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Survey on Different Technologies of Child Tracking System

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Abstract - The project entitled "Child Tracking System" is an application that allows parents to monitor their child's cell phone. All incoming and outgoing calls, texts and multimedia messages can be seen and interrupted by the parents, who can also monitor where their children are (through GPS), and access a history of where they've been and set up alerts if their children are going outside of approved geographical zones. The parent can also block calls or messages to specified numbers. Our aim is to develop an efficient and improved geographical asset tracking Solution and conserve valuable mobile resources by dynamically adapting the tracking scheme by means of context-aware personalized route learning techniques. This system uses Android based mobile phones for the software to be run.

Keywords **- Android, route learning techniques, GPS.**

1. Introduction

Cell phones make life more convenient. With one device, you can make calls, send text messages and take pictures and video. You can even check your email, surf the web and use GPS on many cell phones. This is why many children have cell phones. While cell phones are invaluable resources, they can sometimes be problematic and children can become the victims. It's time for you to step up and monitor your child's virtual life and his or her cell phone and internet use.

Child Tracking System is an android application that help parents to monitor their child's cell phone activities . This software runs in a stealth mode so that your kids may not know it's there. Cell phone monitoring can not only help them avoid dangerous situations, but also can help you keep track of your children in other situations. You can use GPS tracking to make sure your kids are in safe places and make sure they are going to bed instead of texting or calling unwanted persons or surfing unwanted sites.

1.1 Cell phone tracking

Child Tracking System is an application that helps parents to retrieve the details of incoming or outgoing calls and messages of their children at the same time when they send or receive it. Even though child can delete the call log and SMS details manually, this application stores all the deleted data in the server. Content of the message and log can be viewed by their parents even if their child changes the number.

The application also provides GPS location of the child so that the parents can monitor the history of where their child have been and can set up alerts if their children are going outside of approved geographical zones. The system also provide facility to track browser activities and to block calls or messages from specified numbers.

1.2 Android

Child Tracking System is an android based phone tracking application. Android is an operating system based on the Linux kernel, and designed primarily for touch screen mobile devices such as smart phones and tablet computers. The user interface of Android is based off direct manipulation, using touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching and reverse pinching to manipulate on screen objects. Internal hardware such as gyroscopes, accelerometers and proximity sensors are used by some applications to respond to additional user actions, for example adjusting the screen from portrait to landscape depending on how the device is oriented.

Android allows users to customize their home screens with shortcuts to applications and widgets, which allow users to display live content, such as emails and weather information, directly on the home screen. Applications

can further send notifications to the user to inform them of relevant information, such as new emails and text messages. Android is open source and Google releases the code under the Apache License.

This open-source code and permissive licensing allows the software to be freely modified and distributed by device manufacturers. Additionally, Android has a large community of developers writing application written primarily in a customized version of the Java programming language.

1.3 GPS

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include

- The time the message was transmitted
- Satellite position at time of message transmission

The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite using the speed of light. Each of these distances and satellites' locations defines a sphere. The receiver is on the surface of each of these spheres when the distances and the satellites' locations are correct. These distances and satellites' locations are used to compute the location of the receiver using the navigation equations. This location is then displayed, perhaps with a moving map display or latitude and longitude; elevation or altitude information may be included, based on height above the geoid. GPS measurements yield only a position. However, most GPS units can automatically derive velocity and direction of movement from two or more position measurements. The disadvantage of this principle is that changes in speed or direction can only be computed with a delay.

2. Overview

Child Tracking System is a complete remote phone tracking and monitoring system for Android phones. It remotely track and monitor all SMS, MMS, text messages, calls, and GPS location. By installing the application on the target phone, you can remotely read all inbound and outbound SMS Text messages, MMS multimedia messages, view phone call logs ,web browsing history and view GPS location information on a map. Parents now have a powerful tool to help keep your children safe even when you can't physically see them.

• SMS/MMS Tracking – Intercept text messages. Read all inbound and outbound text or multimedia messages. Details include time and date, phone number, contact name and location of the target phone.
• Browser Tracking – monitor all web browser activity on the target phone. Know which web sites were visited, which pages were viewed and when.
• GPS Tracking – view GPS location information on the map. Can set up alerts if the child is going outside of approved geographical
zones.
• Call Tracking – Monitor all inbound, outbound and missed calls. Identifies the phone number, contact name, call duration, and location of the phone for every call.
• Call Blocking – Can even block calls or messages from or to specified numbers.
• Call Recording – Can record calls from or to specified numbers.

3. Literature Survey

3.1 A Self-Configurable New Generation Children Tracking System

Hiroshima City Children Tracking System is a safety support system for children based on ad hoc network technologies. Field experiments have been conducted in cooperation with an elementary school in Hiroshima.In this paper, we propose a new generation children Tracking system which is based on experiences and findings of the field experiments for Hiroshima City Children Tracking System.

Our proposed system consists of Android terminals which has Wireless LAN device and Bluetooth device with the ad hoc communication function. Our system manages groups of Android terminals using Autonomous Clustering technique. In this paper, we show system requirements for our children tracking system and describe the implementation features to satisfy the system requirements. Finally, we provide some preliminary implemented results for our proposed system.

Many technologies using ubiquitous networks have been developed to prevent crimes against children on their way to and back from school. Existing technologies, however, are not powerful to prevent crimes against children and helpful for parents since it is difficult to take information of children as a group. If the system can provide group information of children on the way to and back from school, it is easy for parents to know their safety level. This paper proposes a new technology for children tracking system based on mobile ad hoc networks and describes outline of children tracking system in Hiroshima City. The field experiments using the children tracking system have been performed and the effectiveness of the system is shown by data analysis for the experimental results. In the developing System, Android terminals communicate with each other with Bluetooth and configure a Bluetooth MANET. Also, they configure clusters autonomously by exchanged information. Tags in the Mesh Network use Wireless LAN to communicate with neighbor tags. They communicate with each other using the ad hoc routing protocols. We implement Secret Sharing Scheme for secure their end-to-end communication.

3.2 Self-measurement of the Information Security Level in a Monitoring System

In critical security andsafety monitoring systems, the infor mation security level of the monitoring system might change rapidly because of hostile attacks targeted at it. A self-measurement mechanism can be used for the preservation and improvement of the information security level during the whole mission of a monitoring network. We propose our initial ideas for composing an integrated security metrics framework for a dynamic self-organized monitoring system based on mobile ad hoc networks structured according to currently known security challenges.

The aim is to predict, as well as to monitor, the security level, concentrating on the principal effects contributing to it. In addition, we introduce an on-the-fly security level estimation mechanism for mobile ad hoc networks. The mechanism can be used to support both node-level and the network-level decision making. At the nodelevel,it is obviously possible to estimate constantly the security level for the system when choosing applications and other communication mechanisms. At the network level,the democratic voting among independent estimates originating from different nodes can be used to increase the level of security. Mobile Ad hoc Networks (MANETs) always bring challenges to the designers in terms of its security deployment due to its dynamic and infrastructure less nature. In the past few years different researchers have proposed different solutions for providing security to MANETs. In most of the cases however, the solution is targeting a particular attack or multiple attacks but fails to find the root cause of it. In this paper we use system level security for deploying the overall security in MANETs. The system level security is the security at node level as we believe that if nodes behave properly and in a coordinated fashion, the insecurity level will go drastically down. Our simulation results gives the advantage of using this approach.

This paper investigates the architecture of the mobile ad-hoc network security (MANS), a novel system that provides security to mobile ad-hoc networks (MANETs). MANET nodes operate in a decentralized "trust no peer" mode that complicates and inhibits security services, thus creating a formidable security challenge. Here the design of MANS is presented and its performance is investigated. MANS is based on a "neighborhood watch" concept. This approach builds a fully decentralized scalable security policy that is law-governed globally using only local actions. MANS formally prescribes a local collaborative group function by defining neighborhoods, their states and neighborhood-wide majority voting decisions. It utilizes these concepts in developing the security recovery policy, including specification, implementation, and enforcement. MANS has been tested successfully with simulation experiments; the results presented here cover the case of an attacked but honest node as well as that of a compromised dishonest node. In both cases, it is shown that MANS identifies the attacked and/or compromised node, requiring only a modest size neighborhood to accomplish it. Then, MANS acts to isolate the node and thus avoid or minimize any adverse impact of its compromise.

3.3 mTracker : A Mobile Tracking Application for Pervasive Environment

The use of mobile devices has become part of our daily routine. Recently, mobile devices like mobile phones or portable digital displays (PDAs) are equipped with global positioning system (GPS) receptors that allow us to get the device geographic position in real time. This paper describes a tracking application tool, called mobile tracker, which uses location-based services (LBs) like GPS or global system for mobile (GSM) network to track a mobile device. Through the known geographic position, this application enables the user to track a mobile device and send alerts if it is out of the radius around an interest point, previously defined by the application administrator. The main objective of this system is to track a device

according to an interest point, as well as, a security radius around it. The main objective has been fully achieved. mTracker application includes several features, such as sending distress calls via SMS, detecting unauthorized SIM card in the device and the total capacity for system customization.To interact with both mTracker and mTrackerMap it is not necessary an advanced knowledge user or an expert in tracking technology, since both applications are user friendly. Furthermore, the use of Google Maps in the mTracker Map application is very intuitive.

Since tracking through GSM cell is not as accurate as GPS tracking, we have concluded that the tracking of the device should only be with GPS coordinates. Despite the lack of accuracy when compared with the GPS, the GSM cell tracking can be very useful since it works even when the device is indoors, unlike GPS. We have tested the GSM cell ID in several scenarios like urban areas and rural areas. We can conclude that the tracking precision is much more accurate in urban areas. In rural areas, getting the device position via GSM cell, will lead to inaccurate results than in urban areas.

mTracker is a useful mobile application that combines several features which aims at the user's security. To improve security measures, mTracker is also capable to detect an unauthorized SIM card in the device, and then send a warning via SMS with the current GSM cell and GPS position. mTracker has a record of the positions that were monitored. It also consist a PC application that shows in the Google Maps the positions that were stored in the PDA, allowing the user to see when and where the device was.

3.4 A Tracking System Using Location Prediction and Dynamic Threshold for Minimizing SMS Delivery

In this paper, a novel method called location-based delivery (LBD), which combines the short message service (SMS) and global position system (GPS), is proposed, and further, a realistic system for tracking a target's movement is developed. LBD reduces the number of short message transmissions while maintaining the location tracking accuracy within the acceptable range. The pro- posed approach, LBD, consists of three primary features: Short message format, location prediction, and dynamic threshold. The defined short message format is proprietary. Location prediction is performed by using the current location, moving speed, and bearing of the target to predict its next location. When the distance between the predicted location and the actual location exceeds a certain threshold, the target transmits a short message to the tracker to update its current location. The threshold is dynamically adjusted to maintain the location tracking accuracy and the number of short messages on the basis of the moving speed of the target. The experimental results show that LBD, indeed, outperforms other methods because it satisfactorily maintains the location tracking accuracy with relatively fewer messages.

A handful of studies have developed location tracking applications through SMS. However, SMS is a user-pay service. The number of SMS transmissions must be minimized while maintaining the location tracking accuracy within the acceptable range to reduce the transmission cost. This study proposes a novel solution, LBD, to this problem, and further develops a realistic system for tracking the target location.

In addition to defining the short message format, LBD uses the current location, speed, and bearing of the target to predict its next location. In LBD, the moving pattern information of the target is transmitted only when the distance between the predicted location and the actual location exceeds a certain threshold, which is dynamically adjusted according to the speed of the target. The experiment shows that, in LBD, the number of short messages required is significantly reduced as compared with TBD and DBD. In addition, LBD achieves an acceptable location tracking accuracy. Finally, the use of a dynamic threshold reduces the required number of short message transmissions compared with the fixed threshold.

4. Proposed Approach

Child Tracking System" is an application that allows parents to monitor their child's cell phone. All incoming and outgoing calls, texts and multimedia messages can be seen and interrupted by the parents, who can also monitor where their children are (through GPS), and access a history of where they've been and set up alerts if their children are going outside of approved geographical zones.

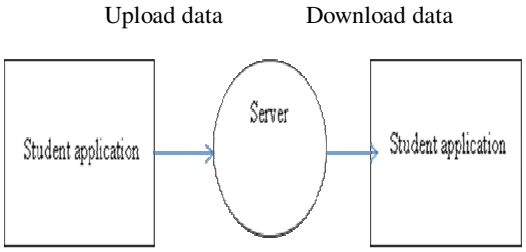

Fig. 1 Level 1 dataflow diagram

The parent can also block calls or messages to specified numbers. Our aim is to develop an efficient and improved geographical asset tracking Solution and conserve valuable mobile resources by dynamically adapting the tracking scheme by means of context-aware personalized route learning techniques. This system uses Android based mobile phones for the software to be run.

5. Future work

Nothing can be ended in a single step. It is the fact that nothing is permanent in this world. So this project also has some future enhancements in the evergreen and booming IT industry. The project entitled "Child Tracking System" was successfully designed , so addition of new modules can be done without much difficulty.

The various future enhancement which shall include in this application are :

- The method of recording all the calls can be added to make the project more efficient.
- Website blocking will add more usability to the application.

6. Conclusions

Child Tracking System can overcome the drawbacks of currently existing system. It is a very useful application which help parents to monitor their children by tracking their cell phone activities, browser activities and GPS location.

It is an android based application which is developing with scalability. So additional modules can be easily added when necessary. Also the application is very flexible, versatile and user-friendly that enables user to use without any inconvenience. Thus the system can fulfill all the objectives identified and is able to replace the existing system.

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