DEVELOPMENT OF APPLICATION CHILD TRACKER BASED ASSISTED – GLOBAL POSITIONING SYSTEM (A-GPS) WITH PLATFORM ANDROID

Andi Juansyah

Informatics Engineering – Indonesian Computer University
Dipatiukur Street 112-114 Bandung
Email : standy301@gmail.com

ABSTRACT

Parents should provide the best for their children, ranging from the need for healthy food, education, and even a sense of security. Parental guidance and monitoring is one of the main factors, increasingly growing magnitude child ,increasingly widespread intercommunication and child busyness not be fully monitored by the parents, it is becoming worries for parent where recently many of lost children news, and in emergency situations children experience difficulty in contacting parents.

Based on that, it can be concluded to build of software that can help the problems of the parent and child which has been described previously. Child Tracker is a software that runs on a mobile device that is easy to be accessed and carry anywhere.Child Tracker uses technology Assisted Global Positioning System (A-GPS), positioning on the GPS with the assistance of a helper server cellular base stations.The software is built using object-based modeling. Child Tracker built into two applications namely Child Tracker – Parent for users parents and Child Tracker – Child for users child.

Based on test using aplha and beta testing can be concluded that the software Child Tracker has helped parents to monitor children using the android platform, and help children send mark of danger and contact parents quickly with the sos features..
Keywords : *Child Tracker,A-GPS, monitoring, SOS, Android*.

1. INTRODUCTION

Parents should provide the best for their children, ranging from the need for healthy food, education, and even a sense of security. Parental guidance and monitoring is one of the main factors, increasingly growing magnitude child ,increasingly widespread intercommunication and child busyness not be fully monitored by the parents, it is becoming worries for parent where recently many of lost children news, it is becoming the central concern of parents that the recent news many missing children were kidnapped, raped, and even did not hesitate in killing. Serperti news Rimma lost child named 14-year-old Naomi, who lost when going to follow swimming eskul in SMPN 9 Tangerang South[1].

Based on the results of interviews with 15 parents, 11 parents obtained by the percentage of 73.33% which states that parents have busy for each other and there is little time to be with the child, causing the parent to the child supervision is reduced, there are many parents who know aktifikas children, like out to play, go sightseeing or aktifikas study is certain without parental supervision and not infrequently also child lying when going somewhere.

Based on the results of interviews to 15 children, found nine children with a percentage of 80% who stated the child takes a long time in contacting parents during emergencies and also does not allow the child quickly to notify the location to parents when an emergency. These problems become factors that need to be noticed by every parent, where pegawasan parents should be further improved. This can be minimized with the advancement of technology which uses A-GPS technology.

Assisted Global Positioning System (A-GPS) is a development of the system as a regular GPS positioning. that the positioning is not just rely on signals from GPS satellites, but getting assists on a data server that the service provider. Aid in the form of data positions taken by LBS (Location Based Service), is a system based on those determinants of the location of BTS (Base Transceiver System). Not only the location data is sent via satellite aided also data from a server that is conveyed to the A-GPS via a data connection via GPRS or 3G, so positioning faster or also known as Time To First Fix (TTFF) and more accurate thanks to the help of a data server operator [2]. Location data will be displayed with the media on which google maps google api.

Currently, there are about 7 billion mobile users worldwide. Meanwhile, the number of users of mobile services has been growing 7 percent annually. In the first quarter of 2014 and then just the addition of new mobile users reached 120 million, with a growth rate like that, then in 2015 the number of mobile users is expected to exceed the number of the world's population, currently at about 7.2 billion [3].

The objectives to be achieved from this study are as follows:

1. Facilitate the parents know the whereabouts of the child by using android mobile.
2. Help the child to contact the parents more quickly during emergency situations and provide the final location to parents.

1.1 *Tracking*

Tracking literally means to follow the road, or in the sense of free is an activity to track an object. Definition of tracking or monitoring activities in this regard is to monitor the whereabouts of the child based on the position of the smartphone get [3].

1.2 Application

In terms notion application is a program that is ready for use that is made to implement the function for user applications as well as the use of other applications that can be used by a target that will be addressed. According to the executive computer dictionary, the application has the meaning that is solving the problem using one of the techniques of data processing applications are usually raced on a komputansi desired or expected and processing of data that is expected.

Understanding the application according to Big Indonesian Dictionary, "Application is the application of a system designed to process data using rules or provisions of a specific programming language" [4].

1.3 *Assisted – Global Positioning System* (A-GPS)

Assisted Global Positioning System (A-GPS) is a development of the system as a regular GPS positioning. A-GPS improve GPS performance usual by providing information through alternative communication channel that is connected to an auxiliary server, where the A-GPS receiver will get some information that is normally received from the satellite through the server. This is what distinguishes between A-GPS with GPS, the addition of elements of assistance server or also called LBS (location Base Service). Thus, helping the process of receiving the data to determine the user's position became really easier and can reduce the time and the amount of information needed from the satellite. Furthermore, because the A-GPS receiver is designed to be able to know in advance in the determination of position, the A-GPS receiver can increase the amount of energy received from certain frequencies. This increases the sensitivity of the A-GPS receiver and allows the user to perform positioning despite acquire GPS signals at a lower signal strength [2].



Figure 1.1 Example (Assisted - Global Positioning System) A-GPS

1.4 The introduction of Android 1.4 Operating System

Android merupakan sistem operasi yang sekarang sedang terkenal di pasaran smartphone saat ini. Berikut adalah pengenalan android :

1.4.1 History of Android

Android is an operating system Linux-based mobile devices that covers operating systems, middleware and applications. Android provides an open platform for developers to create their applications.

Initially, Google Inc. bought Android Inc. which is the newcomers who make software for mobile phones or smartphones. Then to develop Android, formed the Open Handset Alliance, a consortium of 34 companies for hardware, software, and telecommunications, including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and Nvidia. [10]

At the inaugural release of Android, 5 November 2007, along with the Open Handset Alliance Android states support the development of open source on mobile devices. On the other hand, Google released the Android code under the Apache license, a software licensing and open-platform mobile devices.

1.5 Software Support

Here is the software support in supporting the development of applications that will be built.

1.5.1 Android Studio

Android Studio is an IDE (Integrated Development Environment) for the official Android application development and open source or free. The studio announced the launch of Android by Google on 16 May 2013 at the event Google I / O Conference for 2013. Since then, Android Studio Eclipse as an IDE replace official to develop Android applications [5].



Figure 1.2 Android Studio

Android studio itself was developed based on IntelliJ IDEA is similar to the Eclipse plugin accompanied by ADT (Android Development Tools). Android studio features:

a. Projects based on Gradle Build
b. Refactory and bugs fixed fast
c. New tool named "Lint" dikalim can monitor the speed, usability, and kompetibelitas applications quickly.
d. And Proguard support App-signing for security.
e. Have a GUI application easier android
f. Powered by Google Cloud Platform for any application developed.

1.5.2 *Java Development Kit* (JDK)

Java Development Kit (JDK) is a collection of software that you can use to develop software based on Java, while the JRE is an implementation of the Java Virtual Machine that is actually used to run Java programs. Baisanya, each containing one or more JDK JRE and various other development tools such as java compiler source, bundling, debuggers, development libraries, etc. [5].

1.5.3 *Web Service*

Web service is a set of application logic and its objects and methods it has, which is located on a server connected to the Internet so it can be accessed using the HTTP protocol and SOAP (Simple Object Access protocl). In use, the web service can be used only to check the user data that is logged on to a website or to be used in online banking transactions are complicated.

The goal of this technology is to facilitate some applications komponenya to connect with other applications within an organization and outside the organization using a standard which is not bound platform (platform-neutral) and is not bound to be the programming language used. This can occur because the XML standard that is supported by many large companies in the world, which is used to exchange data. Other than that, the use of SOAP into methods of objects that exist in a web service can be accessed from other applications such as the application to access the local method [6].

1.5.4 *Java Script Object Nonation* (JSON)

JSON (JavaScript Object Notation) is a lightweight data interchange format, easily read and written by humans, and easily translated and made (generated) by the computer. This format is based on part of the Programming Language JavaScript, Standard ECMA-262 3rd Edition - December 1999. JSON is a text format that is independent of the programming language whatsoever for using a style commonly used by programmers family C including C, C ++, C # , Java, JavaScript, Perl, Python etc. Because of these properties, making it ideal as a language JSON data exchange [JSON] [7].

JSON is made of two structures:

a) set of name / value pairs. In some languages, this is stated as an object (object), record (record), structure (struct), dictionary (dictionary), the hash table (hash table), keyed list (keyed list), or associative array.

b) List terurutkan value (an ordered list of values). In most languages, this is expressed as an array (array), vector (vector), lists (list), or sequences (sequences).

1.5.5 Google *Cloud Messaging* API

Google Cloud Messaging (GCM) for android is a service that helps developers to send data from the server to their android application to other android devices. It could be a short message to tell the android application that new data will be retrieved from the server (for example, the film uploaded by a friend), or it could be a message that contains up to 4KB of data payload (so that applications such as instant messaging can receive direct messages) [8].

GCM services handle all aspects of a message queue and delivery to the target application, and runs on the target device. GCM allows android application to send a message to the server for broadcasting a notification to all existing clients. Only requires a Gmail account it will immediately be able to use the facilities in GCM.

1.5.6 Google *Geocoding* API

Geocoding is the process of converting addresses into geographic coordinates obtained an address (1600 Amphitheatre Mountain View, CA) and converted into latitude 37.423021 longitude coordinates - 122.083739, which can be used to place a marker on the map or the map position. The reverse geocoding is the opposite of geocoding is the conversion of coordinates into an address that allows to find an address [10].



Figure 1.3 Google Geocoding and Reverse Geocoding API

1.5.7 Google *Maps* API

Google Maps is a service from Google that makes it easy for users to perform mapping capability for applications that are created. While google maps API allows development to integrate Google Maps into web sites. By using Google Maps Api makes it possible to embed Google Maps site into an external website, where site specific data can be overlaid [11].



Figure 1.5 Google Maps

Although initially only a javascript API, Maps API has since expanded to include an API for Adobe Flash applications, service status maps to take pictures, and web services to perform geocoding, generating driving directions, and get the elevation profile.

2. CONTENTS OF RESEARCH

2.1 Analysis System

Child Tracker application on Android smartphones is applications that are used to determine the presence of children. This application can know the whereabouts of children when traveling by using android smartphone. It also can help the child gives the location and contact parents quickly and during emergency situations. This application uses a device that is a-gps on android smartphone so that the position where the child is more accurate and precise, and done anywhere because the application is connected to the Internet.

2.2 Flow System

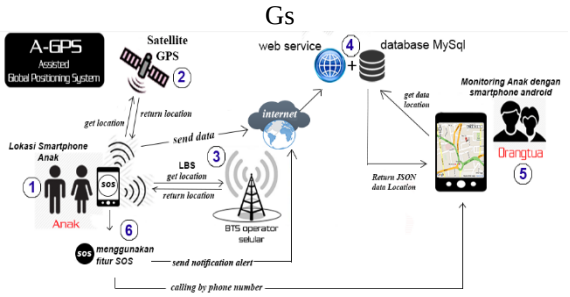


Figure. 2.1 System Architecture Child tracker

2.3 Business Process Analysis

Analysis of business rules explain about the problems that occurred in a parent and child:

1. Analysis of business processes that are currently running.

Here is a business process that is currently running on the parent and child.

a. Parents can only monitor the child when the child is with their parents, but if the child is far from the reach of such lost parents then parents can not monitor the whereabouts of children.
b. Son can quickly contact parents when a child has a disaster such as an accident, lost, or even kidnapping.

2. Analysis of the proposed business processes.

Business processes are proposed for the parent and child are as follows:

a. Parental monitoring of children can be done by using an application that can monitor the child remotely using a smartphone.
b. Using the application on a smartphone that can determine when the children are away from their parents.
c. It takes an application with features giving the location of a place where children and contact the parents and help children when they are in an emergency.

2.4 Analysis of A-GPS

Assisted - Global Positioning System (A-GPS) is a positioning system of GPS supported by slave servers that help from cellular base stations. Thus, the process of receiving the data to determine the user's position becomes easier and can reduce the time of acceptance of the position as well as provide greater accuracy .

2.4.1 Principle Positioning with A-GPS

Positioning on the A-GPS is to use the distance calculation. The distance in question is the distance between the user and the GPS satellites. This distance can be obtained after a long travel time from the GPS signals sent by satellite began to be accepted by the A-GPS receiver is known. While the speed of the GPS signal is equivalent to the speed of light, which is 3x105 km / s. With mathematical equation s = VXT, where s = distance, v = velocity signal (equivalent to the speed of light c = 3 x 105 km / s), and t = time, then the distance between the user and the GPS satellites can be known.

Here is an overview of the differences osisi GPS with A-GPS:

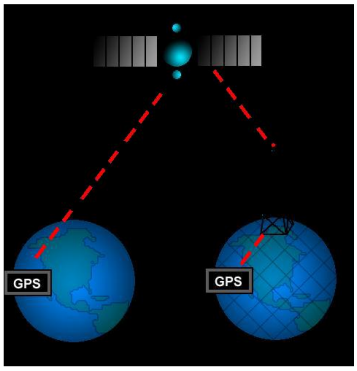


Figure 2.2 Differences in GPS with A-GPS

2.5 Functional Needs Analysis

Here is the use case of child tracker subsystem applications.

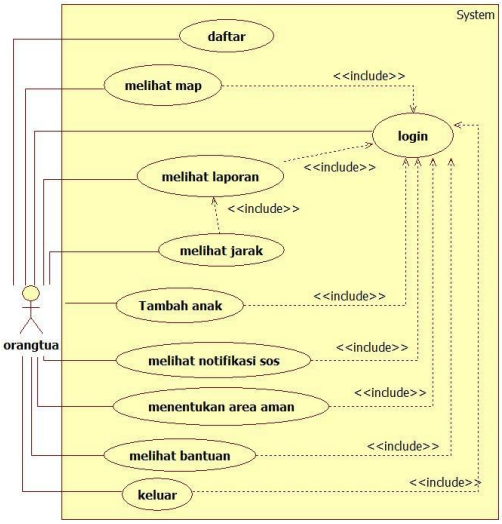


Figure 2.3 Use Case app parent

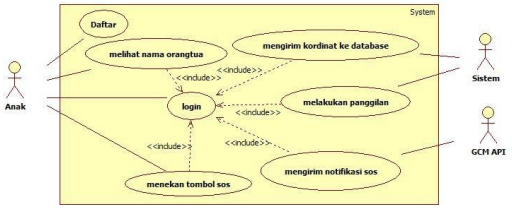


Figure 2.4 Use Case app parent

2.6 Analysis of Relation Scheme

The following is an analysis of the relation scheme on child tracker application.

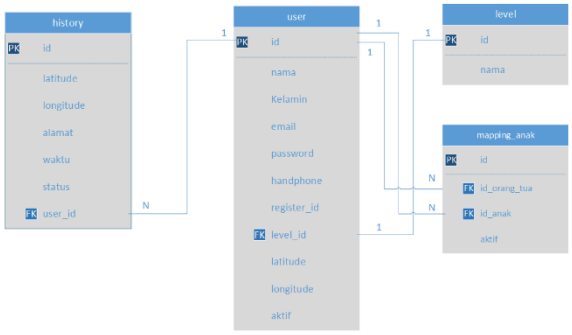


Figure 2.5 Relation Scheme

2.7 Hardware Implementation

Table 2.1 Hardware Specifications smartphones

No	Hardware	Specifications
1	dimensional screen	5.0 inches
2	RAM	2GB
3	Memory Internal	16GB
4	Processor	Dual-core 2GHz
5	Resolusi	720x1280 pixels
6	Operating System	Kitkat 4.4
7	network	2G : GSM 850 / 900 / 1800 / 1900 3G : HSDPA 850 / 900 / 1900 / 2100
8	A-GPS	standar
9	WLAN	Wi-Fi 802.11 b/g/n, Wi-Fi Direct, hotspot

2.8 Software Implementation

Table 2.2 Specifications Software smartphone

No	Software	Specification
1	Operating System	Windows 7
2	Web service	Sublime Text 2
3	Database	Php MyAdmin
4	Android	Android Studio
5	Sistem Operasi Android	Jelly Bean (4.2.2), API 14

2.9 Interface Implementation

Here is a child tracker application interface implementation.

1. Implementation of child tracker interface - parent

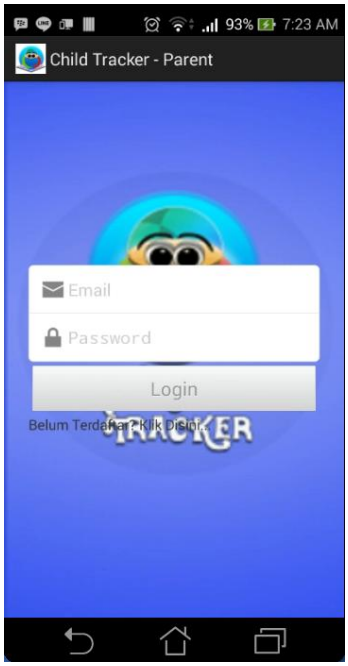


Figure 2.6 Login tracker child - parent

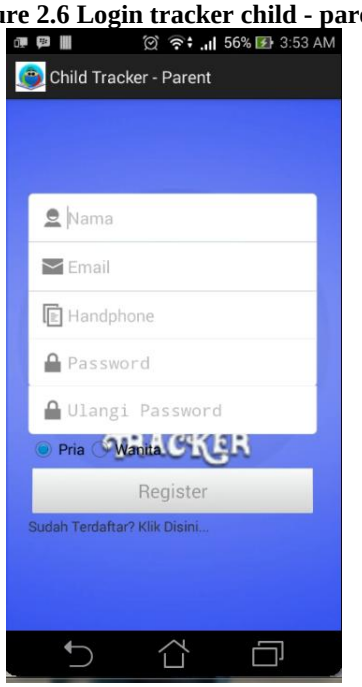


Figure 2.7 registers tracker child – parent

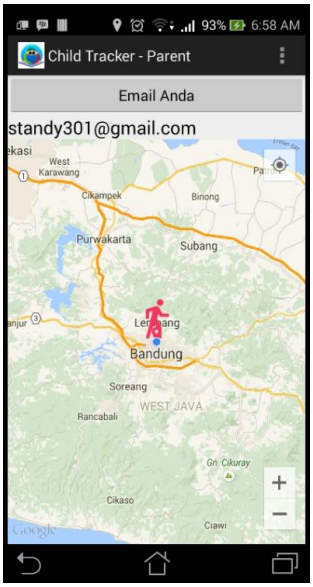


Figure 2.8 Main Menu tracker child – parent

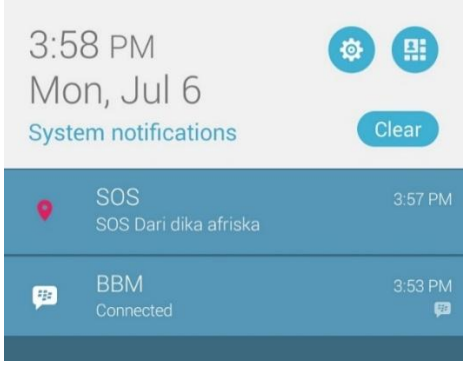


Figure 2.9 SOS Alert tracker child – parent

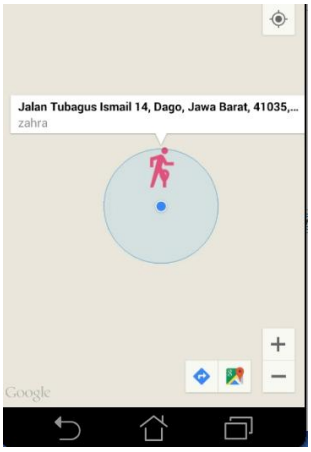


Figure 2.10 Safe Area tracker child – parent

2. Implementation interface tracker child - child

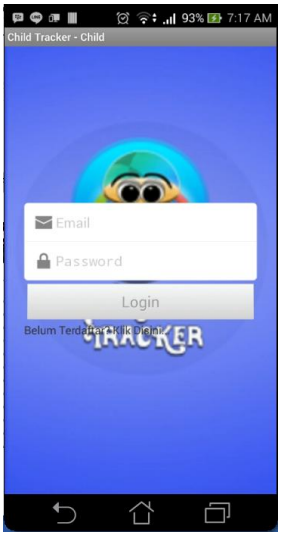


Figure 2.11 Login tracker child - child



Figure 2.12 Register tracker child - child



Figure 2.13 Main Menu tracker child – child

2.10 Testing

Here are the results of testing of the software development,

1. Evaluation of the results of functional testing is done it can be concluded that mobile systems are built has been running as expected both in terms of process validation and error handling.

2. Evaluation of the questionnaire testing Based on the test results of questionnaires that have been carried out, then the conclusion:

Table 2.3 Evaluation of Keusioner App Parents

No	Objectives	Evaluation Results
1	help you to know the whereabouts of the child remotely	Assist
2	helps you know the child's condition remotely	Assist
3	helps you determine a safe area for children	Assist
4	help you determine the closest distance towards the position of children are	Assist

Table 2.4 Evaluation of Child Keusioner App

No	Objectives	Evaluation Results
1	help you to contact parents quickly when emergencies	Assist
2	help you give the alarm to parents	Assist
3	helps you determine a safe area for children	Assist

3. CLOSING

Based on the results of the discussion that has been described in previous chapters, the authors can draw the following conclusion:

1. With Child Tracker application on android platform, parents can easily find out where the child remotely by simply using mobile Android

2. With Child Tracker application on android platform helps the child to contact parents quickly through the features sos who at the time used to send notifications to the smartphone sos parents, as well as the contact telephone number of parents who were registered in the parent application automatically after a few seconds sos button in use.

The suggestions - suggestions for Child Tracker software development are as follows:

1. Adding another feature when handling if the application tracker child - the child was no

internet but still be able to send the location to a parent.
2. Fix the application so that it can display more attractive.
3. Develop a platform that can be supported by the software given the currently only supports the android platform

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