides simplified solution to all kinds of proximity and buffer analyses.

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