DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

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CERTIFICATION

We hereby certify that this project, "DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS" written by **AIBOMOSI RAPHEAL PETER** with Matriculation Number: **ICT/6251830467**, E**SONGBOBA PETER AKASE** with Matriculation Number: **ICT/6251830311**, **GARUBA BLESSING AISHETU AKASE** with Matriculation Number: **ICT/ 6251840721**, **OGAGAOGHENE STELLA** with Matriculation Number: **ICT/625180251**, **OKPO ABDULAZEEZ OTAGER** with Matriculation Number: **ICT/625180316**, **USMAN .C. VICTORIA** with Matriculation Number: **ICT/ 625180142** which is submitted to the Department of Computer Science, Auchi Polytechnic, Auchi in Partial Fulfillment of the Requirement for the Award of Higher National Diploma (HND) in Computer Science.

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DEDICATION

We dedicate this project to God Almighty for His grace, mercy and blessings towards the completion of this project work.

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We wish to acknowledge God Almighty for the gift of life and the strength He bestowed on us in making this project work a reality.

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ABSTRACT

Tracking is the process of determining the location of a given object in a space. When this object is moving, it will have a continuous set of positions within a period of time. GPS system with its global availability, high accuracy and weather condition independently is very effective in tracking moving objects by continuously determining their current position during the period of tracking. The Secure Child Application was designed to track the children as they are in school. The days are gone when one of the two parents sits at home to look after the kids. Now time has come for both parents to work; children's safety is very necessary in such a scenario. The number of users is fitted with Android phone with a Global Positioning System (GPS) that can be used effectively for security and protection purposes. The project scope is to design and implement a real time tracking system that utilizes GPS service to get the location and GSM network to send this location to a tracking centre, where the observer can clearly determine the tracked position. In order to achieve the project objectives, the work plan commenced with deep research, and then followed by design, implementation and testing. This project work is divided into two main parts; GPS Mobile Tracking Device and a Tracking Centre. The GPS Mobile Tracking Device is attached to the tracked object, where location is received by a GPS receiver and processed by the microcontroller which sends object's location automatically every period of time. In the tracking centre, the location is processed until being displayed graphically in Google maps. This proposed system is a multi-purpose application for child safety that will work on android platform. It is designed using the android studio to enable it run on smart wrist watches and android phones and smart wrist watches. The system was developed using Hypertext Preprocessor, Hypertext Markup Languages, Cascading Style Sheet, JavaScript, Android Studio and My Structured Query Language as the database backend which are used in web-based applications. These guarantee that the application is cheap, robust, and is able to run on multiple platforms.

CHAPTER ONE

INTRODUCTION

1.1   Background to the Study

The child is a creature that makes the live of parents more joyful and meaningful. However, parents cannot take care of their child from every moment. As the days goes by, the child will be growing up and start their school life. It is not possible for parents to always stay beside their child as most of the parents needs to go for work to earn some income to sustain a family. Today's child is easily influenced by their friends, and they might even get cheated or kidnapped by any of the strangers. In Nigeria the crime rate becomes increasing day by day. Of all the crimes, kidnapping is the worst one. While it poses a great threat to the victim's life, it also causes endless mental agony and sleepless nights to the others at home. One of kidnappers target is making money by kidnap the children and uses them to make pornography films and distribute it.

People cannot predict or determine what will happen next to them in next seconds. This is the same scenario as people has no acknowledge of when they are target, but can take preventive measures to avert it from happening. As for parents, their greatest concerns are their child, especially the safety of the child. The parents start to take care of the child since born. It is not always possible for parent to stay beside of their child as most of the parents needs to go for work to earn some money to sustain a family. Parents usually feel anxious about their child's current status every second because they cannot see what their child is doing currently or what affairs will happen on them. Today's child is easily influenced by their friends, and they might even get cheated or kidnapped by any strangers (Pawade & Gaikwad, 2015).

Global Positioning System Based Location Detector is a smart phone application that uses location based information and concepts of augmented reality to enhance user's experience. Using android GPS, the application is location aware. It keeps track of the user location in real time. Whenever user points the phone in any direction, application updates its camera view by displaying the label tags with additional information of the buildings and places in that respective direction. The application keeps on updating the view as the user changes location or direction. Information for different places is extracted from the "Google" database. All the information of the user's location is augmented on to the user's reality in this case the live camera feed (Muhammad, 2015).

The children, growing up bring with them a mixture of pleasure and pain, love of knowing everything and need to discover anything. It would be nice if children are happy and free of troubles or dangerous. Feeling safe about children is the first importance needs for parents in all worlds. Although there is no substitute for good childcare, which would include constant monitoring, the reality is that constant monitoring of children is not always feasible; especially when a parent must monitor multiple children at the same time. Developing a tracking system for parents with multiple children could greatly decrease their stress and giving them more freedom during excursions with their children. The top level view of this paper has been designed with two distinct modules; child module and parent module. The child module is attached to each child. Its primary role is to periodically receive messages and in response send messages to the parent module and alert them if the child is in danger. Also, it has a buzzer alarm that sounds whenever the child is in an alarmed state. This allows a parent to more easily locate the troubled child (Morris et al., 2015; Druin, 2014; Stephen et al., 2012). Child module has the ability to

connect different sensors; however, sensors number can increase as necessary with a slight modification. In this work, smoke, temperature and water sensors are used.

A GPS tracking system can work in various ways. From a commercial perspective, GPS devices are generally used to record the position of vehicles as they make their journeys. Some systems will store the data within the GPS tracking system itself (known as passive tracking) and some send the information to a centralized database or system via a modem within the GPS system unit on a regular basis (known as active tracking).

This project focused on how parents can keep track their children movement to avoid child missing, kidnapping and etc. By using GPS as a tracking tool where it allows to determine the exact location (longitude and latitude) of the children. Every an hour, the location of the children will be recorded in the system to keep track the children.

1.2   Statement of the Problem

There is increasing need for safety for little children in current times as there are scenarios of the child getting lost in the major crowded areas and also, losing child while traveling and when they go out for hangouts with their friends is very high.

Tracking small children, monitoring elderly relatives, offering additional layers of security, precious properties and stolen vehicle searching, as well as other enormous applications bring to light the significance usage of tracking nowadays. Other problems are:

1) Increasing rate of child kidnapping.

2) Lack of tracking technology for child. The parent is hardly to keep a watch on their child without the use of technology, especially when the child is in the outdoor. The parent even cannot avoid the negligence that will make by children in the future day.

3) Limited application for child monitoring. There are very limited application available for tracking child when they are out of parents control and let kidnapping or missing cases occurred.

As GPS system provides continuous positioning and timing information, with acceptable level of accuracy anywhere in the world under any weather conditions, these makes it convenient to use as abased of tracking system for this project.

1.3   Aim and Objectives of the Study

The aim of this project is to design and implement a GPS smart mobile tracking system that consists of a tracking device and a tracking centre with reasonable accuracy and performance.

The objectives are as follows:

- To enables parents to monitor and keeps track on child's activities.

- To gives real-time location of a missing child

- To utilizes the GPS system to determine the position of the tracked object.

- To establish an interface between the microcontroller and the GPS receiver

- To establish an interface between a Personal computer and another GSM modem so that to receive the location message.

- To monitor the location of the tracked person in the Personal computer by utilizing Google maps API

1.4   Scope of the Study

To ensure the project running smoothly a few scope have listed as a guide to achieve project objectives. This project is actually developed for parents to keep track the child

whereabouts. Nowadays, child is easier influenced by their friends, and they might even get cheated or kidnapped by any of the strangers. By developing this system can track child current location.

The application will deal with the Android platform and is utilized for GPS following between different mobile devices. The application is mindful to keep track the location of the device. The parent or child account can be edit by parents. The application will include the route history trace where the parent track for the route their child traversed during a certain period of time. The application in the device will update the location of the child to the application by having the interval time for 30 min, 1 hour and 2 hour. Parent can select the interval time to view the current location of the child. Parent also can make call from the application if any inconvenience happens when the location not found or track.

1.5 Significance of the Study

Nowadays crime rate are increasing day by day especially kidnapping child. Moreover, parents is not possible to always stay beside of them as most of the parents needs to go for work to earn some money to sustain a family. The proposed of the system can reduce the child missing cases. This system provide tracking solution for the parent to keep tracking their child location in the outdoor by using GPS as where it allows to determine the exact location of the child. Moreover, help to minimize this tragedy from happening again and again in future.

1.6 Limitation of the Study

During this project research, there were some challenges faced which stood as constraints, some of which are:

    i.   Inaccessibility to the relevant material

      ii.   Financial constraints

      iii.   Time constraints

1.7   Definition of Terms

GPS: The Global Positioning System (GPS) is actually a constellation of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails).

Google Map API: Google Map API is a basic web mapping service application and technology provided by Google that powers many map-based services.

Satellite: Satellite-based positioning provides autonomous geo-spatial positioning with global coverage and high accuracy.

Tracking: recording the progress or development of something over a period

CHAPTER TWO

LITERATURE REVIEW

2.1 Technology

There are many tracking technology can be used to develop the system. Studies had been done on the available technology that can be used in the proposed system.

Below shows the hardware and software that use in the proposed system. Android gives a world-class platform for creating apps and games for Android users everywhere, as well as an open marketplace for distributing to them instantly. Android gives everything that need to build best-in-class app experiences. It gives a single application model that lets deploy apps broadly to hundreds of millions of users across a wide range of devices from phones to tablets and beyond.

Android also gives tools for creating apps that look great and take advantage of the hardware capabilities available on each device. It automatically adapts UI to look its best on each device, while giving as much control as people want over UI on different device types. For example, can create a single app binary that's optimized for both phone and tablet form factors (Google Android, 2021).

GPS is a system which is already implemented and everyone can access it without any restriction. GPS works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS. GPSs are very quickly becoming a standard in most new automobiles, and are even finding their way onto a variety of new cell phones. The mapping devices can come in handy under a variety of circumstances. Benefit of having GPS is GPS can help us to determine exactly where we are at any given moment. Not only can a GPS give the name of the street might be traveling on, but many GPS systems can also give us the exact latitude and longitude of where you are located (Omer & Abdullah, 2013).

Android software development is the process by which new applications are created for the Android devices operating system. It is purpose built for Android to accelerate your development and help you build the highest-quality apps for every Android device. It is available for download on Windows, MacOS and Linux based operating systems. Applications are usually developed in Java programming language using the Android software development kit (SDK) (Satish et al., 2015).

2.2   Global Positioning System (GPS)

The Global Positioning System (GPS) is actually a constellation of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails). The U.S. military developed and implemented this satellite network as a military navigation system, but soon opened it up to everybody else.

Each of these 3,000- to 4,000-pound solar-powered satellites circles the globe at about 12,000 miles (19,300 km), making two complete rotations every day. The orbits are arranged so that at anytime, anywhere on Earth, there are at least four satellites "visible" in the sky. A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location. This operation is based on a simple mathematical principle called trilateration.

In order to make the simple calculation of the location, then, the GPS receiver has to know two things:

- The location of at least three satellites above you
- The distance between you and each of those satellites

The GPS receiver figures both of these things out by analyzing high-frequency, low power radio signals from the GPS satellites. Better units have multiple receivers, so they can pick up signals from several satellites simultaneously.

A standard GPS receiver will not only place you on a map at any particular location, but will also trace your path across a map as you move. If you leave your receiver on, it can stay in constant communication with GPS satellites to see how your location is changing. With this information and its built-in clock, the receiver can give you several pieces of valuable information:

- How far you've traveled (odometer)

- How long you've been traveling

- Your current speed (speedometer)

- Your average speed

- A "bread crumb" trail showing you exactly where you have traveled on the map

- The estimated time of arrival at your destination if you maintain your current speed

2.3   Types of GPS Tracking System

Three Types of GPS Tracking Units are there. There are currently three categories of GPS tracking units. The categories are split into how GPS data is logged and retrieved.

- **Data Loggers:** Data loggers are usually the most basic type of GPS tracking; a GPS data logger simply logs the position of the object at regular intervals and retains it in an internal memory. Usually, GPS loggers have flash memory on board to record data that is logged. The flash memory can then be transferred and accessed using USB or accessed on the device itself. Usually data loggers are devices used for sports and

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hobby activities. They might include devices that help log location for hikers, bikers and joggers.

- **Data Pushers:** Data Pushers are GPS tracking units that are mainly used for security purposes. A data pusher GPS tracking unit sends data from the device to a central database at regular intervals, updating location, direction, speed and distance. Data pushers are common in fleet control to manage trucks and other vehicles. For instance, delivery vehicles can be located instantly and their progress can be tracked. Other uses include the ability to track valuable assets. If valuable goods are being transported or even if they reside in a specific location, they can constantly be monitored to avoid theft. Data pushers are also common for espionage type tasks. It is extremely easy to watch the movements of an individual or valuable asset. This particular use of GPS tracking has become an important issue in the field of GPS tracking, because of its potential for abuse.

- **Data Pullers:** The last category of GPS tracking units is the data pusher units. These types of units push data or send data when the unit reach a specific location or at specific intervals.

These GPS units are usually always on and constantly monitoring their location. Most, if not all data puller unit also allow data pushing (the ability to query a location and other data from a GPS tracking unit).

2.4 Features of the GPS Tracking System

Generally all of the GPS Tracking System has some of the common features that are listed below:-

- **GSM/Gprs Module -** It is used to send the location to the user online. In some case, if the user wants the location through the internet then this module is very useful. By the help of the GSM/GPRS module, we can send data real time. It can be seen on the internet enabled any device as a PC, mobile phone, PDA etc.

- **Track Playback -** Animates your driver's daily driven route so that you can follow every move. The track animation line is color coded to indicate the speed your driver was traveling during his route.

- **Idle Time Report -** Gives you an accurate report detailing when your driver was stopped and has left the engine running on the vehicle. This report was designed with input from our existing customers who were concerned about high fuel bills.

- **Track Detail -** Provides you with a split screen view when reviewing your driver's route. Stop and transit times, as well as speed information, are displayed in the bottom pane. You can easily toggle between stops by clicking the stop number on the track detail pane.

2.5   GPS Position Location Principle:

The Global Positioning System is comprised of three segments: Satellite constellation ground control/ monitoring network and user receiving equipment. Formal GPS joint program office (JPO) programmatic terms for these components are space, operational control and user equipment segments, respectively.

- The satellite constellation contains the satellites in orbit that provide the ranging signals and data messages to the user equipment.

- The operational control segment (OCS) tracks and maintains the satellites in space. The OCS monitors satellite health and signal integrity and maintains the orbital configuration of the satellite. Furthermore, the OCS updates the satellite clock

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corrections and ephemerides as well as numerous other parameters essential to determining user position, velocity and time (PVT).

- The user receiver equipment performs the navigation, timing or other related notation.

2.6 Components of the GPS System:

There are 3 main components to the GPS system. These components are known as Segments, as follows:

- Space Segment - the satellites, also known as space vehicles or SVs

- Control Segment - ground stations run by the DOD

- User Segment - all users and their GPS receivers

These three segments are illustrated schematically below.
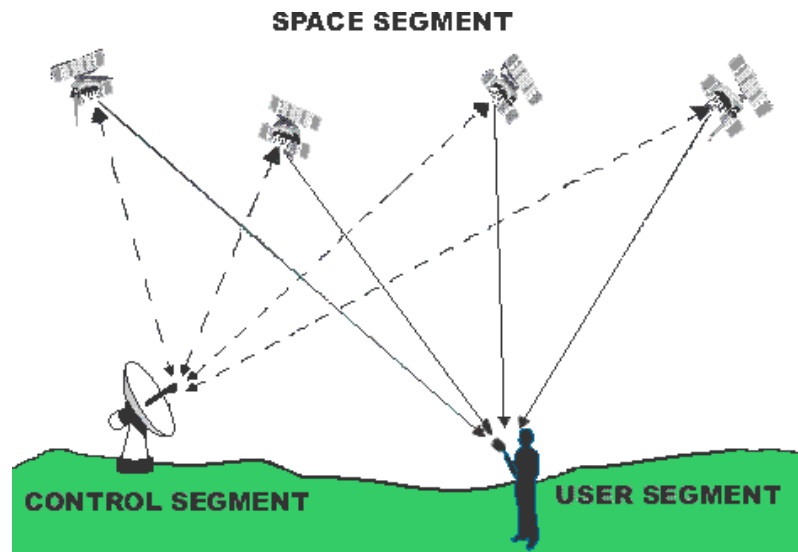
Fig. 2.1: Component of GPS System

2.7 Mobile Positioning Methods

The process of determining the location of a given object in a space within a period of

time is called, mobile positioning. Mobile positioning is very useful in tracking moving objects by determining their current position as well as previous positions during the period of tracking.

Several techniques have been developed to implement this process, as depicted in Figure 2.2. These techniques can be classified into three categories: handset-based positioning methods, network-based positioning methods and satellite-based positioning methods. Besides those three categories, there are also hybrid methods that use more than one technology to improve the performance.
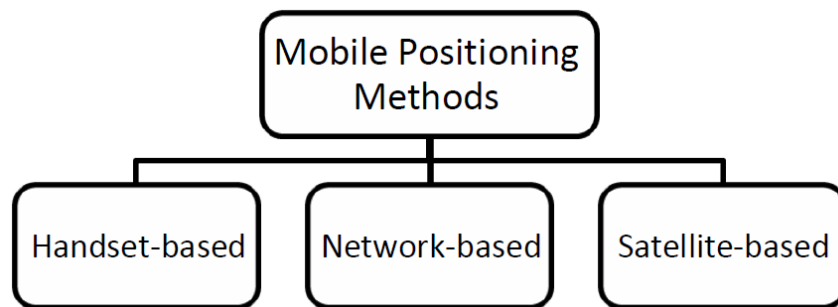
Fig. 2.2: Mobile positioning methods

2.7.1   Handset-based positioning methods

This category is referred to as "handset based" because the handset itself is the primary means of positioning the user, although the network can be used to provide assistance in acquiring the mobile device and/or making position estimate determinations based on measurement data and handset based position determination algorithms. Here the mobile Station (MS) has an active part in position measurement (unilateral), but position calculation is in the network end (Isaac, 2018).

This technique is more accurate and less expensive to deploy than network-based method. But Handset-based technology requires the installation of client software on the handset to determine its location. Another disadvantage is the additional hardware that may result in the

increased weight, size, complexity and consequently the cost of the handsets (Peter, 2016).

2.7.2 Network-based positioning methods

Network-based techniques utilize the service provider's network infrastructure to identify the location of the handset. A key benefit of network-centric solutions is that all handsets can utilize the positioning technology without modification. Network-based positioning methods include:

a) Cell Identification (Cell Id).

b) Time of Arrival (TOA).

c) Time Difference of Arrival (TDOA).

d) The Angle of Arrival (AOA).

The accuracy of network-based techniques is both dependent on the concentration of base station cells, with urban environments achieving the highest possible accuracy and the implementation of the most current timing methods.

One of the key challenges of network-based techniques is the requirement to work closely with the service provider, as it entails the installation of hardware and software within the operator's infrastructure (Isaac, 2018).

2.7.3 Satellite-based positioning methods

Satellite-based positioning provides autonomous geo-spatial positioning with global coverage and high accuracy. There are several systems in use or under development which are classified under Satellite-based positioning system. As of 2010 as cited by Isaac K., (2018), the United States NAVSTAR Global Positioning System (GPS) is the only fully operational GNSS (Global Navigation Satellite System). The Russian GLONASS is being developed towards full global coverage. There are also the planned Chinese Compass navigation system and the

European Union's Galileo positioning system. Terrestrial mobile networks offer the possibility of transmitting support information to the satellite receivers. Using this support data, positioning time (time-to-fix), accuracy and sensitivity are improved considerably.

Satellite positioning suffers from certain drawbacks. First, the signals radiated from satellites are usually very susceptible to shadowing effects and are easily absorbed by buildings, walls and mountains. As a consequence, positioning only works if a direct line of sight between the satellites and the receiver is given, which usually is not the case when staying indoor. Second, satellite positioning of today suffers from comparatively high power consumption at the satellite receiver (Axel Küpper, 2015).

2.8   Different Technologies used in Tracking System

2.8.1   Active and passive tracking

Several types of vehicle tracking devices exist. Typically they are classified as "passive" and "active". "Passive" devices store GPS location, speed, heading and sometimes a trigger event such as key on or off, door open or closed. Once the vehicle returns to a predetermined point, the device is removed and the data downloaded to a computer for evaluation. Passive systems include auto download type that transfer data via wireless download. "Active" devices also collect the same information but usually transmit the data in real-time via cellular or satellite networks to a computer or data center for evaluation.

Passive trackers do not monitor movement in real-time. When using a passive GPS tracker, you will not be able to follow every last move that a tracked person or object makes. Instead, information that is stored inside of a passive tracker must be downloaded to a computer. Once tracking details have been downloaded, it is then possible to view tracking details.

After we have gathered all of the information we need from a passive tracker, we can place the tracker back on the same (or different) vehicle. Aside from the fact that a passive tracking device is entirely reliable, the main reason people choose passive trackers is that these devices are less expensive than active trackers. Most passive GPS tracking devices are not attached to a monthly fee, which makes these trackers affordable.

In contrast to passive devices, active GPS trackers will allow one to view tracking data in real-time. As soon as we place an active tracker on a vehicle, we will be able to view location, stop duration, speed, and other tracking details from the comfort of your home or office. Active GPS trackers are ideal when it comes to monitoring vehicle that need to be tracked at regular time interval.

While active tracking devices are more expensive than passive devices (most come with monthly fees), this expensive is usually justified. An active GPS tracker that comes with a reliable interface (and excellent tracking software), and you will be able to track anything or anyone quickly and efficiently.

When most people picture a GPS tracking device, they are picture a real-time tracker. These trackers can be attached to any object while a person monitors all activity from a home computer. For example, if you were to place a real-time tracker on a vehicle, you could then watch as the vehicle makes stops, takes alternate routes, and sits idling – all in real-time. GPS trackers that work on a real-time basis are usually considered "active" trackers, while those that do not include real-time tracking are considered "passive" trackers.

There are many advantages associated with a real time tracker. The most important advantage is that the GPS locater is convenience. Rather than waiting to download data to a computer (as is the case with most passive trackers), a tracker that works in real-time does not

require any waiting. Since real-time trackers come with software that allows a user to track an object in real-time, watching any object's progress is simply a matter of sitting at a computer.

Many modern vehicle tracking devices combine both active and passive tracking abilities: when a cellular network is available and a tracking device is connected it transmits data to a server; when a network is not available the device stores data in internal memory and will transmit stored data to the server later when the network becomes available again.

Historically vehicle tracking has been accomplished by installing a box into the vehicle, either self-powered with a battery or wired into the vehicle's power system. For detailed vehicle locating and tracking this is still the predominant method; however, many companies are increasingly interested in the emerging cell phone technologies that provide tracking of multiple entities.

2.9   Smart Internet of Thing (IoT) Device for Child Safety and Tracking

It provides guardians with the real-time tracking of location, Ultraviolet (UV) radiation index, surrounding temperature, and Save Our Ship (SOS) light with a distress alarm buzzer for their kids to make people near child to know that child is in panic. It provides feature to locate their kid or alert bystanders so that they can act to comfort the child or rescue the child. In this device they have used Thing Speak, Micro Electro Mechanical Systems (MEMS), NodeMCU, GPS, GSM and Various sensors. This device gives the result for the parent in two different ways. The first one is they get an alert message (SMS) for the registered phone number. The next one is they receive a graphical representation which shows the Latitude, Longitude, MEMS Sensor and Vibration sensor of the child's activities through "Thing Speak". The disadvantage of this device is that, to use this device there must be efficient flow of internet connection and it must be

fullest. Then only it gives the outputs at the earliest otherwise it takes time for the result (Gopinadh et al., 2018).

2.10   Child Safety Wearable Device

This focuses on communication mode to be in SMS text form using GSM. The parent will send a keyword in form of SMS "SOS", "BUZZ", "LOCATION", "TEMPERATURE" etc., to the devices. The device will reply back the real time accurate location of the child and will also provide the surrounding temperature, or any of the data asked by the parents. It helps parents to keep track if the temperature around their kids is not proper for their kid. The secondary idea implemented was distress alarm buzzer and a bright SOS Light on the device that can be activated by the guardians via sending the keywords in the SMS. Parents can text the keywords to ON the SOS signal brightly and can also send the keyword to sound an alarm which a people near child or bystander can instantly help the child's till the parents arrive. People around could also contact the parents and help them to reunite child with his or her parents. Hence this project provides parents a sense of protection for their kid in today's unsafe environment. The drawback of this system is that parent has to remember the keywords (Priya et al., 2019).

Moodbidri and Shahnasser (2017) discusses the concept of a smart wearable device for little children. The major advantage of this wearable over other wearable is that it can be used in any cell phone and doesn't necessarily require an expensive smartphone and not a very tech savvy individual to operate. The purpose of this device is to help parents locate their children with ease. At the moment there are many wearables in the market which help track the daily activity of children and also help find the child using Wi-Fi and Bluetooth services present on the device. But Wi-Fi and Bluetooth appear to be an unreliable medium of communication between the parent and child. Therefore, the focus of this paper is to have an SMS text enabled

communication medium between the child's wearable and the parent as the environment for GSM mobile communication is almost present everywhere.

2.11   A Smart Security for Child Safety

Child tracking is mainly based on two units GPS watch and Android monitoring unit. This wearable device unit consists of a GPS receiver, Flexi Force Sensor, Temperature Sensor and MEMS accelerometer. This security Wearable Device will keep the child safe. The parent will get the continuous update about their child temperature and various other factors, so that they are not afraid about their child well-being when they are not with their kid. This would create some fear in the person's mind who is involved in child trafficking and harassment. As a well-known proverb "Prevention is better than cure", this application will act as a prevention for the child safety from harassment and kidnapping (Nandhini and Moorthi, 2018).

2.12   Activity Tracker Wrist Band for Children Monitoring Using IoT

Bhanupriya and Sundarajan (2017) proposed a device which is integrated with multiple devices, comprising of wearable "Activity Tracker Wrist Band" which is programmed with all the required data which includes the behaviour of the human reactions like anger, anxiety, nervousness and fear. When these situations are faced by the victim, the various sensors generate the emergency signals which are to be transmitted to the smart phone. The system effectively monitors the children presence within the expected zone. When the person crosses the monitoring zone, then based on IOT Monitoring system, GSM sends help request by sending messages to the nearest police station, parents and the people in the near radius.

2.13   Design and Implementation of Children Tracking System Using ARM7 on Android Mobile Terminals

Raj and Anuradha (2014) surveyed that, recently, all over the world, crime against children is increasing at higher rates and it is high time to offer safety support system for the children going to schools. This paper focuses on implementing children tracking system for every child attending school. However, the existing systems are not powerful enough to prevent the crime against children since these systems give information about the children group and not about each child resulting in low assurance about their child safety to parents and also does not concentrate on sensing the cry of the child and intimating the same to its parents.

The proposed system includes a child module and two receiver modules for getting the information about the missed child on periodical basis. The child module includes ARM7 microcontroller (lpc 2378), Global positioning system (GPS), Global system for mobile communication (GSM), Voice playback circuit and the receiver module includes Android mobile device in parent's hand and the other as monitoring database in control room of the school. Finally, implementation results for the proposed system are provided in his paper.

2.14   Android Based Children Tracking System

Pawade and Gaikwad (2015) proposed, a children tracking system based on android terminals. Recently, all over the world crime against the children in the age of 14 to 17 years is more popular. Parent's always worry about their children whenever they are outside from the home. In this paper, the proposed system consists of two sides out of them one is parent module and another is the child module. The child module consists of ARM7microcontroller (LPC 2148), GPS (Global Positioning System), GSM (Global System for Mobile Communication) and voice chip where the parent module consists of android mobile phone. This paper gives the

information about missing child from school campus. There are two android mobile phones for the safety of the both module. The system tracking the child from source to destination i.e. from home to school or anywhere.

2.15   Available Child Tracking Systems

Recently, tracking systems are available with different technologies, such as:

a. Crossbow Motes technology: Crossbow Motes are very small devices that contain a microprocessor, radio transceiver, and interfaces to connect simple sensors such as smoke, temperature. Figure 1 shows the Crossbow Motes device; these Motes are a new and quickly-growing technology. But there are some disadvantages to use these devices such as: Finite Coverage, affected by trees & walls High cost (Morris et al., 2015).

b. Gotcha System: Gotcha it is child monitor that helps parents to protect their children at malls, supermarkets, parks, or everywhere. Gotcha alerts the children and parent whenever they wonder farther than a safe distance. Gotcha Simply attaches the child unit to the little one, turn on the system from the parent unit. Child unit will alarms if the child has wandered beyond the adjustable, predetermined safety perimeter that the parent set the child's unit triggers an alarm to sound if the unit is removed or accidentally falls off. Gotcha is a pager too, simply press the locate button on the parent unit and the Gotcha child unit will beep. But the main disadvantage of using this system that it doesn't monitor the type of danger which can be used with multi-child (Morris et al., 2015).

c. Global Positioning System (GPS) Technology: The GPS is a cumbersome, satellite-based navigation system, subscription service made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS provides specially coded satellite signals that can be processed in a GPS receiver, enabling the receiver to compute position, velocity and time. GPS

satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location (Katin Michael, 2016). Any device that uses GPS is a lightweight device that attaches to the child and is designed to help parents or guardians keep track of their children and prevent this kind of tragedy. The device alleviates the stress and panic that appear when children get lost, or are difficult to reach. It emits a series of loud beeps, allowing parents to find their children quickly and easily. This is also an ideal solution for disabled adults, the elderly and daycare centers.

There are many advantages of using GPS in tracking, first its continuous coverage regardless of weather, its worldwide coverage, 3-Dimensional and precise timing standard, but it's not very useful in keeping children near a parent and systems that use GPS in tracking are too limited in their functionality (Katin Michael, 2016).

2.16 An Intelligent Safety System for Individual's Security

Prof. Kiran et al. (2017) says that, in today's world, security is the major issue for an individual. In this project the system consists of a monitoring device, which gets activated when the device is tapped upon then a text message along with voice alert message is received by the respective emergency contacts. Further the person who receives the notifications can find and track the location without the interaction of the victim's application at each and every function.

2.17 Google Map API

Google Map API is a basic web mapping service application and technology provided by Google that powers many map-based services. According to one of its creators (Lars Rasmussen), Google Map is "a way of organizing the world's information geographically". It

uses the Mercator projection, so it can't show areas around the poles. Google Map provides a highly responsive, intuitive mapping interface with embedded, detailed street and aerial imagery data. Also, map controls can be embedded in the product to give full control over map navigation and the display of street and imagery data. Google Map is coded almost entirely in JavaScript and XML (https://google.com).

By utilizing Google Map API, it is possible to embed the full Google Map site into an external website. An API key is required to use Google Map, which is bound to the website and directory entered when creating the key (https://google.com).

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.1   System Analysis

System analysis can be defined as a process of investigation of a real or planned system to determine the function of the system, identify the problems of the system, analyzing and synthesizing the various factors and determining a satisfactory solution. The purpose of the system analysis is for an analyst to look carefully into the manual system and automate it into computerized system. This was carried out on the existing system. It helped to show the weaknesses of the existing system.

3.2   Method of Data Collections

During this study, interviews with IT specialists and experts were carried out in Auchi, Edo State. This study also reviewed articles that provided an overview of current discussions in this research and some literature that focused on GSP location tracking and child wearable devices, while bearing in mind the main focus of this study. The following were consulted:

- Internet-based information from local and international organizations implementing initiatives that address issues of location tracking using GPS, especially the ones that involve child.

- Electronic media sources that deals with issues of child tracking using GPS and Google Map API

- Books, journals, published articles and other forms of literature.

Due to the delicate nature of this topic, both the primary and secondary sources of information were used in this study.

3.3 Analysis of the Existing System

In Nigeria, missing children are basically classified into two categories. The first category is disappearance, which includes running away from home and the second category is kidnapping of children on their way to and fro school. It was also observed that there are tracking devices for child but are very expensive to afford the less privileges. These devices are also no common. They are yet to be deployed to third world war countries such as Nigeria. Some of the existing wearable devices are not mobile app and does not run on smart wristwatches and mobile phones.

The proposed system is developed on mobile ad hoc networks that is, in GPS system and tag based system, each parent can obtain location information on their child vicinity. It is developed to run in both smart wristwatches and mobile phones with GPS facilities.

3.4 The Proposed System

The proposed children tracking system consists of developing a mobile application that enables users to track their children movements in indoor and outdoor locations. The child holds a small device and the applications tracks that device. That will be done by using GPS and Network technology for tracking the child locations.

This system consists of two components: Client (child) and Server (parent/school). The client will be the android application or android phone. It is designed in such a way that it has very few elements and very less user interaction and the interval at which location updates are received can be predefined, but ideal timing will be every 10minutes. In this system server will receive data sent from the client side and it will save it in a database and display to the parent app. The tracking is possible with two main components: GPS and Network; these two features are present in almost all smart phones now. For first time once user installs the app he should

start the app and after that every 10minutes or any predefined time the application will start automatically and fetch the location and send to server.

3.4.1   Benefits of the Proposed System

1. Application automatically operates location requests without user interaction because at that time child not have knowledge to update his location at map.

2. That application uses SMS when internet connectivity is not available. The system requires location and telephony services.

3. It can be used at indoors where GPS satellites connectivity is not available. At that time it can uses network provides for location services.

3.4.2   Advantages of the Proposed System

- Staying connected

- Data accuracy

- Efficiency

- It can be used in any cell phone and doesn't necessarily require an expensive smart phone

- It is capable of holding the battery for a longer time

3.4.3   Justification of the Proposed System

Child tracking in public places has been implemented in various areas such as Disney and has led to fewer cases of parents spending endless hours looking for their children. Companies that have adopted the policy that allows mothers to bring babies to work also need to ensure that security of these children is catered for within their premises. With the wireless child tracking

system, mothers and guardians can be in a position to receive alerts on their phones in case their children are taken out of the child care without their knowledge.

3.5   System Design

This project design works for parents and children. The parents and children both have GPS Based smart phones. The application is used to track the Childs location for implementation of application, Android SDK tools and Eclipse which support android is used. Reason for choosing android Operating System (OS) is to target more users and lots of people using android mobile phones.

3.6   System Architecture

The architecture consists of two sides. First is parent side and another is child side. Parent side acts as server and child side acts as a client. Basically there are two android phones one is at child side and another is at parent side. Parent's side used SMS service for communicating to child's mobile and with the help of map parent used to view child's location on map. That's why it uses internet and telephony services enable at parent side to track child's location. At child's side another android phone supports GPS and SMS facilities. Child side uses telephony services to communicate with parent side. In child side location services that is GPS is enabled and running in child side .And parent side uses internet connectivity to view child's location on the map. At parent side requirements are mapped for tracking and service(listener)for listening messages coming from child's side. On the child's side listener service always runs in background, at parent side used to send SMS for location of child.
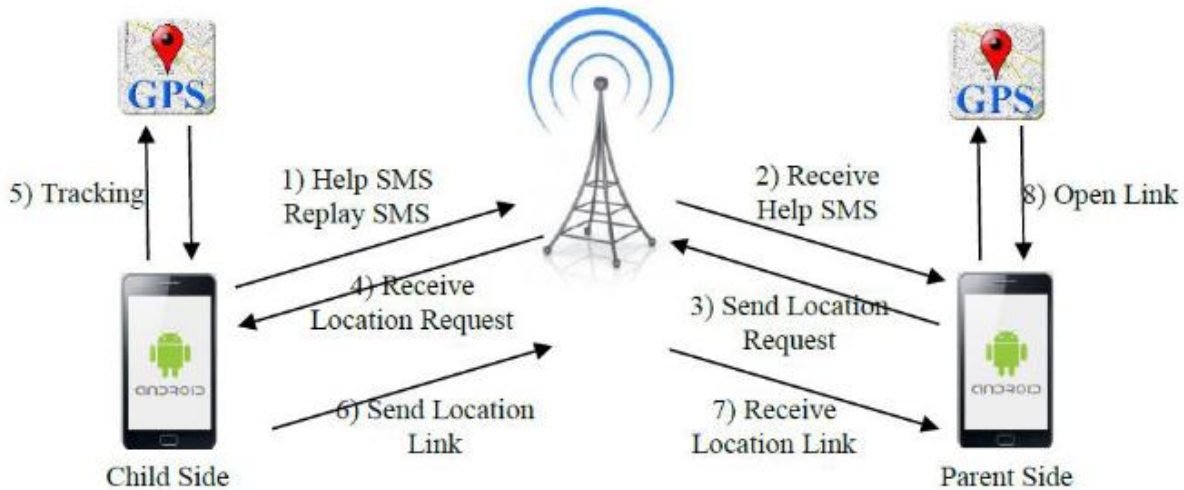
Fig. 3.1: System Architecture

Parent side: This side conducts as a server for the system despite not being a real server. This alleged parent server can then utilize the SMS and available Google maps to spot the child's location. The prerequisites for this operation are availability of telephony and internet services.

In the parent side application, it begins with examining the existence of the child's mobile number saved in the contacts. If the number is not available, the application notifies the user for insertion and the application will store the number in the mobile.

Next, if child sent a "Location" message, the application in the parent side requests the child's position by sending an SMS to the mobile of the child. The child's mobile would answer with the current position coordinates of the child.

Finally, the application will handle the coordinates and display it in the Google map of the parent's mobile. So, the parent can share the Google map with any other like police (which is the third objective), and the parent can also use GPS to determine his distance from his child.

Child side: The child side is considered here as a client side for the system. The child side is similarly an Android mobile but is carried by the child at the time of location request. Hereby, location coordinates are derived from available GPS or network and are sent back to the parent

through SMS. The difference here from the parent side is that child should also be in the range of the telephone towers regardless of the availability of internet services.

On the child side, mobile and location services must be activated and are operating on the child side for the system to begin working. After the location services check, another function is run to examine if the parent's mobile number have been entered. If the number has not been entered then notify the user to enter the numbers of the parents and save them in the favorite memory. Notice that this task must only be done by parents so it is secured by a password that must be only known to the parents. Also, as we mention earlier as a second objective, in case that the child can't write SMS, he has the ability to notify his parent by takeoff head phone from his phone, and the application will automatically send the Location SMS.

3.7   System Modeling

The Unified Modeling Language (UML) is a standardized modeling language consisting of an integrated set of diagrams, developed to help system and software developers for specifying, visualizing, constructing, and documenting the artifacts of software systems. The following UML models were used in the designing of the new system.

3.7.1   Sequence Diagram

The sequence diagram outlined the various interactions between the system administrator and the system. The key input of the administrator was to register new parent into the system. Each child was assigned a unique tag. The tag broadcasted packets sending its location and if the child was out of the predefined area, a trigger was sent. However, to validate that the tag was actually in the tags assigned to the different babies and not any other in order to avoid sending

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false alerts, the tag id was confirmed against those in the database (list of tags object). This is illustrated in Figure 3.2.
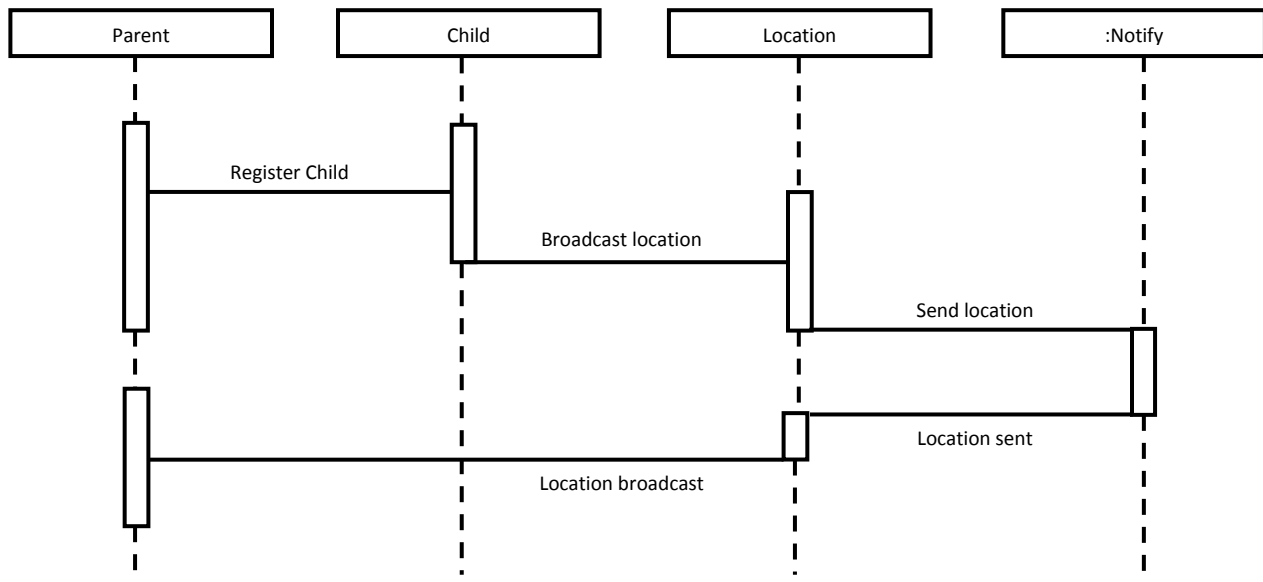
Fig. 3.2: Sequence diagram

3.7.2 Use Case Diagram

The use case diagram illustrates the various systems and actors interacting with the baby tracking system, as illustrated in Figure 3.3
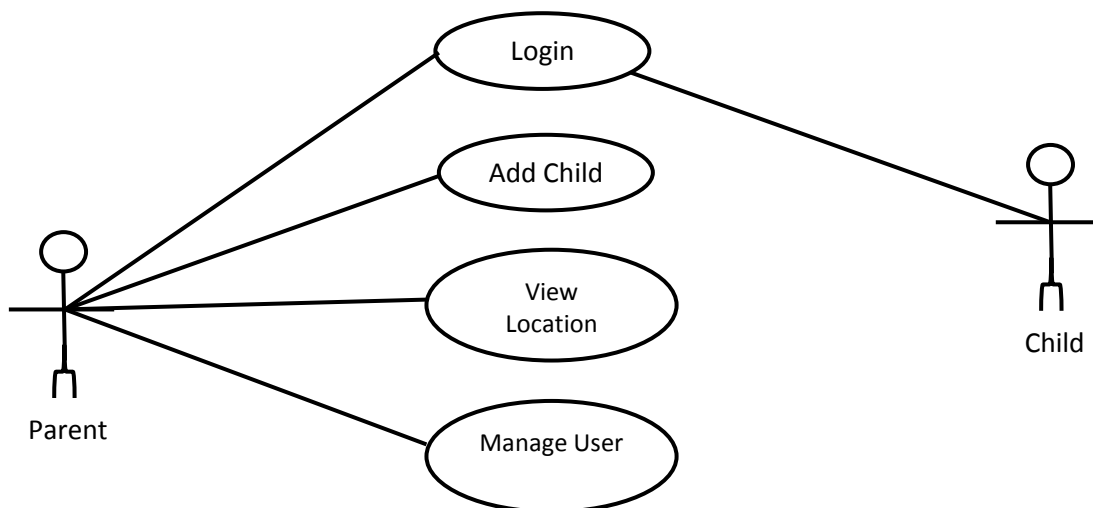
Fig. 3.3: Use case diagram

3.7.3 Program Flowchart
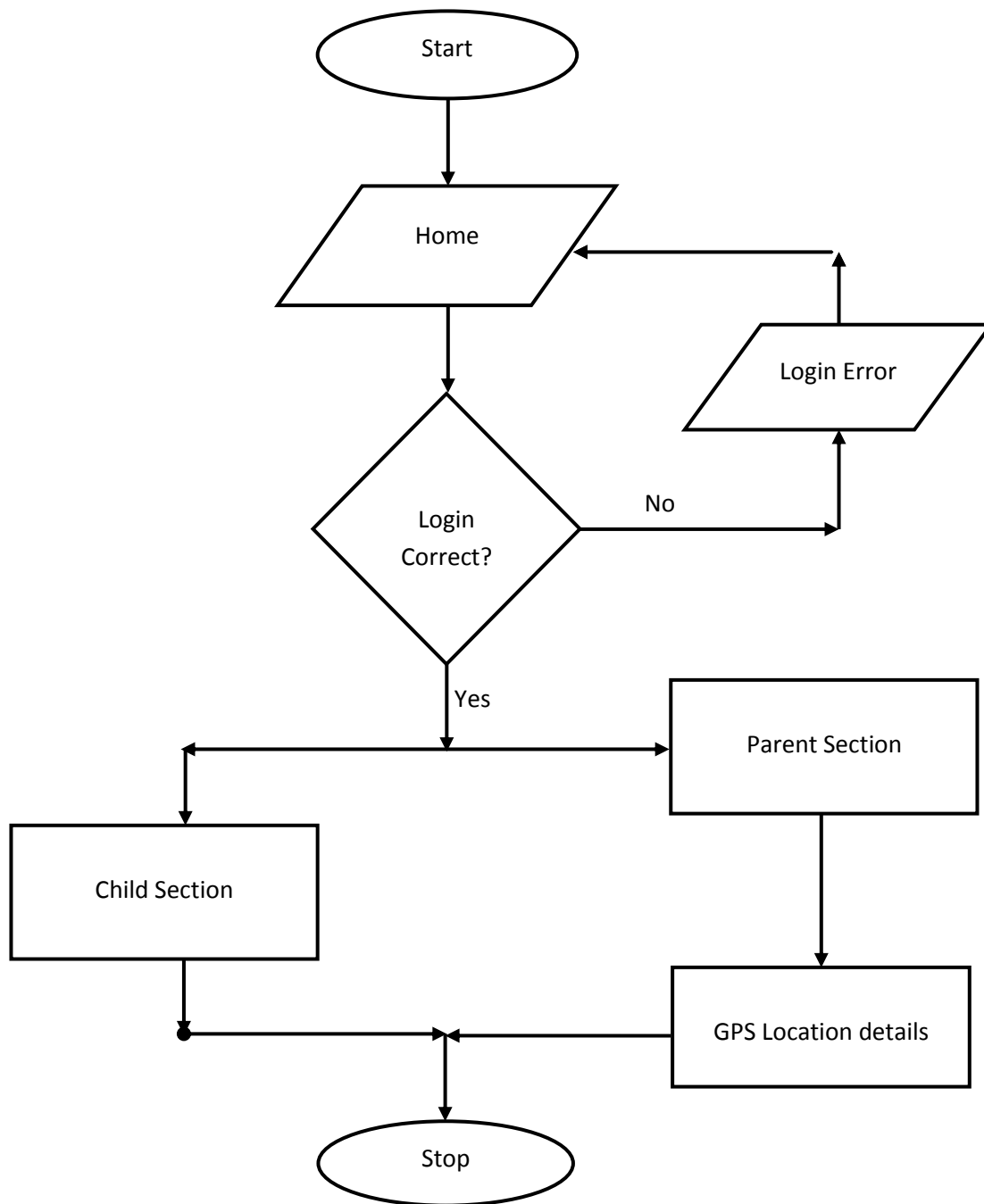
Fig. 3.4: Program Flowchart

3.8   Input and Output Design

3.8.1   Input Design

The main input is the registration form that is used to obtain the child details such as name, date of birth, gender and the tag ID. These inputs are recorded initially and put in the database. The GPS has different attributes, and this information is communicated in the register as the tag broadcast its coordinates, which are passed to the location register.
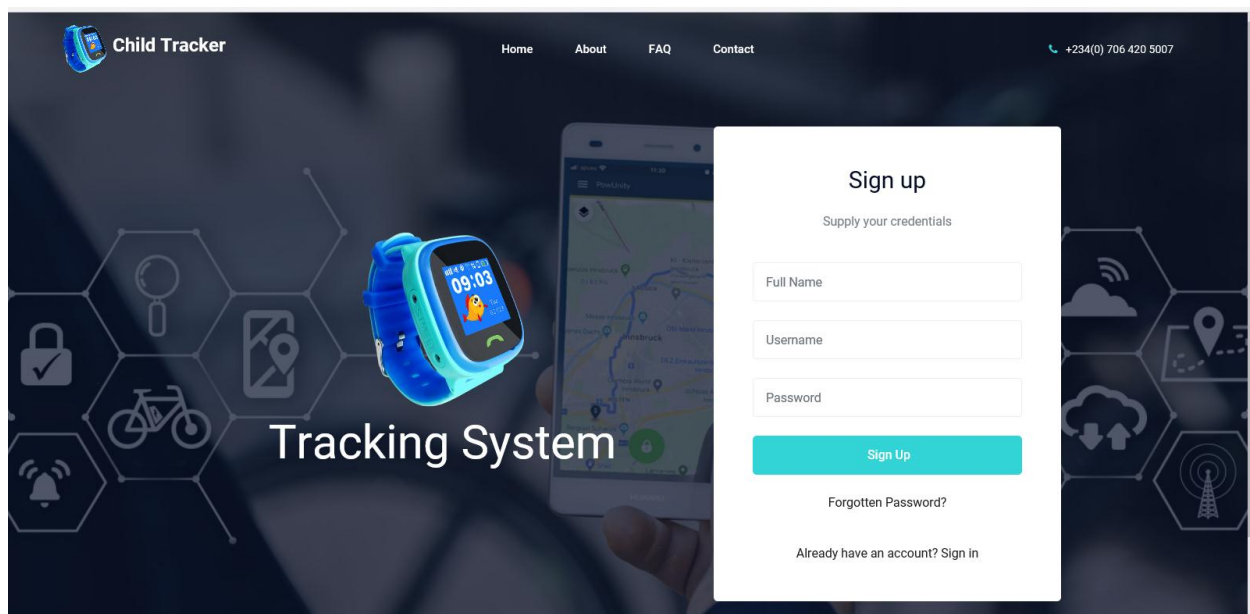
Fig. 3.5: Registration form

3.8.2   Design Process

Information of the baby assigned the respective tag is processed. A user is also registered into the system. The location register also processes the coordinates transmitted by through the GPS broadcasts. Upon validation of the details, that is, to ensure that the GPS broadcasting the packets is part of the list of tags in the database, the trigger by the tag is allowed to proceed.

3.8.3   Output Design

As part of the output, the incident generated produces an incident. The incident then sends child location to the child's parent. From this, reports can be generated and viewed by the authorized parties.
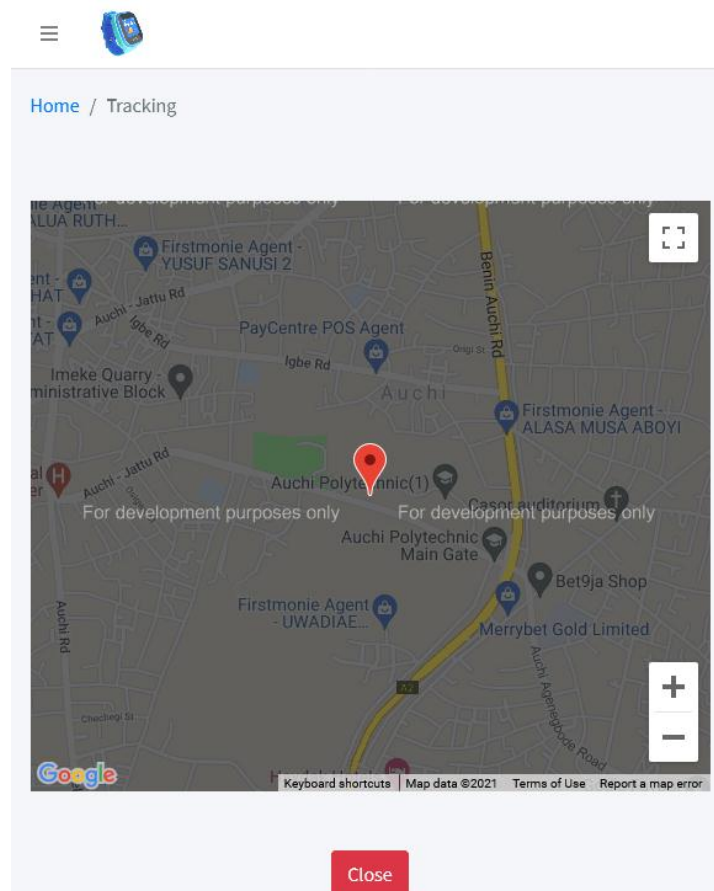
Fig. 3.6: Location display

3.9   Database Design

It is fair to say that database play a critical role in almost all areas where computers are used, including business, electronic commerce, engineering, medicine, law, education, and library science. A database is collection of a related data.

A database has the following implicit properties:

i.   A database represents some aspect of the real world, sometimes called the mini-world or the Universe of Discourse (UoD) changes to the mini world are reflected in the database.

ii.   A database is a logically coherent collection of data with some inherent meaning. A random assortment of data cannot correctly be referred to as a database.

iii.   A database is designed, built, and populated with data for a specific purpose. It is an intended group of users and some preconceived application which these users are interested.

The database used for the purpose of this research work is MySQL Database. The Table structure is as follows;

Fig. 3.7: Child Tracking Table Structure

CHAPTER FOUR

SYSTEM IMPLEMENTATION

4.1   Choice of Programming Language

The system uses PHP and JavaScript are used for creative Graphical User Interface on the websites to give the best user experience to the user and the administrator by providing good Human-Computer Interaction capabilities. MySQL has been utilized as an open-source SQL database to store data and files which serves as the backend of the system.

4.2   Software Methodology

Many consider the waterfall method to be the most traditional software development method. The waterfall method is a rigid linear model that consists of sequential phases (requirements, design, implementation, verification, maintenance) focusing on distinct goals. Each phase must be 100% complete before the next phase can start. There's usually no process for going back to modify the project or direction.

The linear nature of the waterfall development method makes it easy to understand and manage. Projects with clear objectives and stable requirements can best use the waterfall method. Less experienced project managers and project teams, as well as teams whose composition changes frequently may benefit the most from using the waterfall development methodology.

It is said that the Waterfall methodology follows the adage to "measure twice, cut once." The success of the Waterfall method depends on the amount and quality of the work done on the front end, documenting everything in advance, including the user interface, user stories, and all the features' variations and outcomes. With the majority of the research done upfront, estimates

of the time needed for each requirement are more accurate, and this can provide a more predictable release date.
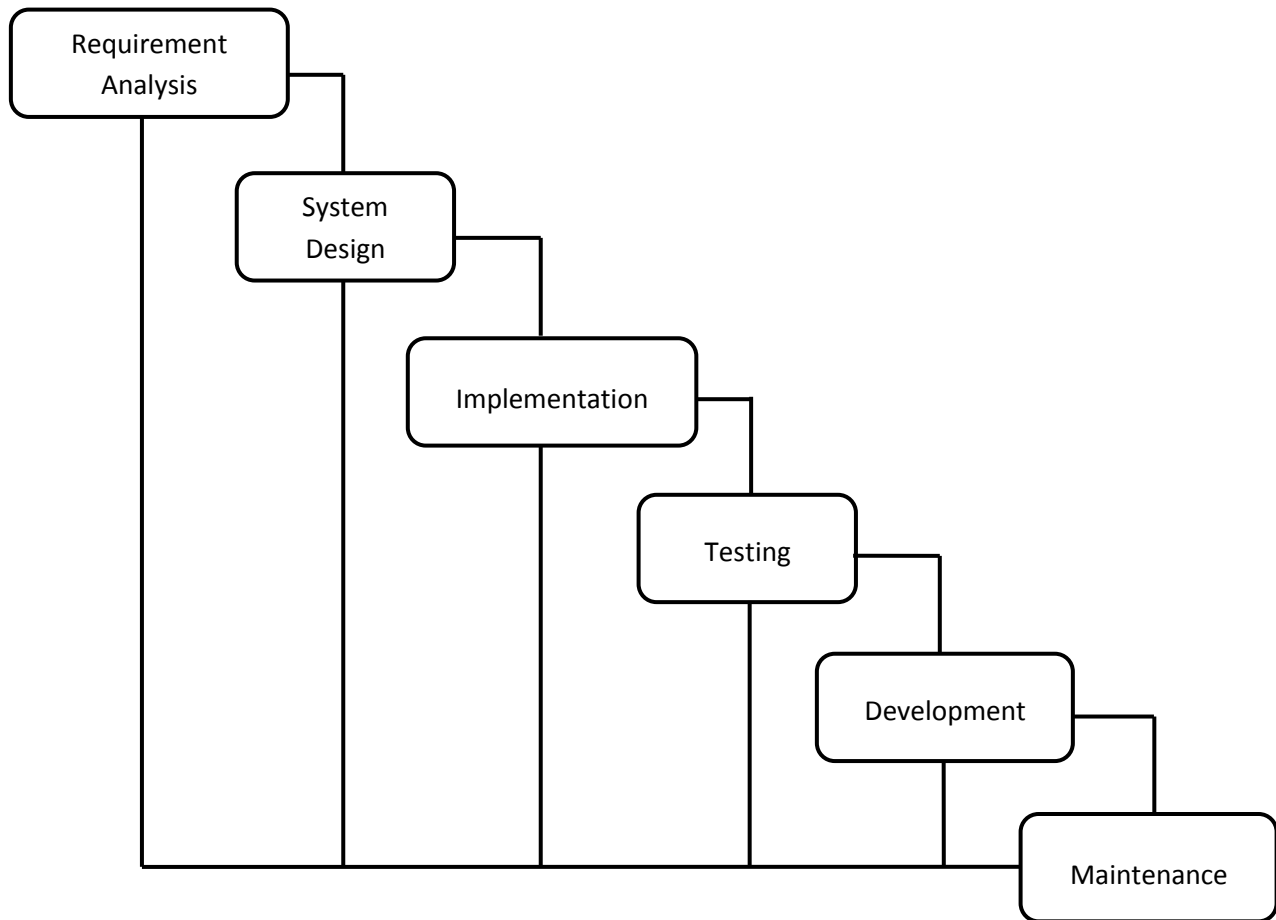
Fig. 4.1: Waterfall Model

4.3   System Implementation

The new system is designed to be put into efficient use. It begins after the management has accepted the new system. It follows the detailed design state and consists of installation of the new system and removal of the old system. This involves the co-ordination of the efforts of the users' department in getting the new system into operation. During the process of implementing the new system, the old system is also used in line with the new system so as to support the newly implemented software in case the system does not meet up with the necessary

requirement or unable to perform as expected. The implementation of the new system involves the following stages;

    i.   Testing of the program

    ii.   Education and staff training

    iii.   System change over plan

4.5.1   Development and Testing of Program

Developing this software is a step-by-step process and the processes are together called as Software Development Lifecycle. There are totally some steps involved in the software development and each step has a set of process specifically. Some of the steps are;

    i.   Planning

    ii.   Analysis

    iii.   Design

The product's working form is tested for defects. Testing is almost final part in the development process. The last time adjustments are made in the software before giving the software to the end user. The person who performs this testing is known as testers.

4.5.2   Education and Staff Training

This is one of the important phases of a system implementation as it ensures the efficiency, effectiveness and proficiency of the users. In the design of this new system, it is not intended that a permanent system operator be employed, but rather that the prospective users should have a fair knowledge of the computer. Apart from this, it is the opinion of the designer of this system to;

(i) Give seminar and workshop on the new system and

(ii) Mount in-house short training program for the users of the system.

The training program is intended to highlight major aspects of this new software, the things that different modules can do and how to make best use of the software.

Two-week lecture programmes that will entail the following courses are recommended also for the staff of the department.

i. **Computer Literacy and Application***:* This will comprise basic computer operation training, MS-DOS and Windows Operating System.

ii. **Software Packages***:* This course will focus on Word Processing using Microsoft Word and introduction to Database Management using Microsoft Access, and then, the Software developed for the new system.

4.5.3   System Change Over Plan

This is the process of changing from old information system to the newly designed, developed and installed system. There are four major methods of system changeover, namely:

i. Parallel Running Method

ii. Direct Cut-over Method

iii. Pilot Approach

iv. Phased Approach

The method which has been chosen for use is very important in system implementation as it might affect the workability of the system at any time. In the case of the new system, it is hereby recommended that the parallel changeover plan should be used. In the parallel approach, both the old and the new systems are operated alongside each other for a number of cycles until the new system has been proved to be operating reliably and correctly. The old system is now phased out.

The parallel approach will allow the institutions to become gradually familiar with the system and if there is any problem, they can always fall back on the old system.

4.4   System Requirements

4.4.1   Hardware Requirements

i.   Intel core i3 is used as a processor because it is relatively fast and provide reliable and stable environment.

ii.   Windows 8 operating system is used.

iii. Ram 1 GB is used as it will provide fast reading and writing capabilities and will in turn support in processing.

4.4.2   Software Requirements

i.   Operating system- Windows7 is used as the operating system as it is stable and supports more features and is user friendly

ii.   Database- MYSQL is used as database as it easy to maintain and retrieve records by simple queries which are in English language which are easy to understand and easy to write.

iii. Development tools and Programming language- HTML is used to develop web pages with CSS, Java Script for validation and JSP for sever side scripting.

iv.   Android Studio for mobile application development

4.5   System Testing

Testing is a set activity that can be planned and conducted systematically. Testing begins at the module level and work towards the integration of entire computers based system. For

testing our software we test each and every path that user can go at any point in the lifetime of the system. Nothing is complete without testing, as it is vital success of the system.

There are several rules that can serve as testing objectives, they are

1. Testing is a process of executing a program with the intent of finding an error.

2. A good test case is one that has high probability of finding an undiscovered error.

3. A successful test is one that uncovers an undiscovered error.

If testing is conducted successfully according to the objectives as stated above, it would uncover errors in the software. Also testing demonstrates that software functions appear to the working according to the specification, that performance requirements appear to have been met.

The entire testing process can be divided into 3 phases

1. Unit Testing

2. Integration Testing

3. Final/ System testing

4.5.1 Functional Testing

Unit involves testing software with a small piece of source code (unit, component, and/or function) of the same software. During performing tests, some hypotheses were made, and the testing was then determined if true or false. This way, the developer was able to check whether a unit behaves as intended or whether a unit corresponds to the design specifications.

All the sources used in unit testing were created by the developer as a part of software development. The following unit tests were performed to ascertain functionality.

Table 4.1: Test Cases for Unit Testing

SN	TEST NAME	TEST DESCRIPTION	TEST ENVIRONMENT
1.	Navigation Tests	This test verifies if the	Windows 10 Pro, 1TB HDD,

		user is able to navigate the site and access all URLs. Testing a login scenario	8GB RAM, XAMPP (Apache) Server, MySQL Server
2.	Authentication Tests	This test verifies the username and password to access core	Windows 10 Pro, 1TB HDD, 8GB RAM, XAMPP (Apache) Server, MySQL Server

4.5.2 Usability Testing

The usability testing of the proposed system was performed by 8 people with different ages; both genders and different level of education. Tasks are given in the Table 4.1. The goal is to determine whether the application is easy to use and her GUIs are friendly or not. All of users performed the tasks easily and give positive feedbacks.

Table 4.1: Usability Testing Results

Task	Comment
Find child using GPS.	Done correctly
Edit child profile.	Done correctly
Delete child profile.	Done correctly
Add child.	Done correctly

On the other hand, the system testing has shown that the proposed tracking system is capable to locate the children, carrying the device, in the indoor and outdoor locations.

4.5.3 Compatibility Testing

This checks whether the various components of the system are integrated and working in sync. All the screens, functions, stores, data tables and other modules were connected with

seamless interfacing. All the required outputs were produced successfully as expected from the systems and all inputs were validated and stored in the correct formats.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1   Summary

Basic child safety device comprises of a GPS, GSM or any other Microcontroller, Panic button and the sensors to keep the track of child's movement, position, etc. Design of the child wearable device is key factor for making the child wear the device happily.

The child safety wearable device is capable of acting as a smart IOT device. It provides parents with the real-time location and the ability to locate their child or alert bystanders in acting to rescue or comfort the child. Also a more power efficient model will have to be created which will be capable of holding the battery for a longer time.

5.2   Conclusion

Nigeria parent, especially who live in urban area, needed to work day and night to sustain the family which causes them cannot know where their child is going during the working hour. However, with the child tracking app, parent can track and monitor their child with just a simple app. The parent is not possible to always stay beside of children as most of the parents needs to go for work. By having this child tracking system, parents can track the location of their children. In order to avoid the kidnapping cases, the child tracking system is needed.

This project work develops a new android-based child monitoring system that works to save the baby and overcomes any other system's disadvantages. It focuses primarily on monitoring a child's location and sending its to the parent and control room. Also, used for the safety of children as they go to school and return from the school that will be used for both parents and school.

This project work was given depth information about child tracking system with the help of two components such as GPS and GSM telephony services the application is built in. The child safety wearable device is capable of acting as a smart IoT device. It provides parents with the real-time location and the ability to locate their child or alert by standers in acting to rescue or comfort the child.

5.3   Recommendations

- The child safety wearable device is hereby recommended for every parent to have it on their kids.

- This should be made compulsory for every pre-KG and KGs pupils by the government.

- It is also recommended that the cost of purchasing the wearable devices should be reduced to enable the less privilege parents to afford them for their child (ren).

5.4   Suggestion for Further Research

Finally for this application has room for enhancement. Geo-fencing, Emergency alerts such features can be added to enhance the system. As a future work, the suggested system can be applied to also notify parents via SMS when the children enter or leave the school, enabling the school administration and parents to keep track of the bus online, or specifying different safety zones if the child gets out of them, the application will notify the parents via SMS.

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APPENDIX I: PROGRAM SOURCE CODES

```html
<!doctype html>
<html lang="en">

<head>
    <meta charset="utf-8">
    <meta http-equiv="x-ua-compatible" content="ie=edge">
    <title>Tracking System</title>
    <meta name="description" content="">
    <meta name="viewport" content="width=device-width, initial-scale=1">

    <!-- <link rel="manifest" href="site.webmanifest"> -->
    <link rel="shortcut icon" type="image/x-icon" href="img/favicon.png">
    <!-- Place favicon.ico in the root directory -->

    <!-- CSS here -->
    <link rel="stylesheet" href="css/bootstrap.min.css">
    <link rel="stylesheet" href="css/owl.carousel.min.css">
    <link rel="stylesheet" href="css/magnific-popup.css">
    <link rel="stylesheet" href="css/font-awesome.min.css">
    <link rel="stylesheet" href="css/themify-icons.css">
    <link rel="stylesheet" href="css/nice-select.css">
    <link rel="stylesheet" href="css/flaticon.css">
    <link rel="stylesheet" href="css/gijgo.css">
    <link rel="stylesheet" href="css/animate.min.css">
    <link rel="stylesheet" href="css/slick.css">
    <link rel="stylesheet" href="css/slicknav.css">

    <link rel="stylesheet" href="css/style.css">
    <!-- <link rel="stylesheet" href="css/responsive.css"> -->
</head>

<body>
    <!--[if lte IE 9]>
            <p class="browserupgrade">You are using an
<strong>outdated</strong> browser. Please <a
href="https://browsehappy.com/">upgrade your browser</a> to improve your
experience and security.</p>
        <![endif]-->

    <!-- header-start -->
    <header>
        <div class="header-area ">
            <div id="sticky-header" class="main-header-area">
                <div class="container-fluid ">
                    <div class="header_bottom_border">
                        <div class="row align-items-center">
                            <div class="col-xl-3 col-lg-3">
                                <div class="logo">
                                    <a href="./">
                                        <img src="img/gpslogo.png"
style="height: 65px;" alt="">
                                        <span class="text-shadow font-weight-
bold text-white h4">Child Tracker</span>
```

```
                                            </a>
                                        </div>
                                    </div>
                                    <div class="col-xl-6 col-lg-6">
                                        <div class="main-menu  d-none d-lg-block">
                                            <nav>
                                                <ul id="navigation">
                                                    <li><a href="./">Home</a></li>
                                                    <li><a href="./">about</a></li>
                                                    <li><a href="./">FAQ</a></li>
                                                    <li><a href="./">Contact</a></li>
                                                </ul>
                                            </nav>
                                        </div>
                                    </div>
                                    <div class="col-xl-3 col-lg-3 d-none d-lg-block">
                                        <div class="Appointment">
                                            <div class="phone_num d-none d-xl-block">
                                                <a href="tel:+2347064205007"> <i
class="fa fa-phone"></i> +234(0) 706 420 5007</a>
                                            </div>
                                        </div>
                                    </div>
                                    <div class="col-12">
                                        <div class="mobile_menu d-block d-lg-
none"></div>
                                    </div>
                                </div>
                            </div>
                    </div>
                </div>
            </div>
        </header>
        <!-- header-end -->
        <!-- slider_area_start -->
        <div class="slider_area">
            <div class="single_slider  d-flex align-items-center slider_bg_1">
                <div class="container">
                    <div class="row align-items-center justify-content-center">
                        <div class="col-lg-7 col-md-6">
                            <div class="slider_text">
                                <h3 class="wow fadeInRight text-center" data-wow-
duration="1s" data-wow-delay=".1s">
                                    <img src="img/gpslogo.png" style="width:
240px; height: 240px;"><br />
                                    Tracking System
                                </h3>
                                <!-- <div class="sldier_btn wow fadeInLeft" data-
wow-duration="1s" data-wow-delay=".2s">
                                    <a href="#" class="boxed-btn3">How it
Works</a>
                                </div> -->
                            </div>
                        </div>
                        <div class="col-lg-5 col-md-6">
                            <form method="post">
```

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```html
                            <div class="payment_form white-bg wow fadeInDown"
data-wow-duration="1.2s" data-wow-delay=".2s">
                                <div class="info text-center">
                                    <h4>Sign in</h4>
                                    <p>Enter your login credentials</p>
                                </div>
                                <div class="form">
                                    <div class="err"></div>
                                    <div class="row">
                                        <div class="col-lg-12 mb-4">
                                            <div class="single_input">
                                                <input type="text" class="form-
control wide" id="usern" placeholder="Username" required="required">
                                            </div>
                                        </div>
                                        <div class="col-lg-12 mb-4">
                                            <div class="single_input">
                                                <input type="password"
class="form-control wide" id="passn" placeholder="Password"
required="required">
                                            </div>
                                        </div>
                                    </div>
                                </div>
                                <div class="submit_btn">
                                    <button class="boxed-btn3" type="button"
id="btnLogin">
                                        <i class="fa fa-sign-in"></i> Sign in
                                    </button>
                                </div>
                                <p class="text-center"><a href="#">Forgotten
Password?</a></p>
                                <div class="text-center mt-2"><a
href="./?signup">Don't have an account? Sign up</a></div>
                                </div>
                                </form>
                            </div>
                        </div>
                    </div>
                </div>



    </div>


    <!-- link that opens popup -->
    <!-- JS here -->
    <script src="js/vendor/modernizr-3.5.0.min.js"></script>
    <script src="js/vendor/jquery-1.12.4.min.js"></script>
    <script src="js/popper.min.js"></script>
    <script src="js/bootstrap.min.js"></script>
    <script src="js/owl.carousel.min.js"></script>
    <script src="js/isotope.pkgd.min.js"></script>
    <script src="js/ajax-form.js"></script>
    <script src="js/waypoints.min.js"></script>
```
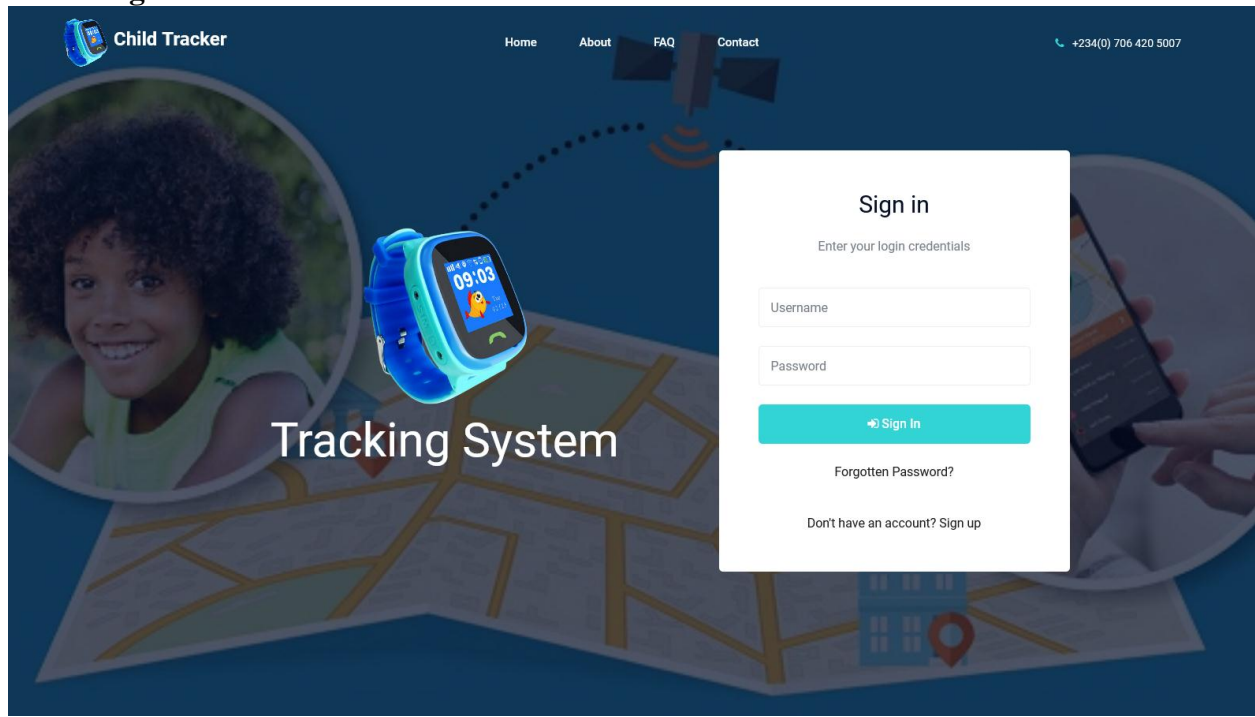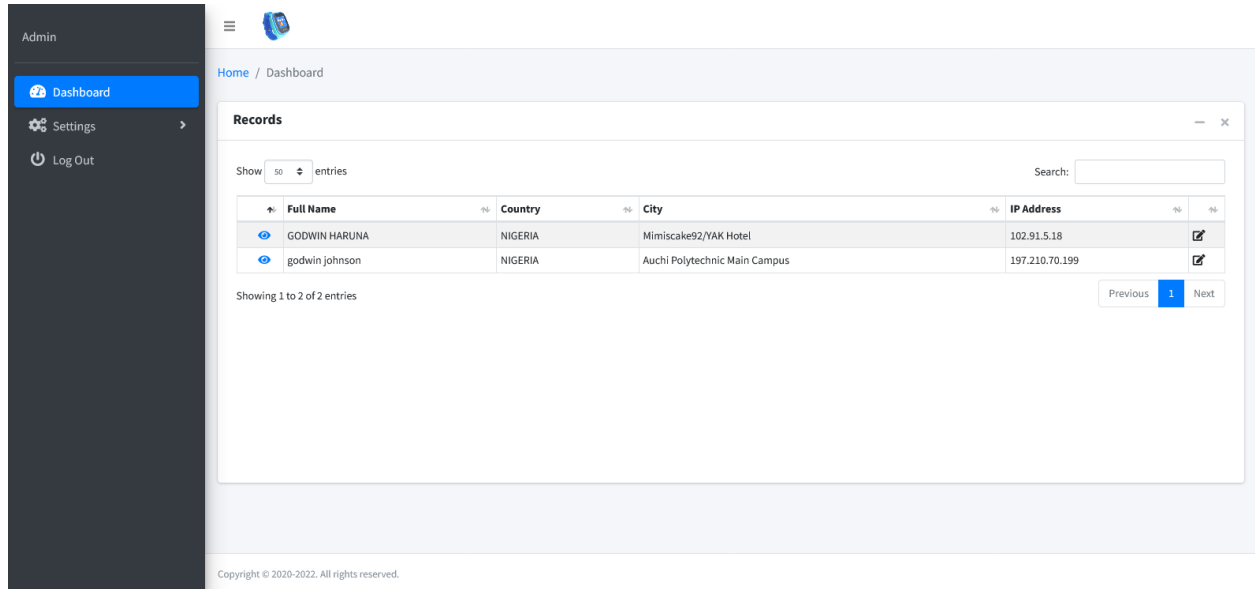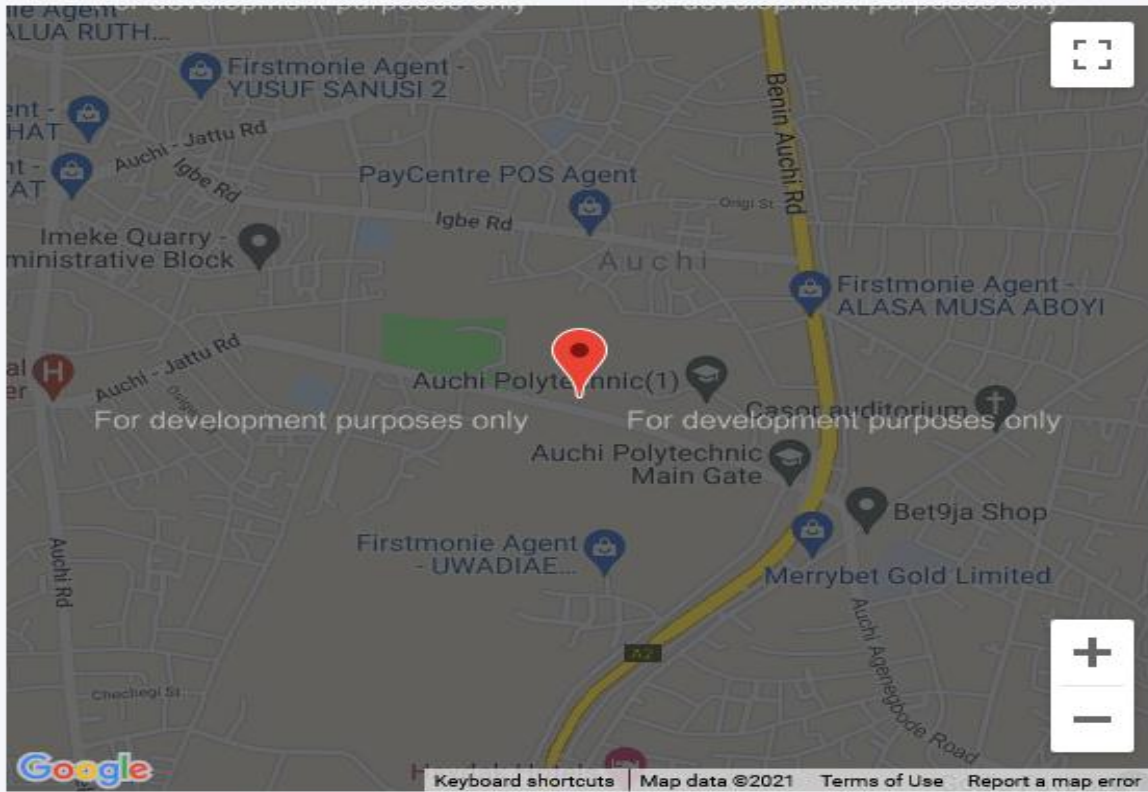
```html
<script src="js/jquery.counterup.min.js"></script>
<script src="js/imagesloaded.pkgd.min.js"></script>
<script src="js/scrollIt.js"></script>
<script src="js/jquery.scrollUp.min.js"></script>
<script src="js/wow.min.js"></script>
<script src="js/nice-select.min.js"></script>
<script src="js/jquery.slicknav.min.js"></script>
<script src="js/jquery.magnific-popup.min.js"></script>
<script src="js/plugins.js"></script>
<script src="js/gijgo.min.js"></script>
<script src="js/slick.min.js"></script>


<!--contact js-->
<script src="js/contact.js"></script>
<script src="js/jquery.ajaxchimp.min.js"></script>
<script src="js/jquery.form.js"></script>
<script src="js/jquery.validate.min.js"></script>
<script src="js/mail-script.js"></script>


<script src="js/main.js"></script>
<script src="js/jquery.login.js"></script>
</body>

</html>
```

Home Page

Parent Dashboard

Geo-location detection

DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

BY

AIBOMOSI RAPHEAL PETER
MATRIC NO.: ICT/6251830467

A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY, AUCHI POLYTECHNIC, AUCHI, EDO STATE

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATIONAL DIPLOMA (HND) IN COMPUTER SCIENCE.

SUPERVISED BY:
MR. UDUIGUOMEN, U.C.

JANUARY, 2022

CERTIFICATION

DEDICATION

This project work is dedicated to God almighty for his undying love towards us, his mercies and provision throughout this project work, and also to my parents for their parental care.

ACKNOWLEDGEMENT

I most sincerely express my innumerable gratitude to almighty God for his infinite mercy, guidance, protection and inspiration towards the success of this project work.

I especially appreciate my project supervisor the person of **Mr. Uduiguomen U.C** for encouragement and contribution towards the success of this project work.

I also want to appreciate my able and amiable head of department **Mr. Akhetuamen, S.O** for the confidence and knowledge he has inculcated in me.

I will not forget to appreciate my parents the person of **Mr. and Mrs. Raphael Aibomosi** for their parental care towards my schooling, may almighty God keep them alive and bless them beyond their expectation.

I sincerely appreciate all my lectures in the department of computer science for their efforts towards my academic pursuit.

Finally, my profound application also goes to my brothers and sisters, Joy, Cyril destiny and peace and all my friends, for their advice and support towards my education.

I must thank my entire lodge mates. I love you all.

DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

BY

OKPO ABDULAZEEZ OTAGER
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SUPERVISED BY:
MR. UDUIGUOMEN, U.C.

JANUARY, 2022

CERTIFICATION

DEDICATION

This project is dedicated to my loving parent **Mr & Mrs okpo Idown .M.** for making me a graduate through the mercy of God. May God give them long life and prosperity and also those who contributed to my success in life especially my lovely wife and mother and others. Friends and well wishes

ACKNOWLEDGEMENT

I wish to express my preformed gratitude to God almighty for his love care, guidance and protection He bestowed upon me throughout my schooling in Auchi Polytechnic. I sincerely appreciate the efforts on my project in person Mr

DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

BY

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SUPERVISED BY:
MR. UDUIGUOMEN, U.C.

JANUARY, 2022

CERTIFICATION

DEDICATION

ACKNOWLEDGEMENT

Gratitude is a duty ought to be paid

I wish to firstly acknowledge God almighty for the gift of life and strength to make the project work a reality.

I wish to acknowledge my project supervisor **Mr. Uduiguomen U.C** whose guidance and counseling lead to the successful completion of the project.

Every understand in life has a basic so my profound gratitude goes to my parents **Mr and Mrs Usman Christopher** for their constant prayer, advice and financial support.

My special thanks go to my brothers and sister and all my cousins.

I also appreciate the good companionship of my lovely friends towards me. I care about you all and my God almighty continues to bless you.

DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

BY

OGAGAOGHENE STELLA
MATRIC NO.: ICT/625180251

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IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATIONAL DIPLOMA (HND) IN COMPUTER SCIENCE

SUPERVISED BY:
MR. UDUIGUOMEN, U.C.

JANUARY, 2022

CERTIFICATION

DEDICATION

I dedicate this project to God Almighty for His grace, mercy and blessings towards the completion of this project work.

ACKNOWLEDGEMENT

I wish to acknowledge God almighty for the gift of life, strength and knowledge that he bestowed on me in making this project work a reality.

I wish to acknowledge my lovely parents **Mr and Mrs JOSEPH EROBOR** whose financial support, prayers, emotional support, moral support, advice help me all through the cause of the work dad, mom I am grateful.

My sincere gratitude goes to my project supervisor **Mr Uduiguomen U.C** whose guidance and counseling led to the successful completion of this project, thank you sir

I also wish to acknowledge my brothers, sister, uncle, cousin who have in one way or the other support me all through the cause of this study thank you so much I love you all

Finally I appreciate all my friends for the Goodwill they lavish on me may God continue to bless you all.

DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

BY

ESONGBOBA PETER AKASE
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IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATIONAL DIPLOMA (HND) IN COMPUTER SCIENCE

SUPERVISED BY:
MR. UDUIGUOMEN, U.C.

JANUARY, 2022

CERTIFICATION

DEDICATION

I dedicate this project to God Almighty for His grace, mercy and blessings towards the completion of this project work.

ACKNOWLEDGEMENT

I wish to express my profound gratitude to God almighty, whose grace has been sufficient for me.

I wish to use this medium to appreciate the contributions of my project supervisor who has been so close to me, giving time and advice, the person of **MR. UDUIGUOMEN, U.C** whose useful guidance, patience, cooperation and advice has made this work a success, may God bless you sir.

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Special thanks goes to my parent **MR and MRS ESONGBOBA** for their moral and financial support during my HND program. To my siblings, family and friends, that supported me in this programme, God bless you all.

DESIGN AND IMPLEMENTATION OF CHILD WEARABLE DEVICES LOCATION DETECTION USING GPS

BY

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IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATIONAL DIPLOMA (HND) IN COMPUTER SCIENCE

SUPERVISED BY:
MR. UDUIGUOMEN, U.C.

JANUARY, 2022

CERTIFICATION

DEDICATION

I dedicate this project to God Almighty for His grace, mercy and blessings towards the completion of this project work.

ACKNOWLEDGEMENT