Controlling Regional Development Project by utilizing GPS Technology

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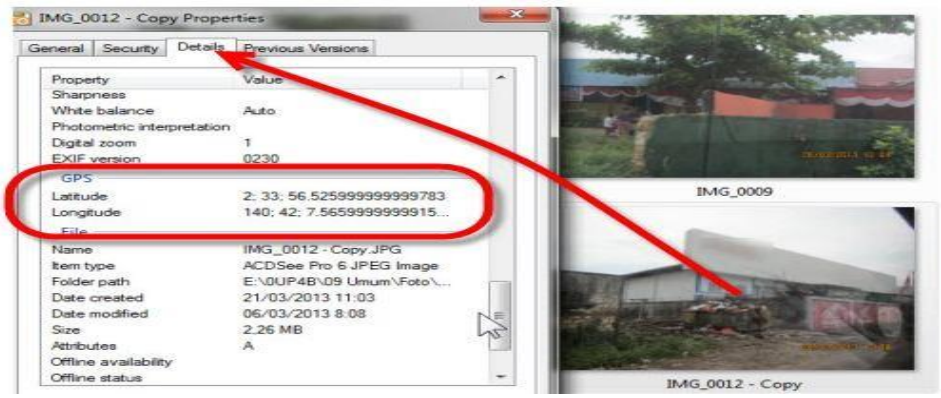
Abstract*— GPS (Global Positioning System) has a variety of applications among which real-time tracking finds significance in day-to-day life. One of the technologies used to find locations by GPS (global positioning system). Service application based information location relies on the accuracy approximate position users. Unfortunately use this application not in real-time so cannot be identification development project a project by sending signals information on the competent also tracking this location many drained of energy batteries. The purpose of this research is to design systems that can monitor the work of the project to equitable regional development in real-time with the efficiency of the energy consumption of battery-based smartphone. By combining the methods of Location-based services (LBSs) and APIs methods that significantly reduce energy consumption up to 90% to the location tracking by applying power-saving algorithms with techniques of encapsulation to the fire without reducing the level of accuracy.

***Keywords*— Technology, Information, GPS, LBSs, Battery, Energy, Consumption**

I. INTRODUCTION

GPS is a network of satellites that continuously emit radio signals at very low frequencies. GPS receivers passively receive these signals, provided that the view to the sky should not be obstructed, so usually this tool only works in open space. GPS satellites are working on a very thorough reference time and transmits data indicating the location and the current time. Operation of all existing GPS satellites are synchronized so that emit the same signal. GPS receiver will work if it receives a signal from at least four GPS satellites, so that its position in three dimensions can be calculated. At this time there are at least 24 operational GPS satellites at any time and is equipped with some reserve. The satellites operated by the US Department of Defense, in orbit for 12 hours (two orbits per day) at an altitude of about 11,500 mile and move at a speed of 2000 miles per hour.



Picture 1 : Langitude position dan building Latitude

There is a receiving station on Earth that calculates each satellite orbital trajectory closely. In the hands of a man who served as the holder of responsibility in development projects in a particular region who have obtained the disbursement of funds to build a building, the presence of GPS (global positioning system) is needed.

Report on the monitoring of their own cannot simply rely on a note or photo mere project properties because it can be manipulated / fraud. GPS in addition will provide accurate evidence of the complainant that he had come to the desired location can also show information on the progress of the building on purpose. Evidence that convey not just a picture of the shape of the building or the building work, but has no complete information such as information about the date, month, year and time as well as position coordinates of where the picture was taken but it also can show the progress of work as well as to the presence of laborers , To avoid fraud in the job, the first person concerned involved in this work capturing photos of the work already completed and work still remains and also workers involved on the day.

This information is automatically sent to the web server to the mobile. The location of the person who sends all this data can be identified by the use of mobile phones equipped with GPS and the information stored in the database. This equipment is important to support activities for the surveying officers in the field. Because, the use of a camera on a smartphone equipped with GPS functionality, will allow officials to provide geo-tagging of data into the resulting photographs, and information point coordinates contained in the photo. Users can share information easily through the Map Utility software or Google Earth. The usefulness of the GPS receiver on the main thing is to take a position coordinate of a point on this earth and save it as a waypoint. Shooting results on the ground will determine the accuracy of the value of the object officer reported. Moreover if the shooting it for monitoring development projects in rural areas that are difficult to be reached, the GPS would be helpful evidence, the existence of work funded projects both APBN and APBD. Still images that will help prove the position coordinates of any project already and done. But unfortunately, the need to track the position continuously to monitor objects will drain energy consumption battery phone for which this paper presents an algorithm in addition to determine the estimated position of an object based on measurements with GPS, can also optimize the use of consumption energy battery on the phone used. Based on the above background, the problem can be identified, namely "How to inform the development of the project through the development of a smartphone with GPS accuracy using the battery energy use as efficiently as possible

The purpose of this study is to ensure transparency in government organizations / private issues such as false measurements and duplication of work. Field Assistant will capture a photo of the workers every day in the workplace. The system automatically captures GPS coordinates using satellite-based system to minimize the use of battery energy consumption efficiently. Location-based services (LBSS) each and will be continue to evolve toward LBSS next generation [1] class services such as geo fence-or zone-based [2] will track the user's location, and proactively inform him about the information that is useful in finding the location of a place or friends who are nearby automatically [3]. To meet the needs of the tracking / location search, mobile phones today are equipped with positioning method or the Global Positioning System (GPS), WiFi [4], [5] or Cell-Id [6]. Global positioning system (English: Global Positioning System (GPS)) is a system for determining the location on the earth's surface with the aid of alignment (synchronization) satellite signals [7]. This system uses 24 satellites that transmit microwave signals to Earth. This signal is received by a receiver on the surface, and is used to determine the location, speed, direction and time. A similar system with GPS among others the Russian GLONASS Galileo the European Union, IRNSS India

This system was developed by the US Department of Defense, the full name is NAVSTAR GPS (common mistake is that NAVSTAR is an acronym, this is wrong, NAVSTAR is the name given by John Walsh, an important policy makers in the GPS program). This set of satellites maintained by the 50th Space Wing United States Air Force. This system maintenance costs of about US $ 750 million per year, including the replacement of old satellites, and research and development. GPS Tracker is often called the GPS Tracking is a technology AVL (Automated Vehicle Locater) which allows users to track the position of the vehicle, fleet or the car in Real-Time. GPS Tracking utilizing a combination of GSM and GPS technology to determine the coordinates of an object, and then translate it in the form of digital maps. API (Application Programmer Interface) will significantly reduce energy consumption for location tracking algorithm by applying power efficient manner encapsulating them into API [8]. In this study, the authors used a form of research by combining methods of API (Application Programmer Interface) with GPS method. The author conducted a study that is closely related to the problems to be solved as well as defining the problem by doing experiments. Moreover, I also find references and information required from books and articles on the Internet. Resources and information are the basis of making an application by the author.

This equipment is important to support activities for the surveying officers in the field. Because, the use of a camera on a smartphone equipped with GPS functionality, will allow officials to provide geo-tagging of data into the resulting photographs, and information point coordinates contained in the photo. Users can share information easily through the Map Utility software or Google Earth. The usefulness of the GPS receiver on the main thing is to take a position coordinate of a point on this earth and save it as a waypoint.

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II. IMPLEMENTATION AND RESUTLS

The theories of this technology are several divisions under the organization of the municipality where in each division supervisor appointed by a group of workers. These inspectors will supervise their group in the field work by providing daily wages. Perhaps there is an opportunity to misappropriate funds by him. To avoid fraud in the distribute the funds we use the concept of this technology. The following procedure describes how this technology is used. Initially the organization will provide mobile phones with special software built for him.

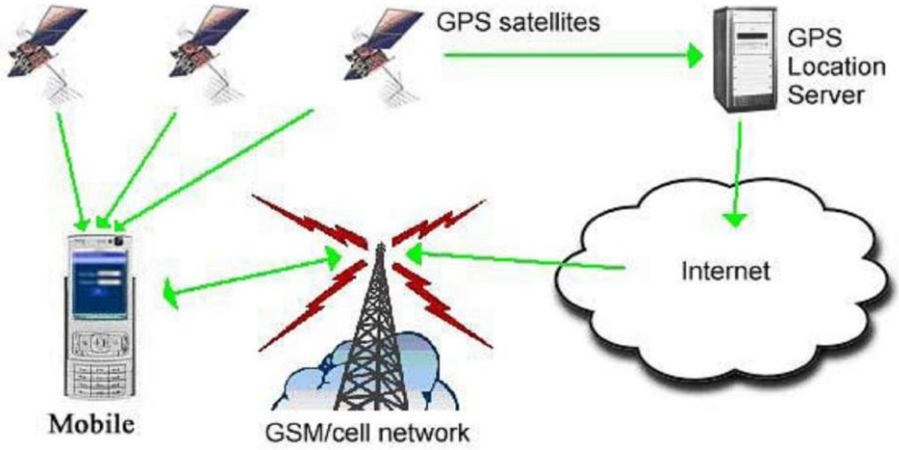


Figure.2.How the application

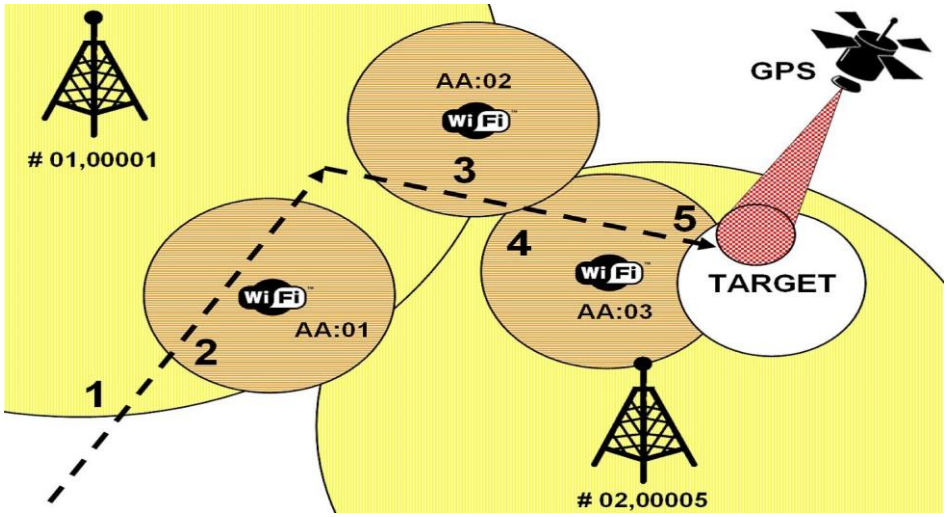
The main work supervisors capture a photo of workers, and also capture a photo of a field in which the work is completed on that day. He must submit photos to the server up to date. So that each user can verify the status of the job. The system proposed in this paper work in two stages, each of the servers (web application) the other side of the client (mobile application).

The using of the app's requiring phones that have GPS enabled for receiving GPS data from the satellites. Now these GPS-equipped mobile very easily available in the market. The system is already installed on your phone; the client can send data by using this application to the server. To retrieve the GPS location details we are using j2me. J2ME API provides a mobile application that provides information about a device that is used to find a location with a view point coordinates are latitude and longitude in degrees, and altitude in meters of the current location Figure 2 shows the J2ME code to capture GPS location details.

TABLE 1. ENERGY USAGE METHOD [10],[6]

Tech	Acc	Prec	Energy	TTFF	Limitations
A-GPS	10m	95%	6.616Ws	15s	indoors & canyons
WiFi	50m	90%	2.852Ws	3s	rural areas w/o WiFi
Cell-Id	5km	65%	1.013Ws	3s	regions w/o cells

Energy consumption is described as the amount of energy needed to obtain a position based on the measurement examples such as those in Table 1. Optimization of energy consumption in a hierarchical concept triangulate its own API, which provides a simple function to keep track of spatial objects without caring about the details of his position, the positioning method is automatically disabled by default and is only activated when the request only. An example of how the algorithm hierarchical position can be seen in Figure 2. In this scenario, the user will be notified when she entered the target area represented by the white circle. Dashed arrows indicate the movement of the mobile device. Big yellow circle indicates the range of the signal reception area, a symbol of the base station and simplified design Cell-Id with an area code location of a small circle logo also WiFi middle and MAC address that is used to represent a WiFi access point coverage. Next GPS with a small red circle shows the position of the GPS was repairing and accuracy. Targets will be tracked about 150 meters where she could be notified when entering the coverage area information is the number (1 through 5) describe the relevant places in the positioning algorithm

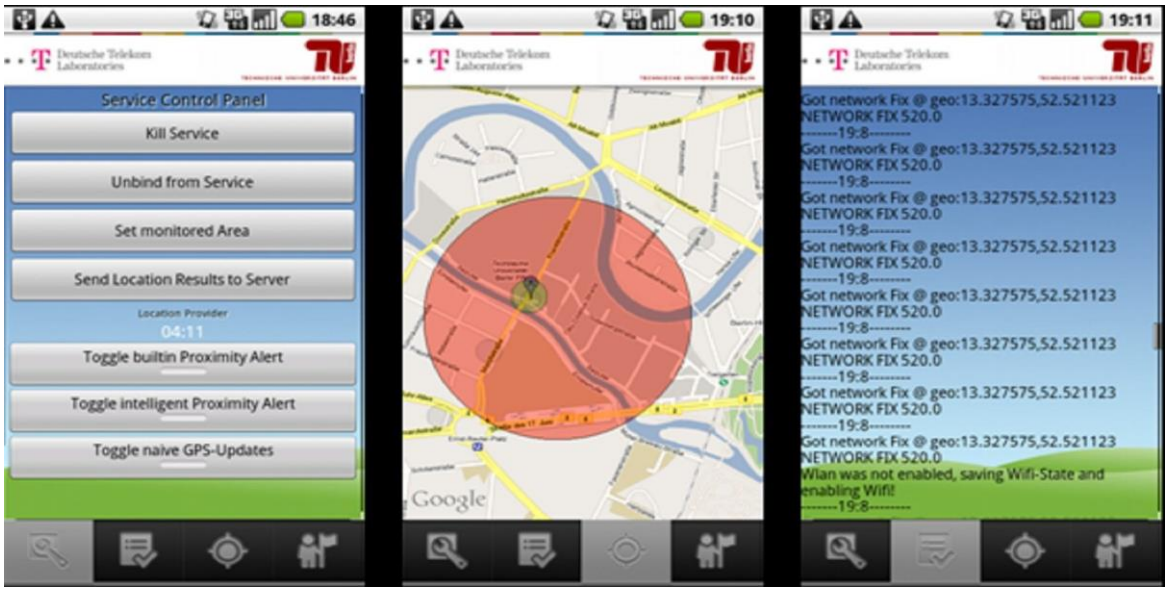


Picture 2. Algoritma function.

The user's device detects a cell tower (# 01,00001) is in the vicinity after the request cell-Id locations that will determine whether the target area is in the location (coordinates and accuracy) or not. If the target area is actually located outside of cellular coverage, it is not necessary to use other positioning methods. Only within the range of reception radius cell towers in the process. A WiFi hotspot (AA: 01) are within range of the reception, but the device is not used because it saves energy.

The same situation occurs when entering a WiFi hotspot (AA: 02).After the user approaches the target, the device will detect a new cell towers (# 02,00005). The next step algorithm will check back in the relation between the position of cell-Id and the target area. After that the positioning method enabled in order to determine whether the user has entered the target zone or not. WiFi hotspot user leaves the current (AA: 02) and enters a new one (AA: 03) From the WiFi positioning algorithm now detects that the user may be in the target area, because the target zone coincides WiFi zone.

GPS position is now enabled to get a more accurate position. Although the user has not entered the target area, GPS remains active while the user continues to move toward the target. After the user enters the target area, it will be detected by the GPS position. Notice to users entering the target zone is displayed to the user. The above description shows that the use of WiFi and GPS together will consume a lot of energy and therefore can be temporarily disabled and enabled if the demand for accuracy positioning is active, a more accurate location providers should utilized. This approach defines the general approach that can be applied to any existing location APIs and integrates positioning method in a general way.



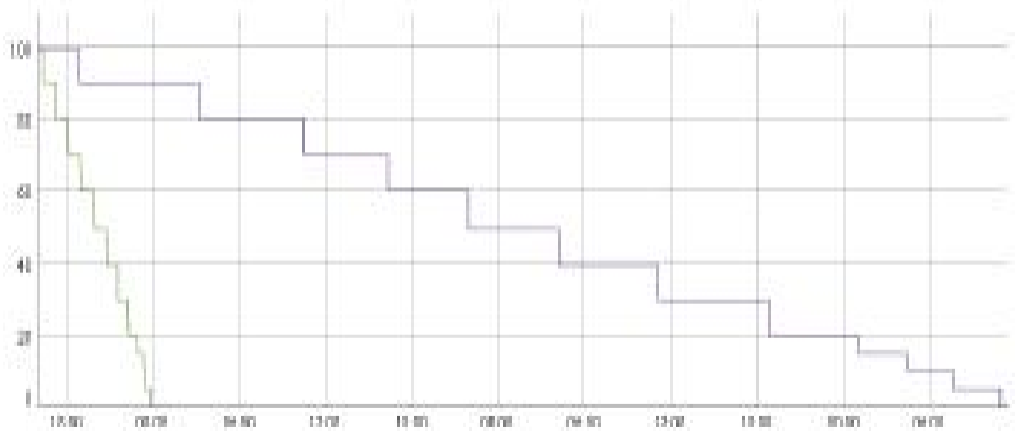
Picture 3. Screenshot test using Android [9]

To measure efficiency by comparing the runtime implementations on different devices. For a direct comparison, by eliminating many programs on two identical devices (Motorola Milestone), both devices have the software installed and it takes more energy for running processes, which may affect the runtime of the device. Android API allows saving battery history log database to SQLite. Table

2. TESTING METHODS DEVICE

Device	Algorithm	Runtime	Energy con.
Milestone *2158	hybrid	239984s (66.66h)	0.077 W
Milestone *9761	naive GPS	27663s (7.68h)	0.669 W

As can be seen in Table 2 and Figure 4, the proposed algorithm requires significantly less energy than naive Gps. While the first devices using a hybrid approach lasted 66.6 hours which resembles an average energy consumption of 0.077 watts, other devices that use GPS naive approach to running out of battery after 7.6 hours (equal to 0669 watts).



Picture 4. Energy Consumption Comparation

Red : Energy Consumption using GPS
Purple : Energy consumption using Hybrid

Hybrid approach only requires 12 percent of GPS naive approach that is more efficient 8 times over. This means that with this technique can be decreased the energy consumption of almost 90%. As can be seen in Table 2 and Figure 4, the proposed algorithm requires significantly less energy than naive Gps. While the first devices using a hybrid approach lasted 66.6 hours which resembles an average energy consumption of 0.077 watts, other devices that use GPS naive approach to running out of battery after 7.6 hours (equal to 0669 watts). Hybrid approach only requires 12 percent of GPS naive approach that is more efficient 8 times over. This means that with this technique can be decreased the energy consumption of almost 90%.

III. CONCLUSION

This research is still in need of development also further evaluation in the future. Although analysis of its feasibility has resulted. The need for more accurate measurements using the battery adapter circuit analysis to verify the values generated. Simulations developed can compare different positioning algorithms without the need to prove on the field. Tracking energy saving position the user must still be developed on the OS level and in an integrated manner in the API location. Application developers can use / develop further and can implement it.

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