Monowalk: A Travelling Companion

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Abstract. In this era of modernization, there are various public transportations that facilitate the movement of users, among which is the Monorail service. However, beyond the route information such as the train schedule and the ticket fare provided by the Monorail service, users do not have access to other sources of information relating to local attraction, nearby places, good food and reasonable accommodation along their route. The MonoWalk Travelling Companion is proposed specifically for commuters or tourists who use the Monorail services. Aside from helping them to plan their journeys better and more systematic, the application can also become a medium for advertising local businesses and attractions.

1. Introduction
Among important elements in establishing a monorail system includes ticket pricing, operation cost, maintenance implications, service quality and passenger’s comfortability [2]. Kuala Lumpur (KL) Monorail is an inter-city monorail that conveniently connects the northern and central of Kuala Lumpur, Malaysia. Its route includes the trade centre, shopping complexes, and an array of hotel chains in Kuala Lumpur. KL Monorail is operated by KL Monorail System Sdn. Bhd., a wholly owned subsidiary KL Infrastructure Group Bhd. The operator provides a comprehensive information related to their train and bus services such as the routes, operating hours, train frequency and ticket fares. The web-based information portal is also convenient and informative.

Nonetheless, the web-based information portal by the Monorail operator is not without drawbacks. Firstly, users need the Internet access to view the website. Secondly, all the information is only related to services by the Monorail. Beyond the route information such as the train schedule and the ticket fare [2], urban commuters have to find other sources of information relating to local attraction, nearby places, good food and reasonable accommodation.

Research has shown that the establishment of public transportation such as the monorail system influences businesses in the neighboring surroundings [3]. The benefits of this scenario is two-sided. First, it provides opportunity for market growth or new businesses around the area. For example, a residential area within the proximity to the stations gives new potential commercial area. Second, it provides travellers or commuters more options for the nearby attractions. The main goal of this project is to develop a travelling application that helps users to plan their travel routes and to find such nearby attractions for shopping, eateries and
accommodation. This is part of a larger effort to ensure travel convenience and safety among the urban commuters [4].

The remainder of this paper is organized as follows. Section 2 presents reviews on similar applications to the proposed MonoWalk. Section 3 presents the methodology for developing the MonoWalk. Section 4 presents the prototype development and evaluation, and finally Section 6 concludes the research.

2. Related Work
There are a number of monorail information and travelling applications available on both website and mobile. This application can help users who are traveling to search different places of interest. This section reviews applications that are available today that help user to access travelling information easier and simpler only using a smart phone. This review is necessary to show areas where the MonoWalk Travelling Companion application would be of advantage.

2.1. Trivago.com
Trivago [5] is a site for traveling that focusing on hotels. This website is operating online hosted at http://www.trivago.com/, which serves as its official website and provides information about hotel and the comparison prices with each hotel that it suggest to user. The site compares prices for over 730,700 hotels from more than 200 booking sites, such as Expedia, Hotels.com and Priceline.com. Trivago provides some of the activity such as booking hotel online, comparison with each hotel that is suggested and shows the location for each Hotel.

2.2. Booking.com
Booking.com [6] is an online booking website started as a small start-up in Enschede in 1996, based in Amsterdam, Netherlands and since 2005 owned and operated by United States-based Priceline. Booking.com offers online accommodation booking. It claims to have over 700,000 properties globally under contract and that it deals with more than 900,000 room nights reservations per day. In 2013, it accounted for more than two thirds of Priceline’s revenue. Booking.com is available in more than 41 languages. This application is provide suggestion for user to choose which want and where the Hotel that he or she want to go. This is also provide a free cancellation and make changes booking hotel. This website need user to open the website for booking the hotel.

2.3. Hipmunk.com
Hipmunk [7], stylized as hipmunk, is a consumer-oriented online travel company headquartered in San Francisco, California. It was co-founded by Adam Goldstein and Reddit co-founder Steve Huffman in 2010. The company focuses on the visual organization of flight search results. It received increased media attention when Google announced its flight search service in September 2011. This website provided suggestion for users to choose any activity, for example transportation, hotels and related packages. This application allow user to open the website for search the activity that user needed in this website.

Table 1 shows the comparison for existing application with the MonoWalk Companion Travelling application. The comparisons are made in terms of the system requirement such as the log in capability, new registration for user, calendar at system, good information for user, and place suggestions for user especially traveler user.

In the proposed application, registration and account log-in are not necessary as the application resides on mobile phone and all data will be stored at local directory once installed.
Table 1. Comparison of Existing Applications

| System Requirement | Trivago | Booking | Hipmunk | MonoWalk |
|--------------------|---------|---------|---------|-----------|
| Log-in             | Yes     | Yes     | Yes     | No        |
| New Registration   | Yes     | Yes     | Yes     | No        |
| Calendar-based     | Yes     | Yes     | Yes     | Yes       |
| Information        | Yes     | Yes     | Yes     | Yes       |
| Suggest Place      | Yes     | Yes     | Yes     | Yes       |
| Responses          | Yes     | Yes     | Yes     | Yes       |

3. Methodology

Methodology represents the means, techniques and procedures used in analyzing the requirements and designing a system to be developed. The methodology is developed to improve the management and control of the system. In a system development, precision and design in the development process are important to avoid any mistake. Figure 1 shows the steps in the prototyping methodology [8], which are the planning, analysis, design and implementation.

3.1. Planning phase

In the planning phase, the process is to identify the areas in the proposed system. The project activities must be designed to meet the master project timeline using a Gantt chart. In this phase, several key points were identified; background to design the course without using the application, application objectives to be developed to address the problems were identified, the functions and scope of potential applications users. In addition, the application also identifies the importance for depicting the inherent value in the system applications that will be developed.

![Figure 1. Prototyping Model](attachment:image.png)
from the perspective of MonoWalk application and user applications. Moreover, the application focuses on the target users.

3.2. Analysis Phase
Any information concerning the application of the system developed is collected and analyzed in more detail during the analysis phase. The application development strategy also study carefully so that it fits well with the objectives of development have application. All the hardware and software requirements are specified in more detail so that adequate and functioning properly. In addition, the information requirements for the application system was also identified that in accordance with user requirements. It also includes processes for identifying the programming language used, modules for user and system requirements in the implementation processes MonoWalk Travelling Companion application.

In addition, in this phase, comparison with existing application such Trivago.com, Booking.com, and Hipmunk.com was carried out as shown in Section II. In the process of application development, developers need hardware and software to generate the necessary input and output of the result of application development. The application is developed using Android Studio with SQLite database.

3.3. Design Phase
The design phase describes in detail the design of the UML diagram, database and interface application being developed. Four types of UML diagrams have been specified, which are the Use Case Diagram, Sequence Diagram and Activity Diagram. The modules are also developed according to what has been analyzed. In general, the overall design of the system MonoWalk Travelling Companion application is developed based on the results of a detailed analysis of system requirements and user application during the analysis phase. It involves processes such as designing the user interface, the basic structures of the application, the describe output, and the program identification codes to the system interface applications.

Use case diagrams are used to explain the functions available in the system that will be developed. In the use case diagram, it involves three important entity of actors, use cases, and relationships. Figure 2 shows the use case diagram for the MonoWalk Travelling Companion application. Actor involved is the user. User can make a choice based on the options that are given in the application. Actor represents the monorail passengers who receives information on travel distance and cost to a destination he or she wishes to choose. The following describes activities in the sequence diagrams based on the use case diagram in Figure 2:

• Upon entering, the user can see the first pages that shows the main pages that shows main current location, calculate and destination. Customers must be able to select current location, calculate or destination if she or he wants.
• Current location shows the main monorail line. Customers must be select Current location, before they can select their next location.
• After the customers have select the current location, they can choose the next location they want to go. There are eleven destination that user can select, which are KL Central, Tun Sambanthan, Maharajalela, Hang Tuah, Imbi, Bukit Bintang, Raja Chulan, Bukit Nanas, Medan Tuanku, Chow Kit, and finally Titiwangsa.
• After user chooses their next location, user will be directed to the list of activities that shows Attraction Places, Eateries and Accommodations. Customers must be select one of list activity for the next page.
• After the passenger has chosen the activity, they can choose a list of alternatives, such as the list of hotels, shopping malls and eatery places. After user choose the alternative, she or he can see the information details about the places that their want to go.
• In the calculate page, user can total all their transportation prices at the attraction place, eateries and accommodation. From that, users can generate their own budgeting based on the total price.

• Finally, in the destination page, user can insert the name of places that she or he wants to go at the attraction place, eateries and accommodation. Then the name of place was saved at the database. From that, admin can generate the manual report which one the place gets more attraction from tourist.

![Figure 2. Use Case Diagram](image)

Figure 2. Use Case Diagram

Figure 3 shows the activity diagram for MonoWalk Travelling Companion application. The activity helps to build the application by determining the process flow. At the same time, it can help analyst to identify problems if the application is developed different from the activity diagram.

3.4. Prototyping and implementation phase
In this phase, all the programming codes are implemented based on the design in previous phase, resulting a a prototype called the MonoWalk Travelling Companion. However, at this stage, if there is a need or vulnerability, the analysis and design phases will be repeated until the MonoWalk Travelling Companion application system is working well and accepted by users. The database designed in the previous phase will be developed together with the information system interface that has been identified. The process is also repeated for the phases that otherwise would occur after prototype system MonoWalk Travelling Companion application is tested by developers and users.
3.5. Testing and implementation phase
In this phase, the prototype of MonoWalk Travelling Companion application will be fully implemented and tested with real users. The modules in the application system MonoWalk Travelling Companion will be tested to run well in this phase. There is a user-acceptance testing to ensure they meet the needs from use. In addition, this testing is very important to ensure the system does not have error and the resulting application is in accordance to the initial requirement planning. The interface will also be tested to ensure all components are functioning.

4. Implementation
This section presents the details of the application interface as well as the activities during the testing phase. Figure 4 shows the page upon entering the application. The user are not required to login, because the application is open suitable to any user. In the second page, the user can choose their current location. The current location is designate for main platform that is KL Central. Furthermore, user can calculate their budgeting. For the destination user need to insert there places she or he want to go for generate the MonoWalk report. Next, Figure 5 shows the Monorail platform for the next location that user can go. The side figure shows the alternate interface that user can choose such as the attraction place, eateries and accommodation.

Figure 6 shows the display details if user chooses one particular alternative as the attraction place. This page is about the price of Monorail and the distance from the main platform to next platform. In this page, user also can choose their attraction place that she or he wants to go. The
side figure shows the page that displays price of transportation from the next location monorail platform that user chooses after clicking at the suggestion place that application provide. From the display, user can make a decision about their budgeting and what kind transportation that can she or he must use. The flow of process is also same with other alternatives such as the eateries and accommodation.

Figure 7 shows the calculate page. From this page, user can insert their price of transportation that she or he want use to go the place. After insert the price, user can see the total price at the bottom application. From the total price, user can make their own budgeting. Next is the destination page, where the user inserts places she or he wants to go to generate the summary. After the user inserted the place, the data will be saved into the SQLite database.
5. Testing

Testing is an activity that will be conducted after the development process is complete. The main purpose of this process is to make sure the application that has been developed function according to its specifications. Testing is important to identify any error or unwanted functionality failures in any of the process involves in the application that has been develop. This is crucial for the application to handle all kinds of unexpected input by the use.

Table 2 shows the results after testing the button MR1 (KL Central). The testing is necessary to make sure the button was functionality and can proceed to the next process.

| Functionality Input | Expected Result | Real Result | Comment |
|---------------------|-----------------|-------------|---------|
| Button MR1 (KL Central) to the next page | Display the list of Button Next Location | Display the list of Button Next Location | |

Table 3 shows the result after testing a button Next Location to the next page. The testing to make sure the button was functionality and can proceed to the next process.

| Functionality Input | Expected Result | Real Result | Comment |
|---------------------|-----------------|-------------|---------|
| Button Next Location to the next page | Display the suggestion activity | Display the suggestion activity | |

Table 4 shows the real result after testing a button Attraction Places to the next page. The testing to make sure the button was functionality and can proceed to the next process.

| Functionality Input | Expected Result | Real Result | Comment |
|---------------------|-----------------|-------------|---------|
| Button Attraction Page to the next page | Display list of alternative places | Display list of alternative places | |
Table 5 shows the result after testing a button Eateries to the next page. The testing to make sure the button was functionality and can proceed to the next process.

| Functionality                        | Input                          | Expected Result | Real Result | Comment |
|--------------------------------------|--------------------------------|-----------------|-------------|---------|
| Button Eateries to the next page     |                                | Display list of alternative places | Display list of alternative places |         |

Table 6 shows the result after testing a button Accommodation to the next page. The testing to make sure the button was functionality and can proceed to the next process.

| Functionality                        | Input                          | Expected Result | Real Result | Comment |
|--------------------------------------|--------------------------------|-----------------|-------------|---------|
| Button Accommodation to the next page|                                | Display list of alternative places | Display list of alternative places |         |

Table 7 shows the result after testing a button Alternative to the next page. The testing to make sure the button was functionality and can proceed to the next process.

| Functionality                        | Input                          | Expected Result | Real Result | Comment |
|--------------------------------------|--------------------------------|-----------------|-------------|---------|
| Button Alternative Places to the next page |                                | Display list of transportation price | Display list of transportation price |         |

Table 8 shows the result after testing for Calculation. The testing is to make sure the calculation of total price is correct.

| Functionality                        | Input                          | Expected Result | Real Result | Comment |
|--------------------------------------|--------------------------------|-----------------|-------------|---------|
| Calculating transportation price (Place + Eateries + Accommodation) | Attraction Places = 1.20, Eateries = 1.20, Accommodations = 1.15 | The Total price is 3.45 | The Total price is 3.45 |         |

Finally, Table 9 shows the real result after testing a Destination. The testing to make sure the name for each place was save into database after user insert the data.
Table 9. Functionality Testing for Destination

| Functionality                                                                 | Input   | Expected Result                          | Real Result                          | Comment |
|------------------------------------------------------------------------------|---------|------------------------------------------|--------------------------------------|---------|
| The name of place will be saved in database                                  | Tun Sambanthan | The name place of Tun Sambanthan will be saved at database | The name place of Tun Sambanthan will be saved at database |         |

6. Conclusions
In conclusion, the MonoWalk Travelling Companion application is able to help users especially traveler from another countries to search places of interest along the Monorail route. This application also requires no Internet connection, hence beneficial for travelers from different countries aside from the urban commuters.

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