VIRTUAL NANNY: A CHILD MONITORING APPLICATION FOR GUARDIANS

A Proposal
presented to the Faculty of the
College of Computer Studies, University of Cebu

In Partial Fulfilment of the Requirements
for the Degree of Bachelor of Science in Information Technology

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The Researchers,

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DEDICATION

To Our Professors

To Our Families and Friends

To God Almighty

APPROVAL SHEET

This Research/Capstone Project Study titled **VIRTUAL NANNY: A REAL-TIME CHILD MONITORING APPLICATION FOR GUARDIANS** prepared and submitted by Michael John E. Deligero, Ana Marie B. Gonzales, Mary Welcey I. Guillen, Christine Joy A. Leonardo and Shara Marie G. Reyes has been examined and is recommended for approval and acceptance.

RECOMMENDED:

Janeth S. Ugang Adviser	**Janeth S. Ugang** IT Research Coordinator

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APPROVED by the Examining Tribunal on ***Proposal Hearing*** with a group verdict of _____on _____.

Moma dela-Torre Ortega, MCS
Chairman

Eric Ortega Member	Judy Ann F. Gimena, DBA Member	Miriam Flores, MA-Lit Censor

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ACCEPTED and APPROVED in partial fulfillment of the requirement in Bachelor of Science in Information Technology

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CHAPTER I
INTRODUCTION

Parenting is not an easy job, some say it is the toughest job there is. You will always be an amateur, no parent is an expert. Childrearing responsibilities with the demands of work makes it challenging on many parents' personal and professional lives. According to a study from the American Psychological Association (2007), over 50% of all employees report that job demands interfere with their personal responsibilities, while 43% of employees say that their family responsibilities interfere with their work performance. Achieving a balance between career and children seems to be a challenging work to do.

It is likely for parents to guide their child as they grow to keep them away from danger. As a parent, you are the link between your child and the outside world. Monitoring your child's activities is an important way to lower his or her chances of getting involved in situations you do not approve of, especially those that can be harmful. But some parents have a tendency to overdo it, and turn out to be overly-controlling depriving their children the freedom to explore the world on their own. This kind of parenting may lead children towards acting rebelliously or they might even become dependent on their parents to solve all their problems for them since they lack initiative. Parents should also give their children enough independence but how can they be ensured of their child's safety?

Since the booming of the technological era, real-time monitoring has been made possible. Therefore, technology can make parenting easier and more effective. After all, Matt Mullenweg once said, "Technology is best when it brings people together".

Rationale of the study

As the skyrocketing number of people embraced the smartphone age, more and more activities can be accomplished in this portable handheld device. Almost every person at present has a smartphone regardless of age. Over 1.8 billion people own smartphones and use their devices on a daily basis (Williams, 2014). Some studies estimate that an average person checks their screen 150 times a day (Ballve, 2013). Filipino children outpace their counterparts in the Asia Pacific region in terms of Internet connectivity and mobile phone ownership. Two-thirds (65%) of children

in the Philippines own a mobile phone. Eight out of 10 (82%) Filipino children access the Internet at least weekly and over a third (37%) are daily Internet users (Cartoon Network Philippines, 2012).

Based on a study, most parents show slight hesitation in allowing their children to use a device, but 98% of Southeast Asian parents allows their children to use mobile phones. (The Asian Parent, 2014). Nevertheless, due to digital advancements this trend cannot be stopped, parents might as well make the most of it and use this to their advantage. Since everything in this age is now hooked on technology, it would build gateway in monitoring their child, making them only tap away.

The proposed system is called “Virtual Nanny", it is a real-time child-monitoring application. It has features designed to address common problems encountered by parents and guardians in their day-to-day responsibilities in looking after a child.

First, knowing whereabouts of their child when not in their sight, this system has a feature that lets guardians know where the child is by pinpointing the exact location of the child using the GPS (Global Positioning System) technology through an actual map. It also stores a location history to know the places they have stayed for the past seven days.

Second, ensuring the safety of their child and keeping them away from danger, the system allows guardians to create fences using geo-fencing that still uses the GPS technology to create geographical boundaries. These fences will serve as virtual barriers that the guardians may set on specific borders on places that they are allowed and not allowed to visit. Guardians will be alerted if the child has arrived or left the area based on their preference.

Third, monitoring their child’s lifestyle and fitness activities, Virtual Nanny also offers a pedometer feature that counts the number of steps a child makes to know if they are physically active or if they need more exercise.

Fourth, reminding their child on being time conscious, guardians can set reminder alarms like curfews, school time (to avoid arriving late), etc. that send guardians a notification if they have arrived on a certain place on or before the set time, it also alarms if they go beyond the specific time. Apart from that, guardians may also add tasks that the child must accomplish.

Fifth, preventing excessive use of smartphones or tablets, in this application guardians has the opportunity to remotely enable and disable the child’s device. Apart from that, they can set a time limit for their child’s smartphone usage. Too much screen time means less time for other

activities like actively playing with other children or reading. As in most things, moderation and balance is the key.

And lastly, raising responsible children that will grow with good character, this system does not only aim to monitor the child but to also motivate them to abide on the guidelines and rules that their parents have established. The system has a rewards and consequences feature that allows the parents to set rewards and consequences with corresponding instructions on how they can acquire it using the other features previously noted. For example, a guardian sets a certain number of steps that the child shall obtain or a certain number of occurrences that the child arrives on or before their curfew or arrives early in school. In this way, children can feel appreciation from their parents for being a good child which would serve an encouragement for them and it will soon turn into a habit. It would also be a learning experience for children to work hard for want they want, instead of giving it directly to them. On the contrary, if they have not followed their parent's instructions, they shall do the consequences to teach them to be responsible of their mistakes. They need to experience the process of making mistakes and failing, and then bouncing back and recovering. As they grow up, they are going to be much better at facing setbacks.

The assurance of their child's well-being would always bring ease, convenience, and peace of mind for parents. Which is the main purpose of the proposed system, to give aid to parents and guardians by assisting them in monitoring their child's activities anytime of the day. Apart from that, it will help in instilling virtuous values at a young age to positively influence the growth of the children. It is essential in child's development to have enough independence, then again a parent's job is just to put them in the right path, but forming their character lies in their own hands.

Objective of the study

This study aims to develop a real-time child-monitoring application for guardians to monitor child's activity throughout the day.

In order to achieve this aim, the following specific objectives are:

1. to gather information on the problems and concerns of parents and guardians in child-monitoring;
2. to determine features that help parents in knowing the activities of the child;
3. to identify mechanism in monitoring the child; and
4. to design an algorithm to help guardians monitor the child.

Scope and Limitations of the study

This study will develop an application called “Virtual Nanny” to give aid to parents in child-monitoring activities. The application covers the actual map of Cebu Province using the Google Maps. It can connect up to 3 child accounts every guardian account. Each account can be logged on by only one device at a time to prevent conflict in location tracking.

Virtual Nanny is a mobile application that run on android phones with Android API Level 16 or Jelly Bean as the minimum SDK up to the latest. When a child is in danger or needs immediate attention and sends SOS, guardians may receive the location of their child and quick messages through SMS, but cannot implement the other features. Therefore, the application requires internet connection to finely perform all its features.

It is essential that the guardian and child owns and is capable to operate an android smartphone. The mobile application uses the GPS (Global Positioning System) technology through mobile devices thus, the child needs to have a GPS enabled smartphone to track their exact location and must at all times bring their mobile device with them. In the same manner, the child’s smartphone should also have a built-in pedometer to implement the pedometer feature. Not all schools in Cebu allows phones in the campus, in this case, they cannot be monitored on their school grounds. When the mobile device of the child is switched off, battery is empty or internet connection is poorly or not available, the parent is notified but the application fails to provide the exact location. Nevertheless, the application stores the last trackable location of the child. Though the location history feature stores up to the past three days only.

For data gathering, the proponents will conduct a survey among the parents of Tugbongan National High School to gain wider understanding on parental apprehensions and concerns in childrearing activities.

Significance of the Study

This study will be a significant endeavor in real-time monitoring. Upon accomplishment, this study will be of benefit or value to the following entities:

Children. Children can enjoy their freedom and independence without sacrificing their safety through close monitoring by means of GPS tracking and pedometer for their activities and fitness lifestyle to be accurately observed. Ensuring their security and well-being is also the main concern, with the assistance of the safe zones and dangerous zones that their parents/guardians established. Aside from that, this application can help them acquire essential values that would help them build a good character.

Parents and Guardians. Parents and guardians are most probably the utmost beneficiaries of this study. Since this study aims to address the problems and concerns of guardians regarding child-monitoring, it would provide assistance to them through its features designed specifically for their ease and comfort. Instead of always looking after or worrying about their youngster, they can use their time more productively in other matters. With the aid of the Virtual Nanny, parents and guardians can experience total peace of mind since they can monitor their child anytime and anywhere through their handheld phones.

Child minders and Babysitters. They can benefit in this study since the nature of their occupation is taking care and looking after a child. Through this study they can be more efficient and effective in their line of work.

Researchers. Conducting this study is a great venue to showcase the creativity and skills of the researchers. It would be an opportunity for them to culminate the lessons they have learned from their instructors. Furthermore, they shall acquire new knowledge and enhance their capability in phone-based software development which would be of the researchers' advantage in their field of study. In the process, they will be able to strengthen their bond as a team by functioning together with collaboration and unity pointing towards a common goal. And that is to create an application that would give them a chance to have a positive impact in other people's lives.

Future Researchers. This study will be of interest or value to the future researchers who desire to have further research pertaining similar topic or subject matter. The study may serve as a reference and still has room for improvements and enhancements for the future researchers to venture upon.

Flow of the Study

This section illustrates the set of dynamic processes in the system. It is the sequential arrangement of the activities of this study.

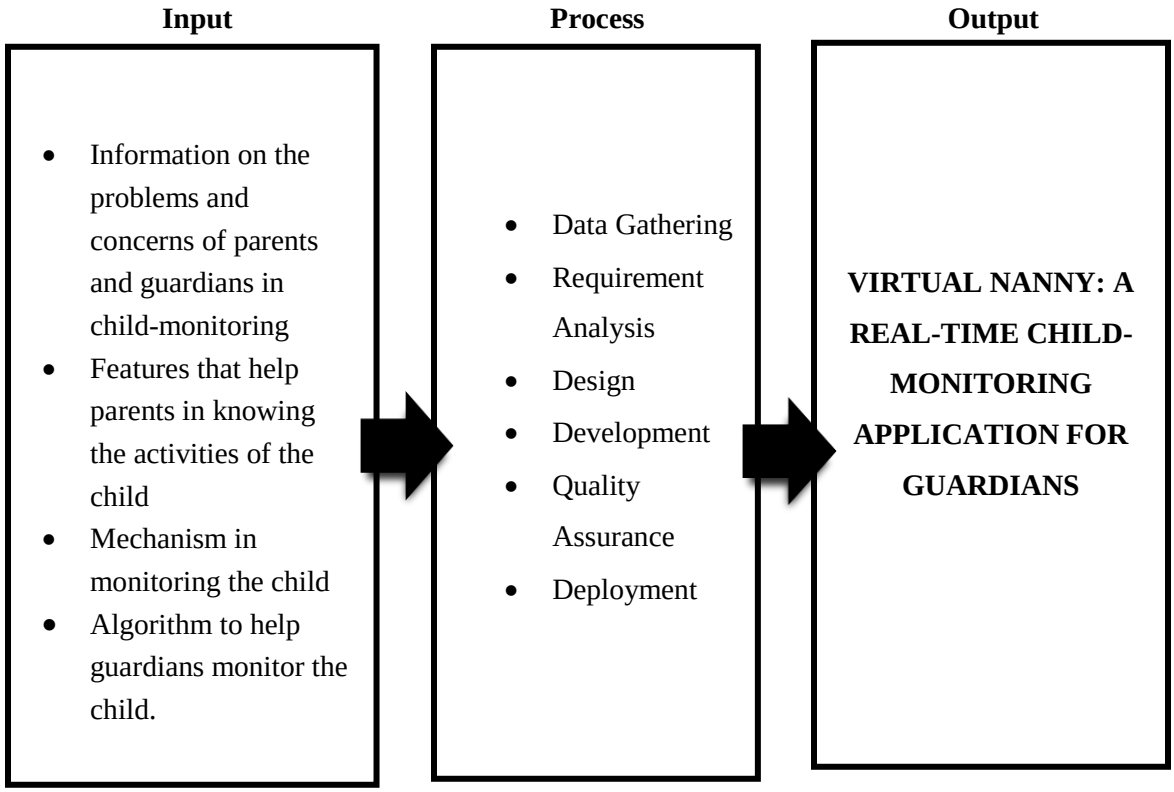


Figure 1: **Flow of the Study**

Figure 1 shows the research flow of the study demonstrating three parts, the input, process and the output. These are progressions of activities that are essential for the study's success.

The inputs of this study are the gathered information through a survey conducted regarding parental concerns. And the features that was intended mainly to address their concerns. Also, the mechanism for the interfaces of the features and the algorithm to be used for child monitoring.

The processes segment is the essential undertakings in the development of the application. It will be implemented through the Agile Development Methodology which will be further discussed in Chapter 3.

The final point is output which is the proposed study called "Virtual Nanny: A real-time child monitoring application for guardians" to help guardians monitor the child through their mobile devices.

Definition of terms

Application – a mobile platform used as the medium of developing the proposed study which is the Virtual Nanny

Child-monitoring – knowing the whereabouts as well as the behavior and activities of the child

Features – the functionalities of the proposed system to address the problems encountered by the parents in childrearing activities

Guardians – person who looks after the child in the absence of the parent

Information – gathered data through the survey conducted by the researchers

Parent - is a father or mother that provides the necessary needs to a child

Real-time - the actual time of monitoring the child

CHAPTER II
REVIEW OF RELATED LITERATURE AND STUDIES

This section tackles about the existing related concepts pertaining to monitoring applications and how the vital insights aforementioned paved way into developing the project as well as obtaining a comprehensive understanding of the objectives. It talks about the history of the Global Positioning System, and how it works. It also mentions about Geo-fencing, which is also an integral module in a monitoring application, alongside the GPS. Lastly, this section also presents the causal factors giving importance as to why these monitoring applications existed as well as the essential benefits it contributed.

Related Literature

In this modern and fast moving world, human safety and security has become an important issue. In the past few years, crime against school going children has grown rapidly. Security of children or their wards has become an important issue for every parent (Bano et al., 2015). Thus, monitoring your child is especially critical to protect them from harm or abuse ("Monitoring Your Child," n.d.). Today, many parents have started investing in GPS monitoring applications that help them monitor their kids from afar, especially the working parents. The technology has become popular these days. Through their smartphones, parents can monitor their child's location 24/7 in real time (Wilson, 2016). Thus, these platforms enable one's smartphone to have broad applicability to public safety problems (Arensman et al., 2009).

Parental monitoring is establishing firm guidelines and limits to keep track of what is going on in your child's world ("Monitoring Your Child," n.d.). The most challenging task a parent has to take is looking after their child and making sure they are free from any harm while doing other things they are expected to do like maintaining the house and putting food on the table. But it's now easier to perform these tasks through location tracking and monitoring applications (Wilson, 2016). Nowadays, most mobile phones are equipped with location services capabilities allowing us to get the device's geographic position in real time. Combined with the fast growing popularity of the smart phone and its built-in GPS through mobile apps, the location tracking functionality of modern mobile devices provides unprecedented opportunity to individual's mobility in daily life. Current position locating in map, road navigation, vehicle tracking etc. are the most uses

application using GPS system provided by Google Map and other free GPS service (National Research Council, 1995).

With smartphones becoming ubiquitous as newer, less expensive models with greater feature sets have been released (Arensman et al., 2009). The need for monitoring exists in some other situations as well when parents require or wish to monitor their children's activities or in companies where employees need to be monitored with the consent of the employee. Monitoring applications also allow parents to track their children's activity – from where they go after school to what they're texting (Rosen, n.d.). Smartphone tracking system and monitoring technology can be deployed in most smartphones. All smartphones constantly send signals to their nearest mobile towers hence it is possible to track a lost phone accurately. The tracking of smartphones is based on GPS satellite tracking system which has been used by cars and road transport industry for many years, mostly in western countries (Dar & Parvez, 2015).

Wide varieties of monitoring applications are being marketed today. Each of these applications provide diverse features and functionalities, purposes and significance which all serve as a tool for monitoring. Through installing these applications on one's phone, parents and guardians can access what their child are up to through the use Global Positioning System or GPS to track a one's location. Other monitoring applications let one monitor texts, calls, and what else they're up to online. Some offers a hybrid of these features (Rosen, n.d.).

Most of today's smartphones are equipped with fully functional built-in GPS receivers and supporting applications (Arensman et al., 2009). Making use of the GPS, monitoring applications can pinpoint the exact position of the person you're looking for using a map on your smartphone or tablet. Others also offer geo-fencing which is an electronic barrier drawn on a digital map in which, when breached, immediately alerts the parent or guardian. There are also devices that include cellular connectivity so kids can make an SOS call to a designated number from their smartwatch (Lamkin, 2016).

The Global Positioning System or GPS is a satellite-based system that can be used to locate positions anywhere on the earth. Operated by the U.S. Department of Defense (DoD), NAVSTAR (NAVigation Satellite Timing and Ranging) GPS provides continuous (24 hours/day), real-time, 3-dimensional positioning, navigation and timing worldwide. Any person with a GPS receiver can access the system, and it can be used for any application that requires location coordinates. The GPS system consists of three segments, namely the space segment: the GPS satellites themselves,

the control system which is operated by the U.S. military, and the user segment, which includes both military and civilian users and their GPS equipment (Cooksey, n.d.).

Geofencing is a popular option for modern mobile applications. The concept of a geofence is simple; draw a virtual boundary around a point on a map, like a fence around a yard, which can then monitor when a mobile device crosses the boundary. Businesses utilize geofences as part of their mobile strategy to create location awareness and provide context for meaningful interactions with their users. Geofencing allows virtual boundaries to be defined on a map. It can be a circle around a specific point, or two polygons representing sides. It allows one to create boundaries in the real world and can be used to as an alert when something enters or leaves a particular area. Geofencing is a powerful tool that is utilized by mobile applications to improve the experience for users while also increasing revenues. It utilizes one of the most crucial bits of data available to mobile applications – the user's location – and customizes the application experience accordingly (Francis, 2013).

Monitoring applications present many advantages, it serves as a tool used by people as they try to locate people who've become lost in remote areas (Reardon, 2006). It also lets one, especially the parents monitor their child's or even the whole family's activities. A combination of GPS data and cell tower triangulation can reveal ones current location wherever your phone has a signal which enables parents to know where their children are at all times. Thus, giving assurance whether they arrived safely into their respective destinations (Artman, n.d.). Monitoring applications for cell phones can help one understand the value of limits in a digital world while also preventing them from the dangers lurking around (Hall, 2016).

This section presents how smartphones proved to be an essential security tool through these monitoring applications. It features the factors concerning the cause of the problem as well as the related concepts that is essential for knowing the complexity of the existing problem. This section also covers the implemented solutions aiding the growing concerns about child security as well as its advantages. Attesting that there are solutions to the existing problem motivates the researches to pursue the research.

Related Studies

With the fast growing popularity of the smartphone, individuals have easy access to the handy GPS navigation system through various GPS mobile apps (Kloub, 2016). Today, technology is growing rapidly and providing all essential and effective solutions for every requirement (Gupta, 2016). In line with this, as the market for smartphones has grown in recent years, various technological breakthroughs arise such as developing applications aiding parents and guardians in regards to their apprehension concerning their child's security.

The following works present the existing applications that were created and developed as solutions to the problem about child security which plays an important area of concern among parents.

Some mobile applications share the same set of features, like the Family Locator - GPS Tracker and the Real - Time GPS Tracker which both enables the creation of a user account and profile through entering a user name, an e-mail address, and a password, both applications also depend on internet connection to authenticate the user, share current location with a group of persons or "friends" that is set by the user and the knowledge about the location of persons belonging to the same group. The user and the persons in the group will be able to track and trace one another as long as they are in the group. These applications also allow users to receive real-time alerts when a person arrives at or leaves destinations through setting a geofence. To locate a person, they get information from the smartphone location sensors and share that information among the other users in the network (Haro & Hulls, 2016).

Another application called Sprint Family Locator enables one to locate friends and family any time. It enables user to see location of the family's phones in real time on an interactive map. It also has a set safety checks feature where it automatically checks if the family members are where they should be (on their respective destinations) and lets the parents or guardians receive a text if they aren't there, which assures the users that their family is safe. They also have a location history wherein the parent gets to have an overview of their kid's location, all day, and it has a save favorite places feature where it creates shortcuts for locating family members (Safely, 2016).

Family Locator - Phone Tracker is another GPS Phone tracker application that lets the user see the real-time location of their kids on the map, and stay in touch with instant messages. Family Locator app was designed as an easy to use safety tool for the family, children and friends localization. Users can also create their own groups in the app (either with kids, friends, or

colleagues) With the Family Locator application, users will be assured of the safety and security of their child, family members, and retired parents and always know wherever their loved ones are because it has a check-in feature wherein it tells the others current location and sends a notification when they arrive at their destination. It also lets one receive alerts when kids go where it's not safe. Parents can also mark safe zones such as school, or home on the map and when in need, it can send or receive SOS with exact location. Through upgrading the application to lifetime premium, it enables the user to have an access to the location history of the kids to increase their safety. Location History feature enables users to see the GPS location points and movement of family members during past 7 days (Stencl, 2016).

Family Orbit: Parental Control is another monitoring application that allows parents to keep tabs on their offspring without making their children feel like they are being unfairly monitored. The application, while offering monitoring, also acts as a family only social network, which allows photo and message sharing. The app offers a number of great features like letting the parents stay connected with their kids 24/7, keep tabs on their location, as well as making an immediate call when emergency arises. Parents can also be notified if ever their teenagers are driving over the minimum speed limits through setting the speed limit. It also has a geo-fence feature which allows parents to create family safe zones, and be notified when their children arrive or leave a specific location. Moreover, children can check which parent or guardian is nearest and request to pick them up. Lastly, the app shows a daily, weekly or monthly network usage history of all the family member's phones and let parents take appropriate control over the data bandwidth (AppObit LLC, 2016).

Funa Family Locator allows users to locate their family members and friends in real time. This enables users to have a peace of mind knowing that their loved ones have safely arrived at a destination. It offers real time localization in it lets the family members know the whereabouts of each member. This application also guarantees that each family member's location is confidential and is visible to the family members only. It also has the history tracking feature where it keeps track of the location history up to seven days. It can also trigger SOS alert to the family during emergency (nPlay Sdn Bhd, 2016).

The Related Studies presents the existing applications, its features, as well as the respective benefits it contributes. The information presented are the solutions offered in order to address the growing concerns of the parents and guardians regarding the welfare of their children. Through reviewing the related studies, it verifies that there are solutions to the existing problem which serves as a basis or a guide for the development and implementation of Virtual Nanny.

Table 1

COMPARATIVE MATRIX

Related Studies	**Features**	**Limitations**
(1) **Name:** Family Locator - GPS Tracker **URL:** https://www.life360.com/ **Year:** 2016 **Proponent(s):** 1. Alex Haro 2. Chris Hulls	• Uses GPS coordinates and state-of-the-art GPS location data to report the real-time whereabouts of friends and family. • Track stolen or lost phone • Creates groups, called "Circles," of loved ones, friends, and teammates • Chats with other members either individually or in a group in the Family Locator • Choose when to share your location with every Group • Receive real-time alerts when Circle Members arrive at or leave destinations	• Internet connection dependent
(2) **Name**: Real-Time GPS Tracker **URL**: https://www.greenalp.com/ **Year**: 2016 **Proponent(s):** 1. Greenalp	• Show outdoor trips live to the family, and friends. • Send messages to friends or to the viewers on the website • Show exact location to family and friends on Google Maps • Can track you in real-time while even when running, hiking, biking, paragliding, or just traveling by train or car.	• Internet connection dependent
(3) **Name:** Sprint Family Locator **URL:** http://www.safely.com/ **Year:** 2016 **Proponent(s):** **1.** Safely	• The ability to locate any phone • Locate a lost or stolen phone after it's disappeared. • Automatically check if family members are where they should be and receive a text if they aren't there. • See the location of your family's phones in real time on an interactive map. • Creates shortcuts for locating family members	• Internet connection dependent

Table 1.1

COMPARATIVE MATRIX cont'd

Related Studies	**Features**	**Limitations**
(4) **Name**: Family Locator - Phone Tracker **URL**: http://www.sygic.com/family-locator/features?r=topmenu **Year**: 2016 **Proponent(s):** 1. Michal Stencl	• See the real-time location of the family, and friends • It can send or receive SOS with exact location • Gets notification, when your kid reaches destination • Mark safe zones such as school, or home on the map • Enables creation of own groups in the app (kids, friends, or colleagues) • Receive alerts when kids go where it's not safe • See the location history of family members during past 7 days (available as an in-app purchase)	• Internet connection dependent
(5) **Name**: Family Orbit: Parental Control **URL**: http://www.familyorbit.com/ **Year**: 2016 **Proponent(s):** 1. AppObit LLC	• Offers messenger and private family network • Enables users to create family safe zones, and be notified when child arrives or leaves a specific location. • Helps parents find the location of a child at any time. • Parents are able to track in real-time, as well as view the location history over the last 7 days. • Monitor the mobile data usage of your family. • The app shows a daily, weekly or monthly network usage history of the family and lets parents take appropriate control over the data bandwidth. • Monitor the contacts that children add to their address book • Allows parents to monitor all photos on their children's phones	• Internet connection dependent

Table 1.2

COMPARATIVE MATRIX cont'd

Related Studies	**Features**	**Limitations**
(6) **Name:** Funa - Family Finder **URL:** http://www.funaapp.com/ **Year:** 2016 **Proponent(s):** 1. nPlay Sdn Bhd	• Gets to know the whereabouts of the family members • Keeps track of family through location history (up to seven days) • Alerts when your family and friends will arrive or leave the marked area. • Notifies the family when unexpected events happen through the SOS alert feature.	• Internet connection dependent

Table 1 shows the descriptions of the different related studies with their corresponding features and limitations in which some of these will be used in developing the application. The related studies will serve as a reference or a guide in developing the proposed study and it will also serve as a basis in realizing the objective of the study as well as developing the Virtual Nanny, an application that is a hybrid or an integration of the various features presented in the related studies with added innovations for a more advanced and efficient child monitoring.

CHAPTER III

RESEARCH METHODOLOGY

This section discusses the methodology that will be used for the development of the project. It covers the application of particular procedures or techniques used to recognize, select and analyze the information applied in the study to justify its general legitimacy and dependability. It shows diagrams, tables and figures to further understand and previsualize the study and its mechanisms. It explains the different phases that the study must undergo to satisfy the requirements of the objectives of the study.

Software Engineering Methodology

The study will apply the Agile Development Methodology. The system will go through a series of iterations, analyzing, designing, developing and testing each feature. The proponents decided to use Agile as the methodology in developing the system since it will create visibility of complete working features faster, allowing a better gauge of progress and quality, and making room for feedback and adaption along the way. Agile is more efficient because the proponents will be able to see some results earlier, mitigate risk, and it will allow flexibility that would help the system respond to unpredictability. If in case there will be changes that the system might come across, this method is more flexible and adaptable.

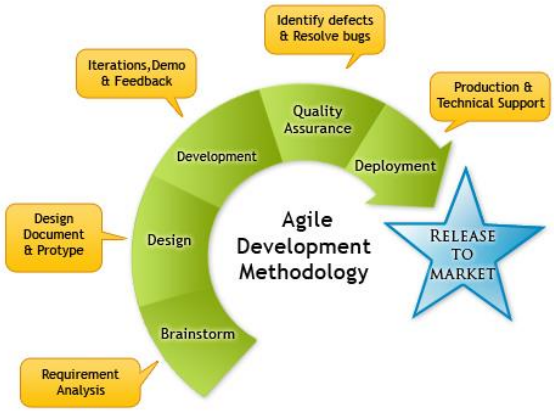


Figure 2: **Agile Development Methodology**

Figure 2 shows the Agile Development Methodology and the phases that the study must undergo, each phase has its specific functions that plays an important role in the development of the system.

Requirements Analysis. In this phase, the proponents brainstormed and identified the possible requirements of the system. To gather information, the proponents will conduct a survey to identify the common concerns faced by parents and guardians in their childrearing activities. The proponents will discuss and analyze on what are the necessary features the project must possess to address the needs of guardians. Moreover, the proponents will determine what should be the flow of the application and how to address the problems that we may encounter by recognizing possible ambiguities and loopholes of the study. The proponents also recognized the software specifications of the system in this phase.

Design. This phase will satisfy the requirements that was previously identified. The proponents will determine the mechanisms and algorithms on how to build the project, as well as necessary deliverables will be produced such as the user interface design, the database design and other elements to meet the requirements of the study. The designs created will guide for the next phase.

Development. This phase refers to implementing the design made in the earlier phase. During this stage, the proponents will write the codes and debug the program and will undergo frequent unit testing. The proponents will develop the system to agree with the functionalities stated in the requirements phase.

Quality Assurance. Also termed as the test and show phase, this phase is systematic processes of checking will be done to see if the system meets the specified requirements. The proponents will perform series of testing in order to increase customer confidence and a company's credibility, to improve work processes and efficiency, and to enable a system to better compete in the market. The proponents will fix the unpredicted mistakes or errors to avoid problems when delivering the system to the users.

Deployment. In this phase, all the activities or features of the system is available for use. The proponents will prepare system for assembly and transfer to the users. Hence, the proponents must determine the resources required for the users to operate the system. They must see to it that the system is equipped and ready to be release in the market.

Planning/Conception – Initiation Phase

This phase shows the beginning of the study with the necessary preparations in starting the development of the proposed system. This phase will verify the feasibility of the system with the presented basis. The business plan, timeline and overview of the functionalities is presented in this phase.

Business Model Canvas

This section sketches a clear and concrete plan of the system's business strategic management by arranging essential activities to manifest its potential market value.

<table>
<tr><th>KEY PARTNERS</th><th>KEY ACTIVITIES</th><th>VALUE PROPOSITION</th><th>CUSTOMER RELATIONSHIPS</th><th>CUSTOMER SEGMENTS</th></tr>
<tr><td rowspan="3">• Internet Providers
• Content Providers</td><td>• Identify and analyze requirements
• Design the overall architecture of the system such as the User Interfaces and Databases
• Build and implement the system, write the codes
• Test the program
• Release the system to the market
• System maintenance</td><td rowspan="3">Virtual Nanny is a real-time child-monitoring application that:
• Allows you to know the actual location of the child
• Let's you set safe zones and danger zones through virtual boundaries
• Makes you track the physical fitness lifestyle of the child through counting the daily number of steps he/she makes
• Can let you set reminders and tasks for child to follow
• Has a reward system to better monitor the progress and behavioral changes of your child</td><td>• System updates</td><td rowspan="3">• Parents
• Guardians
• Children
• Babysitters
• Child minders
• Advertisers</td></tr>
<tr><td>KEY RESOURCES</td><td>CHANNELS</td></tr>
<tr><td>• Financial Resources
• Human Resources
• Intellectual Resources
• Virtual Nanny platform
• Technological Development Equipment
• Internet connection</td><td>• Amazon App Store
• Google Play Store</td></tr>
<tr><td colspan="3">COST STRUCTURE</td><td colspan="2">REVENUE STREAMS</td></tr>
<tr><td colspan="3">• Research and Development
• Production and Manufacturing
• Updates and Maintenance</td><td colspan="2">• Advertising Revenues
• Payment Revenues (Premium Features)</td></tr>
</table>

Table 2**: <u>Business Model Canvas</u>**

Table 2 shows a visual chart with components describing system's business plan. It presents the recognized value proposition, key partners, key activities, cost structure, customer relationships, channels and revenue streams. It assists the system in aligning their activities by demonstrating possible trade-offs.

The value proposition of the application was the Virtual Nanny's specific features that allows you to know the actual location of the child, let's you set safe zones and danger zones

through virtual boundaries, makes you track the physical fitness lifestyle of the child through counting the daily number of steps he/she makes, can let you set reminders and tasks for child to follow, has a reward system to better monitor the progress and behavioral changes of your child. The main key partners were the internet providers and content providers. These partners were necessary to develop and implement the proposed system. The main key activity was first, to identify and analyze requirements. Second, design the overall architecture of the system such as the User Interfaces and Databases. Third, build and implement the system, write the codes. Fourth, test the program to ensure the quality of the system. Then, release the system to the market. And lastly, perform system maintenance regularly.

The key resources for these were the financial, human and intellectual resources hand-in-hand with the Virtual Nanny platform, technological development equipment and the internet connection. The customer segments were the parents, guardians, children, babysitters, childminders and advertisers who could find value and interest in the proposed system. Cost structure is the research and development, production and manufacturing and the updates and maintenance of the system. The revenue streams came from advertisements and payment revenues for the users who would like to purchase the premium features. And the channels will be the amazon app store and google play store.

Validation Board

Table 3

VALIDATION BOARD

Startup Idea:	Virtual Nanny					
Stage:	Stage 1- Problem Validation					
Experiment	1	2	3	4	5	6
Customer	Parents, Guardians and Children	Parents, Guardians and Children	Parents, Guardians and Children	Parents, Guardians and Children	Parents, Guardians and Children	Parents, Guardians and Children
Problem	Does not know the whereabouts of child when not in their line of sight	Hard time in keeping their child away from dangerous places	Limited knowledge on the fitness activities of their child	Child uses smartphones in a long period of time causing too much screen time	Difficulty in asking child do tasks or chores	Trouble in making child follow instructions and rules
Solution	A real-time child monitoring application	A real-time child monitoring application	A real-time child monitoring application	A real-time child monitoring application	A real-time child monitoring application	A real-time child monitoring application
Riskiest Assumption	Worries on the location of their child, child is lost or kidnapped	Child is in a dangerous or accident-prone place	Their child is unhealthy and prone to sickness, obesity and child needs more exercise	Child does not socialize, shy, no time for the family, eyestrain, and may have smartphone addiction.	Their child becomes an irresponsible individual.	Hard headed child. Child lacks respect and values which leads to bad character.
Success Criteria	Survey 60%	Survey 60%	Survey 60%	Survey 60%	Survey 60%	Survey 60%
Results & Discussions	49/50 (98%)	45/50 (90%)	31/50 (62%)	43/50 (86%)	39/50 (78%)	39/50 (78%)
Learnings	Most guardians does not know the whereabouts and location of their child. Guardians need a solution that would help them monitor the exact location of their child.	Guardians have problems in keeping their child away from danger. Guardians need a solution that can alert them if their child is in a dangerous place.	Guardians does not have enough knowledge on the fitness activities of their child. Guardians need a solution that allows them to know if their child has enough exercise.	Guardians are concerned on their child's excessive use of smartphones. Guardians need a solution that can help them control the screen exposure of their children.	Guardians struggle in asking their child to do tasks and chores. Guardians need a solution that can remind and motivate the child on the tasks that they want need to do.	Guardians have a hard time in controlling their child. Guardians need a solution that can help them encourage their child to follow their instructions.

Table 3 shows the problems and risk assumption. This table confirms that the system is greatly needed in the market to solve the identified problems. The customers for the proposed system are the parents, guardians and their children. The proponents assumed six problems concerning the customers and the riskiest possible situation that these problems may lead. These include, first, guardians not knowing the whereabouts of their child when not in their line of sight leading to worrying on the location of their child or even worst, child might be lost or kidnapped without their knowledge. Second, guardians having a hard time in keeping their child away from dangerous places which may cause the probabilities that the child is in a dangerous or accident-prone places. Third, guardians having limited knowledge on the fitness activities of their child which may lead to their child might be unhealthy and prone to sickness, obesity and child needs

more exercise. Third, their child is exposed to the screen too much due to excessive smartphone usage which child does not socialize, shy, no time for the family, eyestrain, and may have smartphone addiction. Fourth, guardians have difficulty in asking their child to do tasks or chores which might make their child an irresponsible individual as they grow. And lastly, making their child follow their instructions and rules seems to be a trouble to them which may cause their child to disrespect them with inadequate values to have a good character.

The proponents conducted a survey with 50 respondents from the parents of the students studying at Tugbongan National High School. They answered a series of questions validating the timeliness, relevance, communality of the recognized problems. Thus, resulting to 49 (98%) of the respondents that they have worries on the whereabouts of their child when they are not in their line of sight. Correspondingly, 45 (90%) of the 50 respondents said that they have problems in keeping their child away from dangerous places. Then, 31 (62%) guardians agreed that they have limited knowledge on the fitness activities of their offspring. Also, 43 (86%) respondents think that their child uses smartphones too much. In addition, 39 (78%) of 50 guardians have troubles in making their child do tasks or chores. And, 39 (78%) respondents said that they have a hard time in making their child follow their instructions and rules.

In order to address these common problems and concerns, the proponents intend to develop a mobile application that aims to give aid to parents in their day-to-day responsibilities in monitoring their child. The proposed system, Virtual Nanny, allows parents to know the real-time whereabouts of their child at the same time seeing to it that they are raised right by motivating and encouraging them to follow guardians guidelines.

Gantt Chart

This section presents the tabular illustration of scheduling of the necessary outputs in developing the system.

Task ID	Task Name	Task Lead	Start Date	End Date	July				August				September				October			
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Title Hearing	Michael John	7/16	7/16																
2	Acknowledgement	Christine Joy	8/9	8/10																
3	Dedication	Christine Joy	8/1	8/5																
4	Approval Sheet	Christine Joy	7/26	7/28																
5	Table of Contents	Christine Joy	7/26	7/27																
6	List of Tables	Christine Joy	7/26	7/27																
7	List of Figures	Christine Joy	7/26	7/27																
8	Introduction	Christine Joy	8/5	8/15																
9	Rationale of the Study	Christine Joy	8/8	8/26																
10	Objectives of the Study	Christine Joy	8/8	9/2																
11	Scope and Limitations	Christine Joy	8/22	9/9																
12	Significance of the Study	Christine Joy	8/29	9/2																
13	Flow of the Study	Christine Joy	9/2	9/7																
14	Definition of Terms	Michael John	9/2	9/7																
15	Concept Video	Christine Joy	8/8	9/10																
16	Related Literatures	Mary Welcey	8/8	9/1																
17	Related Studies	Mary Welcey	8/28	9/22																
18	Comparative Matrix	Mary Welcey	9/12	9/23																
19	Software Engineering Methodology	Christine Joy	8/29	9/12																
20	Business Model Canvas	Michael John	9/1	9/3																
21	Gantt Chart	Christine Joy	7/29	10/12																
22	Validation Board	Christine Joy	10/13	10/14																
23	Functional Decomposition Diagram	Christine Joy	8/30	9/3																
24	Use Case Diagram	Mary Welcey	9/7	9/30																
25	User Interface Design	Ana & Michael	7/31	10/7																
26	Storyboard	Michael John	10/7	10/8																
27	Database Design	Shara Marie	8/20	10/8																
28	Entity Relationship Diagram	Shara Marie	8/27	10/8																
29	Data Dictionary	Shara Marie	8/20	10/8																
30	Network Topology	Mary Welcey	9/10	10/5																
31	Software Specifications	Mary Welcey	9/26	10/1																
32	Hardware Specifications	Mary Welcey	9/26	10/1																
33	Program Specifications	Michael John	9/19	10/7																
34	References	Christine Joy	9/27	9/30																
35	Appendix (Transmittal Letter)	Christine Joy	10/1	10/1																
36	Curriculum Vitae	Christine Joy	7/22	7/23																
37	Survey Questionairre	Christine Joy	9/27	9/28																
38	Survey Results	Ana Marie	10/2	10/3																
39	Completion of the Manuscript	Michael John	10/7	10/12																
40	Powerpoint Presentation	Ana Marie	10/17	10/19																
41	Proposal Hearing	Michael John	10/21	10/21																

Table 4: **Gantt Chart**

Table 4 shows the project timeline and the list of activities to be accomplished, the contribution of each team member as the task leader, and the suitable time allotment of the project documentation from its start date to its end date. The timeline is divided in a weekly basis, each cell indicates one week of performing the specific activity. The table identifies the following task with colors red for “Incomplete” or unfinished activities, yellow for “Ongoing” or continuing and partially finished activities, and green for “Complete” or finished activities.

Functional Decomposition Diagram

This section explains capabilities of the system in a functional perspective. It displays hierarchical relationship of the individual elements of the process to thoroughly understand the general tasks and subtasks of the system.

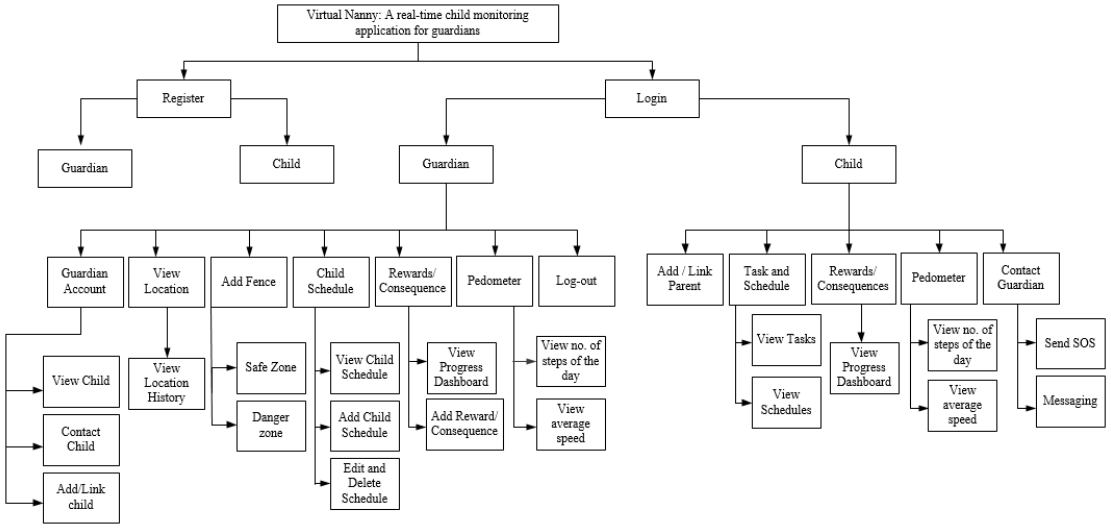


Figure 4: **Functional Decomposition Diagram**

Figure 4 shows the breakdown of the functionalities that a user can perform as to how the user will use the system. It demonstrates what the proposed system will be able to execute in a tree-like structure.

The user will login to Virtual Nanny, if they have no account yet, the user will need to register. When the user is a child, after registration, the child cannot un-install the app and the GPS of their phone will always be enabled. Then the child will link the device to the device of their guardian using a connection code generated by the guardian's phone. Then they will be able to view their tasks, schedules, performance dashboard, number of steps for the day and average speed. The child may also send a SOS to their parent to alert them that they are in danger, they may also communicate with their guardians through real-time messaging. In the guardians account, the guardian may add or link, contact and view their child. They may also view the real-time location of their child and the location history for the past three days. Then they may add a fence which they can mark as safe or danger zones. They may view their child's schedule and also add or edit the schedule. Then they may add a reward or consequence and the corresponding assignments. They may also view the steps of their child for the day and the average speed. They may also view the

steps of their child for the day and the average speed. And then, they may log out to secure their account.

Analysis-Design Phase

In this phase, shows the design and structure of the system. It presents the use case diagram, user interface design, database design and network design of the system. The presented deliverables are the fundamental basis to guide to the development of the study.

Use Case Diagram

This section illustrates the graphical representation of the works of the application, as well as the interaction between the actors and the processes involved. Hence, it illustrates the whole business process of the application.

This section comprises of the involved actors and set of actions performed. An actor is a person who completes the process according to his role, while a set of action is the role played by the actor in the process. The actors involved in the study is the parent or guardian, and the child.

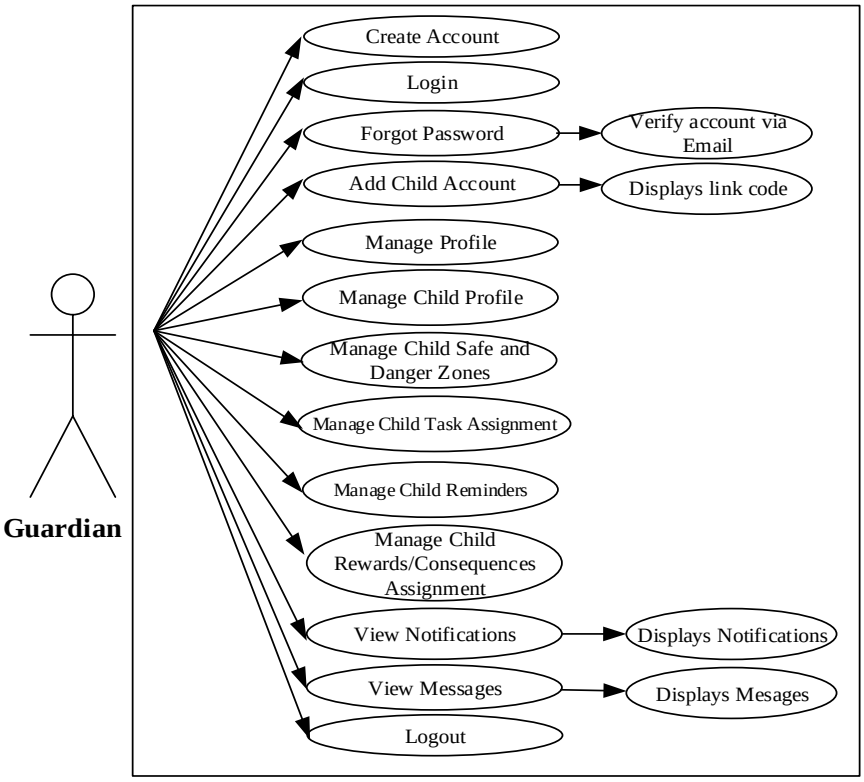


Figure 4: **Guardian Use Case Diagram**

Figure 4 illustrates the graphical representation of what the actor can perform in the proposed application. The actor involved in the diagram is the guardian that needs to create an account in order to login, view notifications and messages in order for the guardian to be notified and be aware if they have messages and alerts them of the whereabouts and activities of their children. The guardian can also logout, verify their account in which it sends the forgotten password to the guardian's email if the password is forgotten, and add child account in which it displays a random link code which will be entered by the child account to let the guardian establish a connection or be in sync with their child's device. The guardian can also manage their own profile if they want to make changes to their personal information, and manage their child's profile wherein they can set controls to their children like managing the child's safe and danger zones where the guardian can set a virtual barrier or fence in the map and mark it as a safe or a danger zone so that they will be alerted if ever their children went to places that's prohibited or dangerous. They can also manage child task assignment to give tasks or errands to their children and set deadlines for each task; manage child schedule wherein the guardian can control the time schedules of their child; and manage child reward/consequence assignment where the guardian can set assignments or missions to their child. The child can get a reward if their child religiously did their assignments and reach a certain number of percentage required on or before the deadline set by the guardian, or a consequence if the child failed to meet the number of percentage required on or before the deadline set.

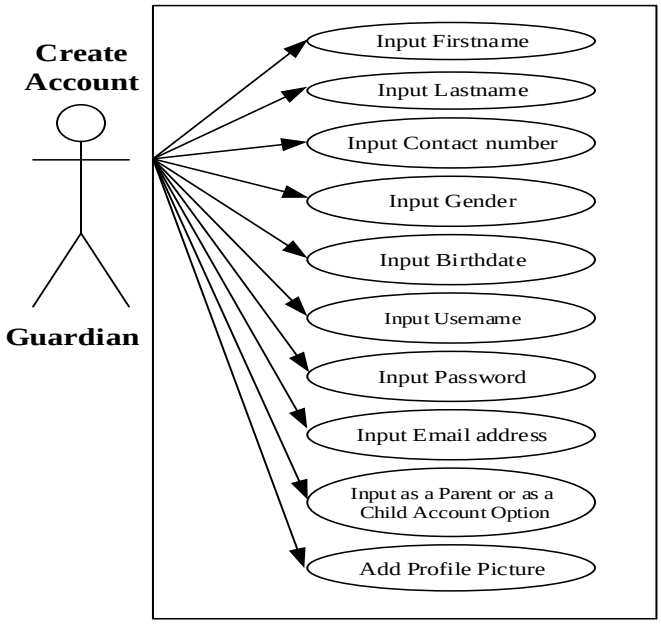


Figure 5: **Create Guardian Account Use Case Diagram**

Figure 5 illustrates the actions that the guardian can perform in creating an account. The guardian must supply their first name and last name, contact number, gender, birthdate, username and password which will be used to log in; email address, profile picture and choose whether the account created serves as parent or child account, when selecting the parent account, the guardian will be able to monitor and set controls to the child as presented in Figure 4, whereas in the child account, it only has limited features compared to the parent account and it does not have the capacity to set controls like what the parent account can do.

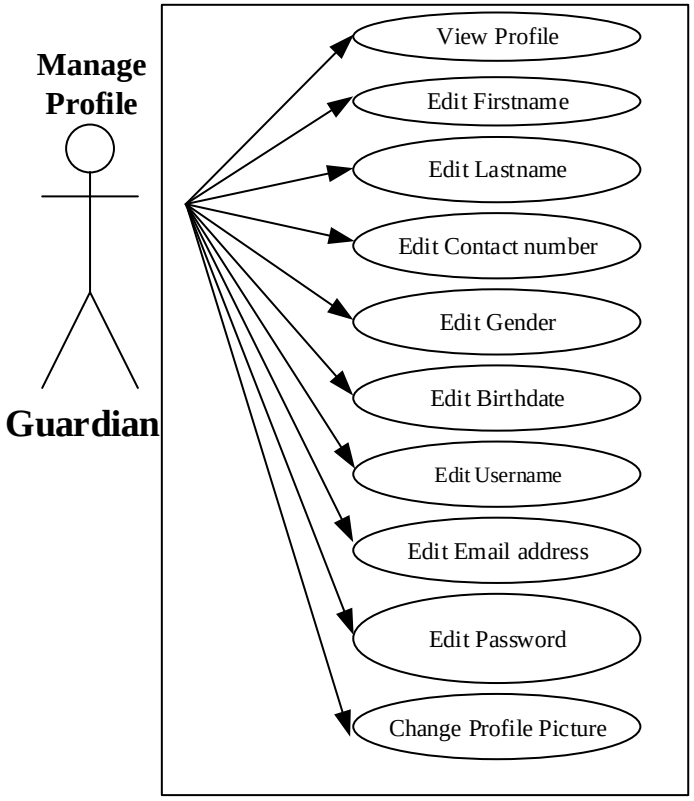


Figure 6: **Manage Guardian Profile Use Case Diagram**

Figure 6 illustrates the actions that the guardian can perform in managing profile. The guardian can view their profile to see the information they had set when they created the account, and at the same time, edit their first name, last name, contact number, gender, birthdate, username and password, email address, and change profile picture if ever they want to make some changes to their personal information.

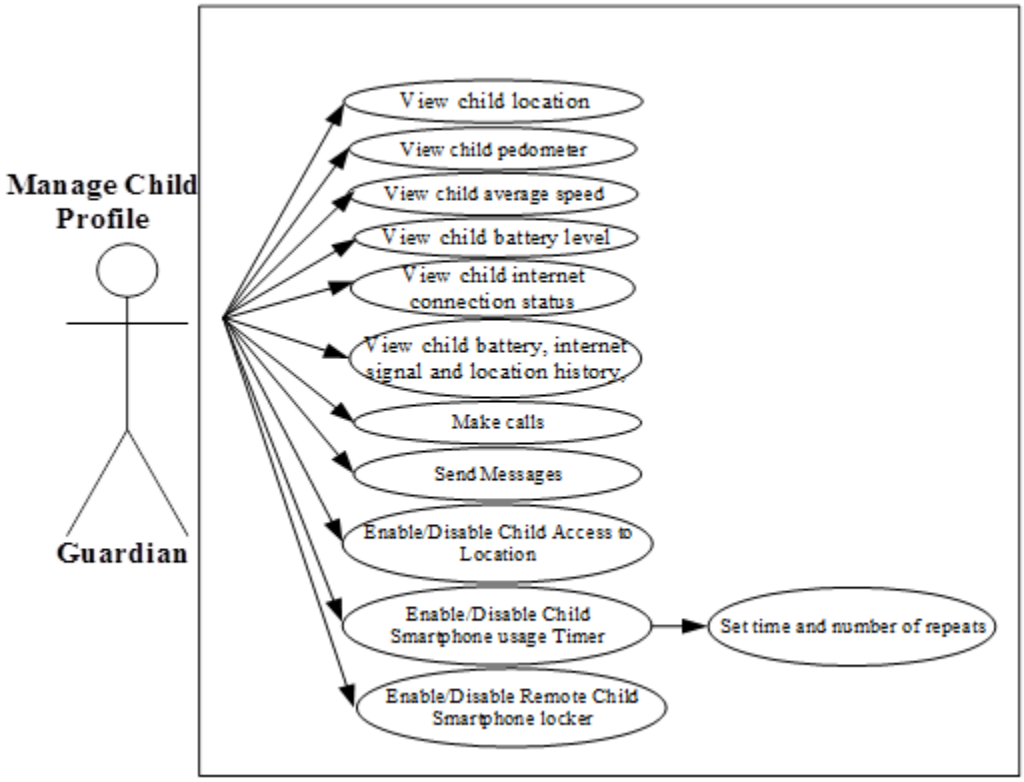


Figure 7: **Manage Child Profile Use Case Diagram**

Figure 7 illustrates the actions that the guardian can perform in managing child profile. The guardian can view the child's location via app or receive the location through SMS when there is no access to the internet. The guardian can also view the child's number of steps and average speed for the day to know if their child does simple exercises like walking or jogging. The guardian can also view the child's battery level and internet connection status to know if their child has a low internet connection or low smartphone battery. The guardian can also view the location history of the child to know the whereabouts of their child in the past days. The guardian can also make calls and send messages to the child in case of emergency or just to simply stay in touch with their child; the guardian can also enable or disable option whether the child can view the guardian's location so as to give privacy to the guardian; the guardian, also, can choose to enable or disable option to remotely lock the child device which serves as a consequence to the child if ever they did not do their assignments religiously. The guardian can also choose whether to enable or disable child smartphone usage timer, if enabled, the guardian can set the time limit and the number of repeats the timer will be enabled, the main purpose of the timer is to control the excessive smartphone usage of the child to the point that it causes problems to their health, problems in socializing with other people, and problems in their academics.

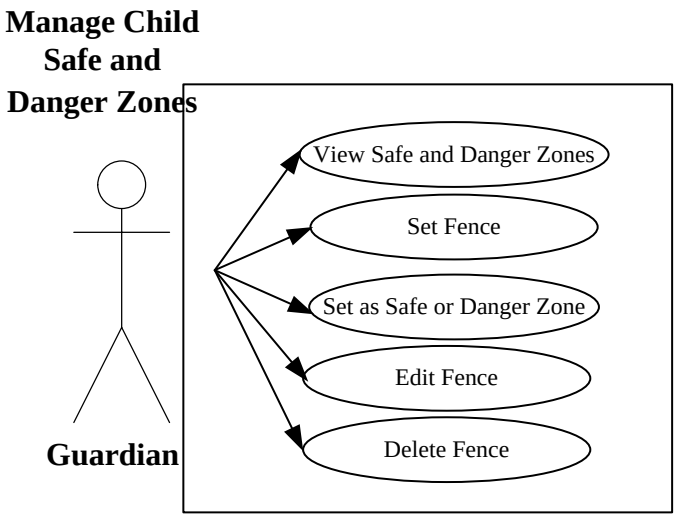


Figure 8: **Manage Child Safe and Danger Zones Use Case Diagram**

Figure 8 illustrates the actions that the guardian can perform in managing child's safe and danger zones. In this figure, the guardian can set a virtual barrier or fence in the map and mark it as a safe or a danger zone so that they will be alerted if ever their children went to places that's prohibited or dangerous. The guardian can also view all the fences or zones created in the map, as well as delete and edit the fence if ever they want to make changes with the fences set.

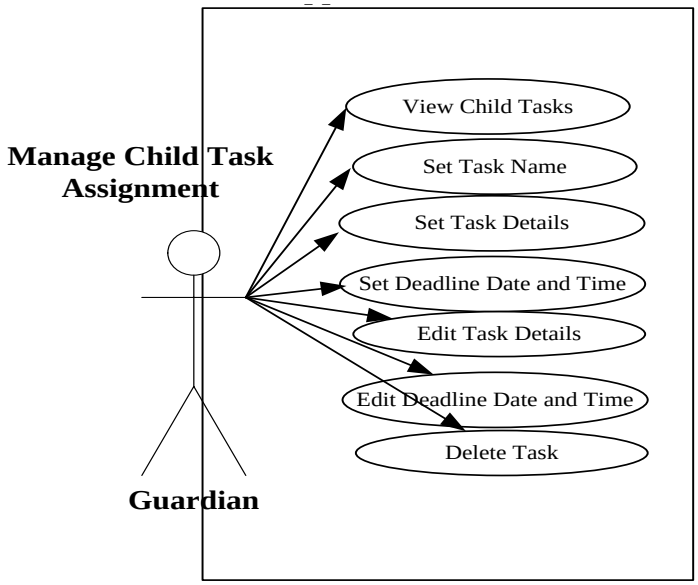


Figure 9: **Manage Child Task Assignment Use Case Diagram**

Figure 9 illustrates the actions that the guardian can perform in managing the child task assignment. The guardian can view, edit, and delete child tasks, set task name and task details, set

deadline date and time in which the task should be completed so as to let the child be more conscious of the time and not be too complacent knowing that they still have tasks to do and deadlines to meet. The parent can also edit child's task details, deadline date and time if ever they want to make some changes.

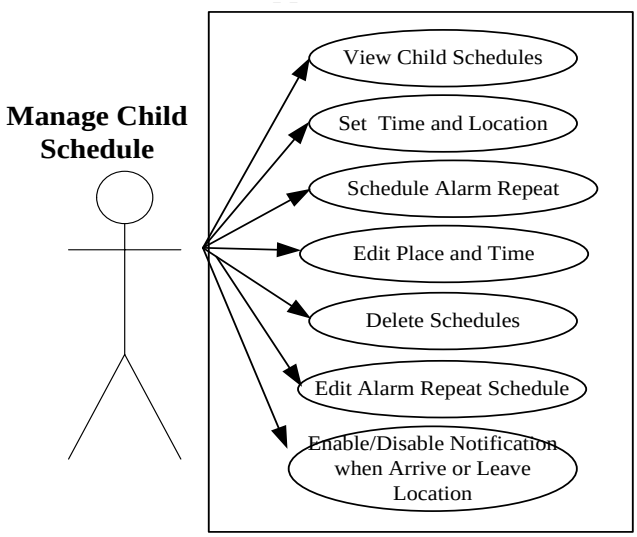


Figure 10: **Manage Child Schedules Use Case Diagram**

Figure 10 illustrates the actions that the guardian can perform in managing child schedules. In this feature, the guardian can set a place through selecting among the fences created in the manage safe and danger zones feature. The guardian can also view child schedules which displays the time and date the child should arrive or leave a safe or danger zone, the guardian can choose whether they want to be notified if ever the child arrives or leaves the zone that is set in the manage safe and danger zone. The guardian can also delete or edit time if ever the guardian wants to make some changes as well as set or edit the place where the child should be at the specified time. Lastly, the guardian can also set and edit alarm repeat schedule so as not to make daily repetitions with the schedules set.

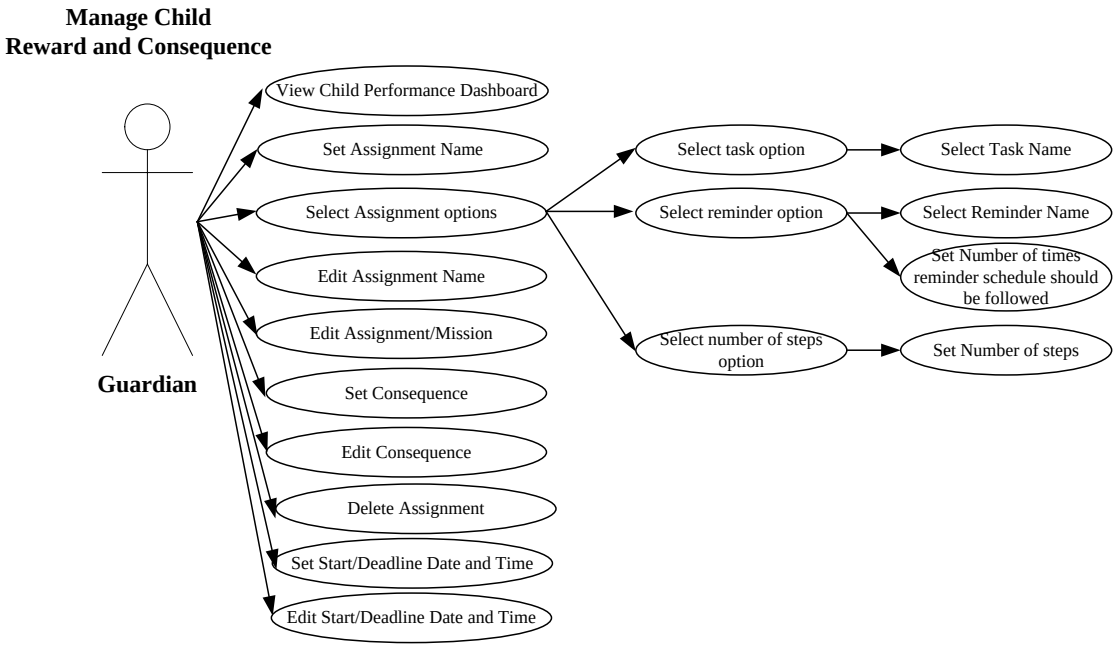


Figure 11: **Manage Child Reward and Consequence Assignment Use Case Diagram**

Figure 11 illustrates the actions that the guardian can perform in managing the child reward and consequence assignment. The Child Reward and Consequence Assignment feature showcases a percentage – based system in which the guardian can set assignments or missions to be done by the child. If the child reaches the percentage required by doing the assignments religiously on or before the deadline date and time set by the guardian, the child can gain a reward, if the child fails to reach the required number of percentage on or before the deadline, the child may receive a consequence that can be set by the guardian.

The guardian can set a small reward or consequence for every assignment given in order to give a little push to the child to do their assignments religiously. The guardian can view child's performance dashboard to keep track of the child's performance regarding the assignments given, set, edit, and delete assignment, select and edit among the assignment options: whether it is a task, a reminder, or number of steps required. If task assignment option is selected, the guardian can choose from list of tasks that were added in the manage child task assignment feature. If the reminder assignment option is selected, the guardian can choose from list of reminders that were added in the manage child reminders feature and at the same time the guardian can set the number of times the reminder schedule should be followed. If the number of steps option is selected, the guardian can set the number of steps the child needs to accomplish.

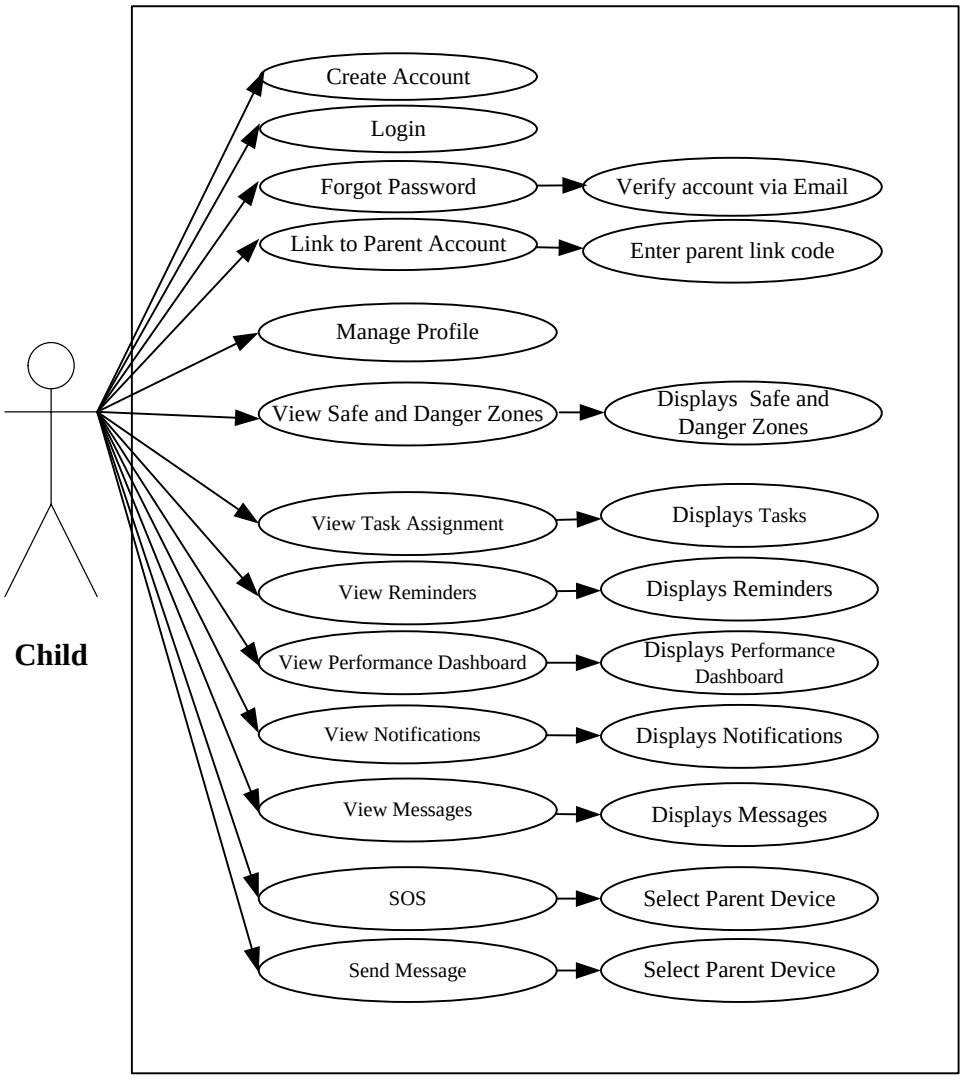


Figure 12: **Child Use Case Diagram**

Figure 12 illustrates the graphical representation of what the actor can perform in the proposed application. The actor involved in the diagram is the child that only has access to the overview of their tasks, assignments, reminders, average speed and number of steps for the day; messages, notifications, safe and danger zones which shows the places marked by the guardian as safe or dangerous, this lets the child know what places are safe to go to and what places are prohibited. The only control that the child can do is the SOS which is an emergency call and alert to guardian, and sending of messages to the guardian. The child needs to create an account in order to login, verify account via e-mail if password is forgotten, and entering the parent link code that is generated and displayed by the parent account to establish connection or be in sync with the parent's device. The child can also manage their own profile if ever they want to see the

information they created during the creation of account, view safe and danger zones, view task assignment, reminders, and performance dashboard which lets the child know their status regarding the assignments set by their guardian.

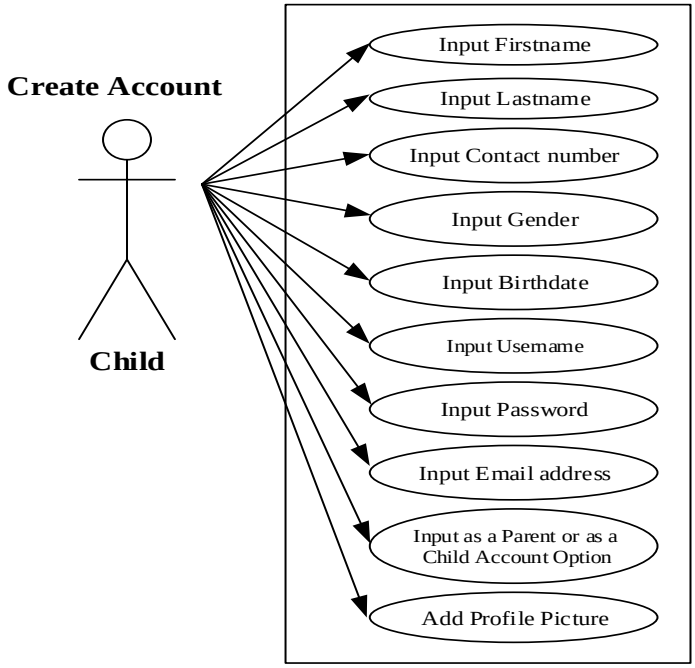


Figure 13: **Create Child Account Use Case Diagram**

Figure 13 illustrates the actions that the child can perform in creating an account. The child must supply their first name and last name, contact number, gender, birthdate, username and password, email address, profile picture and choose whether the account serves as parent or child account. When selecting the child account, it only has fewer features compared to the parent account and it does not have the capacity to set multiple controls like what the parent account can do. If the guardian account is selected, the guardian can set controls to the child account as presented in Figure 4.

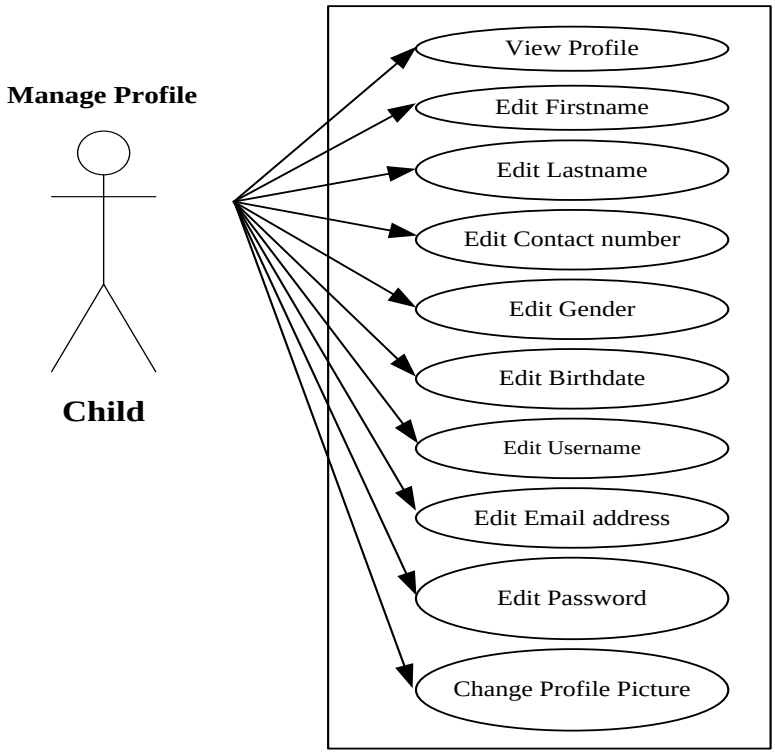


Figure 14: **Manage Child Profile Use Case Diagram**

Figure 14 illustrates the actions that the child can perform in managing child profile. The child can view their profile to know the information they had set when they created the account, edit their first name, last name, contact number, gender, birthdate, username and password, email address, and change profile picture if ever they want to make changes to their personal information.

User Interface Design

This section focuses on anticipating what users might need to do and ensuring that the interface has elements that are easy to access, understand, and use to facilitate those actions.

Figure 15: **Loading Page**

Figure 15 shows the loading screen of the app when it loads the necessary files to be processed, the loading spinner denotes the progress. After the loading spinner reaches one hundred percent, it redirects the page to the login screen.

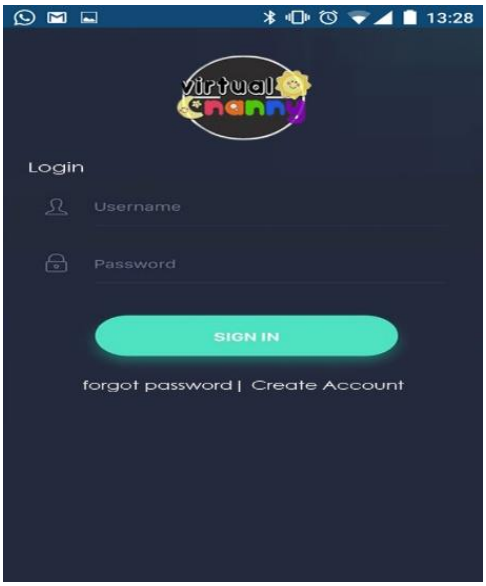


Figure 16: **Login Page**

Figure 16 shows the login page which lets the user log-in using their username and password. If the account is not yet created, the Create Account option can be selected which will

direct the user to the Create Account page. If the user forgot the password, they can tap or click the forgot password option where in it sends the forgotten password to the user's email address.

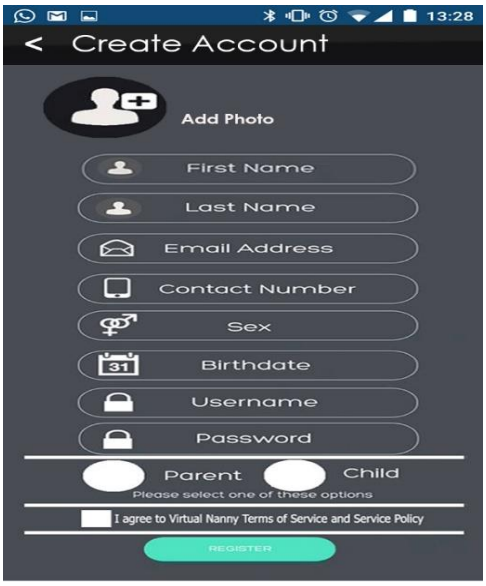


Figure 17: **Create Account Page**

Figure 17 shows the page in which the user can create an account. The user must supply their first name and last name, contact number, gender, birthdate, username and password which will be used to log in; email address, profile picture and choose whether the account created serves as parent or child account, when the parent account is selected, the user will be able to monitor and set controls to the child account, whereas in the child account, it serves as the account that will be monitored and controlled.

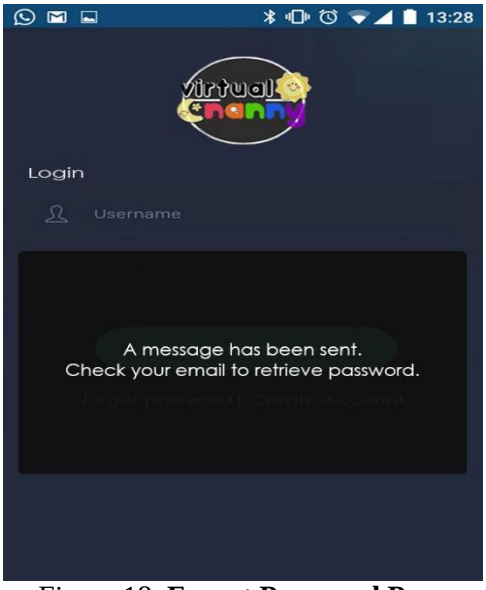


Figure 18: **Forgot Password Page**

Figure 18 shows the dialog box after the “forgot password” link was selected. If the user is unable to enter the correct password, the user will have the option to select the forgot password link which will send and notify the user that the password has been sent to the email address that the user has entered. The user can use the password to login to the account.

Guardian’s User Interface Design

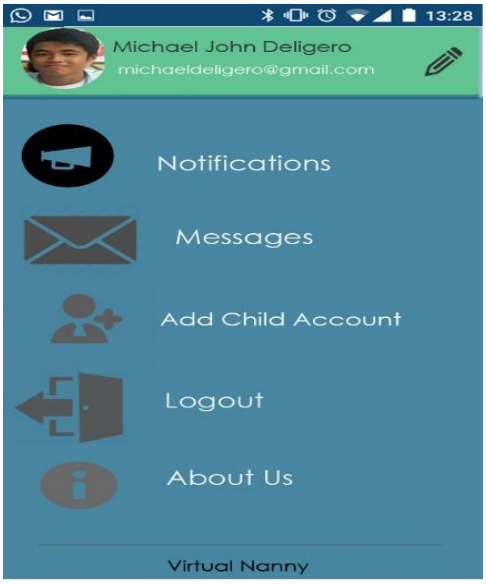


Figure 19: **Menu Drawer Page**

Figure 19 shows the Menu Drawer wherein it contains the Messages, Notification, Add Child Account, Logout, and About buttons. Clicking on either of the buttons will direct the guardian to the respective user interfaces. If the guardian clicks the picture at the upper left, or the name beside the picture, the guardian will be directed to their Profile Page, if the guardian clicks on the edit button (pencil button) on the upper right, it shows the edit option that directs the guardian to the edit profile page where the guardian can make changes to their personal information.

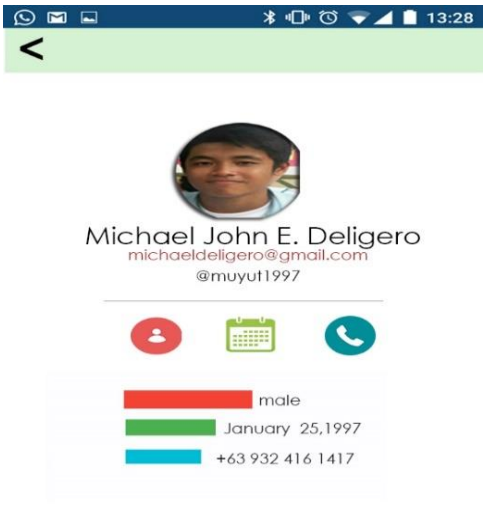


Figure 20: **Guardian Profile Page**

Figure 20 shows the profile page of the guardian. The information displayed were the ones that were inputted in the create account page. If the guardian wants to make changes to their personal information, they can simply press the back button at the upper left and then it redirects the guardian back to the menu drawer where there is the edit option at the upper right corner.

Figure 21: **Edit Profile Page**

Figure 21 shows the edit profile page that allows the guardian to make changes with their personal information. After making the changes, the guardian can tap the save button located at the bottom the page which automatically updates the changes made and it redirects the guardian back to the menu drawer.

Figure 22: **Add Child Account Page**

Figure 22 shows the dialog box that appears when the guardian taps the add child account button at the menu drawer page. The dialog box displays a random unique parent link code where it will be used by the child account in order for the guardian to establish connection with the child's device. If connection is established, the guardian can now monitor the child, set controls and assignments to be assigned to the child.

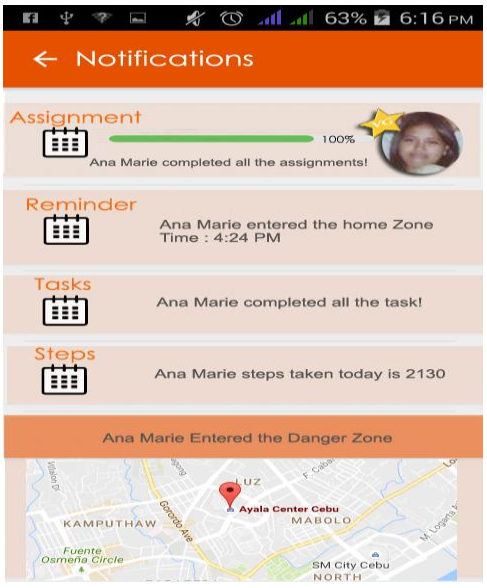


Figure 23: **View Notifications Page**

Figure 23 shows the list of notifications about the child's activities. The notifications page enables the guardian to know about the important alerts which needs to be notified, such as if the

child arrived or left a certain place or if the child completed the task assigned. Through the notifications page, all these important alert will be displayed.

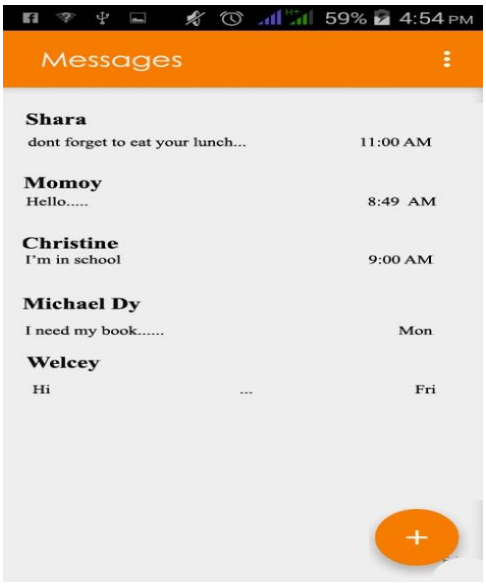
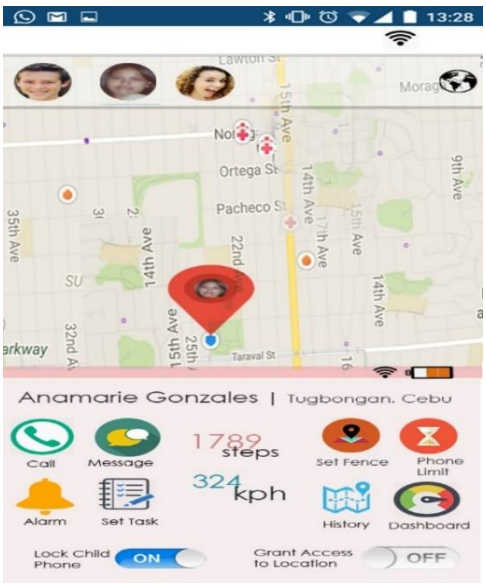


Figure 24: **View Messages Page**

Figure 24 shows the view messages page which displays all the messages and conversations. If the guardian selects one of the messages, it redirects the guardian to the messaging page where the guardian can send messages.



.Figure 25: **Child Profile Overview Page**

Figure 25 shows The Child Profile Overview page where it shows the actions and controls that the guardian can perform in managing child profile. The sets of actions and controls that the

guardian can perform on the child is displayed as a set of buttons on the lower portion of the page. Clicking on either of the buttons will direct the guardian to the respective user interfaces. The buttons displayed are the message button which enable's the guardian to send messages to their child, call button which lets the guardian call their, set fence which enables the guardian to set safe and danger zones and alerts them if ever they leave or arrive at the zones specified, set smartphone usage limit, assign tasks and schedule child time to let the child be more mindful of the time and tasks to be done, and set assignments or missions to be accomplished by the child in order to gain a reward or a consequence based on the performance or on how they do their assignments religiously. The page also shows the number of steps and average speed of the day and displays toggle options in which it lets the guardian choose whether to lock child's phone or not. The page lets the guardian choose whether to allow or prohibit the child to have an access to their location.

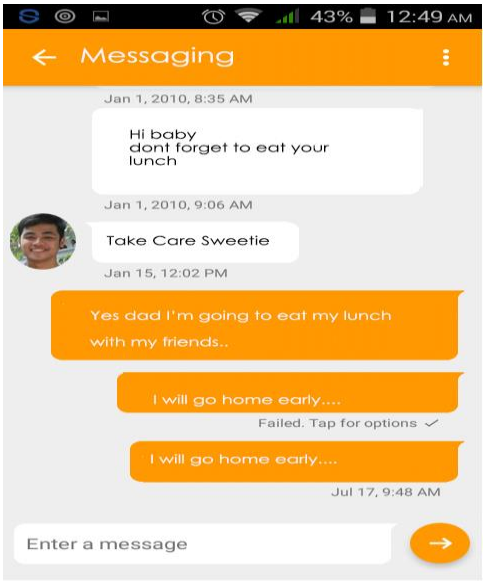


Figure 26: **Send Message Page**

Figure 26 shows the messaging page where the guardian be redirected to when the message button in the child profile overview page is clicked. The page lets the guardian send message to their child an in return they can also receive messages from their child.

Figure 27: **Calling Page**

Figure 27 shows the user interface when the guardian makes a call to their child. The guardian will be redirected to this page ones the call button which is located at the child profile overview is tapped or clicked.

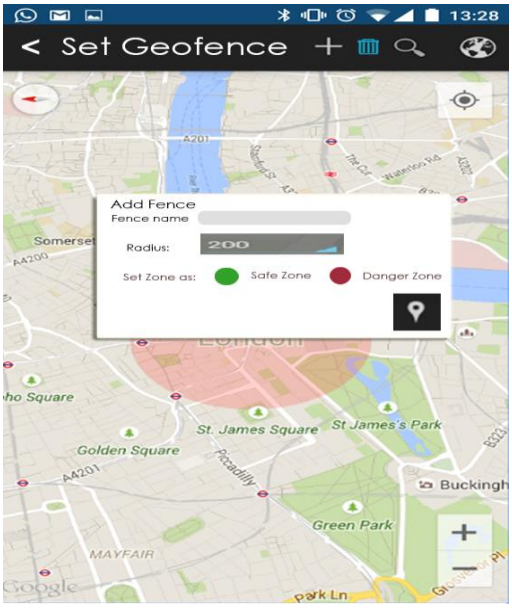


Figure 28: **Set Fence Page**

Figure 28 shows the interface when the guardian taps or clicks the set fence button located at the child profile overview page. In this page, it lets the guardian set, edit, and delete fence. The fence is like a virtual barrier that will be set in the map by simply clicking the desired location in the map then setting the name for the fence, and choose among the option if the place marked is a safe or as a danger zone. The color green button indicated that the fence will be marked as a safe zone while the red button indicates that the fence marked is a danger zone.

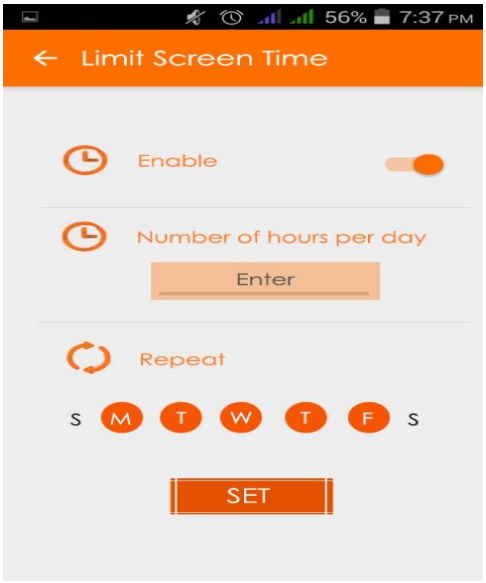


Figure 29: **Set Limit Page**

Figure 29 shows the set limit page where the guardian is directed when the guardian taps the set limit button located at the child profile overview page. This page lets the guardian set time and number of repeats where it displays a reminder to the child to limit their smartphone usage. If the number of hours for smartphone usage that has been set by the parent is already consumed by the child, it displays a reminder to the child.

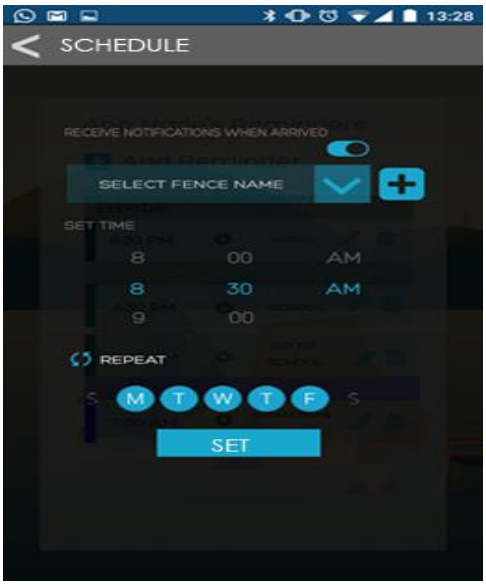


Figure 30: **Alarm Schedule Page**

Figure 30 shows the set alarm page where the guardian is directed ones the add button in the view alarm page is tapped or clicked. In this page, it sets reminder alarms like if the child arrive or leave a fence or zone. The guardian can set a place through selecting among the fences created in the set fence page. The page also shows options where guardian can choose whether they want to be notified if ever the child arrives or leaves a place. Lastly, the guardian can also set alarm repeat schedule so as not to make daily repetitions with the schedules set.

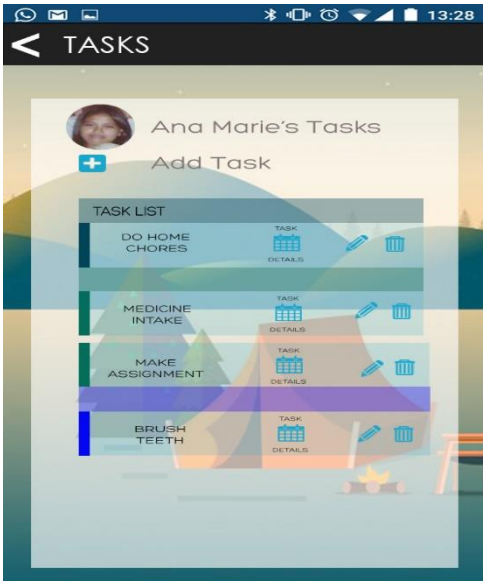


Figure 31: **Task Page**

Figure 31 shows the Task Page where the guardian is directed ones the Task button found at the child profile overview is tapped. The page displays all the tasks added by the guardian, it also shows the edit button if ever the guardian wants to make changes with the task set, delete button if the guardian wants to delete a task, or tapping the plus button located below the profile picture to add another task. Tapping the buttons will direct the guardian to their respective interfaces.

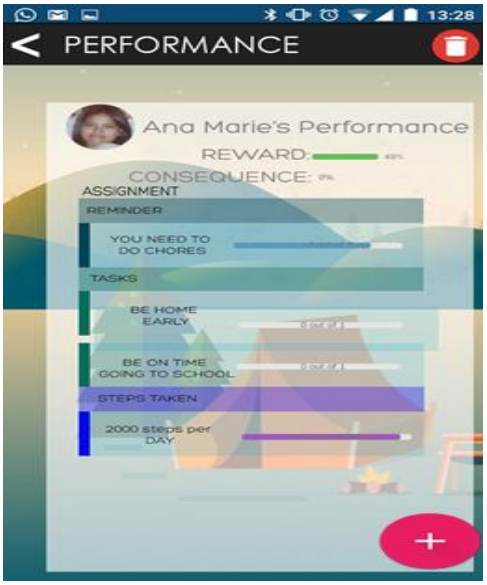


Figure 32: **Dashboard Page**

Figure 32 shows the performance dashboard of the child wherein it displays the child's assignments to be done, it also shows the percentage points of each assignment option done, as well as the overall percentage points. The plus icon at the bottom right of the page redirects the guardian to the add assignment page where the guardian can choose among the assignment options: whether it is a task, a reminder, or number of steps required. The guardian also has a delete button located at the top right corner if ever the guardian wants to delete assignments. The buttons tapped directs the guardian to other user interfaces.

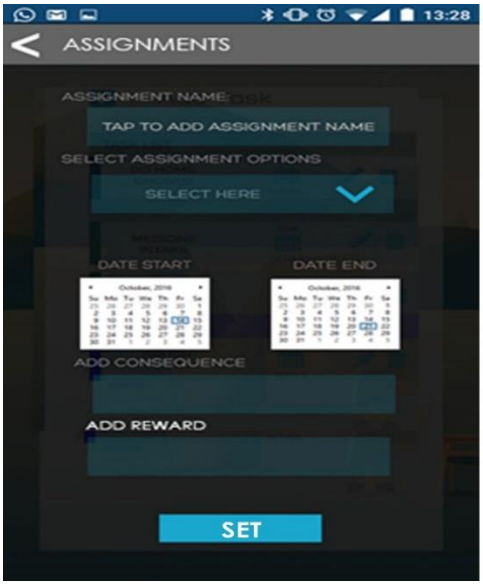


Figure 33: **Add Assignment Page**

Figure 33 shows add assignment page where the guardian is directed ones the add button in the Dashboard Page is tapped. The guardian can set a small reward or consequence for every assignment given. The guardian can also set start and deadline date and time which will serve as the basis for the reward and consequence feature. The guardian also can select among the assignment options: whether it is a task, a reminder, or number of steps required. If task assignment option is selected, the guardian can choose from list of tasks that were added in the manage child task assignment feature. If the reminder assignment option is selected, the guardian can choose from list of reminders that were added in the manage child reminders feature and at the same time the guardian can set the number of times the reminder schedule should be followed. If the number of steps option is selected, the guardian can set the number of steps the child needs to accomplish.

Child's User Interface

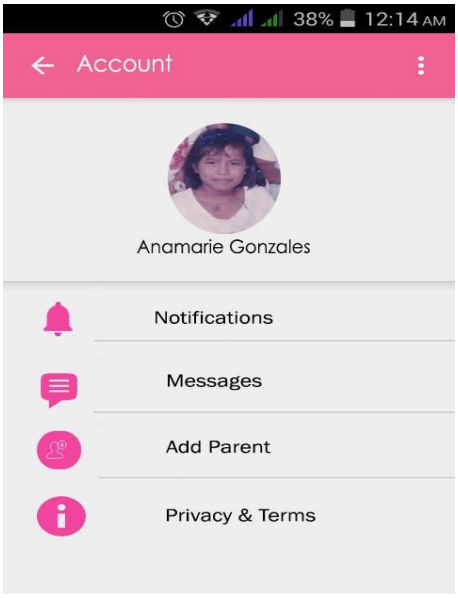


Figure 34: **Child Menu Drawer**

Figure 34 shows the Menu Drawer of the child account wherein it contains the Messages, Notification, Add Child Parent, Logout, and Privacy and Terms buttons. Clicking on either of the buttons will direct the child to the interfaces or pages respectively. If the child selects their profile picture or their name below the picture, the child will be redirected to their Profile Page, if the child clicks on the three vertical dots on the upper right, it shows the edit option that directs the child to the edit profile page where the child can make changes to their personal information.

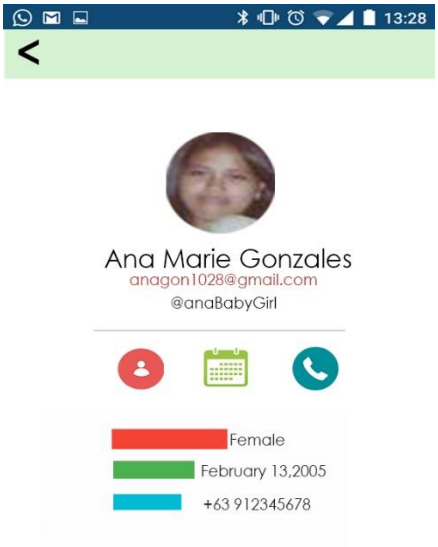


Figure 35: **Child Profile Page**

Figure 35 shows the personal information of the child based on the data inputted during the creation of their account and their profile picture. The back button redirects the child to the Menu Drawer (Figure 23).

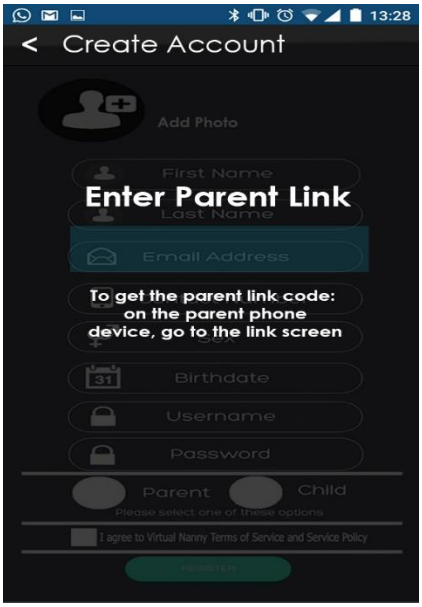


Figure 36: **Add Parent Account Page**

Figure 36 shows the dialog box that appears when the child selects the add guardian account button from the menu drawer page (Figure 23). The dialog box requests the child to input the displayed random unique parent link code in the guardian account for the both parties to establish a connection. If connection is established, the child will be monitored by the guardian in their daily activities.

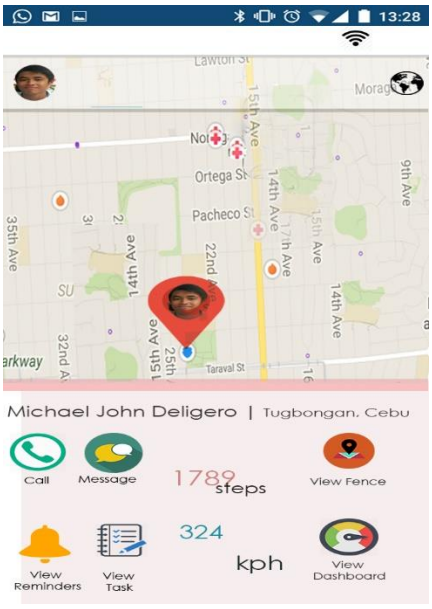


Figure 37: **Child Overview Page**

Figure 37 shows the features of that the child can access. The child may send an SOS by calling their parent, and they may also receive calls from their parent. The child may also send messages to their parent. They may also view the fences, reminders, tasks and dashboard. The child can also see the number of steps that they have made for the day and their average speed.

Figure 38: **Child SOS Page**

Figure 38 shows that the child may send an SOS to their parent to alert them that they need an immediate attention. Simultaneously, the child also sends an SMS message to their parent with their location.

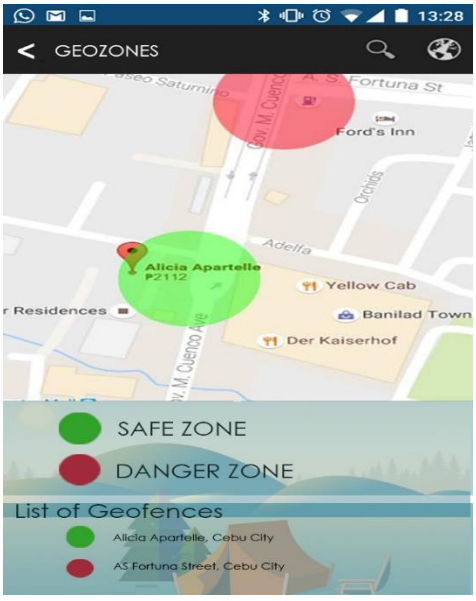


Figure 39: **Child View Fences Page**

Figure 39 shows that the child can view the danger zones and safe zones, these are places set by their guardian. In this interface, they will know that they are not allowed to go to a certain place since it's a danger zone and if they will go inside the danger zone their parent will be alerted right away.

Figure 40: **Child View Reminders Page**

Figure 40 shows the child's schedule that they need to follow with the corresponding time, place and frequency.

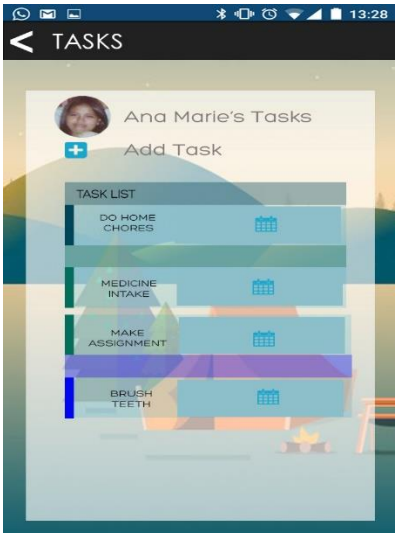


Figure 41: **Child View Task Page**

Figure 41 shows all the tasks that the child must accomplish. Each task has a specific deadline and details that the child can refer to.

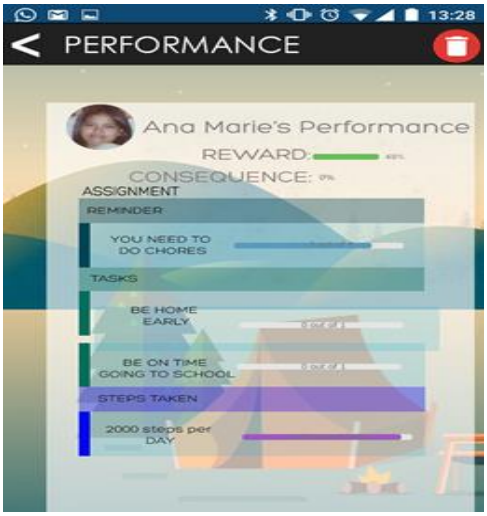


Figure 42: **Child View Performance Dashboard Page**

Figure 42 shows the performance dashboard of the child. The child would see their progress on achieving their goal. It displays the child's assignments to be done whether it's a reminder, task or a specific number of steps. The page also shows the percentage points of each assignment option done, as well as the overall percentage points.

Storyboard

This section presents the overall flow in the application and the overall connectivity of the user interface design in the application.

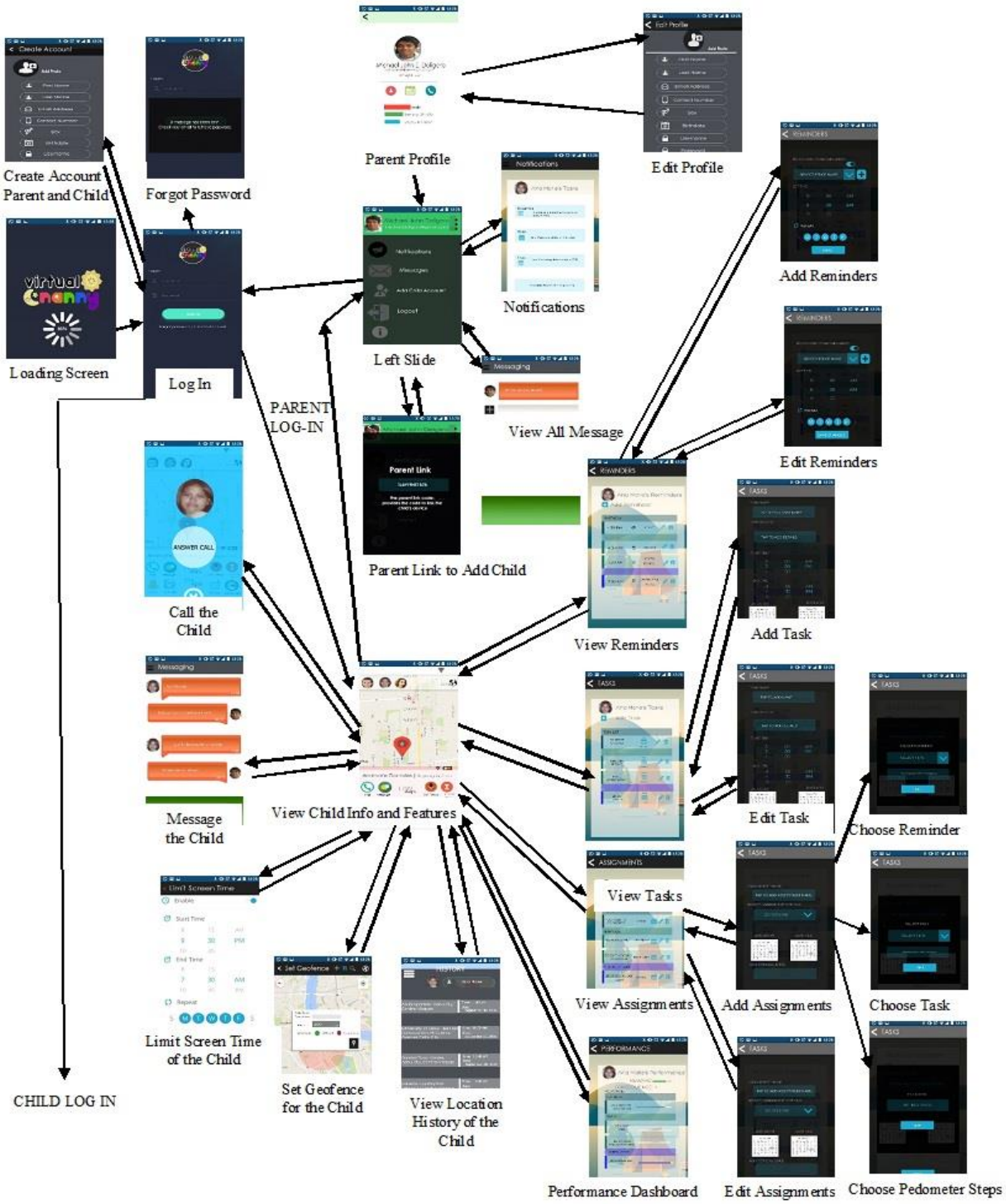


Figure 43: **Guardian User Interface Storyboard**

Figure 43 shows a series of user interface (UI) showing the overall connectivity and flow in the Virtual Nanny Application. The first step is the loading screen user interface which shows the application logo and the process percentage in downloading the requirements needed. When the downloaded requirements are done the log-in user interface appears. In the log-in user interface the parent or the child user needs to enter a valid username and password so the user can continue using the application. If the user has an account and forgets the password, an account verification will be sent to retrieve the user's password and can able now to log-in. If the user is new to Virtual Nanny the user can create an account by clicking the sign up button in the log-in user interface, filling up the necessary information and the user needs to choose if the user is a parent or a child. If the user is a parent then a series of UI with its features that fits the parent user will appear.

When the parent user swipes the screen from left to right; the parent user can see his/her profile and can edit the profile in the edit profile interface if there are mistakes when the account is created, the parent user can see all the notifications about the child's condition in the notification interface, can access all the messages in the view all message interface, can generate the parent link code to add the child's profile and can access the log-out button if he/she wants to use another account. When the user swipes the screen from the opposite direction the parent user can view the selected child's information like the current steps taken by the child, the child's speed, and the child's current location. The parent user can call or message the child by tapping the button found in the user interface. The parent can enable or disable the child's phone and showing the parent's current location but the parent can set also the time when will be the child's phone be enabled or disabled. The user parent can set geofence to inform the child if that place is a danger zone or a safe zone and can also delete if the geofence is not useful anymore. The parent can set reminders, their daily and the interface will be generated where it will remind the child what to do every day, every weekdays and every weekends.

The parent can set also an assignment where the parent needs to choose if it's a reminder, a task or sets the steps needed in a day with its deadline time, deadline date and how many times does the child needs to perform the assignment in the assignment interface. If the child follows them he/she can gain points to acquire the reward set by the parent and if the child failed to do the assignments assigned to them it will add points to their consequences and the overall progress of the child can be seen by the parent in the performance dashboard interface.

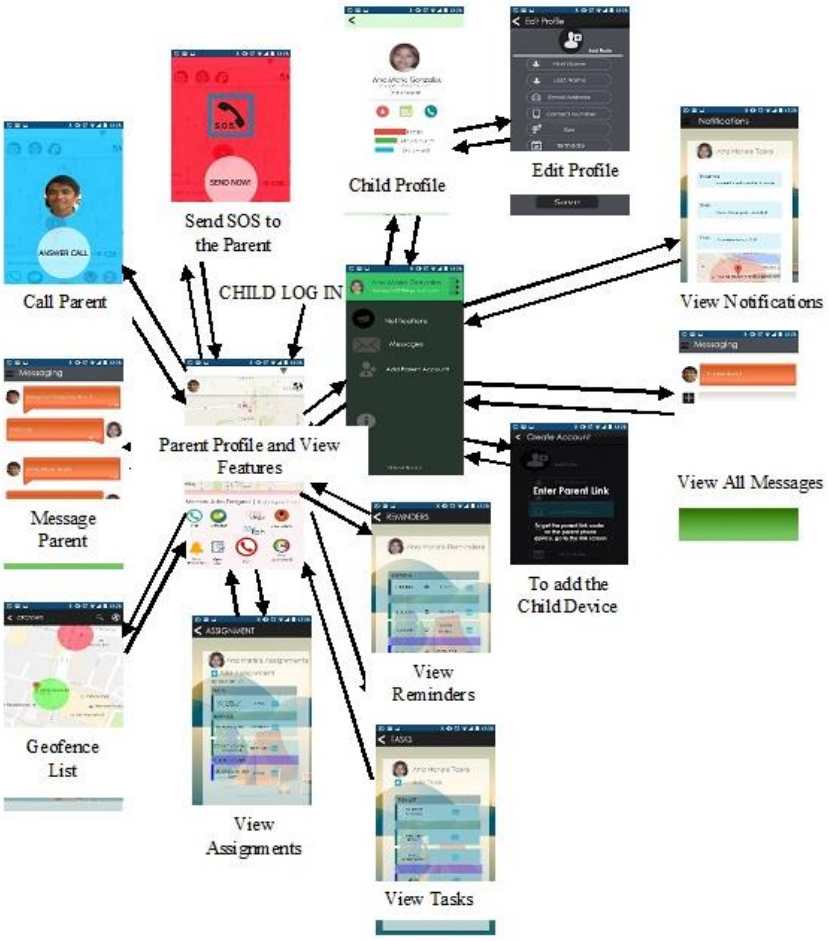


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Figure 44: **Child User Interface Storyboard**

Figure 44 shows the child account storyboard. When the user selects the child button in creating their account then a different user interface that fits the child user will appear when he/she logs in to the Virtual Nanny Application. When the child user swipes the screen from left to right the child user can see his/her profile and can edit the profile in the edit profile interface if there are mistakes when the account is created in the edit profile interface. The child user can see all the notifications example if he/she went to the danger zone it will send a notification to the parent as well as the child user in the notification interface. The child user can access all the messages, can enter the parent link code that is generated from the parent user's phone to add the child user's profile and the child user can't access the log out button so the parent can accurately monitor the same account logged in to the phone. When the user swipes the screen from right to left the child can see the current location of the parent if the parent user allowed them to see it. The

child user can call or message the selected parent by tapping the call and messaging button and it will generate the interfaces needed. When the child feels there is an emergency the child user can tap the SOS button where it lets them call the parent user and sends them the current location through message. The child user can tap the buttons where it generates the interface if he/she wants to view all his/her reminders, tasks, assignments , the geofence set by the parent user and the overall performance made by the child user can be seen in the Performance Dashboard interface.

Database Design

This section shows the relationship of every table. Each database design has corresponding keys which will be used to connect and retrieve data of the tables. In relational database the primary key is a table's unique identifier and cannot contain a null value while the foreign key is also a primary key of another table and also cannot contain a null value.

Table 5

GUARDIAN_INFO

GUARDIAN_INFO	
PK	GUsername
PK	GPassword
	GLastname
	GFirstname
	GEmail
	GContactNo
	GBirthday
	GGender
	GPhoto
	GChildAccess
	GStat

Table 5 shows the profile of all registered guardian which includes the username, password, last name, first name, email, contact number, birthday, gender, display photo and child access to location. The primary keys GUsername and GPassword are compared with the data inputted by the user during login to verify the user.

Table 6

CHILD_INFO

CHILD_INFO	
PK	CUsername
PK	CPassword
	CLastname
	CFirstname
	CEmail
	CContactNo
	CBirthday
	CGender
	CPhoto
	CSOSContact
	CStat

Table 6 shows the profile of all registered child which includes the username, password, last name, first name, email, contact number, birthday, gender and photo. The primary keys CUsername and CPassword are compared with the data inputted by the user during login to verify the user.

Table 7

SCHEDULE _HEADER

SCHEDULE_HEADER	
PK	SHConnetionId
FK	SHScheduleId
	SHScheduleName
	SHLocation
	SHDateTime
	SHStat

Table 7 shows the details of the child's schedule and the place where the child should be. The table also records the schedule id, schedule name and how often the schedule would alarm.

The primary key, SHConnetionId, is compared with the PAIR's PConnetionId to verify the parent and child connection id.

Table 8

SCHEDULE_DETAIL

SCHEDULE _DETAIL	
PK	SDScheduleId
	SDDateTime
	SDRepDay
	SDStat

Table 8 shows the details of the schedule including the schedule id, schedule repetition day and status. The primary key, SDScheduleId, is compared with the SCHEDULE _HEADER's SHScheduleId in order to verify the reminder id.

Table 9

FENCE_HEADER

FENCE_HEADER	
PK	FHConnetionId
FK	FHFenceId
	FHFenceName
	FHFenceType
	FHLocation
	FHRadius
	FHStat

Table 9 shows the details of the fence created by the guardian including the guardian's username, fence id, fence name, fence type, fence location and radius. The primary key, FHConnetionId, is compared with the PAIR's PConnetionId in order to verify user's details.

Table 10

FENCE_DETAIL

FENCE_DETAIL	
PK	FDFenceId
	FDDateTimeIn FDDateTimeOut FDStat

Table 10 shows details of the fence including the fence ID, date and time the child was inside and out the fence. The primary key, FDFenceId, is compared with the FENCE _HEADER's FHFenceId in order to verify other necessary details of the fence.

Table 11

LOCATION_HIST

LOCATION_HIST	
PK	LHCUsername
	LHLocation LHDateTime

Table 11 shows location history of the child including the date and time. The primary key, LHCUsername, is compared with PAIR's PCUsername in order to verify child's's username.

Table 12

PEDOMETER

PEDOMETER	
PK	PedometerId
	TotNumStep Date

Table 12 shows the daily total number of steps of the user. The primary key, PedometerId, is compared with the PAIR's PPedometerId in order to verify the user.

Table 13

LIMIT _HEADER

LIMIT _ HEADER	
PK	LHCUsername
FK	LHLimitId
	LHStartTime
	LHEndTime
	LHStat

Table 13 shows the details of the child's home limit including start and end time. The primary key, LHCUsername, is compared with PAIR's PCUsername in order to verify child's's username.

Table 14

LIMIT _DETAILS

LIMIT _DETAILS	
PK	LDLimitId
	TDRepDay
	TDStat

Table 14 shows the details of the days when the limit of child's phone screen could be repeated. The primary key, TDID, is compared with LIMIT _ HEADER's TLId in order to verify the id's.

Table 15

PAIR

PAIR	
PK	PConnetionId
FK	PCUsername
FK	PGUsername
FK	PPedometerId
	PChildLocker
	PStat

Table 15 serves as parent table and shows the details of the users who are paired to each other which includes the child's username, guardian's username and status. It also shows a unique pedometer id for each child and also the status of the child's phone locker. The primary key, PGUsername, is compared with the GUARDIAN_INFO's GUsername in order to verify other necessary details of the user And PCUsername, another primary key, is compared with CHILD_INFO's CUsername in order to verify the child's details.

Table 16

CHAT

CHAT	
PK	CConnectionId
	ChatSender
	ChatReceiver
	ChatDate
	ChatMsg
	ChatStat

Table 16 shows the details of stored messages including sender and receiver. It also shows the message to be sent or and date. The primary key CConnectionId is compared with both the PAIR's PConnectionId or in order to verify the pair's details.

Table 17

TASK

TASK	
PK	TPairId
FK	TTaskID
	TTaskName
	TTaskDetails
	TStartTime
	TEndTime
	TStat

Table 17 shows the tasks details including task name, task start and end time. The primary key TPairId is compared with both the PAIR‘s PId in order to verify their details.

Table 18

ASSIGNMENT

ASSIGNMENT	
PK	APairId
FK	AssingmentId
FK	ATypeID
	AName
	AStartDate
	AEndDate
	AConsequence
	AStat

Table 18 shows the details of the assignment created by the guardian which includes assignment id, assignment name and assignment type ID which is used to connect to the details of the assignment. The primary key, THPairId, is compared with the PAIR’s PId in order to verify the user.

Table 19

ASSIGNMENT _PEDOMETER

ASSIGNMENT_PEDOMETER	
PK	APID
	APStepsToBeAchieved APStat

Table 19 shows the steps the child needs to achieve the assignment. The primary key, APID, is compared with the ASSIGNMENT's AssingmentId in order to connect the assignment and APPedometerId, another primary key, is compared with PEDOMETER_HEADER's PHConnetionId in order to verify the child's details.

Table 20

POINTS

POINTS	
PK	PAssignmentId
	TimesAchieved TimesFailed Stat

Table 20 shows details for child's reward points including their times achieved and times failed. The primary key, PId, is compared with the assignment's AssingmentId order to verify other necessary details of the task.

Entity Relationship Diagram

This section shows the relationship of each table entities and their corresponding cardinalities. Each table is dependent to each other and in a way needed to function properly. Without one of the table, the database would not be able to retrieve data properly

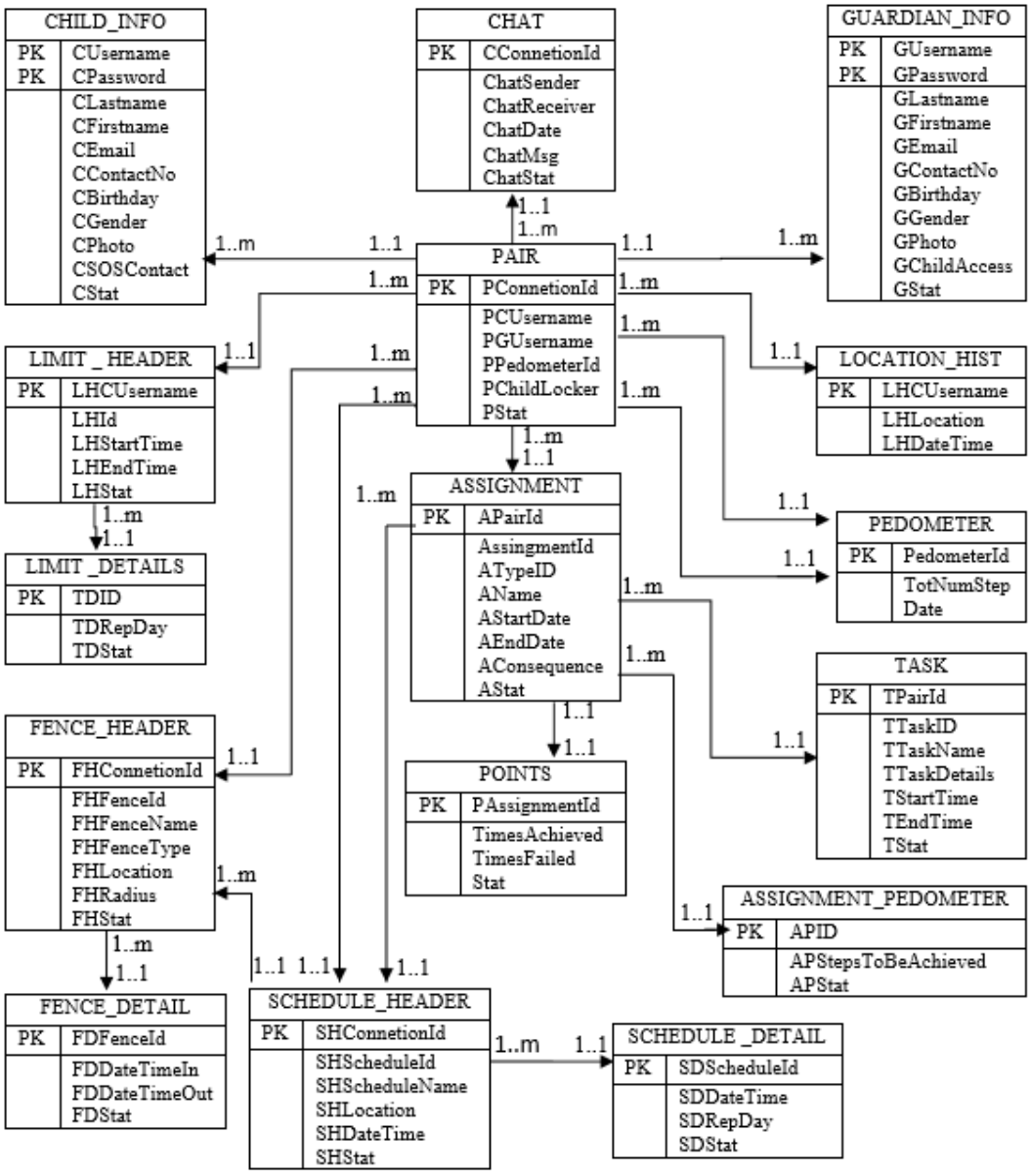

Figure 45: **Entity Relationship Diagram**

Figure 45 shows the relationship of the tables in the database. The relationship of the PAIR is retrieve from the tables CHILD_INFO and GUARDIAN_INFO. Figure also shows how LIMIT _ HEADER and LIMIT _ DETAIL is connected to each other and how the PAIR is connected to CHAT which indicates that one user can send multiple messages to another as long as they are paired or connected. LOCATION_HISTORY is also connected to the table PAIR which indicates that one child can have many location history record. ASSIGNMENT is connected to table POINTS . While Pair is also connected to the table PEDOMETER which is used to retrieve data of the child's daily steps taken. The SCHEDULE_HEADER and SCHEDULE_DETAIL is connected to each other while the SCHEDULE_HEADER is also connected to the tables PAIR and ASSIGNMENT and FENCE_HEADER. While FENCE_HEADER is also connected to FENCE_DETAIL. The ASSIGNMENT is connected with the tables TASK, ASSIGNMENT_PEDOMETER and SCHEDULE_HEADER which is used to retrieve information for the child's assignment details. Figure shows how PAIR and ASSIGNMENT are dependent on each other on retrieving certain assignments for the child.

Data Dictionary

This section is shows the structured and clear information about the database. It presents the description of each data in the database including the field names and properties such as table name, column name, data type, size, null and a short description.

Table 21

GUARDIAN_INFO

Table Name	Column Name	Data Type	Size	Null	Description
GUARDIAN_INFO	GUsername	Text	25	No	Guardian's username and Primary Key of the table
	GPassword	Text	25	No	Guardian's password and Primary Key of the table
	GLastname	Text	25	No	Guardian's Last name
	GFirstname	Text	25	No	Guardian's First name
	GEmail	Text	45	No	Guardian's email
	GContactNo	Text	15	No	Guardian's Contact number
	GBirthday	Date	Fixed	No	Guardian's Birth date
	GGender	Text	1	No	Guardian's Gender M = Male F = Female
	GPhoto	Image	Fixed	Yes	Guardian's Display image
	GChildAccess	Text	2	No	Child's access to guardian's location Enable/Disable
	GStat	Text	2	No	Guardian's Status AC = Active IN = Inactive

Table 21 presents the field names which are the GLastname, GFirstname, GEmail, GContactNo, GBirthday. GGender, GPhoto and GChildAccess. These are the fields that are needed to store the values of all the Guardians info.

Table 22

CHILD_INFO

Table Name	Column Name	Data Type	Size	Null	Description
CHILD_INFO	CUsername	Text	25	No	Child's username and Primary Key of the table
	CPassword	Text	25	No	Child's password and Primary Key of the table
	CLastname	Text	25	No	Child's Last name
	CFirstname	Text	25	No	Child's First name
	CEmail	Text	45	No	Child's email
	CContactNo	Text	15	No	Child's Contact number
	CBirthday	Date	Fixed	No	Child's Birth date
	CGender	Text	1	No	Child's Gender M = Male F = Female
	CPhoto	Image	Fixed	Yes	Child's Display image
	CSOSContact	Text	15	No	Child's emergency contact
	CStat	Text	2	No	Child's Status AC = Active IN = Inactive

Table 22 presents the field names which are the CUsername , CLastname,CFirstname, CEmail, CContactNo, CBirthday, CGender , CPhotoand CSOSContact These are the fields that are needed to store the values of all the Child's info.

Table 23

SCHEDULE_HEADER

Table Name	Column Name	Data Type	Size	Null	Description
SCHEDULE_HEADER	SHConnetionId	Text	25	No	Pair's unique ID Primary Key of the table
	SHScheduleId	Text	25	No	Schedule's unique id
	SHScheduleName	Text	35	Yes	Schedule's Name
	SHLocationID	Text	45	No	Target Location of the Child
	SHDateTime	Date	Fixed	No	Time the schedule will alarm
	SHStat	Text	2	No	Schedule's Status AC = Active IN = Inactive

Table 23 presents the field names which are the SHConnetionId, SHScheduleId, SHScheduleName, SHLocation, SHDateTime, SHStatThese are the fields that are needed to store the values of all the Child's Schedule which is set by the guardian.

Table 24

SCHEDULE_DETAIL

Table Name	Column Name	Data Type	Size	Null	Description
SCHEDULE _DETAIL	SDScheduleId	Text	25	No	Reminders unique ID and Primary Key of the table
	SDDateTime	Date	Fixed	Yes	Date and time the child achieved the reminder
	SDRepDay	Text	3	No	Alarm repeat schedule MON = Monday TUE = Tuesday WED = Wednesday THU = Thursday FRI = Friday SAT = Saturday SUN = Sunday
	RDStat	Text	2	No	Schedule's Status AC= Active IN = Inactive

Table 24 presents the field names which are the RDReminderId, RDDateTime, RDStat. These are the fields that are needed to store the values of all the Child's reminder details.

Table 25

FENCE_HEADER

Table Name	Column Name	Data Type	Size	Null	Description
FENCE_HEADER	FHConnetionId				
	FHFenceId	Integer	8	No	Fence Unique ID
	FHFenceName	Text	45	Yes	Name of Fence
	FHFenceType	Text	3	No	Type of Fence RED = Danger Zone GRN = Safe Zone
	FHLocation	Text	65	No	Fence Location
	FHRadius	Integer	3	No	Fence Radius
	RDStat	Text	2	No	Reminder's Status OP= Open CL = Close

Table 25 presents the field names which are the FHGUsername, FHFenceId, FHFenceName, FHFenceType. FHLocation, FHRadius. These are the fields that are needed to store the values of all the Child's fence.

Table 26

FENCE_DETAIL

Table Name	Column Name	Data Type	Size	Null	Description
	FDFenceId	Integer	8	No	Fence Unique ID and Primary Key of the table
	FDDateTimeIn	Date	Fixed	No	Date and time the child arrived at the location
	FDDateTimeOut	Date	Fixed	No	Date and time the child left at the location
	RDStat	Text	2	No	Reminder's Status AC= Active IN = Inactive

Table 26 presents the field names which are the FDCUsername, FDFenceId, FDDateTimeIn, FDDateTimeOut. These are the fields that are needed to store the values of all the Child's detail.

Table 27

LOCATION_HISTORY

Table Name	Column Name	Data Type	Size	Null	Description
LOCATION_HIST	LHCUsername	Text	25	No	Child's username and Primary Key of the table
	LHLocation	Text	65	No	Location of the child
	LHDateTime	Date	Fixed	No	Date and time the child went to the location

Table 27 presents the field names which are the LHCUsername, LHLocation and LHDateTime. These are the fields that are needed to store the values of the entire Child's Location History.

Table 28

PEDOMETER

Table Name	Column Name	Data Type	Size	Null	Description
PEDOMETER	PedometerId	VarChar	25	No	Pedometer id and Primary Key of the table
	TotNumStep	Integer	25	No	Total number of steps
	PDate	Date	Fixed	No	Date of the Steps

Table 28 presents the field names which are the PedometerId, TotNumStep, PDate. These are the fields that are needed to store the values of child's pedometer's details.

Table 29

PAIR

Table Name	Column Name	Data Type	Size	Null	Description
PAIR	PConnetionId	Text	25	No	Connection id and Primary Key of the table
	PCUsername	Text	25	No	Child's username
	PGUsername	Text	25	No	Guardian's username
	PPedometerId	VarChar	25	No	Child's Pedometer id
	PChildLocker	Text	2	No	Child's phone locker status Enable/Disable
	PStat	Text	7	No	Task status Enable Disable

Table 29 presents the field names which are the PConnetionId, PCUsername, PGUsername, PPedometerId, PChildLocker. These are the fields that are needed to store the values of those guardian and child who are connected.

Table 30

TASK

Table Name	Column Name	Data Type	Size	Null	Description
TASK	TPairId	Text	25	No	Pair's connection id Primary Key of the table
	TTaskID	VarChar	6	No	Task's Id
	TTaskName	Text	25	No	Name of Task
	TTaskDetails				Details of the task
	TStartTime	Date	Fixed	No	Time the task will start
	TEndTime	Text	60	No	Time the task would end
	TStat	Text	2	No	Reminder's Status AC= Active IN = Inactive

Table 30 presents the field names which are the TPairId, TTaskID, TTaskName, TTaskDetails, TStartTime, TEndTime, TStat. These are the fields that are needed to store the values of all the Child's Task created by the guardian.

Table 31

ASSIGNMENT

Table Name	Column Name	Data Type	Size	Null	Description
ASSIGNMENT	AHPairId	Text	25	No	Pair's connection id Primary Key of the table
	AssignmentID	Text	25	No	Assignment's Id
	AHName	Text	45	No	Name of Assignment
	AHStartDate	Date	Fixed	No	Assignment's Start date
	AHEndDate	Date	Fixed	No	Assignment's End date
	AHConsequence	Text	45	No	Assignment's Consequence
	TStat	Text	2	No	Assignment's Status AC= Active IN = Inactive

Table 31 presents the field names which are the AHPairId, AssignmentID, AHName, AHStartDate, AHEndDate, AHConsequence, TStat. These are the fields that are needed to store the values of all the Child's Assignment created by the guardian.

Table 32

CHAT

Table Name	Column Name	Data Type	Size	Null	Description
CHAT	CConnectionId	Text	25	No	Connection id and Primary Key of the table
	ChatSender	Text	25	No	Sender of the message
	ChatReceiver	Text	25	No	Receiver of the message
	ChatDate	Date	Fixed	No	Date of the chat
	ChatMsg	Text	65	Yes	Message of the sender
	ChatStat	Text	2	No	Task status Enable Disable

Table 32 presents the field names which are the ChatSender, ChatReceiver, ChatDate, ChatMsg, ChatStat. These are the fields that are needed to store the values of the child and guardian's messages.

Table 33

LIMIT_HEADER

Table Name	Column Name	Data Type	Size	Null	Description
LIMIT_HEADER	LHCUsername	Text	25	No	Child's username and Primary Key of the table
	LHLimitId	VarChar	6	No	Limit's Id
	LHStartTime	Date	Fixed	No	Limit's Start date
	LHEndTime	Date	Fixed	No	Limit's End date
	LHStat	Text	2	No	Limit's Status AC= Active IN = Inactive

Table 33 presents the field names which are the LHCUsername, LHId, LHStartTime, LHEndTime, LHStat. These are the fields that are needed to store the values of child phone lock limit.

Table 34

LIMIT_DETAILS

Table Name	Column Name	Data Type	Size	Null	Description
LIMIT_HEADER	LDLimitId	Text	25	No	Limit's Id and Primary Key of the table
	TDRepDay	Text	3	No	Limit's repeat schedule MON = Monday TUE = Tuesday WED = Wednesday THU = Thursday FRI = Friday SAT = Saturday SUN = Sunday
	LHStat	Text	2	No	Reminder's Status AC= Active IN = Inactive

Table 34 presents the field names which are the TDID, TDRepDay, LHStat. These are the fields that are needed to store the values of child phone lock limit details.

Table 35

POINTS

Table Name	Column Name	Data Type	Size	Null	Description
POINTS	PAssignmentId	Text	25	No	Assignment's id Primary Key of the table
	TimesAchieved	Integer	3	No	Times the child's achieved the assignment
	TimesFailed	Integer	3	No	Times the child's achieved the assignment
	LHStat	Text	2	No	Reminder's Status AC= Active IN = Inactive

Table 35 presents the field names which are the PAssignmentId, TimesAchieved, TimesFailed, LHStat. These are the fields that are needed to store the values of all the Child's assignment points.

Table 36

ASSIGNMENT_PEDOMETER

Table Name	Column Name	Data Type	Size	Null	Description
ASSIGNMENT_ PEDOMETER	APID	Text	25	No	Pair's connection id Primary Key of the table
	APStepsToBeAchieved	VarChar	6	No	Assignment's Id
	APStat	Text	2	No	Reminder's Status AC= Active IN = Inactive

Table 36 presents the field names which are the APID, APStepsToBeAchieved, APStat. These are the fields that are needed to store the values of Child's needed steps to complete the assignment.

Network Design

The section illustrates to the planning of the implementation of a computer network infrastructure. The whole network design is represented through a network topology diagram that serves as the design for implementing the network physically.

Network Topology

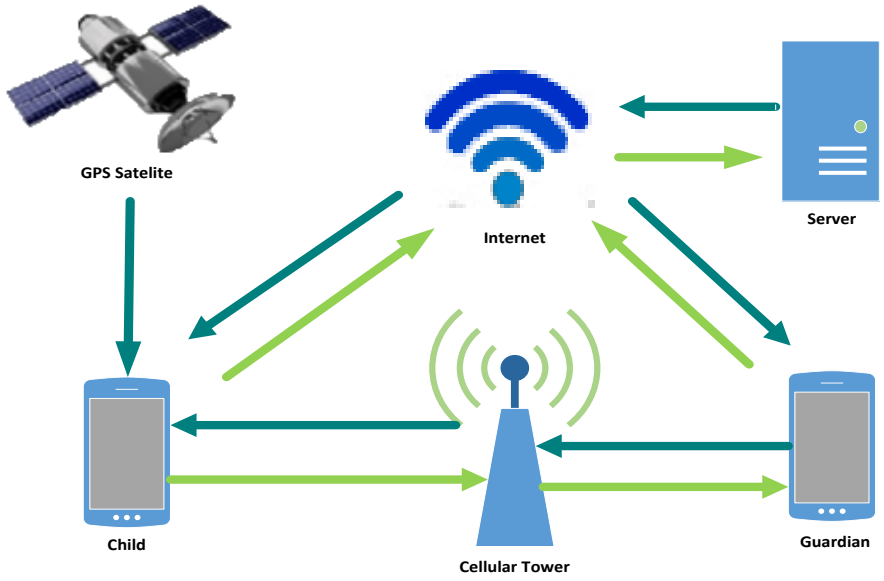

Figure 46: **Network Topology**

Figure 46 shows the bidirectional flow of the information transmission. The GPS or Global Positioning System generates the geographical location of the child. Information is then transferred through the internet or cellular connections.

Development/ Construction/ Build Phase

This phase presents the software, hardware and program specifications in the development and deployment of the system. The equipment necessary to implement the system is arranged and clarified.

Software Specification

This section presents the software specification of the study. This includes the operating system version, the programming languages used, platform, and the database that will be used in the implementation stage.

The application is intended for the parents or guardians and children. Both must have a smartphone that supports GPS with Google Maps integration and SMS in order to function properly. SMS is a service that is common to any mobile phones; however, GPS can be found on newer versions of smartphones.

In the latter phase of the implementation process, the following tools are used for development and deployment purposes:

For Development:

- SUN's Java Development Kit (JDK)
- Android Software Developer's Kit (SDK) and Android Studio/Eclipse IDE which support android application development
- Android Developer Tool (ADT), Eclipse/Android Studio plug-ins
- Java Programming support for Eclipse IDE/Android Studio
- Google Maps API and Interface
- MySQL Database along with Hypertext Preprocessor (PHP)

For Deployment:

- Android Operating System
- Android API Level 16 (JellyBean) up to the latest version.

Hardware Specifications

This section presents the hardware specifications of the study. This includes the memory, RAM, and storage requirements that will be used in the implementation stage.

In the latter phase of the implementation process, the following hardware devices are used for development and deployment purposes:

For development:

- Computer Processor: i3 and above
- Operating System: Microsoft® Windows® 7/Vista /8/10 (x86 or x64)
- RAM: 4GB and above
- Hard Disk: At least 400MB space
- Hard Disk: At least 1GB for Android SDK, emulator system images, and caches
- Android Device running on Android OS Version 4.1 (Jellybean) up to the latest version.

For deployment:

- Android Device running on Android OS Version 4.1
- GPS and SMS enabled smartphone with Google Maps integration
- RAM: At least 256MB free space
- Internal storage free space: at least 150MB

Program Specifications

This section illustrates are the list necessary algorithms required in the development of the system. The tables show the assigned list of modules with respective tasks for the specific programmer.

Table 47

List of Modules

Programmers	Modules	Admin	Parent User	Child User
Reyes, Shara Marie G.	Account Management			
	Create		*	*
	Retrieve		*	*
	Update		*	*
	Delete	*		
No. of Points (1 point per module)		1	1	1
Deligero, Michael John E.	Login/Logout			
	Login	*	*	
	Logout	*	*	
No. of Points (1 point per module)		1	1	0
Reyes, Shara Marie G.	Task Management			
	Create		*	
	Retrieve	*	*	*
	Update		*	
	Delete	*	*	
No. of Points (1 point per module)		1	1	0
	Reminder Management			
Guillen, Mary Welcey I.	Create		*	
	Retrieve	*	*	*
	Update		*	
	Delete	*	*	
No. of Points (1 point per module)		1	1	1
Guillen, Mary Welcey I.	Assignment Management			
	Create		*	
	Retrieve	*	*	*
	Update		*	
	Delete	*	*	
No. of Points (1 point per module)		1	1	1

Table 47.1

List of Modules cont'd

Leonardo, Christine Joy A.	History Management			
	Create		*	*
	Retrieve	*	*	*
	Delete	*	*	
No. of Points (1 point per module)		1	1	0
Guillen, Mary Welcey I.	Chat and Calls Management			
	Create			*
	Retrieve	*	*	*
	Update			*
	Delete	*		
No. of Points (1 point per module)		1	1	1
Deligero, Michael John E.	Consequence Management			
	Create		*	
	Retrieve	*	*	*
	Update		*	*
	Delete		*	
No. of Points (1 point per module)		1	1	1
Leonardo, Christine Joy A.	Reward Management			
	Create		*	
	Retrieve	*	*	*
	Update		*	*
	Delete		*	
No. of Points (1 point per module)		1	1	1
Gonzales, Ana Marie B.	Geofence Management			
	Create		*	
	Retrieve	*	*	*
	Update		*	
	Delete		*	
No. of Points (1 point per module)		1	1	1

Table 47.2

List of Modules cont'd

Reyes, Shara Marie G.	Database Management			
	Create		*	
	Retrieve	*	*	*
	Update		*	
	Delete		*	
No. of Points (1 point per module)		1	1	1
Number of Modules per User(equals total no. of points per user)		11	11	8
Total Number of Modules			30	

Table 47 shows the list of modules of the application. The modules is assigned to a specific programmer from the team. The asterisk (*) represents the part where admin, the parent or the child user can perform when it comes to create, retrieve, update and delete routines in the application.

REFERENCES

AppObit LLC. (2016). Family Orbit: Parental Control (Version 2.0) [Mobile application software]. Retrieved from https://play.google.com/store/apps/details?id=com.appobit.familyorbit&hl=en

Arensman, W., Boler, M. S., & Whipple, J. (2009, October 11-14). *A public safety application of GPS-enabled smartphones and the android operating system.* Paper Presented at the Proceedings of the 2009 IEEE International Conference on Systems, Man, and Cybernetics San Antonio, TX, USA. doi:10.1109/ICSMC.2009.5346390

Artman, J. (n.d.). *Advantages and Disadvantages of Cellphone Tracking.* Retrieved October 4, 2016, from http://smallbusiness.chron.com/advantages-disadvantages-cellphone-tracking-34399.html

Bano, A., Priya, P. L., & Sunehra, D. (2016, February 27-28). *Children Location Monitoring on Google Maps Using GPS and GSM Technologies*. Paper Presented at the IEEE Sponsored 2nd International Conference on Innovations in Information Embedded and Communication Systems ICIIECS'15. doi:10.1109/IACC.2016.137

Ballve, M. (2013). How Much Time Do We Really Spend On Our Smartphones Every Day? *Business Insider*. Retrieved from http://www.businessinsider.com.au/how-much-time-do-we-spend-on-smartphones-2013-6

Cooksey, D. (n.d.). *Understanding the Global Positioning System (GPS).* Retrieved October 4, 2016, from http://www.montana.edu/gps/understd.html

Dar, M. A., & Parvez, J. (2015, March 19-20). *A Live-Tracking Framework for Smartphones*. Paper Presented at the IEEE Sponsored 2nd International Conference on Innovations in Information Embedded and Communication Systems ICIIECS'15. doi:10.1109/ICIIECS.2015.7193066

Francis, P. (2013, November 13). *Geofencing in Mobile Applications.* Retrieved October 4, 2016, from https://thebhwgroup.com/blog/2013/11/geofencing-mobile-applications

Greenalp. (2016). Real-Time GPS Tracker (Version 0.9.81) [Mobile application software]. Retrieved from https://play.google.com/store/apps/details?id=com.greenalp.RealtimeTracker&hl=en

Hall, B. (2016, June 24). *Best Parental-Control Apps 2016.* Retrieved October 4, 2016, from http://www.tomsguide.com/us/best-parental-control-apps,review-2258.html

Haro, A., & Hulls, C. (2016). Family Locator - GPS Tracker (Version 12.2.0) [Mobile application software]. Retrieved from https://play.google.com/store/apps/details?id=com.life360.android.safetymapd&hl=en

Kloub, L., Traveler's Sidekick, & Wook, S. Y. (2016, July 13-15). *Mobile Web Application with Shortest Path Finder*. Paper Presented at 2016 SAI Computing Conference (SAI). doi:10.1109/SAI.2016.7556094

Lamkin, P. (2016, August 10). The best kids trackers: Using wearables for child safety. Retrieved October 4, 2016, from https://www.wareable.com/internet-of-things/the-best-kids-trackers

The Asian Parent. (2014, November). *Mobile Device Usage Among Young Kids: A Southeast Asia Study* [PDF File].Singapore: Mirchandani, N., & Mulled, P. Retrieved from https://s3-ap-southeast-1.amazonaws.com/tap-sg-media/theAsianparent+Insights+Device+Usage+A+Southeast+Asia+Study+November+2014.pdf

Monitoring Your Child. (n.d.). *Scan website*. Retrieved October 4, 2016, from https://www.scanva.org/support-for-parents/parent-resource-center-2/monitoring-your-child/

Morin, A. (2014). The Five Things Successful Working Parents Give Up To Reach A Work-Life Balance. Retrieve from http://www.forbes.com/sites/amymorin/2014/01/20/the-five-things-successful-working-parents-give-up-to-reach-a-work-life-balance/#661d94636e2f

National Research Council. (n.d.). *The Global Positioning System: A Shared National Asset. Washington, DC: The National Academies Press*, 1995. doi:10.17226/4920

nPlay Sdn Bhd. (2016). Funa - Family Locator (Version 1.12.0) [Mobile application software]. Retrieved from https://play.google.com/store/apps/details?id=com.nplay.funa&hl=en

Reardon, M. (2006, December 8). *Turning cell phones into lifelines.* Retrieved October 4, 2016, from https://www.cnet.com/news/turning-cell-phones-into-lifelines/

Rosen, R. (n.d.). *Monitoring apps: what parents should know.* Retrieved October 4, 2016, from http://parentinfo.org/article/monitoring-apps-what-parents-should-know

Safely. (2016). Sprint Family Locator [Mobile application software]. Retrieved from https://play.google.com/store/apps/details?id=com.locationlabs.finder.sprint&hl=en

Stencl, M. (2016). Family Locator - Phone Tracker (Version 4.993) [Mobile application software]. Retrieved from https://play.google.com/store/apps/details?id=com.sygic.familywhere.android&hl=en

Valisno, J. (2012) Pinoy kids among the most-connected in the region. Retrieved from http://www.bworldonline.com/content.php?section=TopStory&title=pinoy-kids-among-the-most-connected-in-the-region&id=51536

Williams, A. (2014). How Do Smartphones Affect Childhood Psychology?. Retrieved from http://psychcentral.com/lib/how-do-smartphones-affect-childhood-psychology/

Wilson, T. (2016, July 7). *Why Parents Need to Start Using GPS Tracker Android*. Retrieved October 4, 2016, from http://trackimo.com/parents-need-gps-tracker-android/

APPENDIX A

University of Cebu

College of Computer Studies

Cebu City

Date: _____

CENSOR'S CERTIFICATE

This is to certify that the undersigned has reviewed and went through all the pages of the proposed project study/research manuscript entitled "Virtual Nanny: A real-time child monitoring application for guardians" as against the set of structural rules that govern the composition of *sentences*, *phrases*, and *words* in the English language as well as the technical terms, syntax (format, etc.) and semantics appropriate for the Information Technology and Computing fields.

Signed:

MIRIAM FLORES

Grammarian

Conforme:

MICHAEL JOHN DELIGERO

Project Manager

Noted:

JANETH UGANG

Adviser

APPENDIX B

October 12, 2016

Dr. Farolito Vestil
Principal
Tugbongan National High School
Consolacion, Cebu

Dear Dr. Vestil:

Greetings!

In partial fulfillment of our requirement for Bachelor of Science in Information Technology Capstone 41, we, fourth year students of the College of Computer Studies at the University of Cebu- Banilad Campus will devise a proposed system/study entitled, "Virtual Nanny: A real-time child monitoring application for guardians".

In line with this, we would like to humbly ask for your approval to conduct a survey with the parents of the students from your institution. The result of the survey would help gain data and insights for the study to strengthen its integrity. We assure you that the information gathered will be solely used for research purposes only with utmost confidentiality.

Your kind consideration will be much appreciated. Best wishes!

Sincerely yours,

Deligero, Michael John E.
Project Manager

Noted by:

Mrs. Janeth S. Ugang
Adviser

Recommended by:

Mrs. Moma dela Torre-Ortega
Dean, College of Computer Studies

APPENDIX C

Survey Questionnaire

Greetings! In partial fulfillment of our requirements in Bachelor of Science in Information Technology, we have proposed a system entitled, "Virtual Nanny: A real-time child monitoring application for guardians"

In line with this, result of the survey would help gain data and insights for the study to strengthen its integrity. We assure you that the information gathered will be solely used for research purposes only with utmost confidentiality.

Thank you for your contribution and God bless you!

Name (Optional): _____

1. Are you a parent or guardian of a child?
   - ☐ Yes, Mother
   - ☐ Yes, Father
   - ☐ No
2. If Yes continue answering the survey,
   - ☐ Yes, a single parent
   - ☐ Yes, a working parent
   - ☐ Yes, a stay-at-home parent
   - ☐ Yes, partner is working abroad
   - ☐ Yes, a guardian
3. How many children?
   - ☐ 1
   - ☐ 2
   - ☐ 3
   - ☐ 4
   - ☐ 5 or more
4. How old is your child/ren?
   - ☐ 0-3
   - ☐ 4-7
   - ☐ 8-11
   - ☐ 12-15
   - ☐ 16 or older
5. Do you allow your child to use a smartphone?
   - ☐ Yes
   - ☐ No
6. Do your child own the smartphone he/she uses?
   - ☐ Yes
   - ☐ No
7. How often does your child use the smartphone?
   - ☐ At all times
   - ☐ Everyday
   - ☐ Weekly
   - ☐ Monthy
   - ☐ Others (Please specify: _____)
8. Does your child always bring the device with them everywhere he/she goes?
   - ☐ Yes
   - ☐ No
9. Do you have worries on the whereabouts of your child when they are not in your line of sight?
   - ☐ Yes
   - ☐ No
10. Do you have problems in keeping your child away from dangerous places?
    - ☐ Yes
    - ☐ No
11. Do you know the fitness activities of your child?
    - ☐ Yes
    - ☐ No
12. Do you think your child uses smartphones too much?
    - ☐ Yes
    - ☐ No
13. Do you have troubles in making child do tasks or chores?
    - ☐ Yes
    - ☐ No
14. Do you have a hard time in making your child follow your instructions or rules?
    - ☐ Yes
    - ☐ No
15. If there is a mobile application that lets you monitor your child through their mobile phones, would you download it?
    - ☐ Yes
    - ☐ No

APPENDIX D

SURVEY RESULTS

Indicators	Result									
1. Are you a parent or guardian of a child?	Yes, Mother		Yes, Father		No					
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage				
	34	68%	16	32%	0	0%				
2. If Yes continue answering the survey,	Single Parent		Working Parent		Stay-at-home parent		Partner working abroad		Guardian	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	4	8%	18	36%	15	30%	10	20%	1	2%
3. How many children?	1		2		3		4		5 or more	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	12	24%	25	50%	9	14%	3	6%	1	2%
4. How old is your child/ren?	0 to 3		4 to 7		8 to 11		12 to 15		16 or older	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	19	36%	16	32%	25	50%	13	26%	9	18%
5. Do you allow your child to use a smartphone?	Yes		No							
	Frequency	Percentage	Frequency	Percentage						
	43	86%	7	14%						
6. Do your child own the smartphone he/she uses?	Yes		No							
	Frequency	Percentage	Frequency	Percentage						
	37	74%	23	46%						
7. How often does your child use the smartphone?	At all times		Everyday		Weekly		Monthly		Others	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	25	50%	14	28%	4	8%	1	2%	6	12%
8. Does your child always bring the device with them everywhere he/she goes?	Yes		No							
	Frequency	Percentage	Frequency	Percentage						
	32	64%	18	36%						

9. Do you have worries on the whereabouts of your child when they are not in your line of sight?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	49	98%	1	2%
10. Do you have problems in keeping your child away from dangerous places?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	45	90%	5	10%
11. Do you know the fitness activities of your child?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	19	38%	31	62%
12. Do you think your child uses smartphones too much?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	43	86%	7	14%
13. Do you have troubles in making child do tasks or chores?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	39	78%	11	22%
14. Do you have a hard time in making your child follow your instructions or rules?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	39	78%	11	22%
15. If there is a mobile application that lets you monitor your child through their mobile phones, would you download it?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
	50	100%	0	0%

CURRICULUM VITAE

PERSONAL DATA

NAME: Michael John E. Deligero

DATE OF BIRTH: January 25, 1997

ADDRESS: Das Locra Lutopan, Toledo City, Cebu

GENDER: Male

CIVIL STATUS: Single

RELIGION: Roman Catholic

CONTACT NUMBER: 09324161417

EDUCATIONAL BACKGROUND

COLLEGE:	Bachelor of Science in Information Technology University of Cebu – Banilad Campus Banilad, Cebu City School Year 2013 – Present
HIGH SCHOOL:	Toledo City Science High School Toledo City, Cebu School Year 2009-2013
ELEMENTARY:	Don Andres Sorian Elementary School Toledo City, Cebu School Year 2003-2009

PERSONAL DATA

NAME: Ana Marie B. Gonzales

DATE OF BIRTH: February 13, 1990

ADDRESS: Tugbongan, Consolacion, Cebu City

GENDER: Female

CIVIL STATUS: Single

RELIGION: Roman Catholic

CONTACT NUMBER: 09223303607

EDUCATIONAL BACKGROUND

COLLEGE:	Bachelor of Science in Information Technology University of Cebu – Banilad Campus Banilad, Cebu City School Year 2013 – Present
HIGH SCHOOL:	Tubongan National High School Tubongan, Consolacion, Cebu City School Year 2003-2007
ELEMENTARY:	Tubongan, Elementary School Tubongan, Consolacion, Cebu City School Year 1997-2003

PERSONAL DATA

NAME: Mary Welcey I. Guillen

DATE OF BIRTH: June 6, 1996

ADDRESS: Tayud, Consolacion, Cebu City

GENDER: Female

CIVIL STATUS: Single

RELIGION: Roman Catholic

CONTACT NUMBER: 09232648560

EDUCATIONAL BACKGROUND

COLLEGE:	Bachelor of Science in Information Technology University of Cebu – Banilad Campus Banilad, Cebu City School Year 2013 – Present
HIGH SCHOOL:	La Consolacion College Liloan., Cebu City School Year 2009-2013
ELEMENTARY:	Tayud Elementary School Tayud, Consolacion, Cebu City School Year 2003-2009

PERSONAL DATA

NAME: Christine Joy A. Leonardo

DATE OF BIRTH: December 16, 1996

ADDRESS: Tres Borces St., Mabolo, Cebu City

GENDER: Female

CIVIL STATUS: Single

RELIGION: Roman Catholic

CONTACT NUMBER: 09330139303

EDUCATIONAL BACKGROUND

COLLEGE:	Bachelor of Science in Information Technology University of Cebu – Banilad Campus Banilad, Cebu City School Year 2013 – Present
HIGH SCHOOL:	Saint Theresa's College Juana Osmena St., Cebu City School Year 2009 – 2013
ELEMENTARY:	Saint Theresa's College Juana Osmena St., Cebu City School Year 2007 – 2009
	Mabolo Elementary School Mabolo, Cebu City School Year 2003-2007

PERSONAL DATA

NAME: Shara Marie G. Reyes

DATE OF BIRTH: December 30, 1995

ADDRESS: Tipolo, Mandaue City

GENDER: Female

CIVIL STATUS: Single

RELIGION: Roman Catholic

CONTACT NUMBER: 09322804289

EDUCATIONAL BACKGROUND

COLLEGE:	Bachelor of Science in Information Technology University of Cebu – Banilad Campus Banilad, Cebu City School Year 2013 – Present
HIGH SCHOOL:	St. Joseph's Academy S.B. Cabahug, Mandaue City School Year 2009 – 2013
ELEMENTARY:	Cabancalan II Elementary School Cabancalan, Cebu City School Year 2003 – 2009