

Travellah - The Travel Helper Application

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Abstract: Traveling is an extraordinary experience every person needs. However, there are a lot of preparations need to be done for a trip. There are many available mobile applications can be used to help a person to manage a trip but no application that fully support the trip planning, most of its just consist of part of the functions. To solve this problem a mobile application called Travellah-Travel Helper Application is developed. This application enables travelers to manage their trip. It combines all of the important functions including schedule of whole trip with a distinct route map synchronize to all the travel buddies, money management, checklist, and etc. A sharing platform for travel information by the other traveler's experience is also provided. Prototype model is used in the development of this project as the methodology model to ensure that the end-users interact with the application and provide suggestions that is incorporated into the implementation to create a usable application. This application is developed as Android mobile application. Java is used the language in Android Studio platform assisted by Adobe XD tool to design the user interface. Testing phase of the application development have shown that the functions of each features are as expected and highly accepted by users.

Keywords: travel, planning, Android, mobile application

1. Introduction

Planning is one of the important stages when preparing for a trip. Based on the research that carried out in [1], the participants reported that the trip planning stage is the most stressful part of their journey, followed by traveling to the destination, and finally the stay at the destinations. There are a lot of things need to be done before, during and after a trip. Preparation for a trip is not only about making reservation for accommodation and transportation, but also to gather all information about the places that we are planning to visit, and then to create a route map for the whole journey. Trip planning can be lengthy and time-consuming which may cause stresses as it involves using multiple tools to figure out the best travel routes and putting a schedule together into some type of document [1]. Without proper planning or information these adventures could lead to a subdued experience.

According to Hsien-Tsung Chang, Yi-Ming Chang, and Meng-Tze Tsai [2], the process to plan own trip requires time and sometimes complicated. First requires finding extensive information, perhaps by using keywords on the Internet to search for tourist destinations recommended by other travelers. After

identifying interesting travel destinations, the relevant tourist destinations, restaurants, and hotels can be planned into travel route for a smooth transition during the entire trip.

Miscommunication or misunderstanding occur frequently in group trip such as difficulty in understanding the schedule, or in remembering the whole schedule. This may cause time delay along the trip and at the same time it will cause whole journey becomes rush and hasty. Apart from that, safety is also one of the important issues during the trip especially if the person is on a solo trip. Additionally, for a group trip, travelling to an unfamiliar place is hard especially in managing all the members. Hence, this will cause issue if let say someone lost their way in the trip or face other dangerous problem.

Besides that, travelling budget is also important along the trip. Improper budget management will cause overspending while vacationing and sometimes will waste our hard-earned holidays to stress over our spending [1]. Even though there are a lot of information of travel tips that can be searched via Internet, however some of the information already outdated, some of it maybe not correspond with the real situation. This may cause us to get into the tourist traps and spoil the whole trip without the real and complete travel tips. Other than that, there are no travel planning application that contain complete functions for trip planning. It is inconvenient for a user to download and install a few different applications just to plan for trip. All the information will be scattered on multiple applications and becomes inefficient to user.

A study on similar application has been conducted to understand the architecture of other application which has the similar features as a blueprint during the development of the proposed application. The main objective of this study is to find out the functionalities and features provided by each application. Roadtrippers[3], Triplt[4] and Sygic Travel Application[5] are the three similar application that have been reviewed. The reason for choosing these applications is because these applications focused on the same target user which is for traveler who want to plan their trip, similar to the proposed application.

The rest of the paper will be organized as follows. In the next section, it will discuss the methodology used to develop the application. In Section 3, implementation and testing of this project system will be discussed in detailed. Finally, Section 4 will discuss the conclusion and future works of the project.

2. Methodology

This section discusses about the software development methodology used for the project development. The selected methodology model is Prototype Model.

2.1. Prototype Model

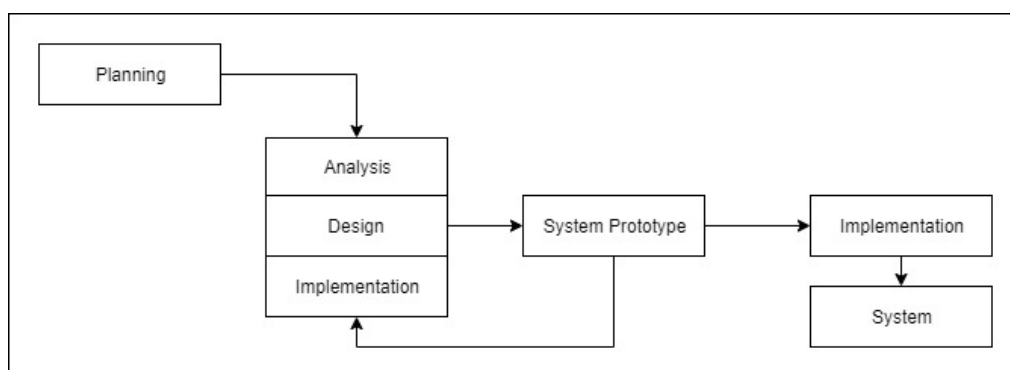


Figure 1: Prototype Model [6]

For the development of this project, Prototype Model (see Figure 1) has been selected as the guideline. The reason for choosing the Prototype Methodology to develop the proposed application is this methodology model is quite useful in the development of high-level user interfaces applications including online systems and mobile application. Systems that require users to fill out forms or go through different screens before processing information can use prototyping to give an exact look and feel until it reaches the complete and final system.

To achieve the ideal outcome, each phase from the Prototype model has its own activities. The activity description for each step is shown in Table 1.

Table 1: Workflow for the development of proposed application

Phases	Activities	Output	Tools
Planning Phase	1. Identify the problem statement, objectives, project scope, expected results and project significance.	1. Proposal	1. Microsoft Office Word.
	2. Organize a project development plan.	2. Gantt chart	2. GanttPro
	3. Online resource study and journal article on the relevant issue for related knowledge and information.	3. Literature review Comparison and analysis table between existing applications	
	4. Analyse the functionality offered and the limitation and strength of existing applications.		
Analysis Phase	1. Define the specifications of hardware and software to develop the application	1. Hardware and software requirements	1. Microsoft Word Office.
	2. Analyse the user requirements for proposed application.	2. User requirement	2. Draw. Io
	3. Identify the functional and non-functional requirements of the proposed application.	3. Functional requirement	3. Google form
	4. Unified Modelling Language (UML) is used to model the relationship and interactions among all classes.	4. Non-functional requirement 5. Unified Modelling Language (UML)	
Design Phase	1. Create wireframes.	1. Wireframes	1. Microsoft Word Office.
	2. Design the user interface.	2. Database design	2. Draw. io
	3. Built the database.	Interface design	3. Adobe XD
	4. Create design specifications.	3.	
Implementation Phase (System Prototype)	1. Develop system prototype modules.	1. Travellah-Travel Helper Application	1. Android Studio
	2. Integrate system prototype modules.	2. Document issues found	2. Firebase
	3. Perform initial testing for the system prototype.	3. Correct issues found	3. Android device (mobile phone)

Table 1: (cont.)

Phases	Activities	Output	Tools
Implementation Phase (Real System)	<ol style="list-style-type: none"> 1. Develop system modules. 2. Integrate system modules. 3. Connect with database. 4. Conduct functional testing 5. Carry out User Acceptance testing 	<ol style="list-style-type: none"> 1. Travellah-Travel Helper Application 2. Document issues found 3. Correct issues found 	<ol style="list-style-type: none"> 1. Android Studio 2. Firebase 3. Android device (mobile phone)

3. System Implementation

As mentioned in the previous section, the Android application is developed using Android Studio with the help of Java programming as the main language and Firebase acts as the database for the system. Other than that, Adobe XD is also used as a tool which help with the actual interface development.

Before implementation can take place, a series of activities have been conducted following the Prototype model as mentioned in Table 1. As for example, analysis on the actual problem and the existing applications have been conducted to come out with the proposed solution for the problem. And as a result of that, a Unified Modeling Language (UML) Use Case Diagram is drawn to become the guideline of what are the functionalities that we should implement in the application (see Figure 2). Other drawings are omitted from this paper due to the space limitation.

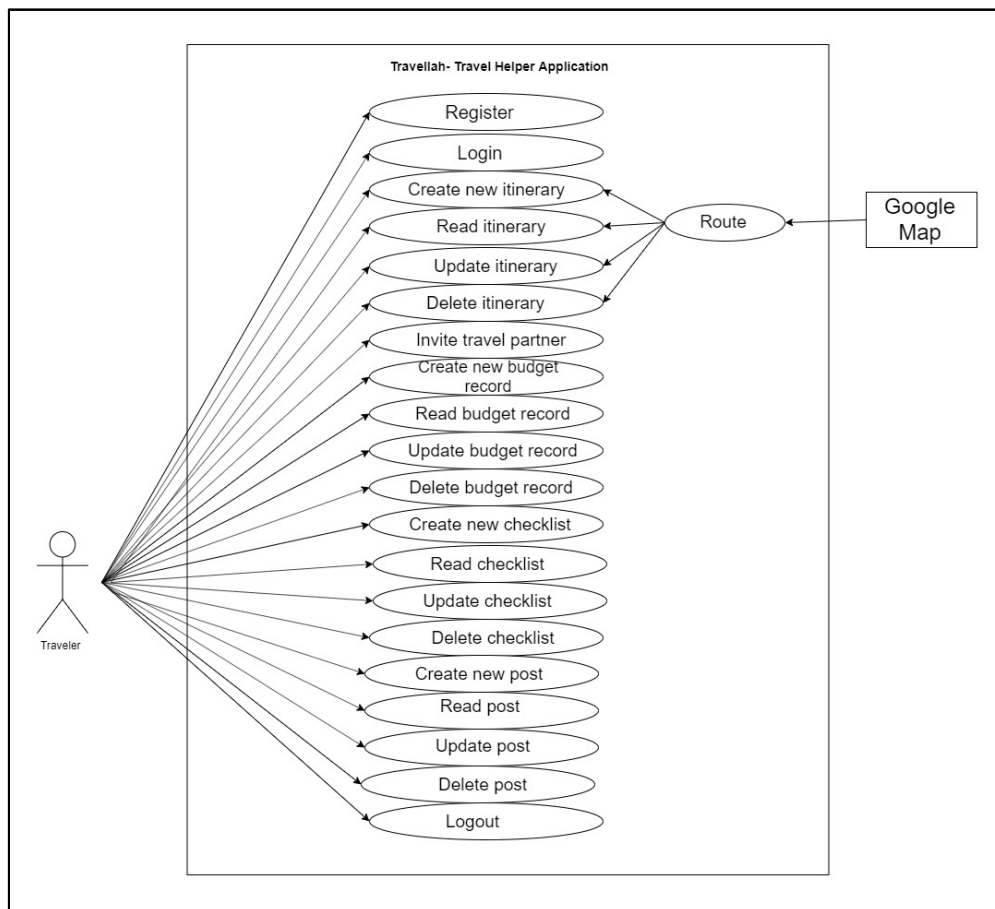


Figure 2: UML Use Case Diagram

Following after the analysis and design, the actual implementation is performed according to a few main modules. There are three modules designed for the application development, i.e., User Management module, Itinerary Management module and Personal Money Management Module. On top of that, the application also comes with another additional modules, i.e., Personal Checklist Module and Trip Forum Module.

In this section, a few selected interfaces from each of the module will be shown and discussed. Before that, a database connection has to be done in making sure that every input and output are successfully working into and from the Firebase.

3.1 Database connection

Figure 3 shows the dependencies which add to the `app/build.gradle` file for Firebase connection. Then, sync the application to ensure that all dependencies have the necessary versions. Figure 4 illustrates the code which retrieve an instance of the database using `getInstance()` and the reference the location the file wants to write. This code generally adds in the class file act as an initialized which need to save the data to database

```
// FirebaseUI for Firebase Realtime Database
implementation 'com.firebaseui:firebase-ui-database:6.2.1'
```

Figure 3: Dependencies which add to the `app/build.gradle` file for Firebase connection

```
mDatabase = FirebaseDatabase.getInstance();
mReferenceUsers = mDatabase.getReference( path: "user");
mReferenceTrip = mDatabase.getReference( path: "trips");
```

Figure 4: Code retrieve an instance of the database

3.2 User Management Module

User management module typically allows users for managing their own information. It is consisting of register, login and user profile. For this module, users are able to create account by their information, login account the information registered and manage the information through the user profile module. Figure 5 shows the user interfaces for Register function. Login function and User Profile Function.

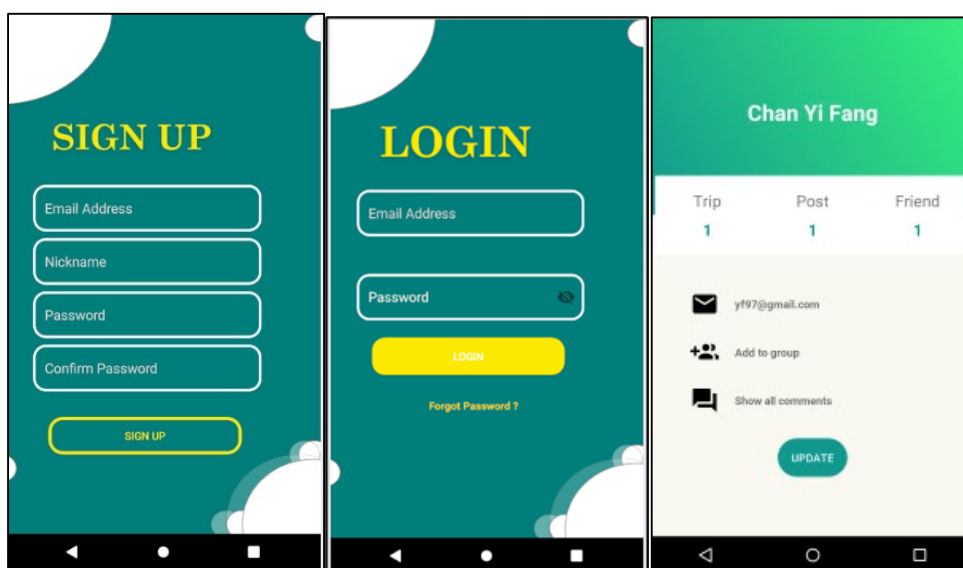


Figure 5: User interface for Register, Login and User Profile Function

3.3 Itinerary Management module

The Itinerary management module is the most important module of the proposed application. It can be edited by multiuser if the user is added as a group member. It consists a lot of function in this module which are itinerary route function, group money management function, group checklist function and invitation group member function. For the itinerary route function, it integrates with Map function to plan the route for whole trip. Figure 6 shows the route planning interfaces that consists in itinerary management.

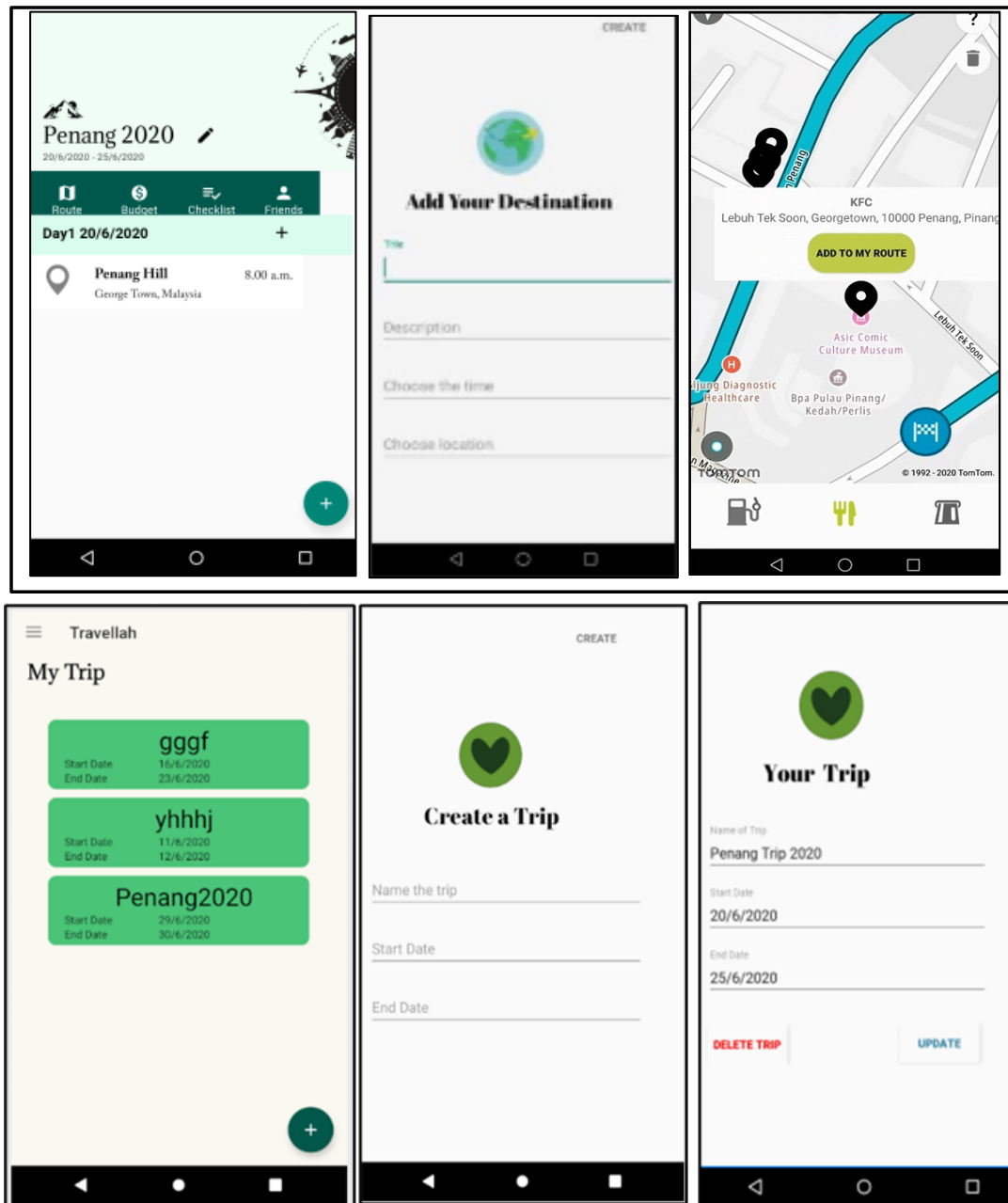


Figure 6: Route planning interface consists in itinerary management

Furthermore, Figures 7 shows the user interface group money management function in itinerary management part respectively. There are two part which are budget part and expenses part, record the group budget and group expenses respectively for a trip. The user needs to input the amount, the title,

the description and choose the category belongs to the record, and the system will arrange the record based on the category. Also, the total amount will show on the top. Since there is a group function, hence, user that become the group member can edit the budget and expense record.

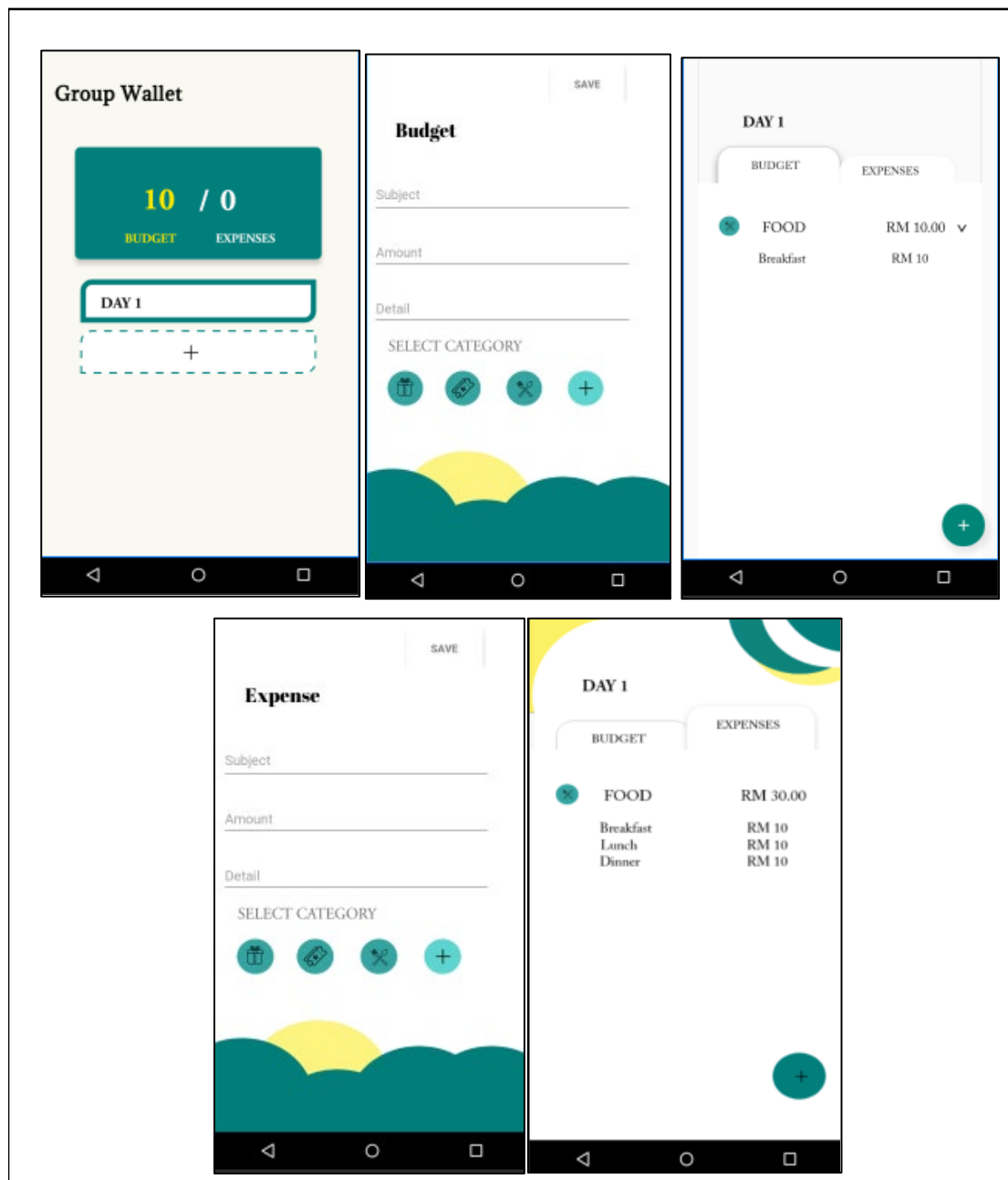


Figure 7: Group money management function interfaces

Figure 8 shows the group checklist interface in itinerary management part. User can input the necessity that all the group member needs to bring for the trip. Since there is a group function hence, user that become the group member can edit the checklist record.

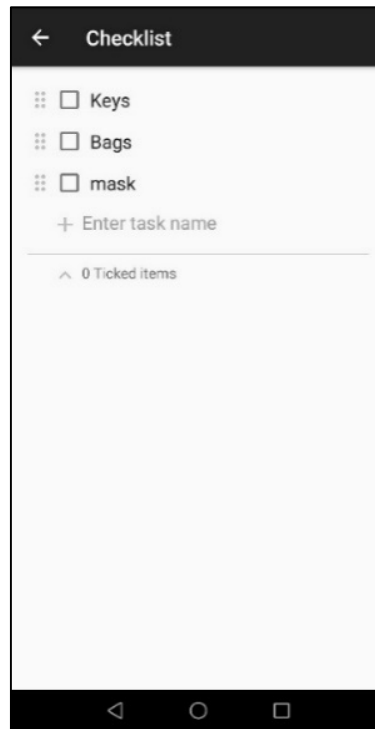


Figure 8: Group checklist interface

Additionally, Figure 9 below shows the invitation group member interface in itinerary management part. User invite the group member that wanted to plan itinerary together by using email. The invited user must be the user registered in this proposed application. So that, the system can search the user through database and invite the user to the itinerary group.

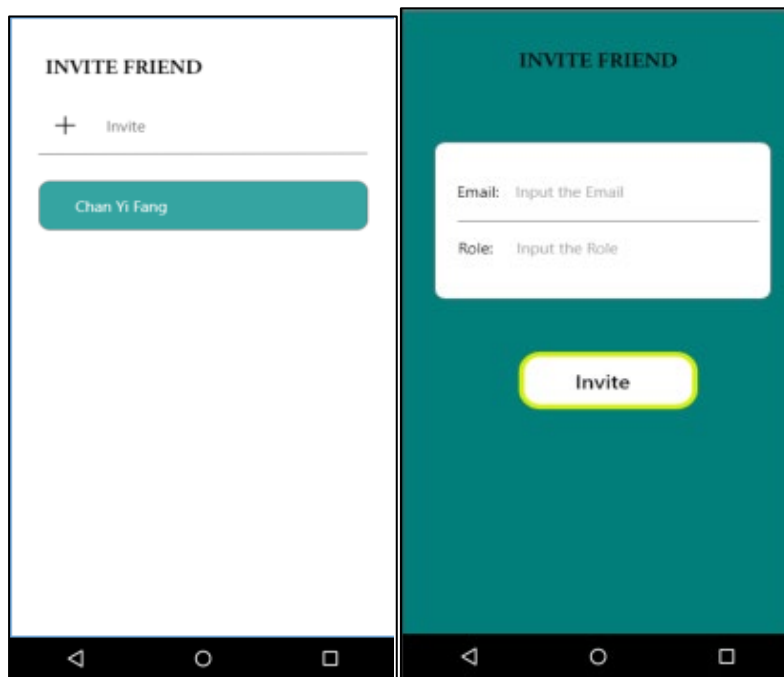


Figure 9: Invitation group member interface

3.4 Personal Money Management module

For this module, it consists of similarities in term of functions and interface with the group money management function. However, for personal money management, it only can be edited and viewed by the user only, unlike the group money management function that can allow to be edited by a group member.

3.5 Personal Checklist module

Since there are similar coding and user interface with the group checklist so the coding part and user interface will not show in this section. In this module, user can input the things that need to bring for a trip. Same situation for personal money management, the personal checklist allows the user only can create, up-date and delete the checklist by their self.

3.6 Trip Forum module

Figure 10 shows the Trip forum interfaces. For the trip forum module, user share the trip experience through this platform. Click on the add button the create post page is showed, fill in the title and description, the photo can upload optionally. The post also can be edited and deleted.

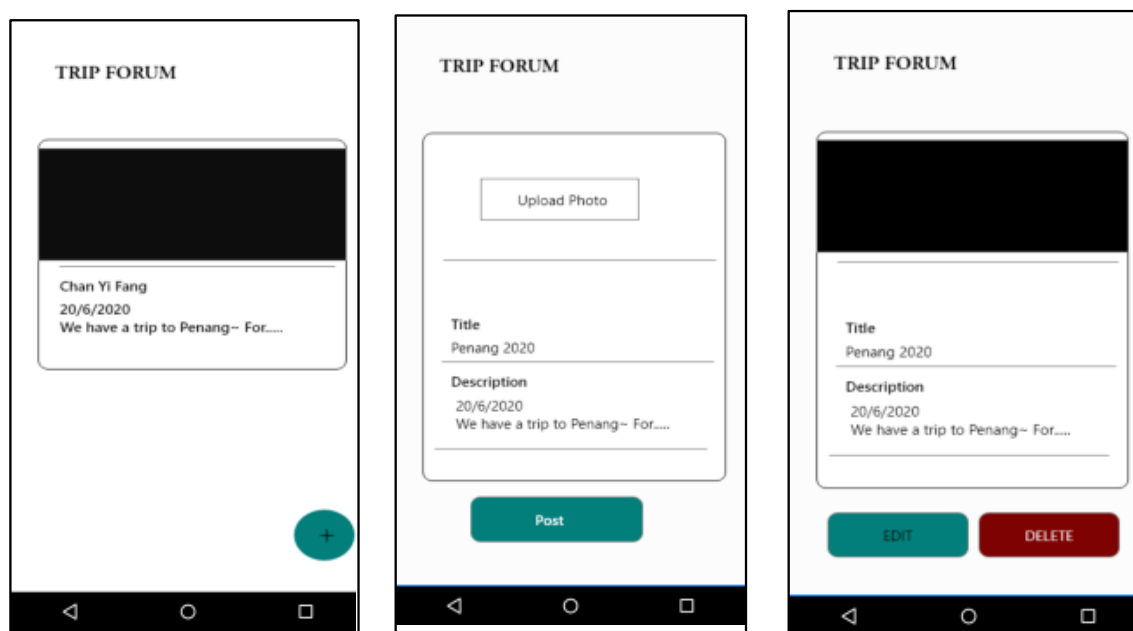


Figure 10: Trip forum interface

4. System Testing

To identify whether the proposed application has achieved all the requirements from user, two types of testing have been conducted, i.e., the functional testing and user acceptance testing.

4.1. Functional Testing

Functional Testing is a method to validate the application against functional requirements or specifications [6]. The aim of the Functional Tests is to evaluate each function of the software application by providing suitable input and checking performance against functional requirements.

Test plan is a technical documentation outlining the formal approach to test a specific system, whether the application meets the requirements. Table 2 shows the test plans carried out for the itinerary management feature provided in Travellah- Travel Helper Application. It is shown that all the expected output has the same actual output for all the test cases. The same results are showing on the other functionalities testing. However, other test cases cannot be included here due to the limitation of the page.

Table 2: Functional Testing results of manage itinerary function

No.	Test Case	Expected Output	Actual Output
1.	Create new itinerary with title, start date and end date.	Itinerary with title, start date and end date is created and display.	As per expectation
2.	Display all of the itinerary	All itinerary include history itinerary is showed	As per expectation
3.	Update the title, start date and end date of itinerary.	The information the title, start date and end date of itinerary are changed and display.	As per expectation
4.	Delete the itinerary.	The itinerary selected removed from the list.	As per expectation
5.	Create the route of itinerary.	Itinerary with title, destination, time and description are created successfully and display according to the day and time.	As per expectation
6.	Display all of the route of itinerary with time and location.	Itinerary with title, destination, time and description display according to the day and time.	As per expectation
7.	Update the route of itinerary by edit the destination.	Itinerary with title, destination, time and description are updated successfully and display the changed.	As per expectation
8.	Delete the route of itinerary.	The route selected in itinerary removed from the list.	As per expectation
9.	Add other users as group members to edit the route, budget and checklist of itinerary together.	Other user already register can be added through email to edit the itinerary together.	As per expectation
10.	Add record of group budget and expenses.	Add record of group budget and expenses. The record can be added by any members that inside the group.	As per expectation
11.	Display the record of group budget and expenses	Record of group budget and expenses is showed can be viewed by any members that inside the group.	As per expectation
12.	Update the record of group budget and expenses.	The record of group budget and expenses can be edited by any members that inside the group.	As per expectation
13.	Delete the record in group budget and expenses.	The record selected of group budget and expenses can be deleted by any members that inside the group.	As per expectation
14.	Add item to group checklist.	Add the item in the checklist. The item can be added by any members that inside the group.	As per expectation

Table 2: (cont.)

No.	Test Case	Expected Output	Actual Output
15.	Display all item in group checklist.	Item in the group checklist is showed can be viewed by any members that inside the group.	As per expectation
16.	Update the item in group checklist.	The item of group checklist can be edited by any members that inside the group.	As per expectation
17.	Delete item in group checklist.	The item selected of group checklist can be deleted by any members that inside the group.	As per expectation

4.2. User Acceptance Testing

Figure 11 to Figure 13 show the results and feedback based on the user interface evaluation that has been conducted by 5 users. For the application interface aspect, there are a user felt good, 2 users felt satisfied and 2 users felt very satisfied on easy to use and understand field. For the navigation part, there are 2 users felt satisfied and the rest felt very satisfied. There are 3 users felt good, a user felt satisfied and a user felt very satisfied to the layout for the content. For interface design, there is a user felt satisfied and 4 users felt very satisfied to the colour, background and the whole interface design of the proposed application. Last but not least, there are 2 users felt satisfied and 3 users felt very satisfied towards the text aspect such as font size, font family and etc. There is no anyone felt unsatisfied and very unsatisfied in the interface design of proposed application. In overall, for most of the items, users are very satisfied with the result, except for the content layout.

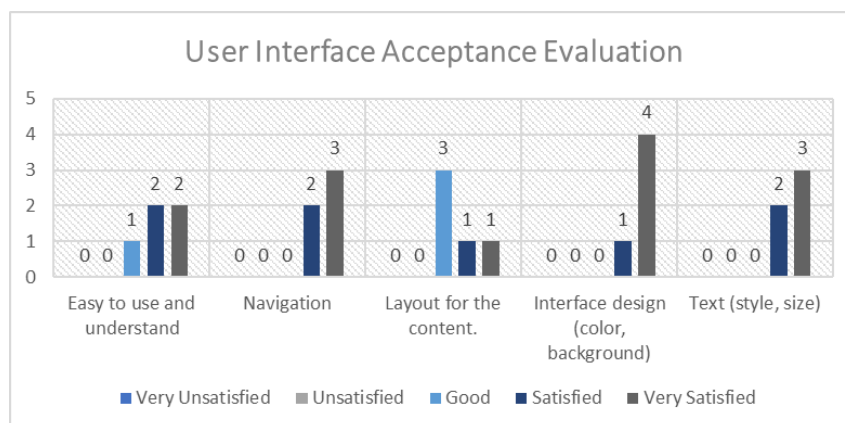


Figure 11: Result of user acceptance evaluation

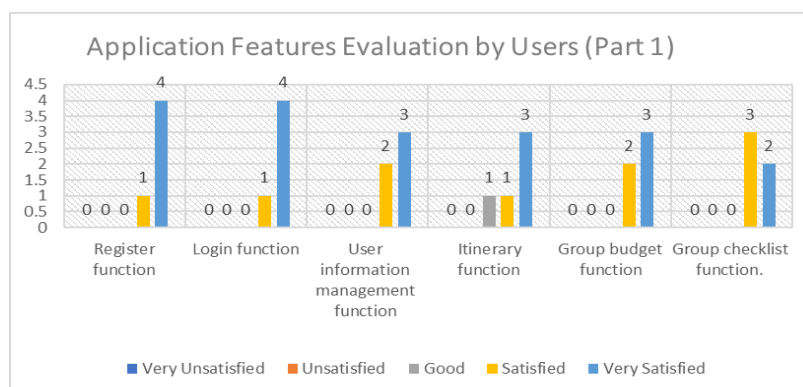


Figure 12: Results of application features evaluated by users (part 1)

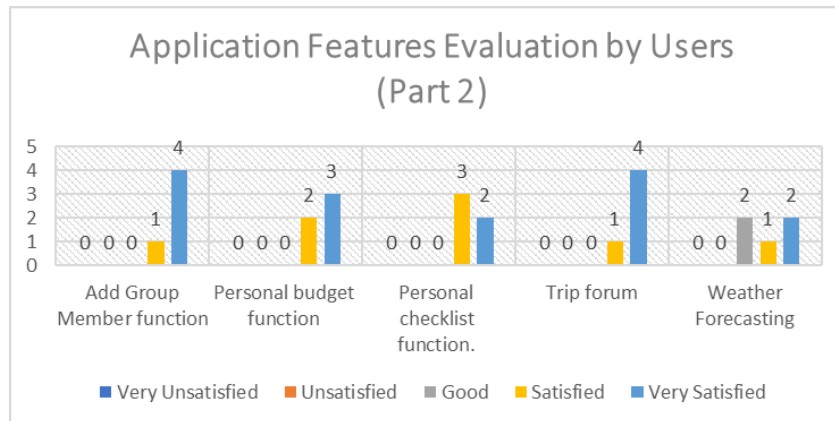


Figure 13: Results of application features evaluated by users (part 2)

According to the application features evaluation of users, there are some respondents’ response that the itinerary function and weather forecasting function need to improve for functionality enhancement. In overall, the bar chart shows that the users are considered satisfy with the user interface and functionality of Travellah- Travel Helper Application.

5. Conclusion

At the end of this project, Travellah-Travel Helper application has been developed successfully by using Android Studio in Java language. It provides traveler a platform to plan their trip either the trip is in group or a solo trip. The traveler is able to plan the route of trip through the route map or based on the experience sharing in trip forum, set the budget and checklist of trip. As for group trip, they are able to plan the route trip, trip budget and trip checklist together. User can invite the group member by using email address. Through this application, the itinerary route planned smoothly as it displays the time departure, the location of each destination and it will automatically arrange according the time departure input. Last but not least, there is a trip forum provides by Travellah- Travel Helper Application which shares the travel information via the experience of the other travelers. So, for the travel newbies, before they start planning their journey, they may refer the suggestion from seasoned travelers. Also, offered are new travel tips and local knowledge to help travelers plan before traveling. In the development process, all the phases in Prototype model act as a guideline to make the work flow smoothly. In testing phase, the result of functional testing was as expected and the application was highly accepted by users in user acceptance testing. There are also suggestions for future works to enhance Travellah- Travel Helper Application. The autogenerate route function should implement to the itinerary function. User just need to input the travel location and the number of days user plan to spend, then the application will automatically recommend the best route of the trip and trip plan for user. Push notifications and reminders are also considered a function for users, because it would be beneficial for them to remember the plans.

Acknowledgement

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