

# ALAMAN Integrated Platform for Child Care

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## Abstract:

Recently, in GCC region, there is increase in the number of children who have been left in the school buses, children disappeared from public places. Also many cases have been reported where children who left houses, schools were missed and never return home. Such situations left parents worried, unfortunately most of these stories had tragic endings wherein it was found that many of the children left unattended in school buses which results many deaths.

Monitoring children is a process of converting from an expensive and tiring manual state to a dynamic and intelligent state that relieves human effort. "ALAMAN" mobile App is a simplified, but in its depths a lot of safety and security for the child. The project aims to provide a system that allows parents to track the locations of their children at anytime and anywhere, in addition to providing medical reports that can be accessed in any hospital in the Sultanate of Oman.

The proposed devices can be worn as a watch to track the child, it Includes GPS and child health it is very useful for the safety of children; continuous signals are sent to the parents' phone where they can see the child if he is in the safe areas that the parents have specified, or he left the safe areas. During registration in the ALAMAN application, the parent will be given the child's ID, as it is used when going to any hospital in the Sultanate of Oman to search for the child's record and add a medical report to him.

A study has been made to study the requirements of the Omani people regarding the health and safety of his child, and the result was the utmost need for this application that limits the issue of loss.

Keywords: Children Tracking, GPS Technology, Centralized Heath Records.

## 1. INTRODUCTION

Children are the foundation upon which society is built, so children have the right to protection, and to be safe, they have the right to survive, to be heard, to belong, growing up in a protective environment, and receive adequate care and prevention. If we talk about the primary sponsor of the child, we will start first with the family; they are the first line to protect their children, Parents are responsible for providing a

loving and protective home environment so that they can live in security and stability, Communities and schools are responsible for providing a child-friendly and safe environment. Therefore, in all aspects, the family, community and school are fully responsible for the protection of the child so that the child can raise, develop, educate and survive. Nevertheless, we hear in the news, and read in the newspapers, about many of the tragedies of children in loss and death, especially on the school bus. Therefore, parents need the most to end the stories and tragedies that happen to their children, they are ready to spend a lot of money in maintaining the safety of their children.

The proposed system is a mobile app called 'ALAMAN'. 'ALAMAN' is an Arabic word means protection and safety, this application will be used primarily by parents; provides an effective and safe solution when tracking the locations of children whether they are at school or at home, It is also intended to enhance child care by linking all government and private hospitals in Oman with the application of ALAMAN, where medical records are provided for every child, for each patient in the medical records, it serves the Ministry of Health in receiving all data, messages, and medical prescriptions through this application. It helps parents keep track of their children's condition and makes it easier for them to go to any clinic, without committing to a particular hospital.

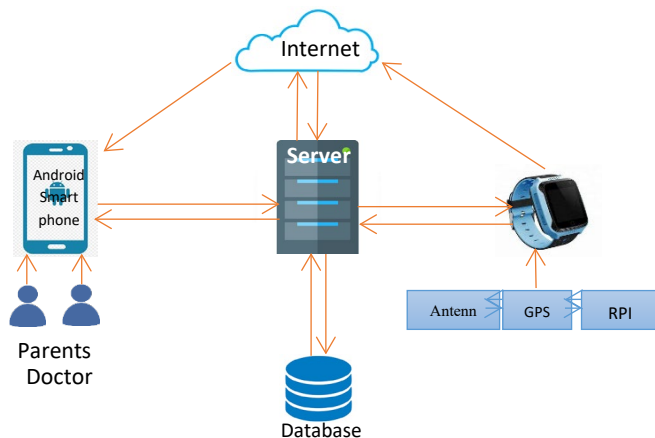
## 2. BACKGROUND AND RELATED WORK

Parents strive to provide comfort and happiness to their children, but how can they monitor their children remotely, if the parents spend half their day at work? Children go to school, stroll with their friends, play in front of the house, ride on the bus, there are many situations where children stay away from their parents.

The application collected the two main points of child safety, track its location, and provide the necessary medical records. This application is capable of establishing security and comfort for children and parents as well, it is also sufficient to limit many of the problems in which children have been victimized.

Tracking systems are not an easy thing, as it needs a deep study, and looking at all its fields in different parts of the world. Android studio was chosen due to it being an open platform and free. It is an App that works through a web application and a mobile application, the web application is used to track the child's location through the wristwatch by using cellular network tools, also to create a user profile, the mobile app will receive the GPS location and store it in a database.

#### Architecture Design



**Figure 1: Architecture Design of ALAMAN App**

In ALAMAN App there is one server which is the application server that using Android Studio to program this application. This server is used to store all data and retrieve it to and from the database. Of course, there is a database for storing tables, child data and medical reports.

The project consists of two main users (parents, doctor) who use ALAMAN app on Android devices. On the registration page, the parents create an account in the application as a new user by entering the child's data and entering an email and password, during registration the parent is given ID number to the child to be used when going to the hospital, and then he can log in to the application.

In the event that the user is a doctor, he does not need to make a registration because the registration is carried out by the admin, the doctor only can log in to the ALAMAN app, and then enter the child ID number in the search box to show him the child's file and then add a medical report for the child.

Also in the project there is a watch that contains (ANTENNA, GPS, RPI), where the watch is programmed with the ALAMAN app by entering the watch code on the parent page specifically in the Google map, to track the actual child's location, and the father can also select some safe area for the child, and in the event that the child leaves these areas, an notification will be sent on the parent's phone to inform him

that your child has left the safety area and inform him of the actual location of the child.

The server interacts with the (ALAMAN app, the child's watch), as it receives data about the child's location via GPS technology, and then the server sends this information to the parent's application to allow him to know the location of his child. After the father receives information from the server, the father will select the safe areas and blocking areas in the application map and then send it again to the server, and the server in turn sends this information to the child's watch to know the child's location, the watch is composed of (ANTENNA, GPS, RPI) so It sends continuous signals to the server about the child's location, and the server in turn sends these signals to the parent application.

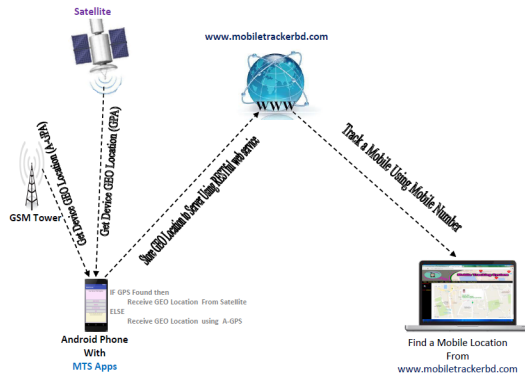
In the case of a doctor's login, the doctor sends the child's data to the server, and the server in a timer transmits it to the watch and is stored, then the watch sends signals to the server, and the server in turn transmits it to the doctor's device. All this data will be stored in the database that interacts with the server. In addition to containing the project on the Internet, which must be activated in order to run Google Maps on the parent's page so that he can locate and track his child.

#### 1. Mobile tracing system using web application

In (2017) Mohammad Jahangir Alam stated that parents are keenly interested in their children, so they have to provide an (Android) phone to their children. Nowadays, we don't find a child without an Android phone, so parents strive to keep an eye on their children, where they go, what are they doing, with who communicate, what software is installed on their phones, and other questions that parents need to know answered.

They are very concerned about the direction of their children but this process is a little difficult, a mobile phone tracking system is designed to track and monitor children; so, parents can track the location of their children through this system. This application (Android) needs to be installed in both parents and kids' phones with login and password registration. Once you have logged in, your parents can monitor their children from anywhere on their mobile phone by site ([www.mobiletrackerbd.com](http://www.mobiletrackerbd.com).)

There are two ways parents can track children either automatic or manual, automatic system, by setting a time (time limit) in the applications, then the applications automatically send the location of the child's mobile phone periodically for their parents. The manual system, by children has to click the button apps until the phone location is sent. In this way, Parents secure their children comfortably and without worry. (Forda Nama et al. 2018).



2. Implementation of child tracking system

Yuvraj Rathod<sup>1</sup>, Manoj Dighole<sup>2</sup>, Ritu Sharma<sup>3</sup> mentioned in their article IMPLEMENTATION OF CHILDREN TRACKING SYSTEM ON ANDROID MOBILE TERMINALS (2018) that GPS is a system that has been known for a long time and is not a new concept; GPS is an abbreviation (Global Positioning System). A navigation system is a common technique used to track objects and objects on earth via satellite. GSM is a technology used for navigation and tracking. This system is a protocol in which data is transmitted by mobile phone only in communications. Recently, the mobile phone has been developed as it is integrated on the GPS sensor, so that it can receive all signals from satellites and base station. GPS Tracker is used for tracking but needs additional GPS, as it charges for these services needs to be paid periodically. GSM displays the location of the base station, that it does not display the location of the device. So the person must pay to the service provider in case he will find the location of the device. With the progress and development of technology, a person should not use and purchase additional equipment (GPS) and paying for these services when talking about tracking, the phone tracking system has been developed. This application works by several devices through the "self-agglomeration technology" which in turn manages the devices associated with the child, it also features Bluetooth and wireless LAN. Therefore, it is a system that believes and supports the safety of children based on modern and sophisticated technologies and devices.



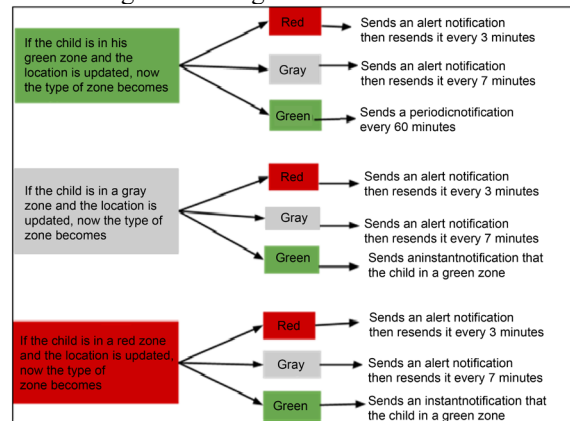
Figure3: Network Services

3. In "Kids' Tracker: a mobile application for tracking children"

Khalid A. Darabkh, Sima Al-Ali, Ramzi Saifan, Shaima Abu-Kaff, Saadeh Z. Sweidan

Thakur Polytechnic (2017 they have proposed a special phone for children only, these phones restricted to specific contacts by parents, as the application is installed in their phones to track their location. The device is designed to be worn by the child and installed the Android application in the mobile phone parents; it also includes many features that help the child to complete his daily work.

This application works through the bracelet a hand worn by the child in conjunction with the Android application in the phone of the father, the father is logged into the account in the application via many notifications. The child's location is sent via notifications on the phone, and he / she can refer to the archive record during the past days. Parents can identify specific areas where a child can go, such as school and home, the green color appears on the specific area where the child is at the same time and day, Shows the gray color of the area if the selected area but not the day and time required, Red may appear in unspecified locations. Signals are sent to the main server from the GPS every 5 seconds, either periodic notification are sent every 60 seconds, or it can change the duration through the settings.



3. METHODOLOGY ADOPTED

The methodology I used is DSDM, it is best suited for my project for the reasons that I will mention later.

The DSDM methodology has gained full and sufficient recognition for effective development by delivering the latest software more quickly, even in conditions of time constraints. Despite this, there are criticisms that some security elements are not available in the four phases, so this research aims to

take a broad and in-depth look at discovering the facts of the DSDM, through literature reviews that have been conducted. The findings show that the DSDM in this current form does not provide support for the development of security-focused software. Although there is some research related to this topic on FDD, Scrum, XP but the findings state that there is no research that talks about developing any of the secure software using the DSDM method. (Sani et al. 2013) Thus, this research proposes to improve the DSDM, so that it meets all security aspects in the field of software development.

Advantages of DSDM methodology:

- Process independent of technology.
- Flexible in developing project requirements.
- Adherence to the specified budget, strict time.
- In the development process, stakeholders are integrated.
- Focus strength of testing.
- It is characterized by a specific approach.
- Determines all stakeholders' expectations.

All in all, DSDM is the best method for my project.

- In DSDM, resource and time are fixed, and are unchanged. If I have 30 weeks to complete my project, I can't add one week.
- Function can be variable. If my project contains 5 jobs, then I can do 4 jobs because of time.

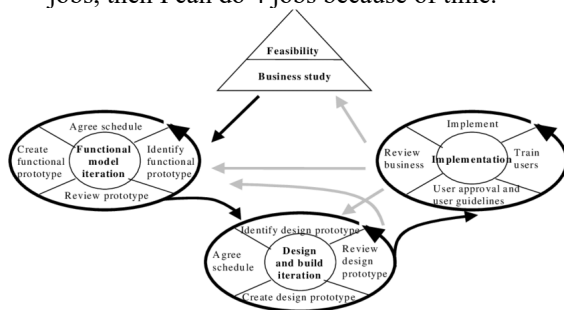


Figure 5: DSDM model Diagram

#### 4. RESULTS & EVALUATION

Data gathering is an important and practical technique for group creativity or facilitation. It is carried out by a group of people who are familiar with the project requirements. Ideas develop, and help define some requirements, through group creativity. In this technique we have many tools, but the right choice always depends on the stakeholders or the type of needs. List of some tools included in this technique.

The questionnaire aims to collect the requirements in case the groups are very large. These are collected for the requirements of the stakeholders, provided that they are

separate, the questionnaires distributed among the parents, doctors and some students. The questionnaire provides the opportunity to collect requirements from a large number of stakeholders for the project, and it also provides flexibility and participation to the stakeholder in expressing their opinion. However, when preparing the questionnaire questions, care must be taken that they are general and impartial, which helps to understand and collect requirements and needs of stakeholders.

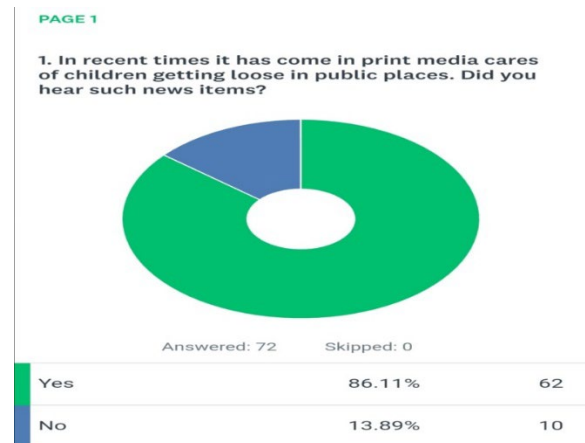


Figure 6: Results1 of survey

The data collected in this graph shows parents who have previously read any news about child loss in Oman. The result was that most of the parents had heard of this news before and the percentage was among 72 questionnaires, 62 people answered "yes" by 86.11%, while the people who answered "no" were 10 people, or 13.89%.

From this graph we conclude that many cases and tragedies occur to children in died and loss, especially in school buses, which makes parents concerned about their children when they leave the house, they do not have a way of how to reach their children or monitor them remotely. Therefore, parents are in dire need to end these stories and tragedies to reduce loss and died, through a solution that enables them to monitor their children even if they are in a location without network.

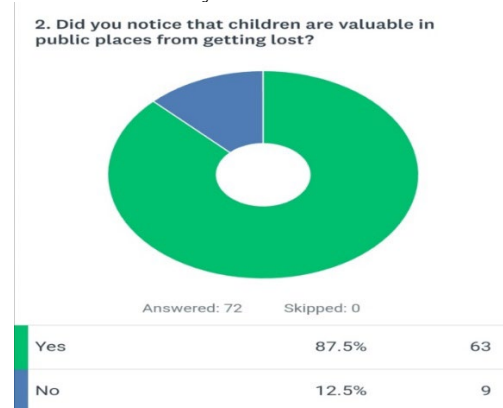
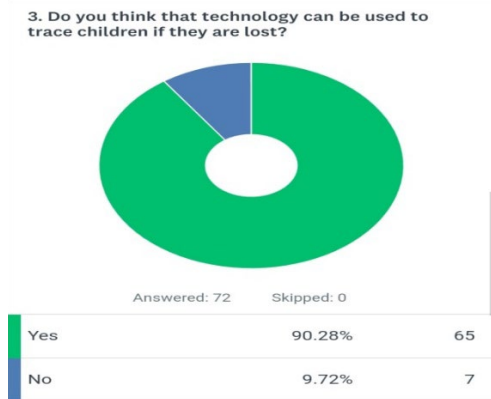


Figure 7: Results 2 of survey



This graph clearly shows the percentage of people who have noticed the absence of children in some areas. They were 87.5% which is 63 people. As for those who answered some of that, they were 12.5% which is 9 persons.

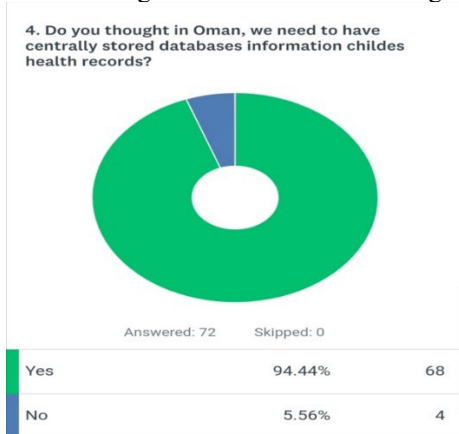
Children are vulnerable to absence in public places, whether it is in a park, garden, or perhaps in markets and shops. It is also known that children have energy and empty it in playing and exploring, so they are at risk of losing from their parents, which causes panic and fear for parents if they are not a way to protect them from loss.



**Figure 8: Results 3 of survey**

This graph shows the percentage of parents who think technology can enter into the child tracking field. The proportion of those who answered “yes” was 90.28% which 65 persons, while those who answered “no” 9.72 which 7 persons.

Now a day, technology plays a fundamental role in daily life, as we have become in the era of technology, the time of automation. These ratios indicate that technology is able to track and monitor children from a distance, which makes it easier for parents to know the movements of their children in every part of the second, and to know their locations in the smallest details through the use of GPS technologies

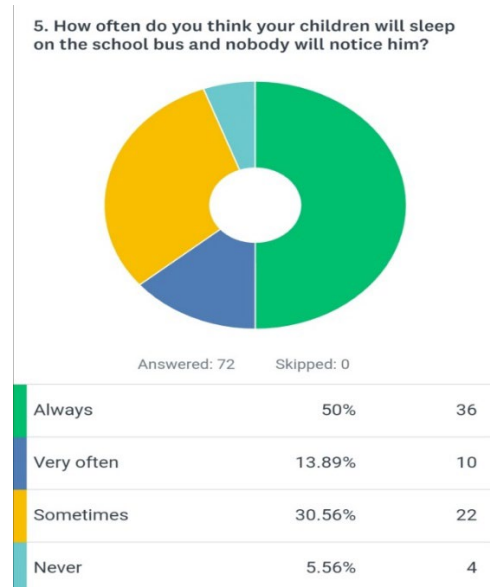


**Figure 9: Results 4 of survey**

The following chart shows the parents 'need for a database of child medical records associated with all hospitals. The highest percentage of fathers who answered "yes" was 68, by

94.44%. As for those who answered "no", they were 4 persons, with a percentage of 5.56%.

This indicates that parents are in urgent need of child care by providing medical records in hospitals, where if the child is registered in a hospital in Muscat, and he has gone to a picnic from the school to the state of Barka, and something happened to him that led him to go to the hospital. Here the problem lies; the hospital in Barka does not contain the slightest medical information about the child. So here lies the importance of providing a medical database linked to all hospitals for all patients. Once the patient gives their ID number, an automatic medical record will appear.

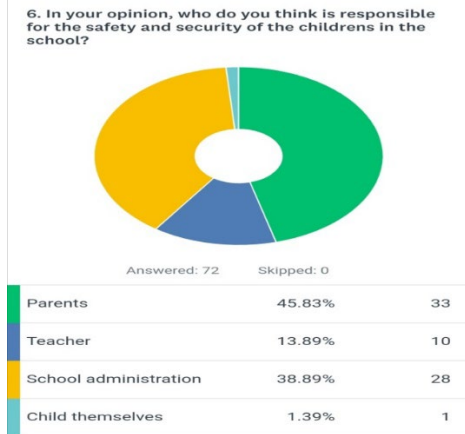


**Figure 10: Results 4 of survey**

This graph shows parents believing that their children will sleep on the school bus, which raises fear and thinking about them because they have no solution to monitor them.

Of course, the highest percentage was attributed to parents who answered “always”, they are always anxious and thinking about this issue and their percentage was 50%, followed by those who answered “sometimes” by 30.56%, followed by those who answered “very often” by 13.89% percentages, and the lowest share was for those who did not think about this issue permanently and were A very small percentage 5.56%.

We can deduce from these proportions, the extreme fear of their children on the school bus, given the many tragedies and stories that we heard everywhere, which we read in the newspapers, and which many talks about in the died of the children inside the bus because of their forgetfulness, which led to their suffocation due to the lack of oxygen. Again, I repeat, parents an urgent need for a solution that ends these stories and tragedies.



**Figure 11: Results 6 of survey**

Graph 6 illustrates the parents' opinion about the primary responsibility for the safety of children in the school bus. The highest percentage of parents was 45.83%, The lowest percentage was to protect the child himself by 1.39%. As for the parents' opinion regarding child safety by the school administration, it was 38.89%.

Through what I gathered of information and opinions of parents about an application to track their children, and the need for it. I have come up with the following results:

We hear a lot of children's tragedies in loss, some of them die suffocated on the school bus, some may drown in a swimming pool, some may lose in their garden while they are going to a picnic, and many cases that occur here in the Sultanate of Oman. Parents are also worried about their children sleeping on the bus, causing a sensation, many psychological problems for children and many deaths.

Children go through many stages, one of which is to become a naughty child and love to explore places, which leads to a loss from his parents. Parents spend some of their time out of the sight of their children, which makes it difficult for them to know what their children are doing, i.e. they went, did they arrive, with those who play Parents have no way to protect their children from this loss.

Children and patients in general, need a special medical record for each patient in all hospitals, meaning that they need a solution that collects medical records, and tracks children. In addition to parents' opinion that technology can end these tragedies, through a solution that enables parents to monitor and track parents on their children.

Therefore, with the information you have gathered, parents need the most urgent need to find a technology that tracks the location of your children, so that they are monitored in cases where they are out of sight of their parents, which reduces the loss of children.

## 5. CONCLUSION

Feeling of safety for children is one of the first importance of the Omani parents, although there is good care for children and constant monitoring, but in reality, constant monitoring is not always a useful way; especially since the children are not under their parents eyes all the time.

Omani parents need to end the tragedies that happen to their children in the loss, the Omani child has the right to care and preservation.

ALAMAN application has been implemented, in line with the requirements of the Omani people, in providing a system that allows parents to track the location of their children at anytime and anywhere through GPS technology, which limits the loss of children, facilitating the searches that last for hours and days. The parents can specify safe areas for the child to go to, and define block areas. In the event that the child is out of the safe areas, the watch sends signals to the server via GPS, and the server transmits these signals to the phone application as a notification that tells the parents that your child has left the safety areas, again the application sends signals to the server and the server converts the signals to the watch to know the actual child's location and then Once again, these signals, provided with the child's location, are transferred to the father's application as a notification informing him about the child's location and the distance the child is away from.

It also facilitates the movement between the Sultanate's governorates, as it contains medical records for children that can be accessed in any hospital in Oman. ALAMAN application is a very simplified application, but there are many important details that every parent should know and follow it, as it aims to care and safety for the Omani child.

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