Abstract: This System is proposed to add new paradigm in use of smart phone, by keep track of family members, friends and dear one’s location sending simple SMS (Short Message Services). Smart phone uses technologies like General Packet Radio Service (GPRS) and Global Positioning System (GPS) to locate the current location information of the device. The person’s location can be tracked using a smart mobile phone equipped with an internal GPS receiver or mobile internet connectivity or wifi connectivity facility. This system is developed for the android supports mobile devices using android sdk, Google play service, Google MAP API and SQLite database for storing required information. System serves as a requestor (i.e. parent) and location provider, who can ask for other person’s device location and can provide own device’s location to other device respectively. Communication between synchronized requestor and provider for the location is done using SMS service. System makes sure that only synchronized numbers can ask for device’s location. Internet connection is required for show the location on Google Map. System rendered with facility to store emergency contact information and send alert message, when device get power off or first SIM card number is off or it get changed. System send alert message using SMS service. System enhances the safety of device by sending location information to emergency contacts when device get power off.

Keywords: Location Tracking, GPS, GPRS, Location Provider, SMS, Android, Synchronization, Google Map, power off device

I. INTRODUCTION

In Today’s world the use of the smart phone is increase. Device comes with GPS (Global Positioning System) sensors to detect the location of device even device is not connected with the network. Location of the device also detect from technique GPRS (General Packet Radio Service). GPS system which is a satellite based service which is available 24X7 everywhere in the whole world. GPS system can be used to get location which includes details like latitude, longitude’s values eventually tracking of human beings. GPS system tracks the location with the help of service provider network at nominal cost and gets location easily. While in some area GPS is taking time to detect location, wifi or service provider data network can be used frequently for fast retrieval of location. So Using Mobile phones equipped with GPS receiver or using wifi or service provider network can be use to find out the location of the device. This facility of smart mobile phones can be used as a security aspect. As In Today’s fast life everyone always wants to know that their kids, retired parents and dear ones are safe. So it’s become easy with the help of mobile device to keep in track of location of family members. It provides protection and safety anywhere with a dedicated GPS or GPRS tracker designed for older parents as well as for kids. Generally, majority of the smart phones are having SMS (Short Message Service), GPS and data network service of service provider available for tracking the location.

The main purpose to develop the system is to keep track of the family, friends, kids and dear ones location, by simply sending SMS to them, which is very cost effective. System is equipped with main three parts as requestor, provider and emergency contact. Requestor is the one who can send the request for the location of other person’s device. Provider, who is the one who detects its own device’s current latitude and longitude coordinates and can replay location information of coming request. Emergency contact list is the list of number which receive alert message when changes into first SIM card or the device is powered off.

System holding facility to work as a requestor which will allow requestor to send a request using SMS to get the location information of other person and can see that location on Google Map. System also having facility to work as a provider which accept the request of requestor and pass on the current latitude and longitude value of device to the preregister requestor on device. On the other hand, the system at the provider’s side uses GPS or GPRS service provider network to get provider’s current location. Information of current location coordinates send to the requestor using SMS service. Again for security purpose, at the provider side system checks incoming number from where the request for checking of location and replay the current location’s of own device to only those number which are synchronized. Request from unsynchronized number would not be fulfilled. Thus Communication between
two devices for getting location coordinates is done using SMS services. SMS offers the system unique features, which makes system to work without the need of internet connection thus allows the application to be implemented on smart phones that don’t support continuous GPRS, 2G or 3G internet connectivity for communication between two devices.\(^1\) In case of finding latitude and longitude values GPS off GPRS service provider network, WIFI sensor is utilized. For check the location at Google Map only internet connectivity is required. Location information provides by provider is logged into system, which will be useful to show the location on Google Map whenever internet connection available on device. System is rendered with basic utility of update and deletes the provider and requestor detail and emergency contact numbers\(^1\).

System can store emergency contact numbers to send alert messages. In addition to existing system\(^1\) some features are included. It keeps track of last location of device which store in mobile phone by its location service. When phone device is powered off system send alert message along with location detail to emergency contacts using SMS service. Using this facility it become easy to know the last stored location of device before it going to powered off by someone. System maintaining first SIM card serial number, and after and every 4 hours keep checking the number and send alert message to emergency number if SIM card is change or its off. For security aspect system also check the SIM card’s serial number during booting of the mobile phone and send the alert message(in case of dual SIM from second SIM number) to emergency numbers if it found mismatch of SIM serial number, that is SIM card is removed or it change from first slot. This way System take care of security of person by tracking location as well as of mobile device also by sending alert messages to emergency numbers.

II. RELATED WORK

In Existing system of SMS based Person’s Location Checking System\(^1\) detects the location of device on getting request via SMS by requestor. System can check the location of other person’s device location on receiving request of location SMS form synchronized number, and it send location coordinates latitude and longitude detail using SMS service. System facilitate with option to check the location on Map. System provides facility to update requestor and provider detail. For checking current location of smart phone device, system can use GPS or WIFI or service provider’s data network services. System does not have facility to check changes into SIM serial number changes and facility to send alert message to emergency contacts on powered off device.

Existing human tracking system, the architecture of the system is based on client server approach\(^2\). At mobile device’s application side that is client side it fetches the GPS location, instead of using SMS, system uses more cost effective techniques like GPRS packet. Application at Android based mobile side sends this GPRS packet along with location information to the server. Server stores packet information and at server computer displays the map along with location to track the human.

Limitation of system is that in order for the system to work there must be continuous internet connectivity required at mobile device and server computer.

System for child tracking aimed to help locating missing or lost children\(^1\). GPS is combined with one of the basic service of a smart phone which is GSM, more specifically SMS, in one system. System having two parts, parent and child application.\(^1\) An application at the parent side allowed parents to send a request for check location of child to child’s device. Child side application can continuously update its own location, and also can replay the location information to parent’s device using SMS. Parent’s side application requires internet connection only for show the location on Google map. The communication between the parent and the child applications is done using Short Message Service (SMS) and application to be implemented on smart phones that don’t support GPRS, 2G or 3G internet connectivity. Limitation of system is device having a child side application cannot requests for location of parent’s and does not having facility to send alert message before power off device from child side.

Existing system for woman tracking using GPS and GPRS, use client-server type of architecture\(^4\). With the application installed in phone, it registered on server and get password. When user activate emergency /danger options of the application GPS start tracing phone by finding location coordinates, and send it to the server using wifi or service provider network after certain time slab continuously. At other side Administrator’s computer generates and updates the MAP for received updated location information. Location information store in database and server send the same location information via message to its family members continuously after specified time slab. Limitation of system is server works as bridge between sending location information to family members mobile devices, for that continuous internet connectivity is required to send and receive location information on devices and on server.

III. APPLICATION DEVELOPMENT

A. Requirement for the system

This system use basic SMS service and GPS Or GPRS Or wifi service which is commonly available in every smart phones. So to make use of system family member need at least GPS and SMS services in their Android smart phone. Implementation of the Application is done using eclipse for android developer tool and Android SDK tool.\(^7\) Application use SQLite database to store information about the location and details of requestor and provider as well as synchronization detail of devices. For display the MAP, system uses Google play service and MAP key for accessing Google MAP.\(^8\) For generation Google Map key Google developer consol is
used. Mobile phone must have Location service on, either via using GPS or wifi or using service provider network facility to detect the current latest location of the device.

B. System Architecture

Application proposed is based on use of basic Telephony service like SMS(Short Message Service) to communicate between two person’s device. And use of location service to detect location of the device for checking other person’s current location. System is easy to use and user friendly.

Mentioned figure Fig.1 shows the proposed system architecture. Mainly consisting of two sides i.e. requestor side and provider side. All the communications between both the sides done using service providers SMS service only. For detecting the location coordinate either service provider network or wifi or GPS satellites service is used. For check location on Google Map internet connectivity is required. System at requestor side can request for location of provider. Before request for location, requestor first send request for synchronize the number to provider using SMS. Provider side request of synchronized is logged into system and acceptance of the request is replay back to requestor with acceptance SMS. After successful synchronization between requestor and provider, Requestor request for checking the location of provider can be granted. At provider side application first check of device using GPS sensors or wifi or service provider data service at provider side. Latitude and Longitude information is replied back to requestor via SMS service. Same application can work as requestor as well as provider. At requestor side after receiving of SMS of about location information notification of location information is generated to rendered a facility to open a location in map by single click on notification whenever internet connectivity available on requestor’s device.

Provider’s location information logged at requestor side to facilitate to locate last known location of provider’s device on Google map. Any device work as a requestor as well as provider at the same time, that is person can request for location which number are stored in provider list. And person’s device sends location information to only those number if it coming from requestor list.

Apart from basic functionality more features are added into existing system. Features like system use stored emergency contact information to send SMS at power off the device. During power off it fetch the location information and send via SMS to emergency contacts. System also rendered with features of SIM card checking during boot time as well as after every four hours it keep checking the first SIM card status. In case of SIM card not exists or it get changed then system send alert SMS to emergency contacts using second SIM number (in case of dual SIM) or new SIM number insert into first slot.

C. System Algorithm

Algorithm describes the steps for detecting current location of provider’s device

1) Requestor send request of synchronization to provider’s mobile device using SMS.

2) At Provider side system generate notification about synchronization request. On accepting request provider mobile device replay acceptance SMS to Requestor, as well as log requestor information.

3) At Requestor side, after getting acceptance from provider, details of provider is stored.

4) Requestor send request for getting location of provider using SMS service.

5) Provider side user GPS sensor, wifi or Service provider network to find the current latitude and longitude of device.

6) After getting current location information provider send the latitude and longitude data to requestor using SMS service.

7) At requestor side, on getting location information SMS, system generate the notification to check location on to the Google Map, as well as store/update the provider’s device location for later use.

8) By open the notification or using option of system requestor can see location of provider on MAP.

Fig. 1 System Architecture
Steps 4 to step 8 is repeated when synchronized number asking for the current location information.

Following steps are for the sending alert message to emergency contacts.

1) Add Emergency contact Number in Alert option
2) select power off option true , so application will use location service to get current location.
3) Send current location information to emergency contacts using SMS service.
4) System store first SIM serial number information during installation.
5) At the time of Booting of device , system check it own service by comparing current first SIM serial number with stored SIM serial number. If not match then send SMS to emergency contacts.

D. system specification

Fig. 2 having main page of system , shows the basic functionality of system requestor side as well as provider side. Requestor can first ask for synchronize the number, Location options list out all the synchronized person’s phone number whom request for current location of person can be send. Also facility to display stored location on map when it click on location button. Location provider options gives a list of available person and allowed to update/delete contact whom location is allowed to check . On click of Pending button its list out all coming request for synchronization. Requestor List options shows and update/delete the requestor number which can access device location and can send it via SMS. Alert option allowed to add emergency contact number which will be used to send alert message.

In Fig. 3 Requestor can send synchronization request at other person’s number where these application is installed. It Send “Request Syn” SMS on click of button.

Fig. 3 Request for Synchronization

Fig. 4 At receiver side it get SMS and application generate a notification so on click of notification it open pending list waiting for the synchronization and Fig 5 shows the pending list waiting for the synchronization acceptance.

Fig. 4 SMS and Notification about synchronization

Fig. 5 List of Pending Request waiting for Synchronization
After accepting synchronization request send “Accepted” SMS back to requestor and store information as a requestor, after getting “Accepted” message at requestor side, system add synchronized number detail as a provider.

![Add Contact](image1.png)

**Fig. 6** Adding information of synchronized number

By selection Location option it opens the list of location provider whose device location is allowed to check. shows in Fig 7.

![Location Provider List](image2.png)

**Fig. 7** List of location provider

By sending SMS request for checking new location is send at provider’s number. System first check that request for location is coming from synchronized number or not. On other side receiving SMS for location from synchronized number, provider uses its wifi or GPS or service provider facility and detect current longitude and latitude values and send back to requestor using SMS.

![Sending SMS for Location](image3.png)

**Fig. 8** Sending SMS for getting Location detail

Provider get SMS and send location information as SMS to requestor’s number.

After getting Location message at requestor side system generate notification shows in Fig 10. On click of notification, location values from notification displayed on the MAP. It shows in Fig 11.

![Notification about Location](image4.png)

**Fig. 9** Provider get SMS and send location information as SMS to requestor’s number

![Notification and Location](image5.png)

**Fig. 10** Notification about latitude and longitude

![Notification and Location on Map](image6.png)

**Fig. 11** Notification and location of provider on Map
System allowed to edit basic information of list of provider as well as requestor of the system. List of requestor who can ask for device location. List of provider who’s current location of device can be request and can get current location.

On selection of Alert option it allowed to add emergency contact number and by selecting power off option it send location(latitude and longitude) information to emergency contact via SMS when device gets power off. Shows in Fig. 14

On changing of first SIM card or off of SIM card system send the alert message to emergency contact. In case of Dual SIM device system use second SIM number to send the SMS . In case of single SIM slot device, when new card is inserted then with new SIM number alert SMS is send.
IV. SYSTEM CONCLUSION
System uses a SMS service for communication between two devices and sending location information to other device. As security aspect only entitled synchronized number can do location request so threat of accessing device location by other than entitled synchronized number not possible. System stores last known location coming from provider, and later on by Map to show the location. Internet connectivity is required to show the Google Map in device. System logs emergency contact list to send the alert messages. System facilitates to send the location information to emergency contacts when device gets power off for security of device. System also services to check first SIM number at boot time and periodically after every 4 hours and can send alert message when any change/off in SIM card.

V. LIMITATION AND FUTURE ENHANCEMENT
For getting location information of the device, it must keep on its location service either using GPS or service provider network or wifi network. System detects only first SIM change/off. In Dual SIM support device system can send alert message of SIM card change/off using second SIM card number. In case of single SIM slot device, until new SIM card not inserted alert message will not be send. In Future enhancement System would send some alert message when synchronized number enter in some specific location zone, like alert zone for intensify security features for family,friends and dear one. At current stage of system, person cannot initiate to send alert when person is in threat or danger. System would be overcome with same limitation.

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