

In so many countries some of the companies and organizations lose their valuable properties due to inefficiency and inconsistency of some of their security personnel, this use to happen because of unavailability of security tracking system that can monitor and track all the security personnel. When developing a security tracking system, GPS and Android's Network Location Provider can be utilize to acquire the user location. Android's Network Location Provider determines user location using cell tower and Wi-Fi signals, providing location information in a way that works indoors and outdoors, responds faster, and uses less battery power. To obtain the user location in this application, one can use both GPS and the Network Location Provider, or just one. Here we can track the positions of the security personnel that are holding the Device constantly for period of his working hour and save them on a well secured remote database and display them on google map in a webpage. So, that if a personnel device is found to be in a prohibited area it can be easily traced out. It can also help to create a daily log of device i.e. each and every location visited by the security personnel that hold the device in a day.

Keywords: Global Positioning System (GPS), Google Maps, Location Based Services (LBS), Android.

Introduction

For so many years back many nation's security divisions have suffered because of inefficiency and laziness of some security personnel, some security personnel can just decide to leave their post during working hour without any notification, and at this present time something critical can happen that can be costly to the organization because of their negligence and incompetence and that might not be traceable to the source of the problem and we might not be able to know the officer or the personnel in charge, that is why it is of a great necessity to introduce a research on how to monitor any security personnel of any form of organization like, Higher institution (universities, polytechnics, colleges of education) and other organization like financial institutions, insurance company and so on with a tracking system that is almost close to real time tracking system using Global Positioning System(GPS) and Wi-Fi including the database that is going to be saving the position of each security personnel in 10 min with their ID and the android app to be developed and installed on each android base operating system mobile phone of each security personnel with their ID, So that if a device is found to be in a prohibited area it can be easily traced out and so that no unauthorized devices can enter or leave the area without notification to the server. With the advent of android phone at very low cost the lazy security personnel can be supervised.

Various GPS-based tracking systems have been successfully deployed and utilized in various applications such as fleet and vehicle location identification, and in route guidance. Recently, systems that integrate GPS and GSM technologies with Google earth to provide real-time data have also been proposed. Global positioning systems and mobile phone networks make it possible to track individual users with an increasing accuracy.

Background:

In some years back monitoring the security personnel of a specific organization is very difficult and base on manual approach such as each department having their supervisor that check on them during working hour, and the research make us realize that the approach is totally unsuccessful because a worker can know specifically when to be inspected by the supervisor and try to keep to the time. To solve this problem, Automated tracking system can be introduce using android application of a very low cost that can easily obtain the location of each of the security personnel in every ten minute of their working hour which is very close to real time tracking and this is going to assure the management of the organization that the work is going properly without fear of loss or risk in all aspect of the organization. All board of director / chairman and principal officer of all organization want to be sure that there is adequate security in their organization to prevent loss of any kind and to be sure that all the security personnel are all doing well in respect to the work that has been entrust to their hands. Furthermore, negligence and laziness has been an issue that many organizations face nowadays, and all these issues are very onerous to handle for many organizations over long time.

Review on Location Aware Computing Using Android Operating System

(Zohaib et al, 2008) has put forth the major challenges faced in designing a ubiquitous application. Android operating system is suggested as a best tool for designing context aware applications. Towards the end, author had featured an analysis report on performance of various mobile devices for a location aware computing.

(Xianhua et al, 2009) in their manuscript have described on the anatomy of Android architecture. Components of Android platform such as Activity, Services, Content Providers and Broadcast Receivers were introduced thus providing a better insight of application development.

Review on location based service

(Sandeep et al, 2009) have outlined the significance of location based services. Technological development in an exponential manner have paved a way to access hardware directly by customized application interface such as GPS, web service, programming cameras were elucidated. Ubiquitous Computing is an emerging technology and has lot of challenges in design, modeling and user interaction which are identified and implemented in this organizer application.

Review on mobile location and tracking application

(Abhijeet Tekavade, 2013) in “Mobile Tracking Application for Locating Friends using LBS” presents an approach which uses the GPS as location provider through geographic location for mobile network. (Arnon Amir, 2004) in “Buddy tracking efficient proximity detection among mobile friends” present an approach to maintain information about social sites using dynamic coordinates using centralized and peer-to-peer servers.

Review on ambiguous GPS Vehicle tracking and management system

(Almomani, 2002; Ahmad et al., 2002). in a “ambiguous GPS Vehicle tracking and management system is proposed” this system architecture design in a way that it is offers maximum accessibility for the user anytime anywhere by providing two type of end user application a web application and mobile application, the architecture of the system is based on client-server, in the server side it contain a GPRS a web and SMS server along with database to store user details and data. As for the client it is a box that contain GPS tracker and GSM modem when the user request location from the web or mobile application after registering and logged into the web server an SMS request will be sent to the GSM modem in client device the client device response using the GPRS which will be received by the GPRS server and forward it back to the SMS server finally the SMS server forward the response back to the web server and this project was designed for fleet operation in monitoring driving behaviour of employee or parent monitoring their teen driver.

DESIGN OF THE SECURITY TRACKING SYSTEM

System analysis and design involves people and technology. It is separation of system into subsystems that work together to support the system for study and the interpretation; detailed examination and design based on requirement specification worked out during the analysis phase. Thus, the analysis of the design of this project carried out to describe the system development activities involved.

Flow Chart

This is a diagram that shows the connection between the different stages of a process or part of the system. Hence, depict the pictorial representation describing the process being studied. Figure 1 the flow chart showing the flow of process carried out in security personnel tracking system both android application and web application respectively.

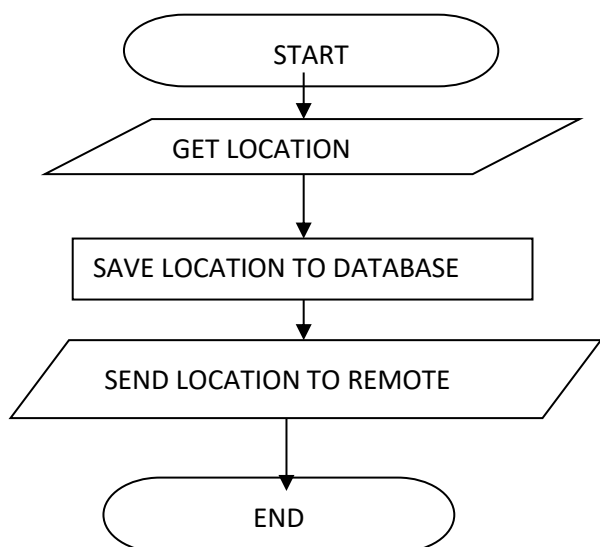


Figure 1: flow chart for the android mobile app

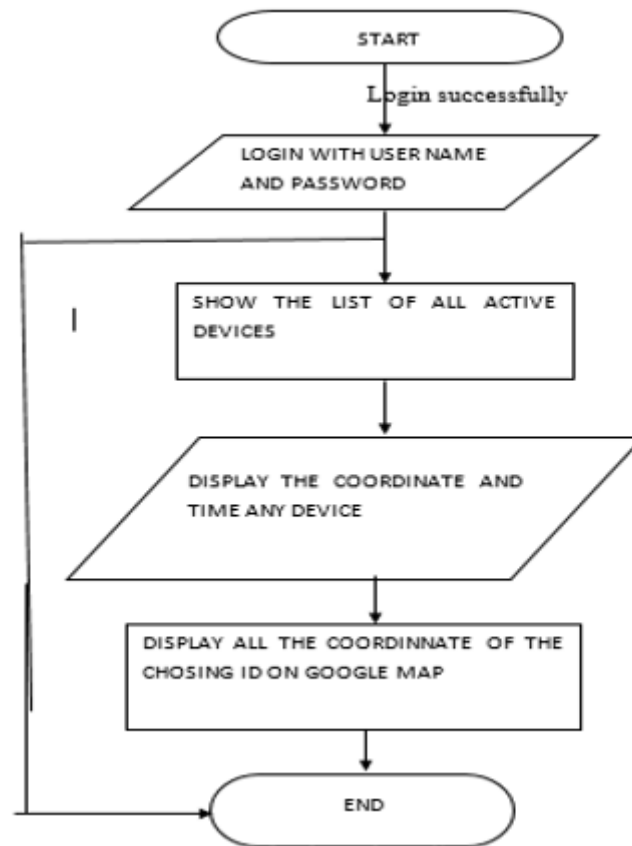


Figure 2: Flow chart that describe the function of the web app of the system

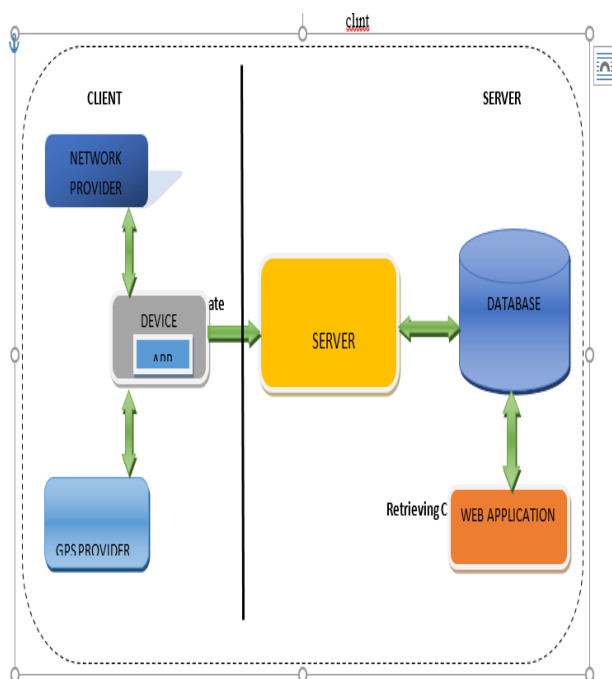


Figure 3: Block diagram of the system

Working of GPS: The global positioning system (GPS) is a space based satellite navigation system that provides location and time information in all-weather condition, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellite. 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 receive

Network provider

Network provider is a business or organization that sells bandwidth or network access providing direct internet backbone access to the internet and usually access to it network access point (NAPs). Network service providers are always referred to as backbone provider or internet provider and it can consist of telecommunications companies, data carrier, wireless communication provider, cable television operators offering high-speed internet access

Mobile application function is to be getting the location of the mobile phone couple with the time that phone is located in that specific location time to time and save it in the database created on the phone and also send it to the remote server

Remote server

Remote server is a running instance of an application (software) capable of accepting requests from client and giving response accordingly. It runs on any computer including dedicated computers. It facilitates the clients to share data, information or any hardware resources. The client typically connects to server through the network but may run on the same computer in the context of IP networking, a server is a program that operates as a socket listener

Database

Database is an organized collection of data. The data are typically organized to model aspect of reality in the way that supports processing requiring information. This database collect all the data and information of each client send by the mobile app and save the for the use of the web application to view all their location (latitude, longitude and time) on Google map

Web application

Web application or web app is software that runs on a web browser. It created in a browser supported programming language (such as combination of html, css, JavaScript and php) and it relies on web browser to render the application. This specific web app using for this tracking system will have many specific web pages, the first web page contain front page that allows the administrator to login the if the login is successful it open the home page, follow by the next page that allow the administrator to view all the user that is available on the system and this will be done by the function that will get all the user from the database and the tracking page will display all the locations and time that will describe the movement of the user on the map

Use case diagram

The uses case diagram describes the interaction and the relationship between all the component of the system including the client and the roles of the client on the system and the administrator including his roles on the entire system

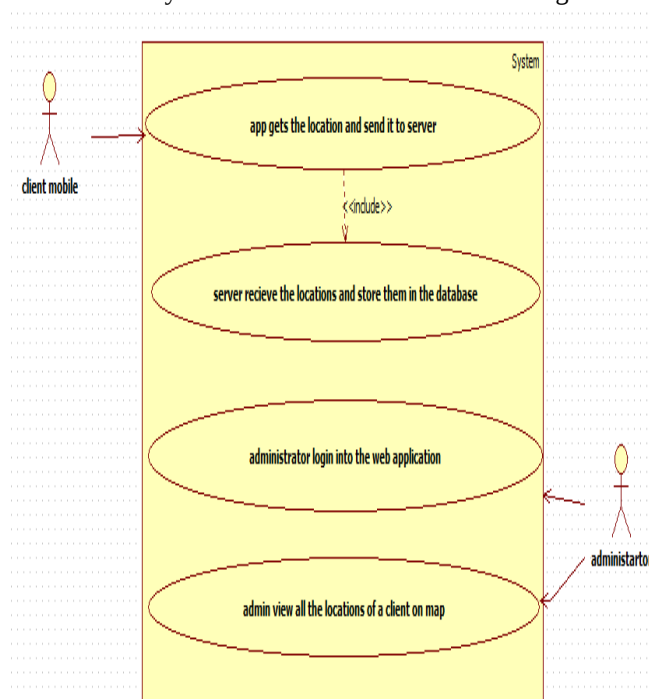


Figure 4: Use case diagram of the system

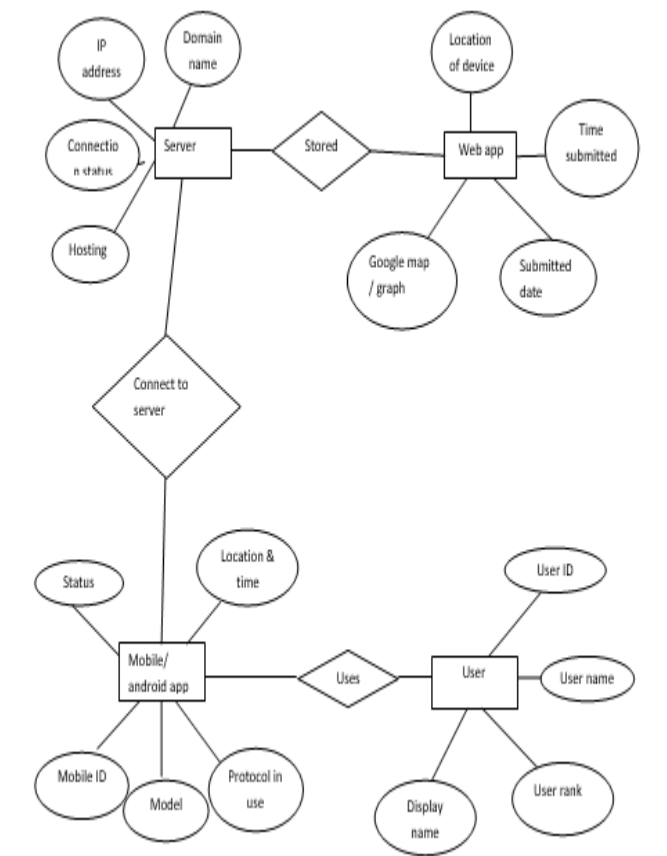


Figure 5: Entity relationship diagram

Implementation of the project

The project, (security tracking system and necessity of time) is the project that has two phases of software mainly using to track the consistency and movement of security personnel

The first phase

The first phase of the software is an android base application, that is going to be installed on android mobile phone, the application will run in the background and it has no interface and it going get the location of the mobile phone in every ten minute and send it to remote server (url), the location will be received by a PHP script then submit to the database.



Figure 6: android phone with the application

The second phase

The second phase of the software is web application that gives access to the administrator to perform many tasks. This web application includes many pages that simplify the task of the administrator to segment to make the task sequentially execute.

Logging into the system

Immediately the administrator enter the URL of the tracking site the first page that will load is an authentication page that check from the database if the user name and the password provided by the administrator is correct from the login page and if one of the user name and the password is not correct then the system return an error “INVALID LOGIN INFORMATION” to notify the administrator that the login information is wrong

The screen shot bellow shows the login page of the of web application

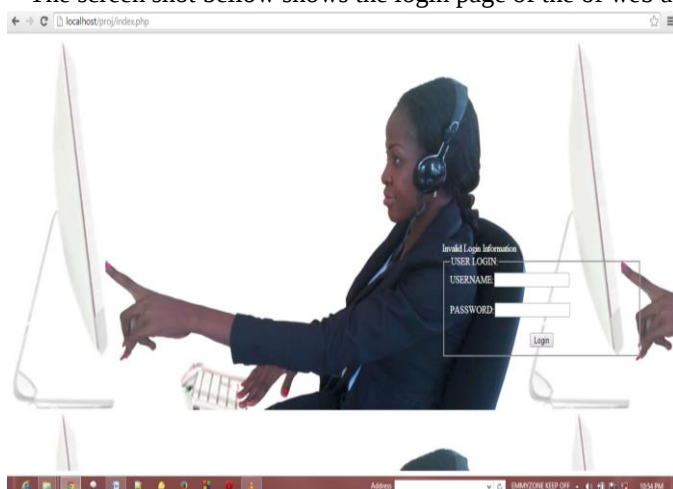


Figure 7: the login page of the web application

Home page

This is the page that load immediately the login is successful and it expose all the function of system to the administrator such as register user, register personnel, view device, add new device, assign device, track device, about us page and logout function.

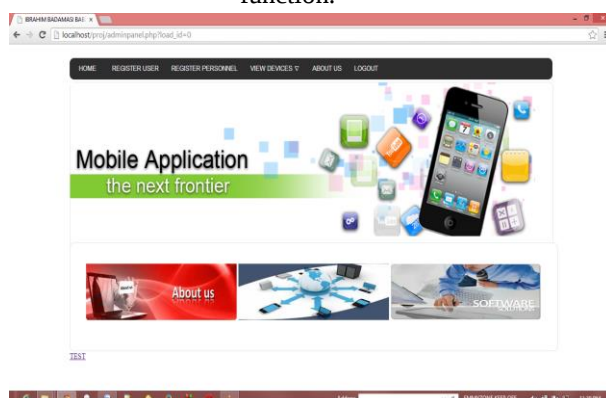


Figure 8: Home page of the web application

Register user page

Register personnel page is a page that allows the administrator to share the access to other user. It is a page that administrator use to create permission for sub user and assign the role that the user will perform on the system and the user created by the administrator cannot work beyond the permission of the administrator.

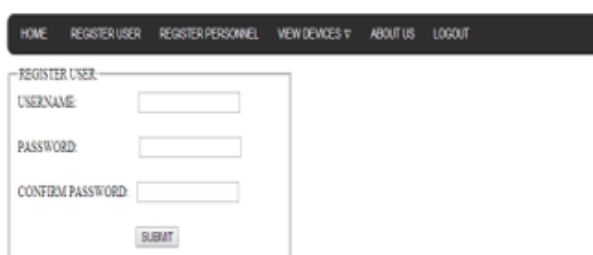


Figure 9: Register user page of the web application

Register Personnel Page

Register personnel page is the page that allow the administrator to register all the client and the security personnel that will be handling the those android mobile phone, immediately when the administrator click on submit, the data send to the specified table

in the database and then create a viewable table that can be accessed by the administrator on the same page for the administrator to view all the data entry without checking the database. Its also perform an update anytime the administrator input a personnel id that is already existing.

S/N	Surname	PERSONNEL ID	ADDRESS	PHONE NO
1	ADVENTIST	771124	24917008	0142040
2	ELIJAH	771124	1542	0970040
3	ELIJAH	771124	20000	09711119
4	ELIJAH	771124	24917008	0970040
5	ELIJAH	771124	1542	0970040
6	ELIJAH	771124	20000	09711119
7	ELIJAH	771124	24917008	0970040
8	ELIJAH	771124	1542	0970040

Figure 10: Register personnel page of the web application

Register device page

Register devices page give platform for the administrator to input the new device name and the device number before the assigning of the device to the security personnel it has a php script that retrieve the information from the database and display it on table on the same page. It has a table in the database that the entire device name and their numbers are stored in the database. It also have two specific functional key “ add new and delete ” add new button submit new input and display it on the table and the delete button remove the input from the database and the table on the page

S/N	DEVICE NAME	DEVICE NUMBER
1	YUNGLAO	6756
2	MOBILE4	3454677
3	B120	13479
4	laval	12345678900

Figure 11: Register device page of the web application

Assign device page

Before a location of a device been sent to the specified URL, the device must be assigned to personnel, when a device is been assign to personnel automatically the system read the date and the time from that present hour before starting sending the location to the URL and from the URL the php script accept the latitude, longitude and the time then send to the database. On this same page you can also unassign personnel from a device.

Figure 12: Assign device page of the web application

Track device page

This is the page where tracking each devices is been carry out, all the active devices on the web app will display on with their id and the name of the personnel that the devices is been assign to and more so it also display the full address of the personnel, the phone number, date and time couple with the “view button” that will take the administrator to the page that will display all the coordinate “at and long” of a specific personnel that hold a specific phone id. Its also include search that allow admin to have access to the history of the tracker, for instance the normal tracker page track that very day but to view the formal locations that is not recent the search is needed.

SEARCH RECORDS					
2014 1 1 SEARCH					
TRACKING INFORMATION					
PHONE ID	FULLNAME	PERSONNEL ID	ADDRESS	PHONE NO	
13479	ADDED DESAY	TR2407	80N STREET LAGOS	0807778043	2014-10-26 02:49:47
1234567890	DOTN THONGAS	TR20124	WULFA YODERA	0807781844	2014-10-26 03:08:06
1234567890	SLAYAGE OLANDRO	TR10142	LAPA/VOGER STATE	0808832211	2014-10-26 03:02:09
1234567890	LAYAL RYA	RTT1154	LONDONA	0807877478	2014-10-26 03:02:40

Figure 13: Tracking page of the web application

Google map that will display immediately after a click on view location.

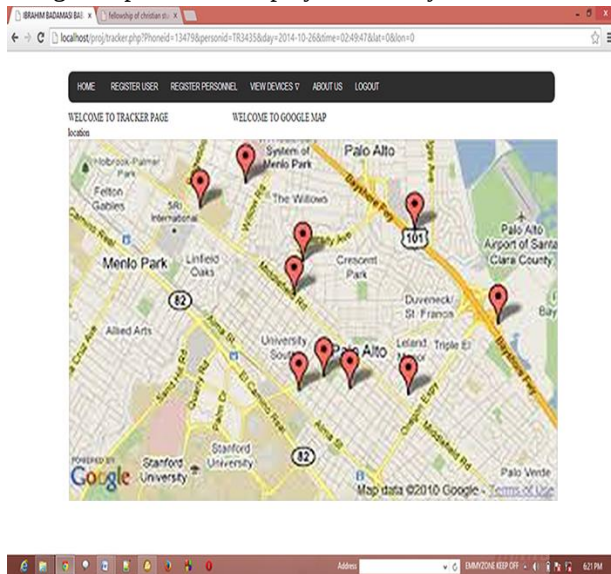


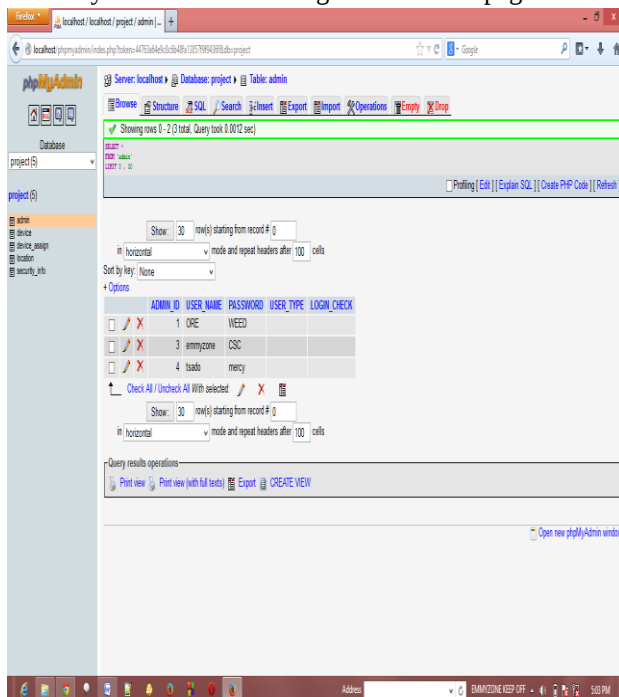
Figure 14: Google map display multiple location

Implementation of database

This database holds all the data sent from the web application and the mobile application for dynamism of the entire system its help the programmer to implement the project in an easiest way and allow the information store to be retrieved. The database for this project consist of six table that hold each data of each application that is been sent from the android mobile app and all the pages on the web application.

Administrator's table

Administrator table in the database store the admin user name and password and it also store the new user name and password create by the admin on the register new user page on the web application



ADMIN_ID	USER_NAME	PASSWORD	USER_TYPE	LOGIN_CHECK
1	ORE	NEED		
3	emmyzone	CSC		
4	loads	mercy		

Figure 15 Database table for administrator login

Device table (add new devices)

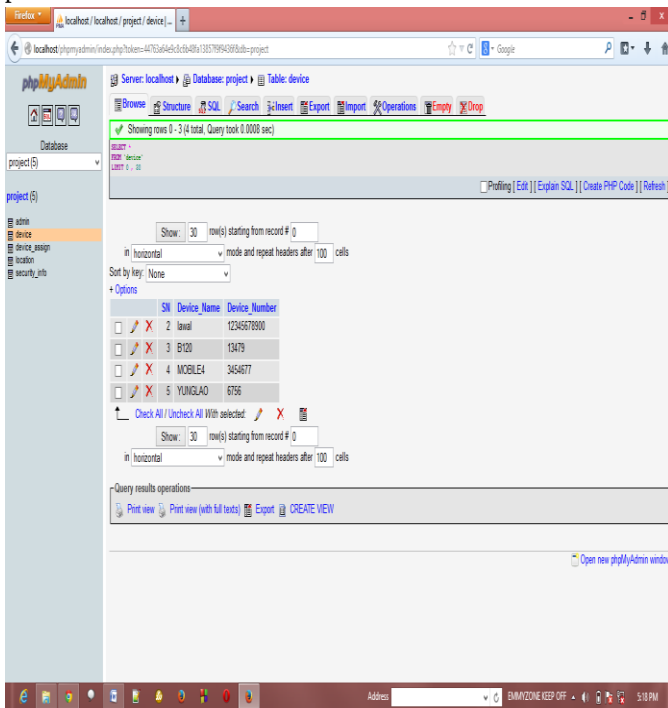


Figure 16 Database table for add new devices

Assign device table

Assign device table consist of five fields that store different value like personnel id , phone id, date , time ,and check assign that indicate if a phone id has been assign to a personnel before tracking page is been activated.

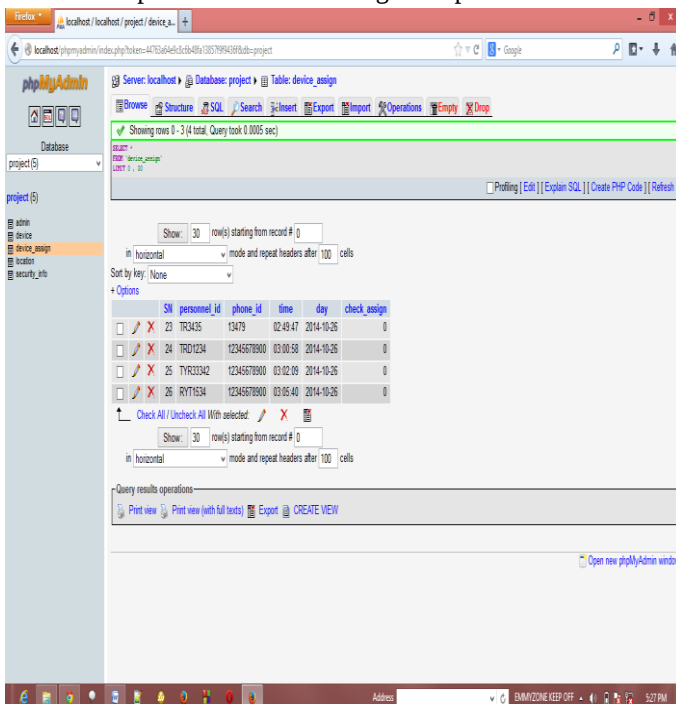


Figure 17: Database table for assign device

Location table

Location table consist of five fields that store different value like phone id, personnel id, latitude, longitude, time and date. It's also responsible for sending back the entire coordinate store to the tracker page before it been display on google map.

SN	Phone_M	LATITUDE	LONGITUDE	Personnel_ID	TIME	DATE
14	12345678900	3.87766630	17.67090656	TRD1234	03:15:25	2014-10-22
13	12345678900	3.87766630	17.67090656	TRD1234	03:15:25	2014-10-22
12	13479	3.87766630	17.67090656	TR3435	03:15:25	2014-10-22
10	13479	3.87766630	17.67090656	TR3435	03:15:25	2014-10-22
11	13479	3.87766630	17.67090656	TR3435	03:15:25	2014-10-22
15	12345678900	3.87766630	17.67090656	TRD1234	03:15:25	2014-10-22
16	12345678900	3.87766630	17.67090656	TRD1234	03:15:25	2014-10-22
17	12345678900	3.87766630	17.67090656	TRD1234	03:15:25	2014-10-25
18	12345678900	3.87766630	17.67090656	TRD1234	03:15:25	2014-10-25

Figure 18 Database table for location

Security information table

Security information table store all the security information like first name, middle name, last name, address, phone number, personnel id, next of kin, next of kin address and next of kin phone number.

SN	SURNAME	LASTNAME	MIDDLENAME	ADDRESS	PHONE_NO	PERSONNEL_ID	NEXT_OF_KIN	NEXT_OF_KIN_ADDRESS	NEXT_OF_KIN_PHONE_NO
13	OLUJADE	DICKSON	MIYE	ABAJI	081746463	FRY1234	EMEXA	ABAJI	08080736454
11	OLAWALE	OLADEJO	KUNLE	LAPA NIGER STATE	08198832211	TRY33342	KINGSLEY	KAPIN KORO NIGER	0805432112
12	LAMHAL	JINA	KOBI	LOKUGA	08178574766	RHY1534	HAJEED	MINNA	08058077447
9	MOSES	SESAN	EMMANUEL	SUN STREET LAGOS	0809777643	TR3435	KOLAWOLE	SUN STREET LAGOS	08076543211
10	DOTH	THOMAS	OLAYMI	SULEJA NIGERIA	08097785644	TRD1234	KOLAWOLE	CRESENT LAYOUT AKALA	08122232343
14	ADESIYAN	BABATUNDE	ADEWALE	LAPA NIGER STATE	01-4325432	TRY1234	KAYODE	LAPA	08080736363

Figure 19: Database table for security information

Summary

The relevant and great capabilities of tracking system that comprises of two phases application that is developed to monitor all the security personnel that will work for an organization, to make sure the properties that belongs to the organization are save and to reduce risk to a minimum level. There are various types of tracking systems that has being implemented over the years like integrated Vehicle Tracking System, another one is mobile antitheft used for tracking back stolen or lost mobile. This research work is implementing another tracking system that is an android mobile application based on android phone. This is a powerful application that can be used to discover if all the security personnel of an organization perform their duty according to the requirement of the organization. All this will be done sequentially, firstly, the mobile phone application will get the location through GPS then sends it to the server and after that the administrator is the only eligible person to view all the location of any user ID that exist on database.

Rong Chen, Xianhua Shu, Zhenjun Du, "Research on mobile location service design based on android" fifth international conference on Wireless communications networking and mobile computing, pp 1-4,2009.

Ghaith Bader Al-Suwaidi, Mohamed Jamal Zemerly, "Locating friends and Family using mobile phones with global positioning system (GPS)," IEEE/ACS International Conference on Computer Systems and Applications.

Almomani, I.M., Alkhalil, N.Y., Ahmad, E.M., Jodeh, R.M., "Ubiquitous GPS vehicle tracking and management system," 2011 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), pp.1-6, 6-8 Dec. 2011.

Abhijeet Tekawade, Ahemad Tutake, Ravindra Shinde, Pranay Dhole, Sumit Hirve, "Mobile Tracking

