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Mobile based Communication System for Child Monitoring

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This system mainly focused on monitoring the behavior of children when they are using mobile phones. Most parents give mobile phones to their children because they rely on giving mobile phones will keep them safe in case of any emergency. But using a mobile phone can make much dangerous significances in other hand. It can make a child an easy target for Cyber bullies, predators and exposure to explicit material and sexing.

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Mobile based Communication System for Child Monitoring

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This system mainly focused on monitoring the behavior of children when they are using mobile phones. Most parents give mobile phones to their children because they rely on giving mobile phones will keep them safe in case of any emergency. But using a mobile phone can make much dangerous significances in other hand. It can make a child an easy target for Cyber bullies, predators and exposure to explicit material and sexing.

This system designed to offer a better relief to the parent, which consists of two modules, android application and the web server infrastructure. Parent can monitor SMS, incoming and outgoing calls, websites visited and the location of each child separately. Child can be more motivated to doing the tasks allocated by parent because according to their performances they can receive ratings. It will help child to self-motivated and increase their enactments.

Through the web server infrastructure, the parent will allow viewing all above tracking data, as well as will allow to view how the progress of the child from secure parent web account by providing the child IMIE, since every child is separated from their IMIE. Our main objective is providing a better solution to the most challenging problem that the parent face to protecting child from misusing the mobile phones.

Keywords: mobile, SMS, caller list, google-maps, web, android.

I. INTRODUCTION

Smart phones, with their user-friendly and intuitive interface, have shown great demand among children and young people. In fact, the popularity of iPhones among children is so great that the New York Times called the iPhone as the Toddlers favorite toy of 2010.

Mobile phone usage has increased with age; with 40% of teenagers spend with mobile phones chatting with friends, exchanging text messages and browsing internet for more than 2 hours a night. Possibly more surprising, 22% of 7-9 also spend with their phones for more than 2 hours. [1]

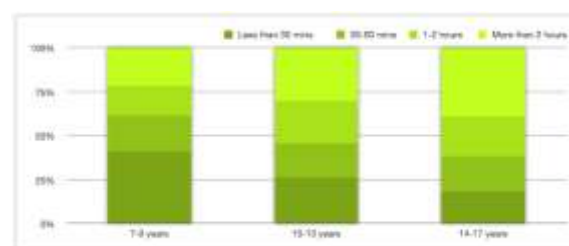


Figure 1: Mobile phone usage among teens

A Research Center study, Teens and Technology 2013, conducted by Lucia Moses (April 16, 2013) found that while cellphone ownership has held steady, 37% of kids who were in age between 12-17 owned a smartphone in 2012, up from 23% the year before. [2]

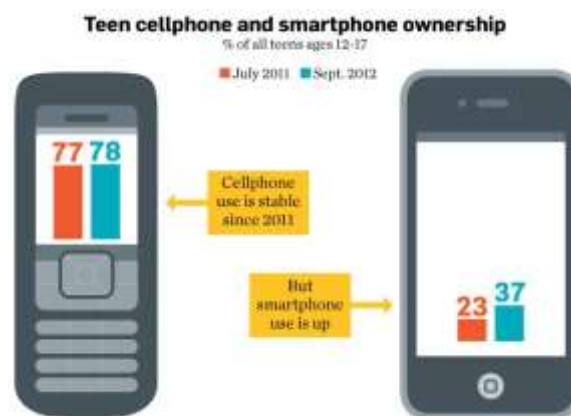


Figure 2: Ownership between teen cellphone and smartphone

Since the usage of mobile phones has become a most significant factor, there are biggest challenges that parents have to face in order to protect their kids being victims from the mobile phones.

The survey done by The National Campaign, to Prevent Teen and Unplanned Pregnancy in 2008, found 20% of teenagers who were in age between 13-20 and 33% of young adults who were in age between 20-26 among total of 1280, had sent nude or semi-nude photographs of themselves. Also it demonstrates 39% of teenagers and 59% of young adults had sent sexually explicit messages. [3]

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Sue Marquette Poremba, who is published his article about monitoring the usages of children cell phone on nbcnews, defined since it has become a most effective tool, one of the biggest challenge relating to children and young people's use of smart phones, is the danger of encountering or downloading applications with wrong content. Therefore the mobile phones can make a child an easy target for Cyber bullies, predators and exposure to explicit material and sexing.

Today with the availability of social media and other Internet platforms of communication, youth are more open to communicating with strangers and may not think twice, about giving out their phone numbers to someone who friended them on Facebook. Yet the way many children and teens now use technology puts them at a different level of risk.

Therefor experts say that the best way to keep track of kid's activities is to essentially fight fire with fire, which means using technology to keep track of the way that the kids use technology. [4]

This study is focusing on since child has been a victim of these fast growing mobile technologies, and their behavior and mobile usage are beyond the control of the parent, they are freely addicted to the unethical behavior of mobile phones, especially smart phones, without the awareness of the parent.

This system designed to offer a better relief to the parent, which consists of two modules, parent module and the child module. Parent can monitor SMS, incoming and outgoing calls, websites visited and the location of each child separately. Child can be more motivated to doing the tasks allocated by parent because according to their performances they can receive ratings. It will help child to self- motivated and increase their enactments. This system includes a web server infrastructure; so that, the parent will allow viewing all above tracking data, as well as will allow to view how the progress of the child from secure parent web account by providing the child IMIE, since every child is separated from their IMIE.

Our main objective is providing a better solution to the most challenging problem that the parent face is to protecting child from misusing the mobile phones.

II. METHODOLOGY

Figure 3 illustrates the high level architecture of the system. This mobile based child monitoring system basically consists of two mobile applications and Web server infrastructure. Two mobile applications are parent and child mobile applications and both of them are android applications.



Figure 3: Technical Overview

This child monitoring system consists of five major components,

1. Measuring child performance by allocating tasks
2. Tracking child's mobile activities (SMS history, Call history, Web history)
3. Tracking child's location and show using Google map
4. Predict the child's location
5. Develop web server infrastructure

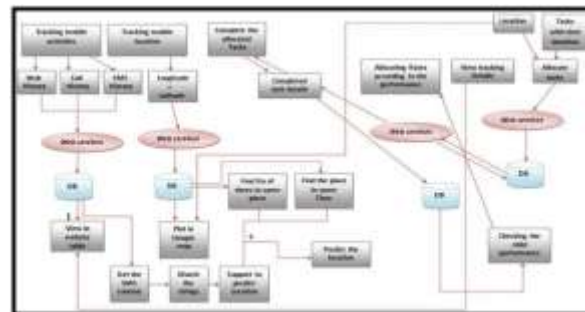


Figure 4: Development Procedure of the System

According to the figure 4, following section described the development procedure of each function.

a) Measuring child performance by allocating tasks

Allocating task is a module that is used to interconnect the parent and child mobile applications and which is mainly targeted to allocate the tasks to the child by the parent. All the data will be transferred using Web services. When the parent logged on to the parent application, the list of children who have registered under the relevant parent will be displayed. At that point, parent could select the relevant child to allocate the tasks. The tasks can be assigned weekly or daily basis to the child and it can be assign the location if parent want. Also parent is given the opportunity to modify and delete the tasks. After the parent allocates the tasks for

the child, the child can view those tasks by logging to the child application. Child can perform the tasks accordingly. When child completes a particular task, the child should update the tasks status as "Completed". Then those completed tasks will be notified to the parent. Parent is given the opportunity to evaluate the child's work and award the ratings according to the child's performance. When the parent awards the ratings, it is not only considering whether the child completes the task on time. Parent can also consider whether the child completes the task in a correct manner and achieved the expected result. Correct manner mean, when parent allocated that task by considering location, at that time parent can get that point also to evaluate the child. There is a map view to check the child location against to the parent assigned location. Also when parent assign the ratings they can check the child's work load manually and can measure the child's performance.

After parent awarding the ratings for the work done by the child, will be displayed to the child. At the end of each day child's performance will be displayed in a graph with ratings against to the task name. Then the child could know about their performance. By that child can get a clear idea about how should work more to increase the performance. In this case child will get self-motivated and continue his/her tasks well.

b) Tracking child's mobile activities (SMS history, Call history, Web history)

This module is implemented as back-end services in the child mobile application and not visible to the child. It is used to track all the child's mobile activities such as SMS history, call history, web history without knowing to the child.

Call history tracking feature is used to track the child mobile call history and implemented as a service in the child android mobile application. It track the contact number, contact date and time, contact type (incoming or outgoing) and call duration of the call history. After tracking these details, those are passed in to the web site through the internet using web services. In the web site, it is displayed these details for the parent.

SMS history tracking feature is used to track the child mobile SMS history and it is implemented as service in the child mobile application. SMS tracking consists of contact number, SMS date, and time, SMS content, and SMS type (sent received). After tracking the SMS history it will update to the web site through the internet using web services. In the web site those details are displayed to the relevant parent.

Same as to the above features web history tracking feature is used to track the browsing history of child mobile and it is implemented as a service in the child application. Web history tracking details consist of web URL and access date and time. After track the web

history, it is passed in to the web site through the internet using web services for displayed to the parent.

In this function, it is not only consider these three features (SMS history tracking, call history tracking, web history tracking). It also consists of another feature of blocking specific contact number. This feature is useful for parent when parent want to avoid the connection between child mobile and other mobile for child protection. This feature is enabled in the web site and it is help the parent to block specific identified contact number that is connect with the child mobile phone.

c) Tracking child's location and show using Google map

This is implemented in the back-end service of the android application. The location is tracked in the child mobile and it is updated to the web server. In child mobile application, it is sent the latitude and longitude values according to the changes of the geolocations of the child location through the Internet using web services frequently. Those GPS values are updated to the web site and plot those GPS data in a Google map in the web site. This feature is unaware from the child and it is passed the GPS data frequently. Parent can checked the real time GPS tracking details of the child easily using Google map. Also this map view is update to the parent mobile phone checking the child location against to the allocated task location. In that situation the real time GPS data are viewed against to the allocated task. Parent can get these details to evaluate the child by checking whether child complete the task in correct location. Using that result parent can accurately evaluate the child.

d) Predict the child's location

Predict the child location useful when the connection between the child mobile application and web server goes down. In this system, it has the real time location tracking facility. But it is not provide longitude and latitude values when the connection lost. It totally depends on the internet connection between them. To avoid that in such situation it is predicted the child location using past GPS data of the child locations. In here this system considers all other major functions data when doing the location prediction.

- a. Keywords searching
- b. GPS data
- c. SMS history
- d. Call history
- e. Web history

This location prediction module is working in two ways.

- a. Parent can predict the location with considering keyword searching.

- b. Parent can predict the location only considering the past GPS data.

Parent can predict the location with considering keyword searching:

In here there is a facility to searching the keyword by parent. Using the keyword searching parent can search any word. When a keyword type in the keyword search bar, the system check is this keyword is in any of the data of call history, SMS history or web history. It can be a contact name, location or any other word regarding to the SMS content, web URL or other than that. In that situation the system is capable of finding the location according to the predefined time range. When that keyword is found in somewhere of the details, the system find the location according to the keyword result. Also it considers the time range against to the prediction time. As an example if parent going to predict the location in 11 am, it add time range to that time. It mean it search the keyword of the time between 10.30 to 11.30. Also it is not considering the am or pm as well as the date. This searching data can be in any date of within the time range. When parent going to predict the location using keyword, in every time it consider the previous keyword result set also within that time range.

Parent can predict the location only considering the past GPS data:

Other than previous way parent can predict the location only considering the past GPS data. In that situation it is only consider the past geo-location within the time range. If parent is going to predict the location in 11am. It get the time range as 10.30 to 11.30 in any date. Likewise it adds the -30 and +30 to time. In that time it is retrieved the result set according to the time range and past child locations.

At the end both of ways are produce possible locations where child will be in.

e) Develop web server infrastructure

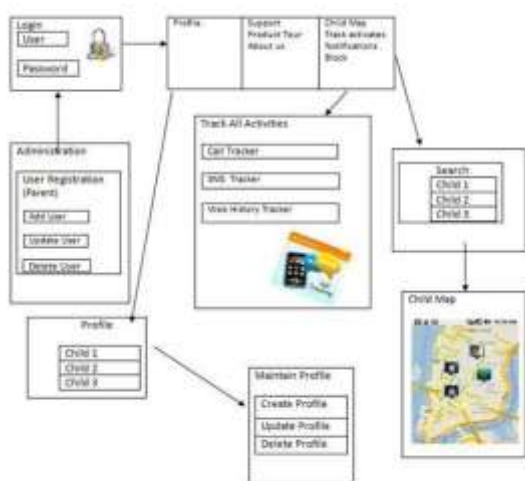


Figure 5 : Web Server Infrastructure

Figure 5 explained the web server infrastructure of the system. The following section is explained how it is captured this web server infrastructure in this implemented system

The main purpose of developing web server infrastructure is to build administration task well. In this implemented system it has to manage two mobile applications for one parent. When considering a mobile it is difficult to monitor these entire tasks with only using mobiles with limited capacity and speed. This web server infrastructure is giving major support to this implemented system by providing better administration.

This web site there are two user levels for manage this product. Parent can view all the details of child with including tracking mobile details, real time GPS locations, and child performance. But only child can access to the web site to view the performance details. All the child mobile tracking details of the child mobile and GPS tracking locations details are updated to the web server. Other than it is updated the child performance details to the web server. According to each child, it is displayed the relevant tracking details and Google map. Other than that it is measured the child performance and it is shared each child performance details to a separate page. This page can be accessed by both parent and child. Basically this web server is used to manage this product and to monitor child, parent mobile applications. All the details, data are kept in this web server.

III. RESULTS AND DISCUSSION

The main result that wants to be achieved is the development of the fully completed system. Evidence plays an important role in any software product. Because from that, end user and other external parties, related to the project development, can get an idea of final output and the quality of the final product. This verifies the final output verification and the validation. According to this, project outcomes can be viewed under following major units.

- Motivate the child by allocating tasks and awarding ratings.
- Track all the child activities done using the mobile phone.
- View all the tracked detail in the web server infrastructure.

These are the test outputs of the Child Mobile Monitoring system (CMS)



Figure 6 : Task View



Figure 7: Completed Tasks

For each child, it is displayed the call history report interface. That is included all the call tracking history of the child.



Figure 8: Call Tracking Report



Figure 9: SMS Tracking Report



Figure 10: Web History Tracking Report



Figure 11: Child Location Tracking Map

This is the results and output finding final state for relevant to our system. We have successfully built the Child Mobile Monitoring System Software Application and demonstrated our achievements in the final presentation of our project.

IV. CONCLUSION

With the development of new technology, lots of features are added to mobile phones. Since kids are more addicted to mobile phones, the usage of smart phones has been increased up to 44% in year 2013 among kids aged between 10-15 years old. The most challenged problem that the parents face is to protect their child from misusing the mobile device. Therefore this child monitoring system is developed as a solution to help parents to protect their children from the negative impact of using the mobile device.

Child has both negative and positive impact by using a mobile phone. When the child understands the correct usage of a mobile phone, there won't be any negative sides. Negative impact is occurred when child is miss-using the phone. Unexpected repercussions may arise such as superfluous photos, videos, and messaging and these things might spoil a child's mind and he may be a victim one day. Therefore this mobile application can be used to monitor the child ethical behaviour.

This child monitoring system consists of two main parts. They are tracking all activities and motivating the child to perform well in his/her work. This system helps parents to track all activities of the child which is done using mobile phones and to motivate children to increase their performance. The existing systems that the research team has examined contained only one function, either tracking or motivating the child by tasks allocation. This child monitoring system is a combination of those two functions. This will be an advantage for parents to carry out their work using only one system. Therefore the usage of phone memory will be decreased.

This system contains a mobile application and a web server infrastructure. All the administrative functions will be handling by the web server infrastructure. That will help to reduce the memory consumption of the mobile phone. Overall, this application can be used to monitor the child in every angle. The child can be motivated from the task allocation feature.

Another advantage of this system is to predict the location of the child when the internet facility is down. Once the internet is down, using GPS technology it is unable to detect where the child is. Therefore this system will give the parents a better solution for that problem.

Children can lie to parents in any situation. By tracking all the activities, parent can get to know the

truth about their children. Therefore parents will get the 100% accurate details and will able to protect their child.

This system can be enhanced for future activities. Moreover, this system is basically implemented to protect as well as motivate, and this can be expanded in future by any organization to allocate tasks and track activities of the employees.

Also this system can be used to monitor and increase the performance of the parent as well. Through this a parent will be transformed into a good role-model for a child to follow.

A social network can be created to share ratings and badges that a user has awarded for performing tasks properly. Therefore the user can get feedbacks of others about the performance, so the user enhances his/her performance according to the feedback.

REFERENCES RÉFÉRENCES REFERENCIAS

1. 30% of teenagers spend more than 2 hours a night chatting online [online]. Available: <http://www.dubitlimited.com/blog/2009/08/02/30-ofteenagers-spend-more-than-2-hours-a-night-chattingonl-html>. [Accessed: 04th July,2013]
2. One in Four Teens Uses a Cellphone to Get Online Among adults, it's only 15 percent By Lucia Moses[online].Available:<http://www.adweek.com/news/advertising-branding/one-four-teens-use-cell-phones-get-online-148577>. [Accessed: 08th July, 2013]
3. Should You Monitor Your Child's Cell Phone Use? [online].Available:<http://www.nbcnews.com/id/41602998/ns/technology%20and%20science%20security/.US7Eolc3hJJ>. [Accessed: 24th July,2013]
4. Mobile Monitor: Mobile Monitor is the Best Cell Phone Monitoring Software for iPhone and Android. Android Tracking Software featuring GPS location Tracking:www.mobilemonitor.com [Accessed: 13-Aug-2013]
5. Norton Family: parental control software protects your kids from online predators by allowing you to understand what your kids are really doing: <https://onlinefamily.norton.com> [Accessed: 22- Aug-2013]
6. Life360: Life360 is a family locator, messaging tool and communication app all in One <http://www.life360.com> [Accessed: 22-July-2013]
7. MiNino: Its unthinkable that every year 1000s of children around the world become victims of crime through kidnappings, violent attacks or sexual abuse:<http://www.silvertouch.mobi/mynino>[Accessed: 06-Jan-2013]
8. Google Maps, Discover what you can do with the Google Maps APIs,"Google Maps developer Documenta- tion", <https://developers.google.com/maps/documentation>

9. Google developers, "The Solution for Maps Applications for both the Desktop and Mobile Devices", "Google maps API V3", <https://developers.google.com/maps/documentation/javascript>
10. Google developers, "Build location-based apps", "Google Maps API", <https://developers.google.com/maps/location-based-apps>
11. Hellospy:HelloSPY is a cell phone tracking and monitoring software for iPhone and Android smartphones and tablets: <http://hellospy.com/homepage.aspx?lang=enUS> [Accessed:10-Jul-2013].
12. Zlitter: Zlitter is the best way for you and your family to accurately locate each other using GPS, WiFi, and Cell Tower tracking while staying in touch:<http://www.zlitter.com/index.php> [Accessed:15-Aug-2013].



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