

CHILD MONITOR

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This Report Presented in Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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DHAKA, BANGLADESH
10TH DECEMBER 2018

APPROVAL

This Project titled “**Child Monitor**”, submitted by Foysal Ahmed, ID No: 151-15-5164 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfilment of the requirements for the degree of B.Sc. in Computer Science and Engineering (BSc) and approved as to its style and contents. The presentation has been held on 10-12-2018.

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DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Shaon Bhatta Shuvo, Senior Lecturer, Department of CSE** and the Co-supervision of **Itisha Nowrin, Lecturer, Department of CSE**, Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ACKNOWLEDGEMENT

First, I express my heartiest thanks and gratefulness to almighty Allah for His divine blessing makes us possible to complete this project successfully.

I am grateful and wish my profound and indebtedness to **Shaon Bhatta Shuvo, Senior Lecturer**, Department of CSE, Daffodil International University, Dhaka and, **Itisha Nowrin, Lecturer**, Department of CSE, Daffodil International University, Dhaka. Deep Knowledge & keen interest of my supervisor in the field of Android app to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project.

I would like to express my heartiest gratitude to **Dr. Syed Akhter Hossain, Professor and Head**, Department of CSE, for his kind help to finish my project and also to other faculty member and the staff of CSE department of Daffodil International University.

I would like to thank my entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must acknowledge with due respect the constant support and patients of my parents.

Abstract

This project is on “Child Monitor” is an android based application which will effectively and efficiently monitor the smartphone use and smartphone location which is mainly targeted for kids and teenagers. The monitoring will be done by their parents though. To prevent the abuse of smartphone by the kids are the main goal of this project. The main feature of the project is to track smartphone uses and notify the parents about how much time the device is being used or how much time a certain application is opened in the foreground along with the daily device location. Daily device location will ensure parents about where their children are roaming outside home. Parents will be the main user of the application and the children device will be the linked device to their parents. A user can register to the application through email and password.

This application will lessen the worries of the parents about their children and help parents to ensure better future for their children before being too late.

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CHAPTER 1

Introduction

1.1 Introduction

Children needs more of our attention and guidance. Day by day we are getting more away from our children. They are becoming more addicted to the electronic devices. Because of our busy life we don't know properly where are they roaming while they are outside of home. To mitigate this situation, this "Child Monitor" application will track smartphone usage statistics of children regularly along with location data of child device and notify parents so that parents can be more careful about what their children are doing with their smartphone and where they are roaming around.

1.2 Motivation

We are living in the era of modern technology. Smartphone has become the part and parcel of our life. We can't ignore it even if we want to. Besides adults, children are also using smartphone. And it is worth mentioning that children are permitted by their parents. Because of urbanization children are staying at home more than they are outside at the playground. As a result, they are passing their leisure period by using smartphone and other electronic devices. We know, everything has their both positive and negative side. And it totally depends on the use of the technology. But proper monitoring and guidance is not happening currently. Beside this problem another security issue for children are their outdoor safety. Are they really safe out there? Are they roaming here and there without parent's concern? So, I have been motivated from this concept to build such a smartphone application that will prevent the abuse of smartphone and ensure parents about outdoor activity.

1.3 Objective

To ensure the better future for the children and effective use of smartphone is the main objective of this project. This project will ensure the parents about smartphone use of their children and outdoor visited place per day to keep them tension free. Potential abuse of smartphone will be controlled which is usually done by the teenagers and children.

1.4 Expected Outcome

Parents will be able to take necessary actions to control their children by analyzing the smartphone use data and location data. They will be notified on regular basis. In our current situation we don't know how our kids are using their smartphones and how our kids are roaming outside home. But through using this application we will be able to track the usage and location which will help us to secure them from harm and ensure betterment of their future.

1.5 Report Layout

In the first chapter of this project report, I have discussed what actually motivated me for the development of this project and from where I've got the inspiration to work on this as well as the objectives of this project and the outcome from this project.

In the second chapter of this report, I have focused on the background of related projects, discussed some other related works, compare their comparative activities and the improvement of this project.

In the third chapter of this report, I have discussed the use case model, business process model, design requirement, ER diagram, and requirement collection.

In the fourth chapter of this report, I have focused on the front end, back end design specification and requirements for implementing the project.

In the fifth chapter I have showed the project implementation phase, like database, front end, testing and test results implementations.

In the sixth chapter I have conclude our discussion with further development ideas that I have in my minds.

CHAPTER 2

Background

2.1 Introduction

When it comes to child safety it becomes the major priority. Not only in real life but also in virtual life their safety is the major concern. Modern devices are doing great help to mankind but they have certain bad consequences too. Adults might be careful and understand the consequences of using smart devices like mobile phone computer etc. But when it comes to children and teenagers, they are not that much concerned. They might do harm to themselves without knowing a thing. Another thing is they might be mixed with illegal works by bad companies. If parents could know about where are they roaming outside home parents might be able to guide them properly. To prevent this several works are done. In my ‘Child Monitor’ application I am introducing some features which will help parents to control children’s smartphone use and inform parent about outdoor roaming information. In the section below, I will be talking about related works about child safety in virtual life and real life as well.

2.2 Related Works

There are some mobile applications which are built in in intention with family member safety and child safety. These applications and their functionality are discussed below.

2.2.1 Family Locator-GPS Tracker

Life360’s Family Locator simplifies life in the digital world by making it easy to stay connected to the people who matter most ^[2].

Some key features are:

- Creating own groups or circles of loved ones to stay connected.
- Viewing the real time location of circle members on a private family map.
- Receiving real-time alerts when Circle Members arrive at or leave destinations.
- Get the location of stolen or lost phones.

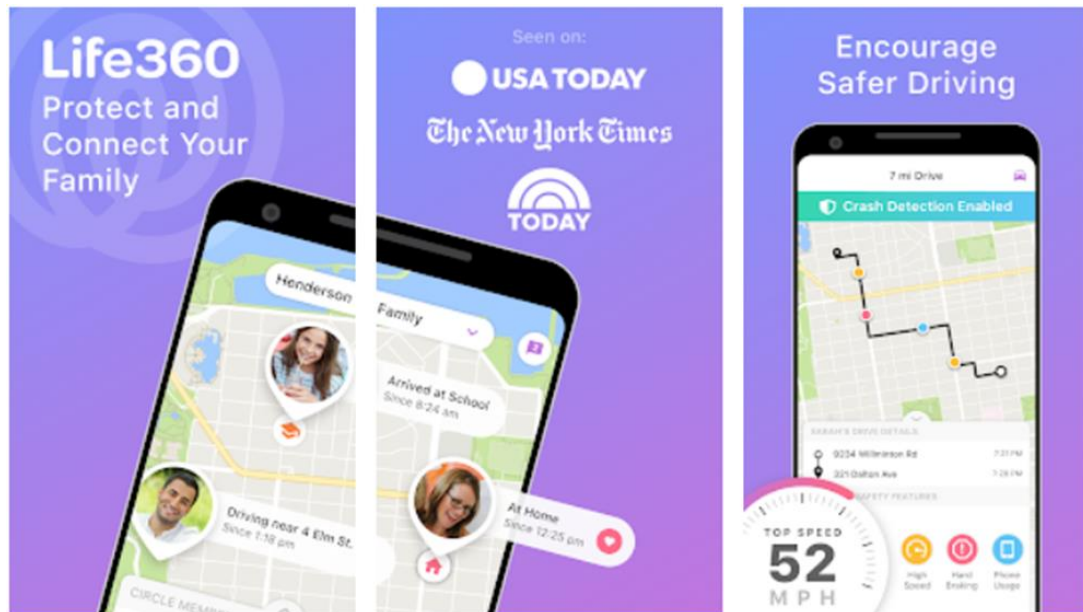


Figure 2.2.1: Family Locator - GPS Tracker

2.2.2 App Usage

It lists the usage time of apps by preferred sorting order. This usage information is helpful to check which apps should be uninstalled as they are not used. It can also be used for spying whether an app has been used by someone else ^[1].

Some key features are:

- Show app usage history.
- Check phone history
- Show activity history
- Notification history
- Most used apps
- Overusing reminder
- Heat map
- Unlocked time
- Installed apps
- System app usage
- Call history

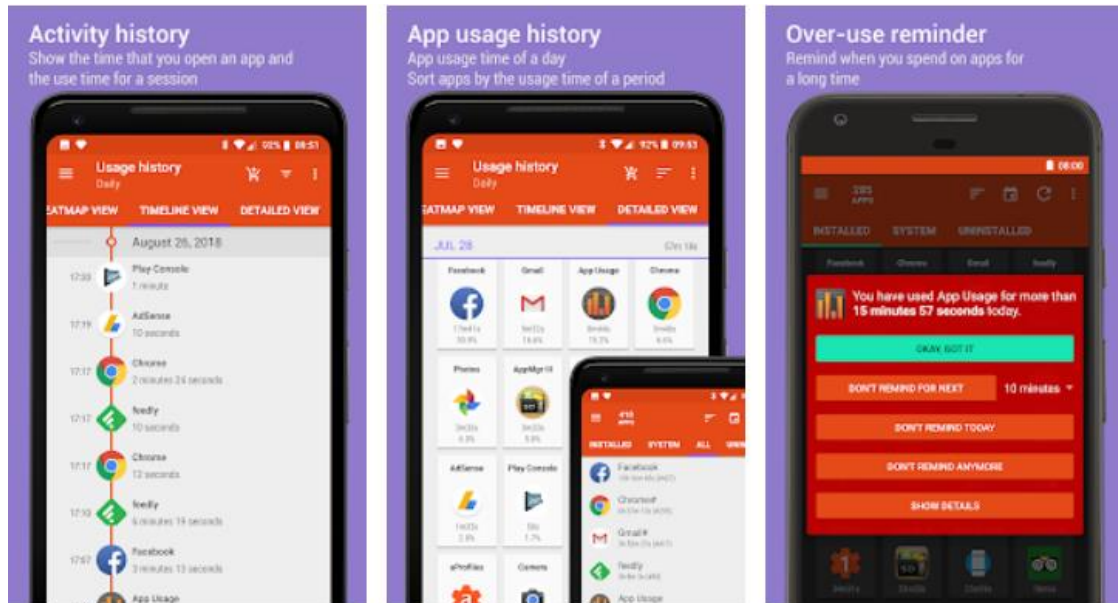


Figure 2.22: App Usage

2.3 Comparative Studies

In Related Work section some application features have been discussed. Those works are similar to my project works in some ways. But they are not same in all ways. They are pretty different in many ways. We saw in these applications that these features are isolated where in child monitor application all of the features are included. We can simply say that ‘Child Monitor’ application is a complete package. In this project it is intended to track the child’s phone usage by installing the client application. The main application will be in parent’s smartphone from where parents will be able to monitor the child’s activity. It is worth mentioning that no other application has been published yet with this concept.

2.4 Scope of the problem:

I have faced a lot of difficulties while building this mobile application. I had to read a lot of documentation in the android developer website. As the common functionalities are easy to build, they were easy to understand. But when it is about the background service then the task is very difficult. Resources were necessary to build the application but finding resources are not that easy. Resources that were available either very complicated or intended to build simple application. So, Collecting the ideas from these application and resources and integrating them and tuning the information for my project were really challenging.

2.5 Challenges

While working on this project I have faced a lot of challenges. But finally, these challenges were overcome. Some of them are listed below.

- Finding relevant works
- Setting up Android development environment
- Connecting devices to parent user
- Setting up service properly
- Collecting App Usage Statistics appropriately
- Uploading statistics data to Google Firebase

CHAPTER 3

Requirement Specification

3.1 Business Process Modelling

Business process modelling refers the process of modelling the analytical representation of an organization’s business processes. Along with business process discovery, process modeling is widely viewed as a critical component in successful business process management (BPM) [7] .

The Business process model of this project is given below.

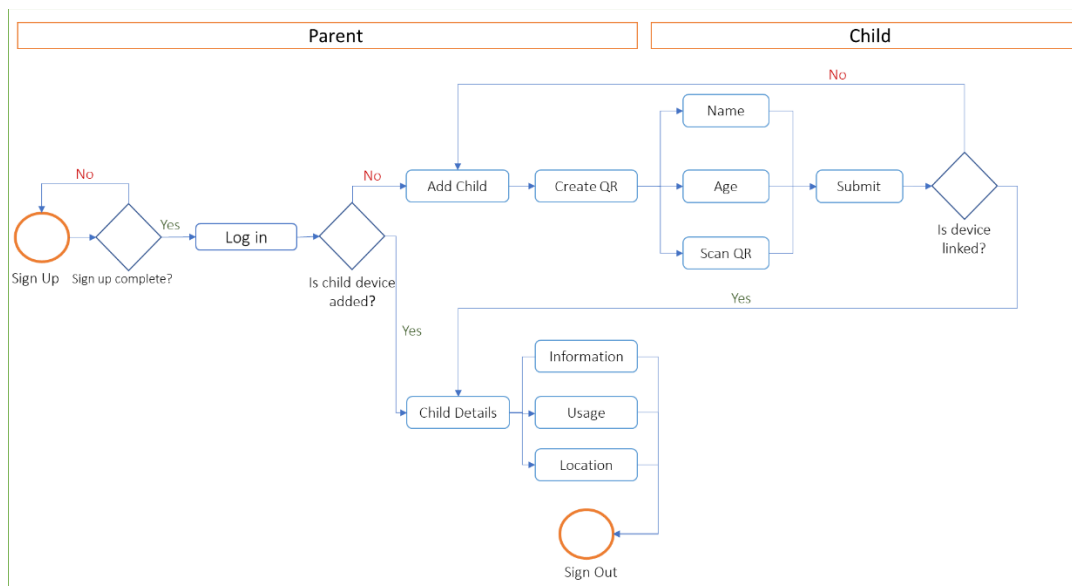


Figure 3.1.1: Business Process model.

3.2 Requirement Collection and Analysis

Before starting implementation of the any project requirement collection is the vital part. Because the whole system is dependent on requirements. No project can be successful without proper requirement collection. About 60% project fails to fulfill its main target because of low quality of requirement analysis. If the project team fails to capture all the necessary requirements for the solution then the project will not be running fine. This may cause future loss and damage.

For my project I had to collect the requirements carefully. After collecting all the requirements, I have analyzed them and taken necessary decision to make the project possible. I have found while collecting information and requirements that parents are

not happy about their children's device use and they are not even aware what are their children are using. They want something that can help them to track their children's smartphone usage activity. It is fully clear after collecting requirements what I need to include in the application and exclude from it.

3.3 Use Case Modelling and Description

Use case model refers the action relation between different type of users and the software or application. Use case model consist of some elements. These elements are use cases, actors and the relationship between them. Use case model is used to simplify model to communications [3].

This project is used by two type of users. The use case model of this project is given below.

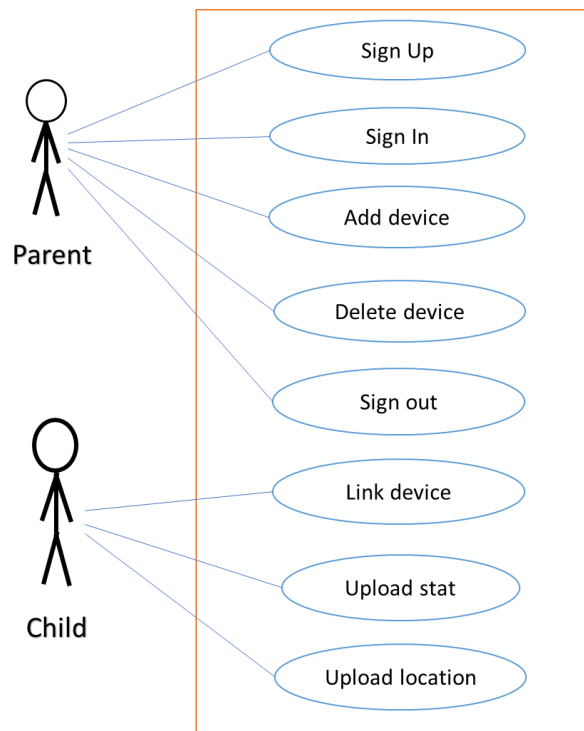


Figure 3.3.1: Top level use case

Briefly explained use case diagrams are given below.

Managing child device use case is given below

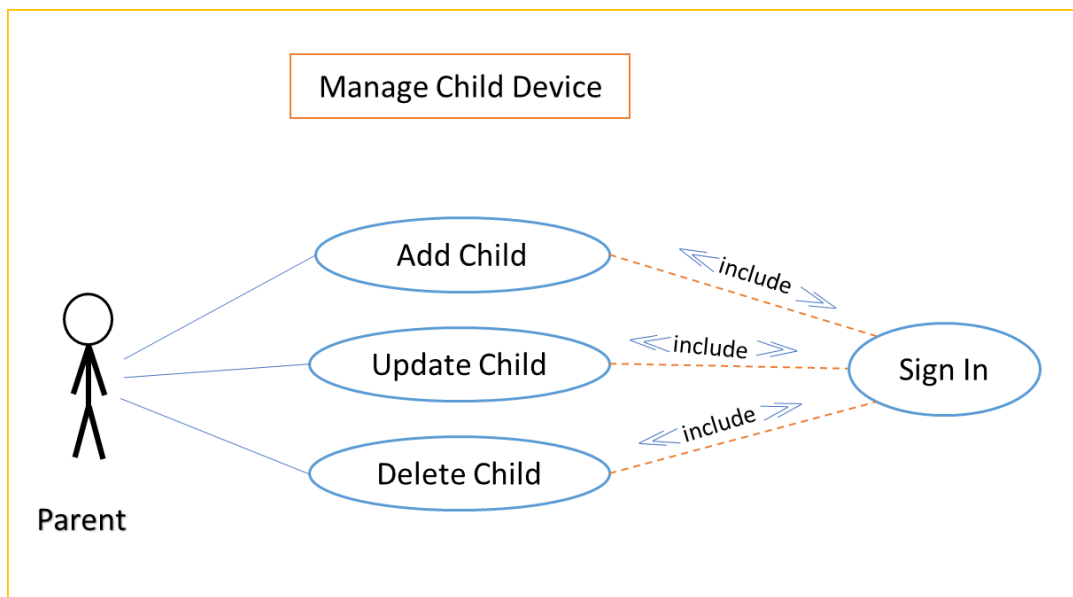


Figure 3.3.2: Manage Child Device system

Usage upload system use case diagram is given below

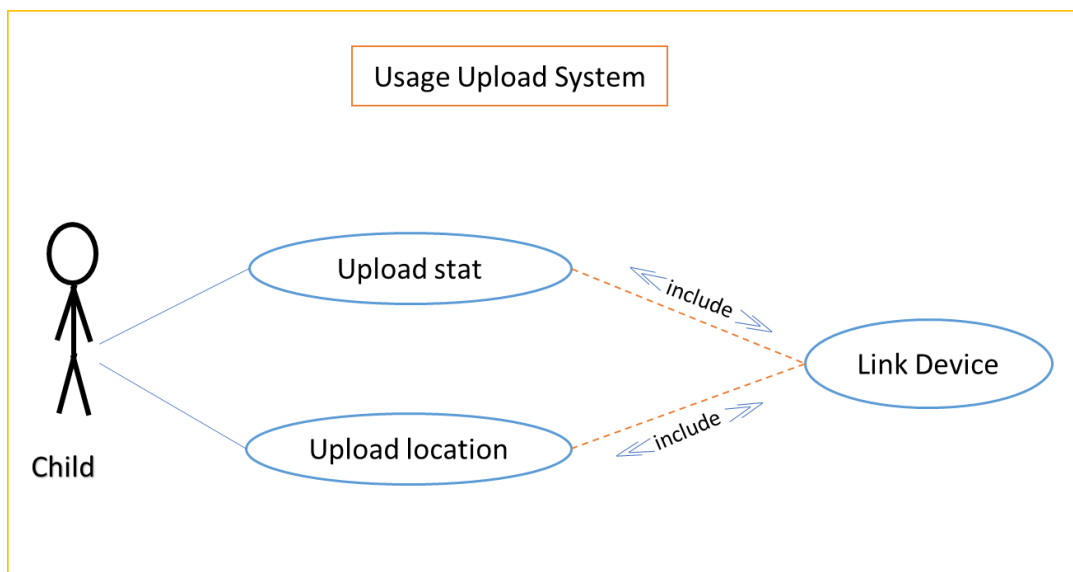


Figure 3.3.3: Usage upload system

Parent use case details:

Table 3.3.1- Use case of Parent Sign-up

Use Case name: Parent Sign-Up	
Use case details	Parent sign up to use the service
Precondition	No precondition
Actor	Parent
Normal flow	<ol style="list-style-type: none">1. Parent provides name2. Parent provides E-mail3. Parent provides mobile Number4. Parent provides password5. Parent is successfully signed up.
Alternative flow	<ol style="list-style-type: none">1. E-mail is not valid2. Mobile number is not valid3. Password is too short4. Fields can't be empty5. Network error
Post-condition	Parent is redirected to Home page

Table 3.3.2- Use case of Parent Sign In

Use Case name: Parent Login	
Use case details	Parent login into the system
Precondition	Parent must be registered
Actor	Parent
Normal flow	<ol style="list-style-type: none">1. User provides E-mail2. User provides password3. Get access of the system
Alternative flow	<ol style="list-style-type: none">1. E-mail or Password in incorrect2. Network error
Post-condition	Parent is redirected to Home page

Table 3.3.3- Use case of Add Child Device

Use Case name: Add Child Device	
Use case details	Parent adds child device to monitor
Precondition	Parent must be logged in
Actor	Parent
Normal flow	<ol style="list-style-type: none"> 1. Parent provides information 2. A QR code is generated 3. QR code is shown in image view
Alternative flow	<ol style="list-style-type: none"> 1. QR code generation failed 2. Invalid QR data
Post-condition	User is redirected to Device List page

Table 3.3.4- Use case of Manage Child Device

Use Case name: Manage Child Device	
Use case details	Parent manages added child device
Precondition	Parent must have added child device
Actor	Parent
Normal flow	<ol style="list-style-type: none"> 1. Update child information 2. Delete child from monitoring list
Alternative flow	<ol style="list-style-type: none"> 1. Update failed 2. Delete failed 3. Network error
Post-condition	User is redirected to Device List page

Table 3.3.5- Use case of View child Usage Statistics

Use Case name: View Usage Statistics	
Use case details	Parent can view usage statistic
Precondition	Parent must have added child device
Actor	Parent
Normal flow	<ol style="list-style-type: none"> 1. Parent select child 2. Parent select date 3. Parent view child usage statistics
Alternative flow	<ol style="list-style-type: none"> 1. Network error 2. Firebase error
Post-condition	User is redirected to Usage Stat page

Table 3.3.6- Use case of View personal Usage Statistics

Use Case name: View Personal Usage Statistics	
Use case details	Parent can view personal usage statistic
Precondition	Parent must be logged in
Actor	Parent
Normal flow	<ol style="list-style-type: none"> 4. Parent select child 5. Parent select date 6. Parent view child usage statistics
Alternative flow	<ol style="list-style-type: none"> 3. Network error 4. Firebase error
Post-condition	User is redirected to Usage Stat page

Table 3.3.7- Use case of Link with parent device

Use Case name: Link device with parent	
Use case details	Child can link device with parent's device
Precondition	No precondition
Actor	Child
Normal flow	<ol style="list-style-type: none"> 1. Child provides name 2. Child provide age 3. Child scan QR from parent's device 4. Child device get linked with parent device
Alternative flow	<ol style="list-style-type: none"> 1. Required fields can't be empty 2. QR scanning failed 3. No valid QR code found 4. Network error
Post-condition	No post condition

3.4 Logical Data Model / Data Flow Diagram

Logical data model actually represents the database structure of a software project. Good database management system can be easily represented with this diagram [5]. This provides a quick idea about the database data structure and used classes and objects of a project. This model includes relational tables, columns, object-oriented classes and relation between classes with keys and specific symbols. To organize this 'Child Monitor' project database I have used several classes. They are UsageStat, Parent, Child and LocationInfo class.

Following figure shows the logical data model

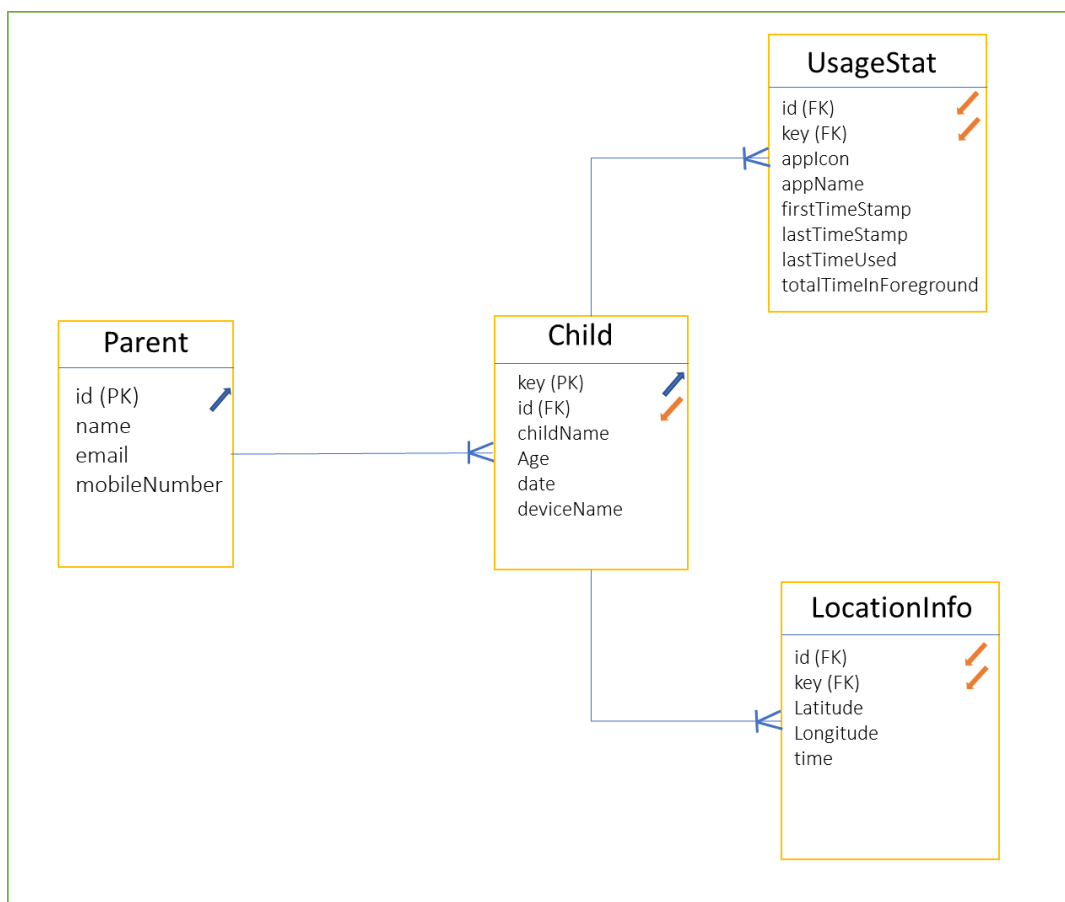


Figure 3.4.1: Logical Data Model

Data flow diagram shows how the data used or manipulated in a software project flow. My project has one type of user who upload data to database and other type of user retrieve them with reference keys.

The figure drawn below represents the data flow diagram.

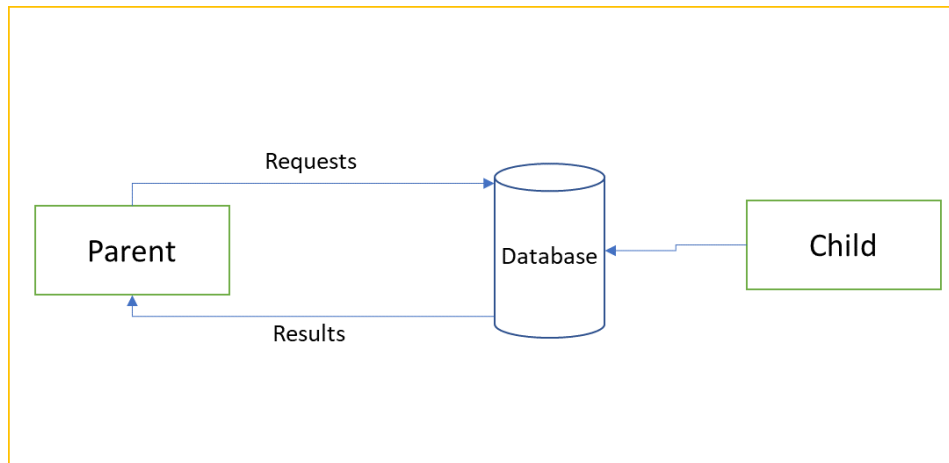


Figure 3.4.2: Data Flow Diagram

3.5 Design Requirement

Design requirement state is the important characteristics that any project must meet in order to be complete a successful project. It helps any project or application to be more user friendly and easily understandable. To make the application convenient to the users I must meet the design requirement. For 'Child Monitor' project following requirements must be meet to reach the goal.

Design requirements:

- Sign Up
- Sign In
- Parent information
- Add child device
- Link with parent
- Device list
- Usage Statistics
- Google map location

CHAPTER 4

Design Specification

4.1 Front-End Design

Front-end design is intended to interact between user and the application. Users get service through this front-end. If the front-end design is easy and understandable then it is easy for the user to use the functions of the application. Considering this I have built the application user friendly and easy to interact.

As it is an android application and front-end design is of an android application is designed by XML so I had to build the design with XML code. XML refers to Extensible Mark-up Language.

Sign In page is the first front-end representation of my application. User can sign in providing registered e-mail and password. This page can also take the user to the 'Sign Up' page through a button press. This page includes an easy way to register users. Users has to provide E-mail and a password for signing up.

After sign up and sign in procedure user is taken to the main homepage of the application. Homepage contains three 'tab view' with three functionalities. In the homepage user see the add child option where he/she can link his/her children device. There is a recycler view always shown in the homepage which shows the list of linked devices.

Tapping on the list of devices take the user to the information view page as per different device.

Information page show the daily usage statistics of the device which is the main purpose of this project. Information is shown in a recycler view.

From the home page where the liked devices are linked and displayed can be removed or the device information can be edited as per user wish.

Application user interface design and interaction of user and application is given below.

4.1.1 User interface of first page of the application

This is the first page of 'Child Monitor' application which allows to choose between parent and child type user.

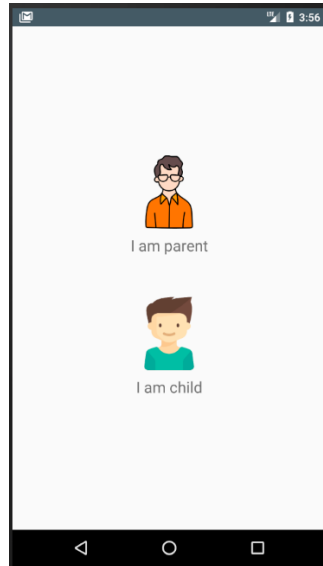


Figure 4.1.1 User type selection page

4.1.2 Interface of Signing up to the application

This page helps user to sign up as parent.

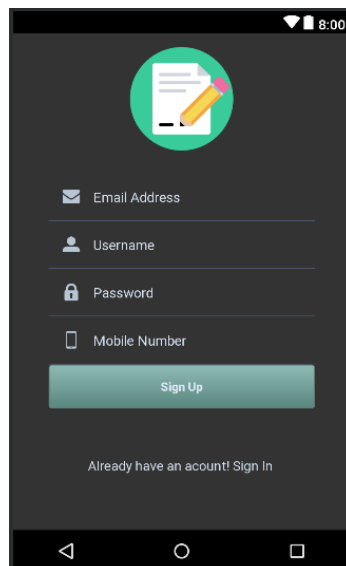


Figure 4.1.2 Sign Up page

4.1.3 User interface of Sign In system

Through this user interface a registered user can get access to use the application.

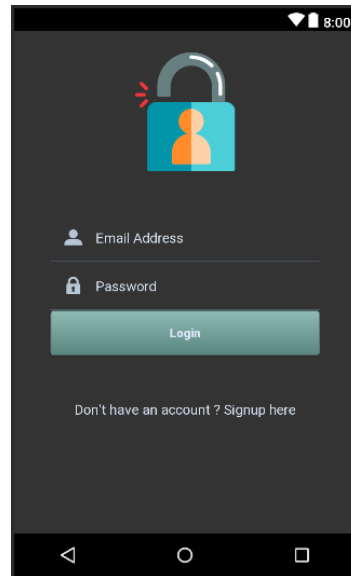


Figure 4.1.3 Sign In page

4.1.4 User interface of application home

This is the home page of 'Child Monitor' application.

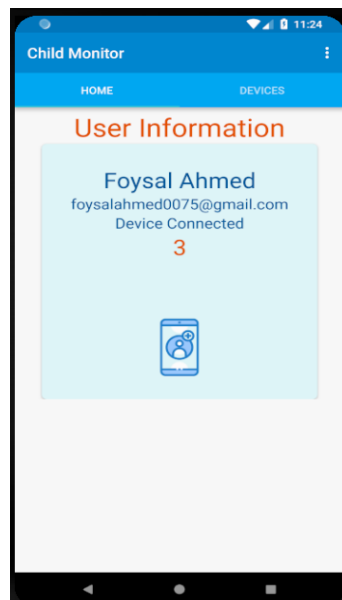


Figure 4.1.4 Application home

4.1.5 User interface of add child device page with QR code generation

This page helps parent user to connect child device for monitor. In this page parent can create a QR code which will be scanned by child device for successfully linking device. Once successful parent will hit done button.

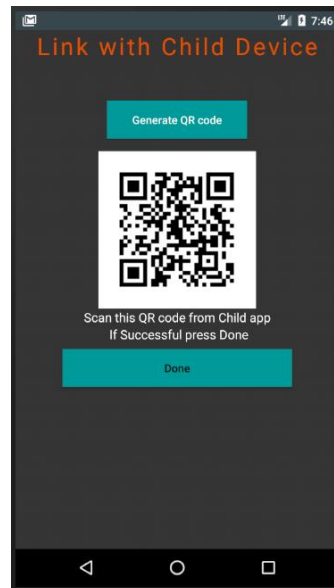


Figure 4.1.5 Add child device page

4.1.6 User interface of child side device linking

This page helps child device to be linked with parent user. The start monitoring button start the background service to contribute uploading usage data which will be read by parent later.

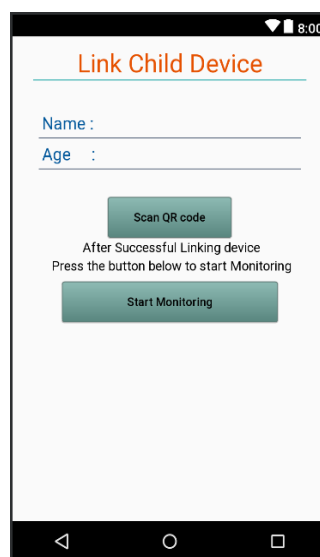


Figure 4.1.6 Link Child device with parent device page

4.1.7 User interface of connected or linked child device list.

This page shows all the connected child device list in a recycler view with child name, device and child age information. Clicking on the device redirect user to the usage details page.

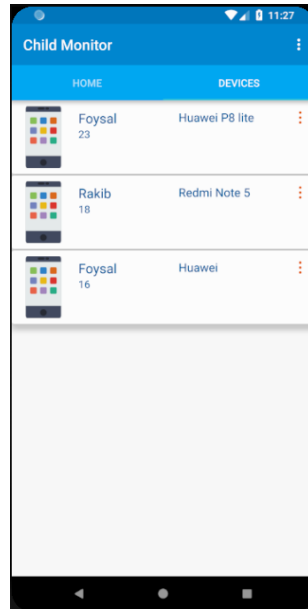


Figure 4.1.7 Connected child device list page

4.1.8 User interface of Usage Details page

This page shows the child device usage statistics in a grid recycler view with application name, application icon and total used at selected date.

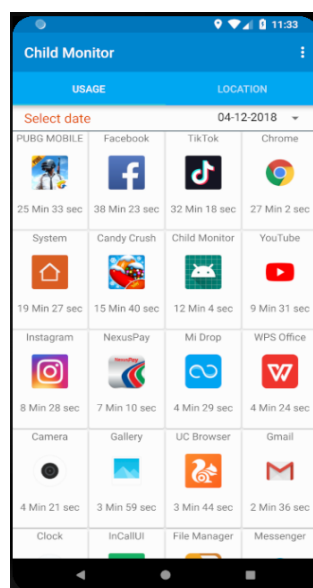


Figure 4.1.8 Usage details view page

4.1.9 User Interface of Usage details of specific application of child device.

This page shows the details of application use for a single application. Here parent can see the last time the application was opened, total usage time of the day and the use frequency. Use frequency means if the current using level of that application is low moderate or high. This will help parent to easily understand if his/her child is using the application too much or in moderate level.

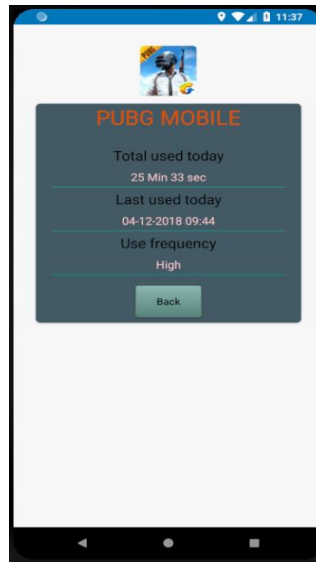


Figure 4.1.9 Application usage details

4.1.10 User Interface of google maps with daily location history.

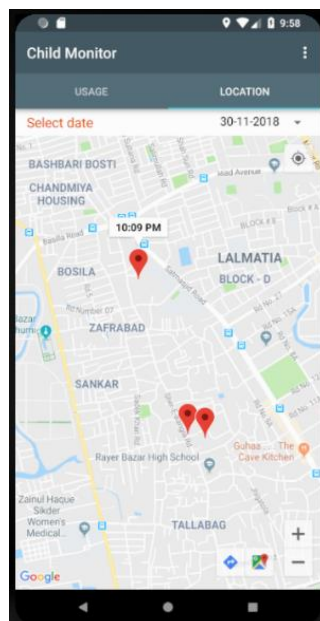


Figure 4.1.10 Location history on google map

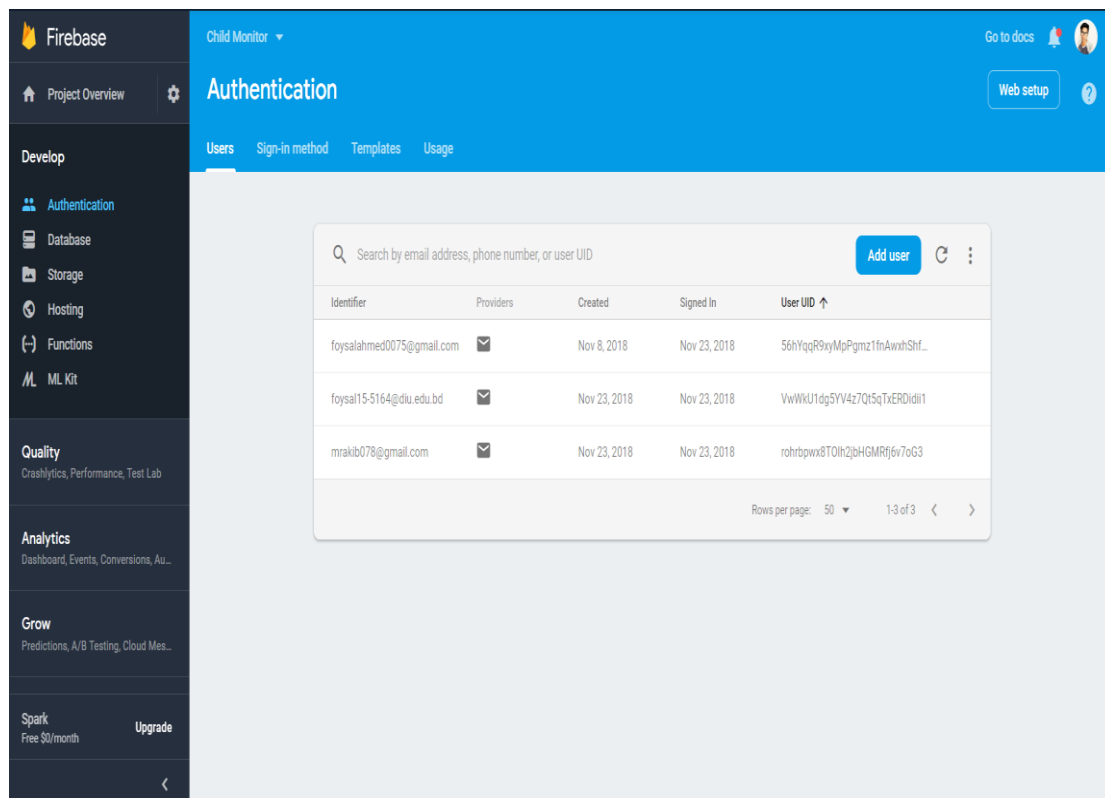
4.2 Back-End Design

Back-end refers to the logical and functional point of a project or application. In the back-end all the logistic operations are occurred which is designed by the developer.

To make this project successful I have used Android studio IDE. Android studio require several development kits to run. These are java, jre, Java Socket Programming. It is a plus point in android programming is we can use variety of libraries which provide us various functionality very easily. I have used android UsageStats for the information collection from client or linked device.

For storing and saving the information online I have used Google Firebase. Google Firebase is an excellent and efficient way to user store and analyze data. Its data management system is real time fast and hassle free [6]. As Firebase is free and easy to use, I have chosen it for my application storage side.

Following figure shows the registered users in the application.



The screenshot displays the Firebase Authentication console interface. On the left is a dark sidebar with navigation options: Project Overview, Authentication, Database, Storage, Hosting, Functions, ML Kit, Quality, Analytics, Grow, and Spark. The main content area is titled 'Authentication' and includes a search bar, an 'Add user' button, and a table of registered users. The table has columns for Identifier, Providers, Created, Signed In, and User UID. Three users are listed, all with email providers and creation/sign-in dates in November 2018.

Identifier	Providers	Created	Signed In	User UID ↑
foysalahmed0075@gmail.com	📧	Nov 8, 2018	Nov 23, 2018	56hYqR9xyMpPgmz1fnAwxbShf...
foysal15-5164@diu.edu.bd	📧	Nov 23, 2018	Nov 23, 2018	VwWkU1dg5YV4z7Ql5qTxERDidi1
mrakib078@gmail.com	📧	Nov 23, 2018	Nov 23, 2018	rohbpwx8TOln2jHGMrf6v7oG3

Figure 4.2.1 Users registered with email and password

Following figures shows the basic firebase database structure.

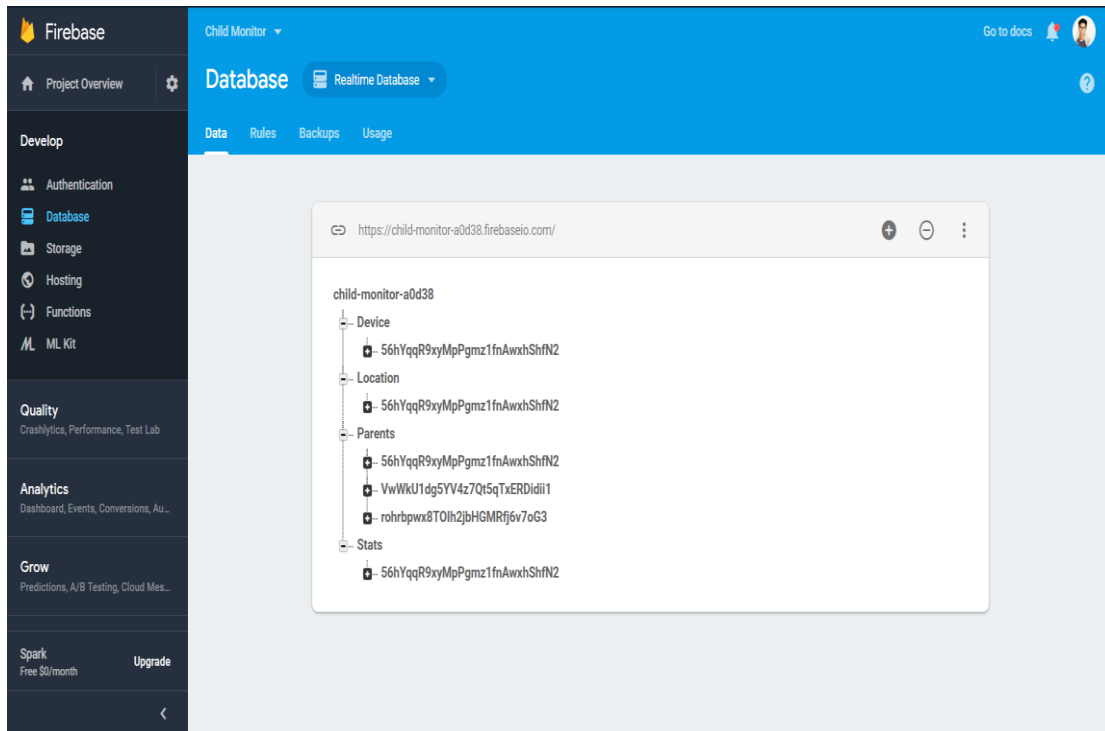


Figure 4.2.2 Firebase database for storing usage data

Following figure shows the database data nodes of firebase.

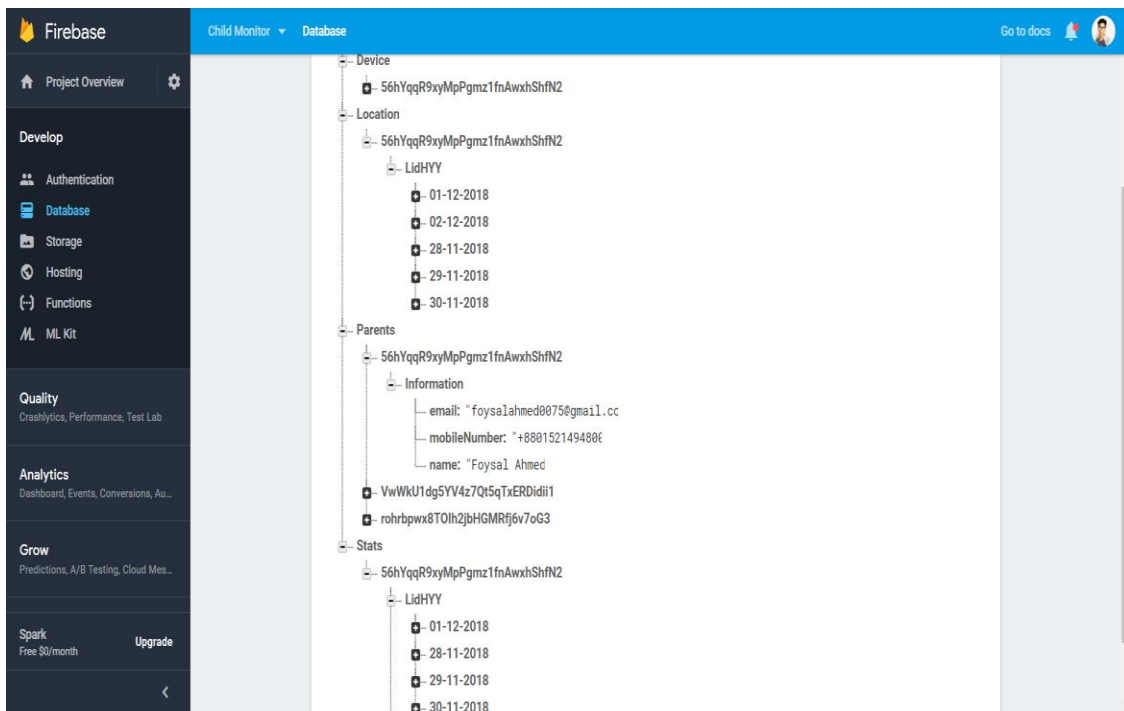


Figure 4.2.3 Firebase database tree structure

Following figure shows the usage statistics data structure

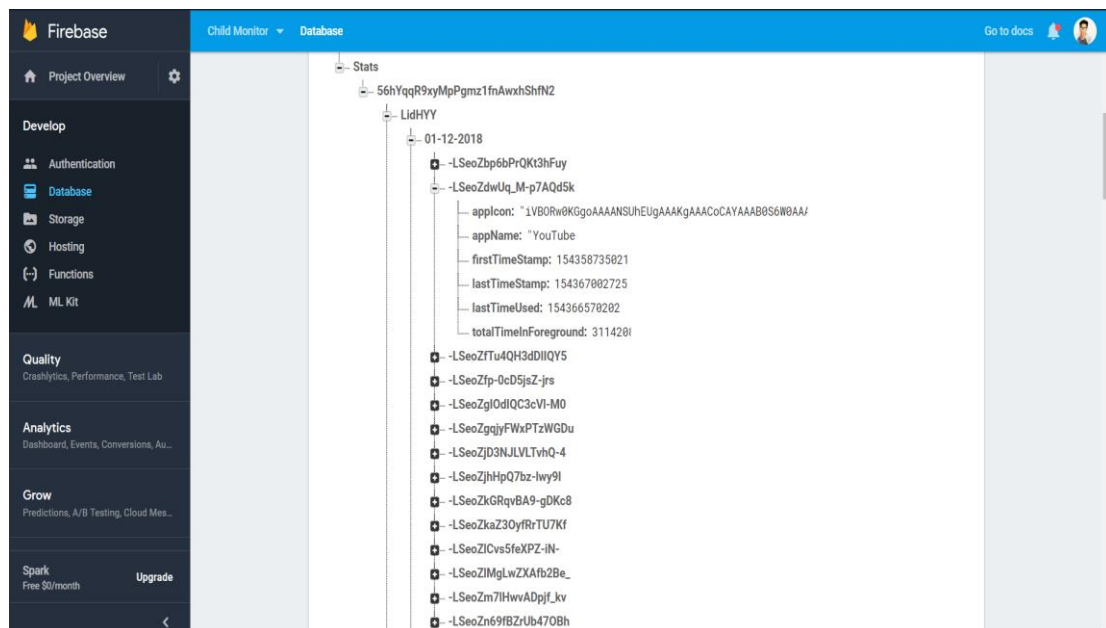


Figure 4.2.4 Firebase data structure for daily usage statistic

4.3 Interaction Design and UX

Interaction design is very important component of user experience design. It is the medium of interaction between users and products. Here products usually refer to software or application that users are going to use. It enhances the user's positive feedback about using the application. A good UX design make sure that the users are finding value while using the application. This is the process to make sure that products that are being delivered are relevant and useful to users.

It is always challenging to make the application user friendly and easily understandable. In fact, first time use is very much challenging for the user. Proper instruction should be followed to overcome this challenge.

For this purpose, I have built the 'Child Monitor' application very user friendly and easy to use and rejected unnecessary function that might be irritating and not useful for the user.

Parent user activity of my application at a glance is given below.

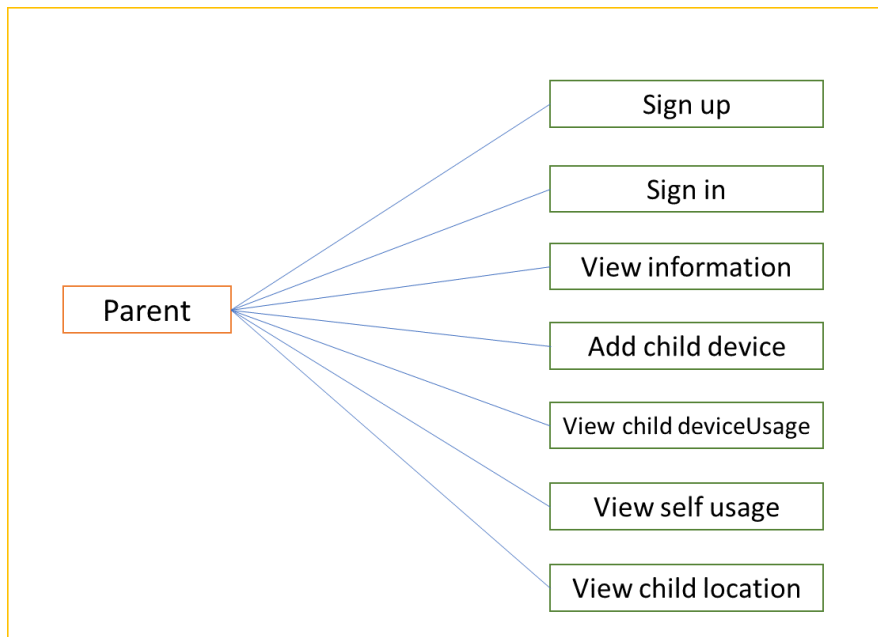


Figure 4.3.1- User Activity

4.4 Implementation Requirement

Implementation refers to execution of any plan, idea, model or policy for doing something. Implementation process must follow preliminary thinking in order to make something possible.

For successful implementation of any plan or project many tasks between different departments need to be accomplished in within deadline.

For making my project successful following things are required.

1. Computer with following specification
 - Minimum 4 Gb RAM
 - Minimum 3.00 Ghz CPU
2. Internet Access
3. Android Studio
4. JRE installed
5. An android phone

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

Database is used to store information of an application or software in an organized way. Database manages easy access and updating of data without any hassle. Choosing right kind of database for a project is very important. Performance of an application mostly depends on efficient database operation. In 'Child Monitor' application I have used Firebase database as my database client. Firebase is real time database and very easy to use. As my project is an android project so I have used android studio to build my application. Android studio supports easy firebase connection.

5.2 Implementation of Front-end design

5.2.1 Implementation of user type selection

This is the first page of 'Child Monitor' application which allows to choose between parent and child type user.



Figure 5.2.1- User type selection page

5.2.2 Implementation of Signing up to the application

This page helps user to sign up as parent.

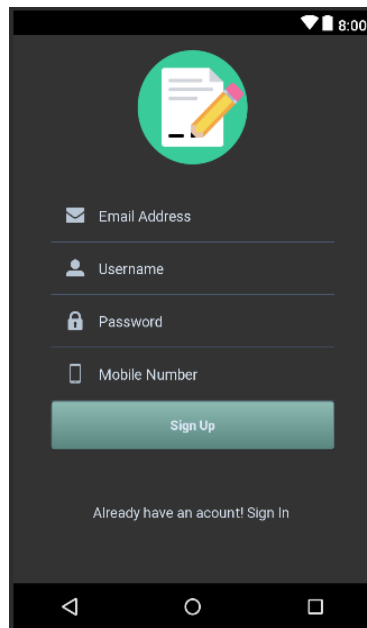


Figure 5.2.2- Sign Up page

5.2.3 Implementation of Sign In system

Through this user interface a registered user can get access to use the application.

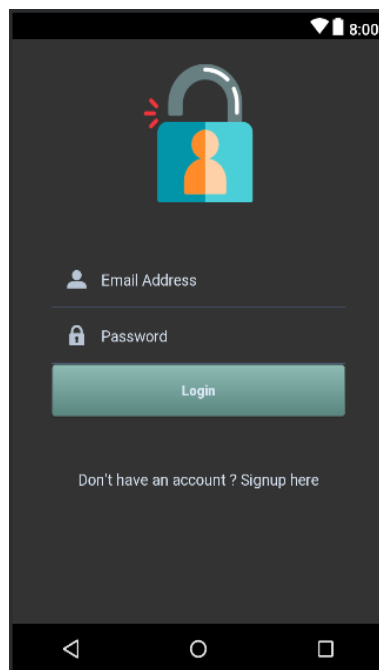


Figure 5.2.3 Sign In page

5.2.4 Implementation of Usage Details page

This page shows the child device usage statistics in a grid recycler view with application name, application icon and total used at selected date.

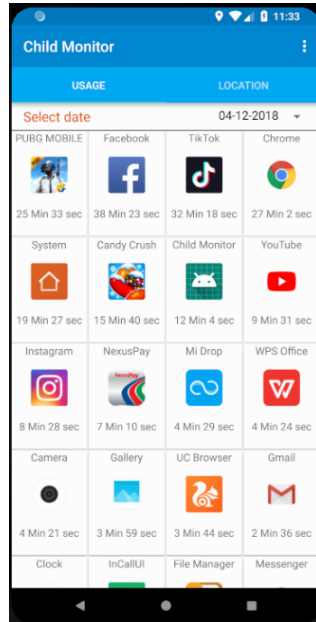


Figure 5.2.4 Usage details view page

5.2.5 Implementation of daily Location history of child device

This page shows the daily location history of child device which is accessed by parent account.

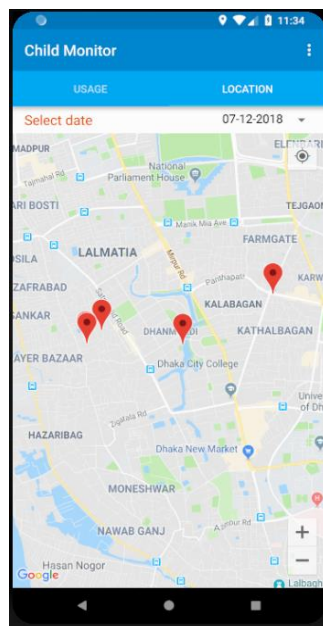


Figure 5.2.5 Child location history page

5.3 Implementation of interaction

Smooth user interaction is the first priority of an application. If a user finds the application lacky and irresponsive then the application using experience would not be good. Even user might stop using the application. Keeping this in mind I have tried to make the application as simple as possible. All the views and interactive tools used in this project are very simple and easily understandable.

5.4 Testing Implementation

System testing is the most important thing to do before deploying any project or application in the market or simply before launching. To ensure the application's or software's performance and feedback with the specified requirements is the key purpose of testing. Performing action based on software requirement and evaluate the output is called system testing. Testing that has been performed in my application is given below.

Table 5.4.1: Evaluation of Test Case

Test case	Test input	Expected outcome	Obtained outcome	Pass/Fail	Tested on
1.Sign Up	Sign up using different android version	Sign-up should be successful	Successful sign-up	Pass	2-10-2018
2.Sign-In	Sign-in using registered email password	Sign-in should be successful	Successful sign in	Pass	2-10-2018
3. Add Device	Generate QR	QR should be generated	QR generating successful	Pass	4-10-2018

4. Link Child	Child name, Child age, Scan parent QR	Child device should be linked with parent device	Child device has been connected with parent device.	Pass	7-10-2018
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5.5 Test result and Reports

Test report is the way to evaluate the system at a glance. It helps for better understanding to estimate testing result quickly. The test case input, output and actual output is already shown in test cases. The test result of this application is quite satisfying. We can conclude with the following outcome from the test result.

- Application is easy to use
- User friendly
- Easily understandable functionality
- Interactive user interface
- Necessary guides for input data

CHAPTER 6

Conclusion and Future Scope

6.1 Discussion and Conclusion

We are the citizen of modern civilization. We can't live without modern technology. More or less, we have become dependent on technology. But these technologies are not always beneficial for us. Especially for young kids who are not aware that much to prevent themselves from bad effect of using those technologies. Ultimately parents have to teach and guide their children from the devil side of those technologies. This 'Child Monitor' app is purely intended to help parents monitoring their kids.

I hope this 'Child Monitor' application will be helpful for parents to know more about their children and guide them before being too late.

6.2 Limitation

- Data Collection from UsageStats sometimes create problem
- Uploading this kind of data to firebase is complex for service
- Internet Connection mandatory
- Sometimes background service might be stopped
- App must be opened sometimes for continuous data upload
- Limited functionality

6.3 Scopes for Further Development

There are wide possibilities to expand the features of this application. Adding those features might give great benefit to the users. Those features are given below at a glance.

- Adding real-time location tracking
- Adding parent-child real-time messaging
- Adding notification option upon destination arrival
- Building this application for IOS and Windows phone
- Limiting app usage time by parents.

REFERENCES

- [1] 'App Usage'[online], available at << <https://play.google.com/store/apps/> >>, last accessed 25-9-2018 at 8:00pm.
- [2] 'Family GPS Locator' [online], available at <<<https://play.google.com/store/apps/> >>, last accessed 26-9-2018 at 10:00pm.
- [3] 'UsageStatsManager' [online], available at <<<https://developer.android.com/>>>, last accessed at 1-10-2018 at 9:00pm.
- [4] 'UML Use case' available at << <https://www.uml-diagrams.org/> >>, last accessed 20-10-2018 at 10:00pm.
- [5] 'Logical Data Model' [online] available at << https://en.wikipedia.org/wiki/Logical_data_model >>, last accessed 21-10-2018 at 9:49 pm.
- [6] 'Firebase' [online] available at << <https://developer.android.com/studio/write/firebase> >>, last accessed 25-11-2018 at 12:24 pm.
- [7] 'Business process modelling' [online] available at << <https://en.wikipedia.org/wiki/> >> last accessed 22-10-2018 at 7:30 pm.