PARENTAL CONTROL AND PHONE RESTRICTION APPLICATION

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ABSTRAK

Children are particularly vulnerable to accidents. Parents nowadays need a countermeasure to keep their children safe. Hence, this project aims to build a monitoring application that can protect youngsters. The method use to develop the application will be object-oriented software engineering. It is expected that the application is able to tell where their child is physically or alert the parents if the child is somewhere he or she shouldn't be. The application will also display children's location history, and send data from the child's phone to the parent's phone when the SOS button triggers manually. It also will restrict phone usage to avoid excessive phone usage. On top of that, it has a built-in reward system to gain more phone usage for children judging by their performance. The expected conclusion from the project will be the improvement of understanding of the software development processes and requirements. There will be also improvement in programming and developing a software process model.

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1   INTRODUCTION

Mobile devices are an important medium of communication for most people in this current era regardless of their age. The use of mobile gadgets by children has been increasing, which concerns the society about the excessive mobile phone usage and safety risk against children. The raise of concern indirectly causes the born of parental control measures. Parental control can be divided into two types: psychological and behavioral control. Psychological control refers to parenting behaviors that attempt to control youths by taking advantage of their emotional and psychological needs. In contrast to psychological control, behavioral control targets youths' behaviors. Behavioral control encompasses behaviors such as supervision, setting limits, and enforcing household rules and curfews, which is what the parental control application aimed at. The applications is mainly created to assist parents in monitoring or restricting inappropriate contents viewable by their children.

The reliance of society on mobile services to carry out daily activities has expanded dramatically over the previous decade. No one is immune to this tendency, and children are not an exception. The MCMC's survey found that 83.2% of children aged five to 17 were Internet users and 93% of them surfed the Internet using their smartphones. Unfortunately, mobile devices is a sources to a massive quantity of potentially hazardous information for youngsters. To protect their children's digital lives and safety, some parents use parental control application to monitor their children's actions and limit them access to certain features on their smartphones.

A typical parental control application enables parents to filter, monitor, and limit communications, system functions, and the application's usage. Other applications give parents with detailed information on their children's phone use, social interactions, and physical whereabouts. The former is shown by Screen Time app on play store, while the latter is exemplified by the Find My Kids application. However, these parental control applications available on the market are not without problems. In this document, we are going to obtain an understanding of how developers create parental control applications to address real-world issues and critique what they did incorrectly. This will help us gain better understanding for the application.

2   PROBLEM STATEMENT

According to the Britain's national health research, a quarter of the children reported a complete victimization and over a third experienced a completed or attempted victimization. At some time in their lives over half the children a completed or attempted victimization. These data shows that children are particularly vulnerable to assaults and victimization. In the second place, recent years have seen an explosion in research considering the prevalence of problematic smartphone use (PSU), which has been operationalized in such a way that it maps onto concepts of behavioral addiction: tolerance, withdrawal (dysphoria when the battery dies), preoccupation, neglect of other activities, subjective loss of control and continued use despite evidence of harm. Other behavioral addictions, such as problem gambling, show robust associations with common mental disorders such as depression, where sporadic gambling does not. The issue became hot in the year 2000 when the British Independent Expert Group on Mobile Phones (IEGMP) issued a report on potential mobile phone health risks arguing, "There is evidence that at frequencies used in mobile phone technology, children will absorb more energy per kilogram of body weight from an external electromagnetic field than adults" and concluding "the widespread use of mobile phone by children for non-essential calls should be discouraged".

These parental control applications also may have a harmful impact on the children's development. This is due to parental control could be viewed by youths as unduly restrictive or unfair. According to Lauree C. Tilton-Weave from Örebro University and Hakan Stattin from Uppsala University, When youths view parents as exerting too much control, their feelings of autonomy would be compromised, and adjustment difficulties would likely ensue. In short, the general control model predicts that a high level of control, regardless of the type, could lead to negative adjustment if youths perceived it as unnecessarily restrictive.

The parental control application that we planned to built has a reward system feature that requires children to complete daily task to unlocked more phone usage. One of the daily tasks are the clean up room task, which is troublesome for the parents if they need to physically check their child room. Therefore we need an automatic detection feature to detect if the children has done their daily task.

3   OBJECTIVES

Accidents and excessive phone usage are especially dangerous for children. This project aims to develop an efficient and effective parental control application to protect children. The current objectives are to develop a parental control application with a reward system

4   METHODOLOGY

The methodology used for the development of this application is the Agile Model. The model has 5 phases namely: Planning, Analysis, Design, Development, and testing. If there is a problem in a phase, we can return to the previous phase to complete the project. Our project characteristics which need continuous testing also is suited with the characteristics of the agile model. For example, the monitoring module might not merge well with the emergency module during the merging processing. By adapting the agile model, we will be continuous resting our project. It deterministically measures progress and prevent defects.

4.1   Planning Phase

Project planning will be carried out in this phase. After selecting the title, a literature review will be conducted to identify the problem and study the background of the problem. A comparison between existing applications such as Secure kids, McAfee Safe Family and Find My Kids was also conducted to understand the system requirements. The project development schedule will be planned to ensure that the works can be completed within the specified time. Additionally, proposed solutions and initial ideas will be generated in this phase.

4.2   Analysis phase

In this phase, users' requirements and system requirements, among other things, have been listed as requirement specifications. The investigation and comprehension of these requirements are critical for the creation of the application in the following step. The development process can be made more efficient and effective by gaining a deeper knowledge of these requirements. Furthermore, the questionnaires that have been administered to users of parental control and phone usage restriction application that are now available on the market have assisted in gaining

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a better understanding of the primary demands and expectations of user. Additionally, the application models that have been developed have the same goal, which is to serve as a guide during the application development process. Application models, such as use case diagrams, can help to convey a more complete understanding of the functions and activities of an application.

4.3 Design phase

The design specifications for architecture, database, interface, and process have all been explored in detail in this phase. These designs are critical in the development of parental control and phone usage restriction application. The design serves as a guide for the creation of the application in preparation for the following phase, which is application implementation. With reference to these design criteria, it is possible to ensure that application development is carried out in accordance with the critical needs that have been defined. Additionally, the implementation of architectural design, database, interface, and procedure can help to ensure that application development is completed efficiently and successfully. In order to maximise the efficiency and availability of the applications that might be delivered, the 3 tier client-server architecture was used. An explanation is provided for the entities and attributes that are required for a functional parental control and phone usage restriction application. The interface is a critical component of creating a satisfactory user experience; therefore, the design must be thoroughly researched and executed with care. Once this is completed and tested, a process design is implemented in order to identify the algorithm or process flow for each of the primary functionalities of the project application. The design is complete, and the project can be implemented as soon as it is completed and approved.

4.4 Development phase

In this phase the implementation results for the parental control and phone limitation applications for user will be done. These applications were discussed in relation to the phone. During this period of development, a variety of experiences have been obtained, such as how to allow android permissions and how to use the tools that are provided by Firebase. Those are just two examples. During the course of the development process, we also were able to acquire the skills necessary to construct a SQLite database and make use of a broadcast receiver, usage stats

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manager, and wifi manager. The application's implementation has been carried out in accordance with the specifications and design that have been decided upon.

4.5   Testing Phase

In this phase, application testing will be performed to ensure the application's functionality and to identify logic and system errors. In addition, applications will be modified and improved based on user feedback and test results. Component Testing, System Testing, and Acceptance Testing are the three levels of testing. It is also divided into three categories, testing types include Functional Testing, Non-Functional Testing, and Structure-Based Testing.

5   Implementation Result

Android Studio is the Integrated Development Environment (IDE) that is utilised during the process of system development. Java is the programming language that is utilised. Embedded databases have been built with SQLite in the applocation. This is because the applications themselves had to save some data on the local device. Some of the features that Google Firebase has to offer, such as Firebase Authentication and Firebase Realtime Database, are also incorporated into the application. Discussion will take place regarding the outcomes of the implementation in accordance with the modules that have been established.

5.1   User Registration and Login Module

Firebase Authentication was utilised so that users could log in into the application. Google provides a function and platform called Firebase Authentication for the purpose of user authentication. The user authentication processes involved in application registration and login are going to be handled by the platform. The application's implementation has been carried out in accordance with the specifications and design that have been decided upon.

There are a number of other ways that one can register, including making use of an email address protected by a password, creating an account with Google, Facebook, Apple, or one of the other available options. For this particular application, the mode of user registration that is utilised is the email approach. When registering, users are required to provide both their email address and

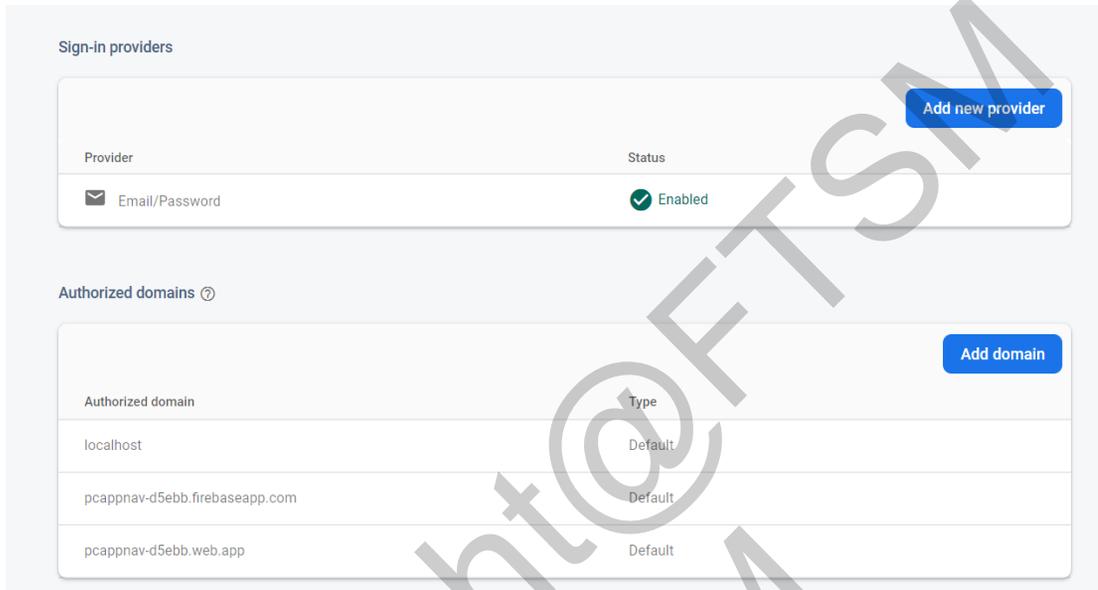a password. Firebase Auth will assign a unique identifier (UID) to each user that registers successfully.

Figure 5.1 Registration Methods Offered By Firebase Authentication

Figure 5.2 User Records in Firebase Authentication

During the Sign in process, The program with verify the user inputs(email and password) with the firebase console. After the sign in verification, the user UID will be inserted into SharedPreferences so that it could be use in later activities.
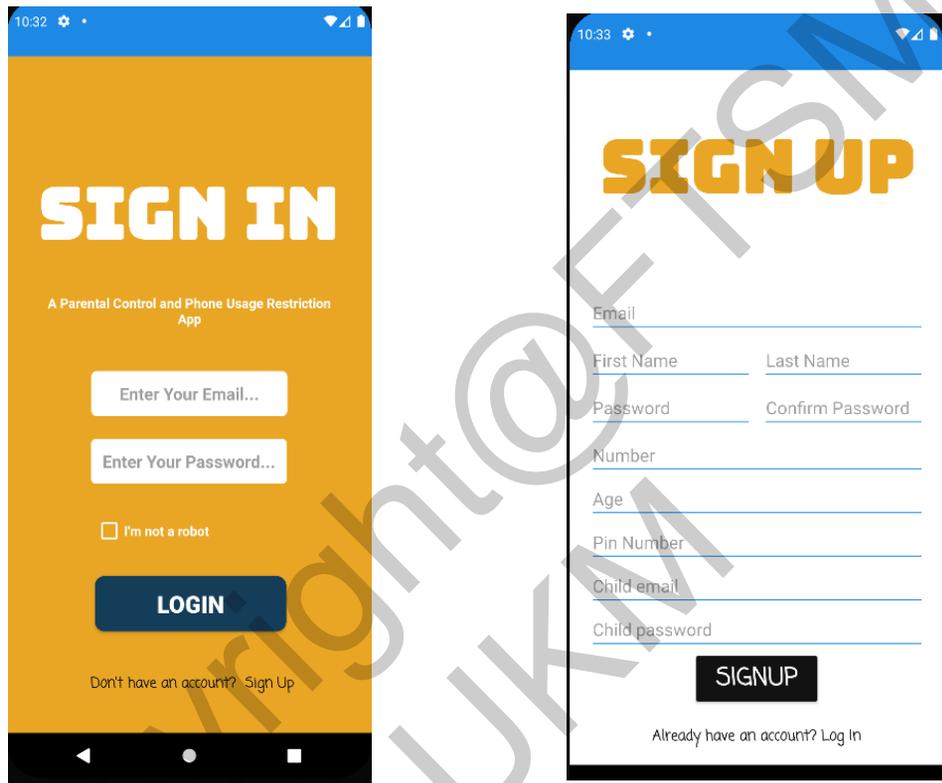

Figure 5.3 Sign in, Sign up UI

5.2 Phone Locking Module

Users of the parental control and phone restrictions applicaiton have the ability, as one of its primary tasks, to lock apps that have been given instructions to be limited. This is to prevent kids having phone addiction and internet addiction at early stages of life. It is necessary to turn on the Android permission in order to have access in order to build this function. After that, a local database needs to be set up in order to save the specifics of the timer as well as the programme bundle. In order to receive signals that are transmitted from the system, broadcastReceiver java class is also utilised.

a.   App Locking Function

The main page of the system after successful login is the app locking activity. For app locking, the system will display all the apps installed on phone through android permission of the android manifest file. After selecting the desired app to be lock, the system will give the options to lock apps through a period of time. After retrieving the lock information, the data will be stored is the SQLite embedded database.The locked app is unable to be use in the period of time.

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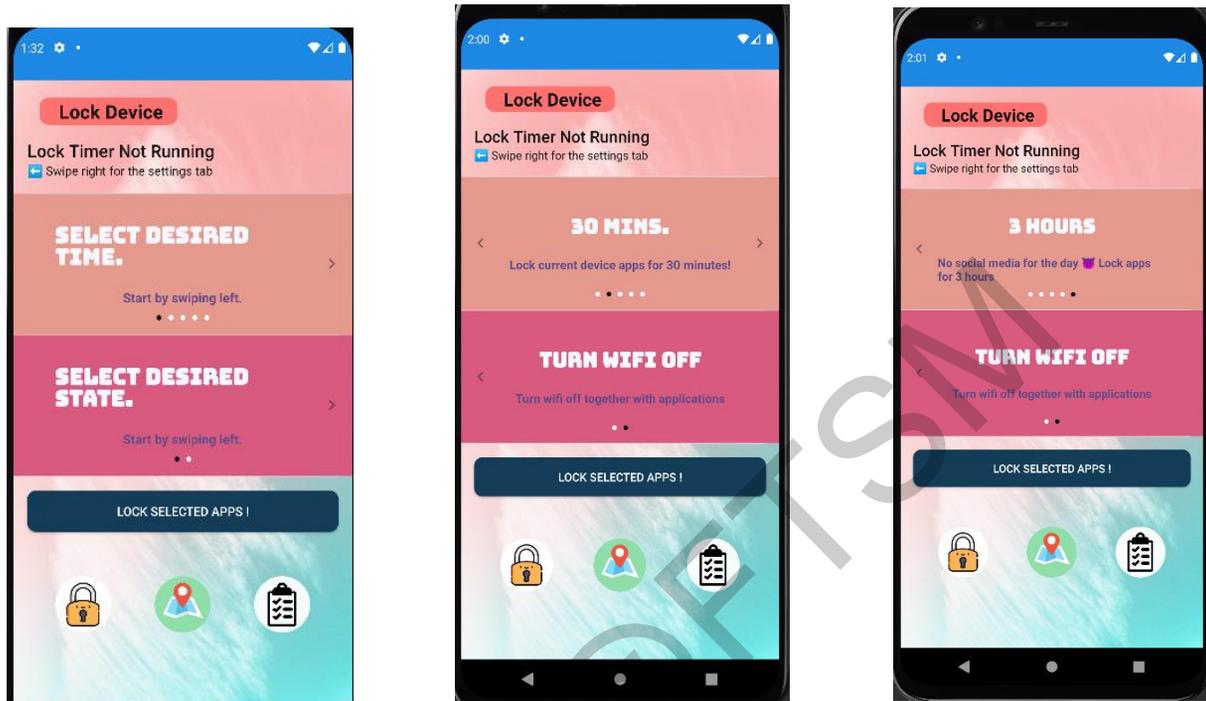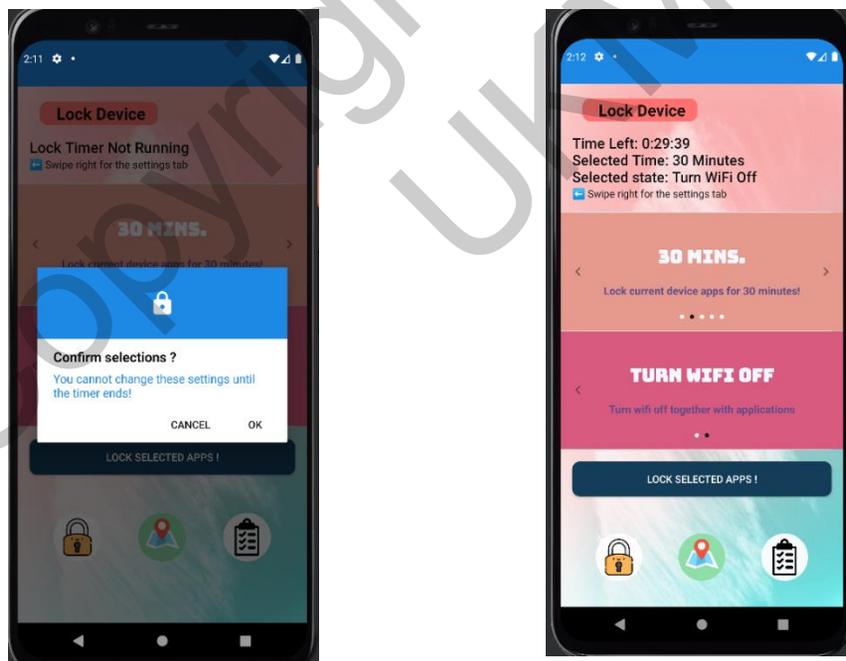
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Figure 5.4 Blocking Menu User Interface

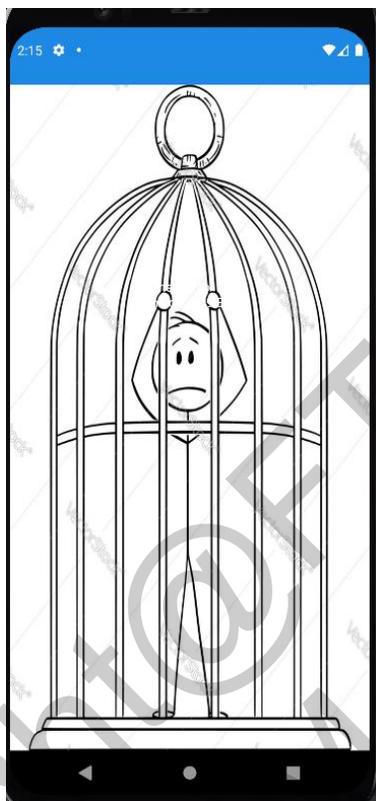Figure 5.5 Confirmation for Blocking Menu User Interface

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Figure 5.6 Locked Screen User Interface

b. **Wifi blocking function**

Next, parent user can also block their child wifis. Users can select blocking wifi under the wifi selection and block their child access to the wifi alongside with the selected app access. In this feature, the wifimanager provided by android is also utilize.
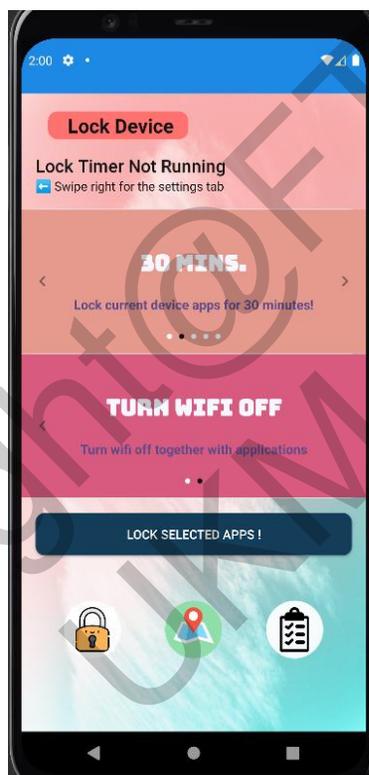
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Figure 5.7 Wifi Blocking UI

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c.   **Check Application Usage Function**

This Function provides parent user a way to monitor child usage on various application in 24 hours. To implement this function, the android permission needs to be enable first. This function is created by utilizing the usageStatsManager class of android. After enabling the android permission, the application will retrieve the package name from the SQLite database then retrieve the total time spend of the app from the system. After getting the time spend, the total duration needs to be converted from millisecs to minutes, seconds and hours. After that the usage statistics will also be updated into the SQLite database.
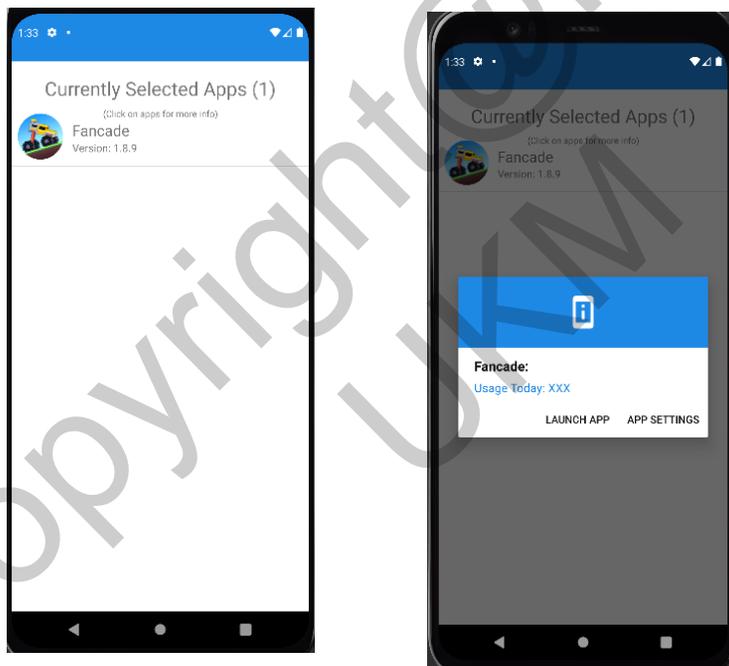

Figure 5.8 View Usage UI

5.3 Monitoring module

In addition to preventing child users from accessing the mobile phone, the application may also monitor the children's physical position using GPS technology. This enables parents to pinpoint the whereabouts of their children wherever they are.

d.   View Location Function

Once the monitoring button has been selected, the monitoring menu will ge updated to display the Children's Longitud, Latitud, and gps accuracy entries. If you click the view location button, the current location of the child will be displayed, and clicking the map button will display the child's location on the map.
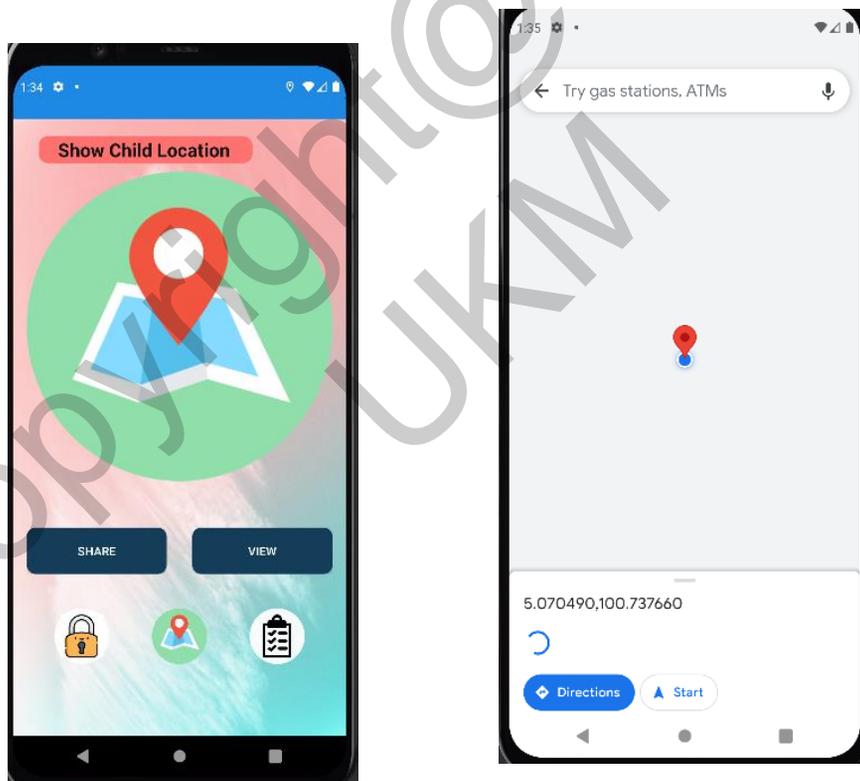

Figure 5.9 User interface of viewing location

e.   Share Location Function

In addition to being able to view their children's locations directly, parents also have the ability to use the function that allows them to share their location with their children. This gives families the opportunity to let their children know where they are at all times.
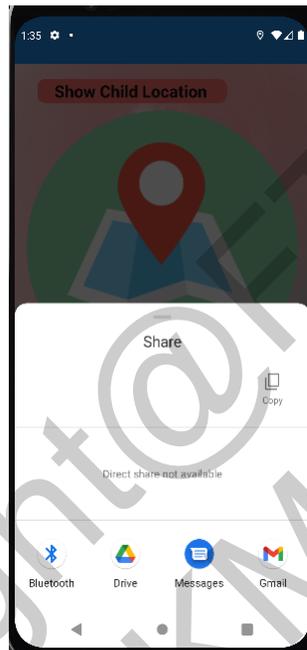

Figure 5.10 User interface of sharing location

5.4   Task module

The following module is task module. The children user can complete task activities to reduce the app locking duration. This function encourages the children user to undergo more beneficiary activities. It also utilizes the firebase realtime database to retrieve child's info

f.   View Children Progress Function

For this function, parent user is able to view children progress on their activities. By clicking on the task activity, children user's progress is displayed clearly. The data is frist updated to the firebase database by children user then it will be display on parent user screen.
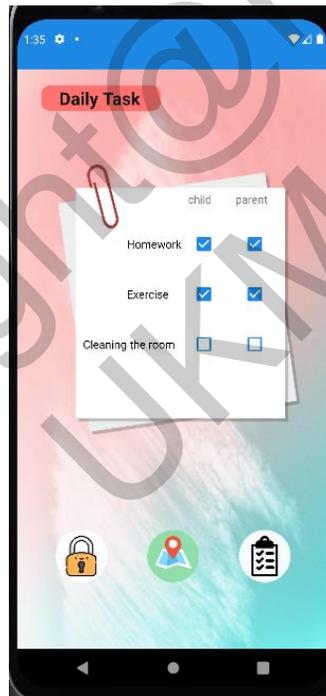

Figure 5.11 User interface of viewing progress

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g.   Reduce app locking timer function

For this function, Child user is able to reduce app locking timer when they completed their task. Child user is awarded with more time with every task they has completed. This function is done by altering the SQLite database data. By reducing the timer in SQLite database, Children's progress is awarded. To ensure that the children progress in genuine, The app timer will only be reduce after being verified by the parent user. The pin number is needed in the process of verification.
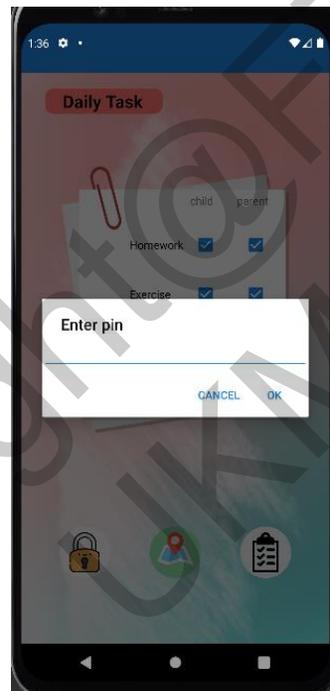

Figure 5.12 User interface of entering pin

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5.5 Profile module

In this module, users are able to edit thier personal data as well as add more data to their profile. This function is done by utilizing the firebase realtime database.

h.   Edit user account functions

User is able to view the username and other personal information like age and phone number when they log in to the profile activity in the system's user interface. The number of binded accounts and whether or not the user is a parent will be shown by the system. After clicking the update button, the system will update the user's information with the new information.
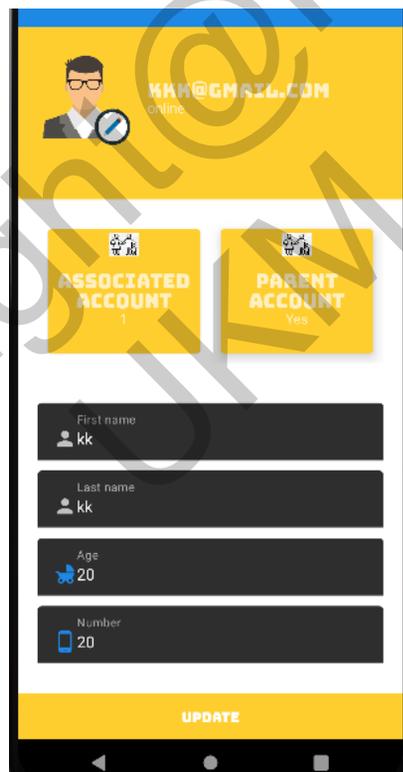

Figure 5.13 User interface of Profile

5.6   Testing

Use case testing and usability testing are the two types of testing that have been put into place. The findings of the first test indicate that all of the modules and the functions that are covered by these modules can be carried out in an efficient manner. Next, the results of usability testing on five factors—namely, usefulness, learning efficiency, ease of use, interface satisfaction, and system satisfaction—show that users are content with the complete system that has been constructed. This demonstrates that users are happy with the system. The results of the questionnaire were found to be reliable after being subjected to a Cronbach's Alpha analysis. This analysis was performed on the results of the usability testing.

6   CONCLUSION

Overall, this app has great potential. The importance of child awareness is increasingly emerging in society. The app provides a platform for parents that are worried about their children. In conclusion, the problem statement which is the psychological impact of using parental control and phone usage restriction programmes, was identified and a solution was designed to address it. While the project was still in its design phase, the design requirements for the architecture, database, user interface, and process had already been finished and were ready for implementation. One of the project's limits is the inability to ignore the authorization access requisitions that have been submitted. This is due to the fact that accessing user data without the user's permission is a violation of ethical principles as well as a contempt for the law. A communication platform between children and their parents can also be established through the use of the software.

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