The Development of Budgeting Module on Android based on Backpacker BackInd Applications: Sorting and Filtering Features

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Abstract. Decision making problems often occur in tourists to determine the activity within the tourist destinations or location. For tourists, information about attractions also is needed to allow their planning to be precise and meaningful. The BackInd (Backpacker Management System) have been developed as an application to help and support tourists by providing comprehensive information about tourist attractions through filtering and sorting mechanism. In addition to provide those type of information, tourists also allowed to buy tickets directly without much more burden to wait physically in that attractions counter. The development of this application is expected to help tourists get recommendations based on their preferences that are in accordance with the budget of the travellers. Thus, this study uses the Rapid Application Development (RAD) method, which the results focused on the featured added to the application in term of sorting, filtering and budgeting features so the homestay that tourist want will match accordingly with their plan.

1. Introduction

In the current era, traveling activities have become one of the most prominent and sought leisure activities by the public eyes from children to even the elderly. Actually, doubled with the ever increasing development and especially in very rapid technological developments, traveling activities become intense and meaningful with more stylish and diverse for example in finding information about desired tourist destinations that related to their spiritual enhancement or look for soul-mate. According to the current developments, there are many emergence of start-ups that are engaged in travelling activities, which one of them is BackInd as Startup Company that still in the incubation phase. It has objective to facilitate tourists in choosing tourist attractions precisely and accordingly to reduce headache and of course the burden expense that at certain occasion exceed the plan. The application are called Backpacker System Management (BackInd), where this system have two kind of platform; web-based application used by business managers and android-based applications used by tourists. The website service have given its user the full right to do several primary activities in the menus such as create, read, update and delete (CRUD) processes for the products sold. Meanwhile, android services allow the tourists to search attractions and lodging as desired, as well as do comparison and survey regarding those are being visited. Then, the tourist can determine their choice with they find more appropriate and suitable by purchasing the tickets directly within the system.

Based on the questionnaire delivered to potential customer in 2017, the researcher obtained interesting result regarding the main problem faced based on 45 correspondents, which can be concluded that the problems experienced by tourists are a matter of budgeting or the price is in line with capital pocket. In short, tourist find difficulty regarding the proper prices according to their budget owned. The
need for this feature is also supported by the adjustment of the current user characteristics, especially in e-commerce and the traveling field, for example Traveloka, Tiket.com, booking.com, etc., which all of have budgeting features in it as most of the site realize the importance of this features to satisfy the user. Meanwhile, the tourist also have another problem regarding the difficulty of finding study or packet tours that are suitable for their budget especially to compare each of them in the detail. Thus, to overcome this problem, the development of the budgeting module with filtering and sorting features is a solution especially by adding mobile-based features to increase mobility. The system was built using the Java programming language as the basis for making Android applications. Furthermore, Android Studio as a tool for creating applications wherein the development expected to advance the prediction and forecasting of the tourists so they can anticipate and prepare reliable and confidence budget before going to travel. This study uses the Rapid Application Development (RAD) method because application development using this method is fairly short and very helpful in improving customer needs for application development.

2. Theoretical Basis

Mobile application development has three development approaches, namely native applications, web-base applications and hybrid applications. The application development approach chosen in this study is native applications. Native Applications are developed in programming languages for certain OS, using certain IDEs based on the selected OS. With this approach, applications can access and take advantage of all the capabilities of mobile devices that can be accessed for development. The developed application provides the best use, the best features, and the best overall usage experience. This native applications development approach uses the Java programming language and supports mobile application platforms [3][4]. Meanwhile, android is a Linux-based mobile device operating system that includes operating systems, middleware and applications. Android is an operating system application for cellphones based on Linux (Nazruddin, 2012). Android provides an open platform for developers to create their own applications for use by various mobile devices [5]. Here’s the Android version from the first to the present, which are Alpha (1.0), Beta (1.1), Cupcake (1.5), Donut (1.6), Eclair (2.0 - 2.1), Froyo (2.2 - 2.2.3), Gingerbread (2.3 - 2.3.7), Honeycomb (3.0 - 3.2.6), Ice Cream Sandwich (4.0 - 4.0.4), Jelly Bean (4.1 - 4.3.1), KitKat (4.4 - 4.4.4), Lollipop (5.0), Marshmallow (6.0), Nougat (7.0) and Oreo (8.0 - 8.1).

Analysis of capital budgeting calculations is useful for analysing a plan and decisions in using funds. Regarding capital budgeting, it is emphasized strongly towards a decision-making process used in the acquisition of fixed assets. Basically, capital budgeting is the entire investment planning process for fixed assets that will provide the level of income expected by the company for a period of more than one year. Capital budgeting analysis describes the benefits of a fixed asset investment plan to be carried out by the company, so that it can be used as a basis for companies in making decisions to invest in fixed assets [2]. Rapid Application Development (RAD) is a method of developing information systems with a short time. RAD uses an iterative method (repetitive) in developing a system where the working model (model works) system is constructed at the beginning of the development stage with the aim of determining the requirements (requirements) of users and subsequently removed [6]. There are three (3) stages in this method, namely requirement planning, where at this stage the user and analyst meet to identify the objectives of the system and information needs to achieve the objectives, and this stage is the most important thing because of the involvement of both parties. Then, system design process, where at this stage the activity of the user determines the achievement of goals because this process is a design process and can make improvements if there is a design mismatch between the user and analyst. After this stage was conducted comprehensively, the output can be in the form of the software specification. At last, the implementation where the programmer who develops the design of a program that has been approved by the user and analyst. Before being applied to an organization, the testing process of the program is first carried out whether there is an error or not. At this stage the user usually gives a response to the system that has been made and gets approval about the system.
Functional testing is a test carried out on the proposed system seen as a "black box", because this test is based on the specifications of the requirements and does not need to update the code system. This test uses applications that have been completed [5]. Therefore the experiment in this study is more aimed at each functional system that is built that can be done correctly or not. Unit testing is a code-based test carried out by the developer, the purpose of this test is to test individually and each unit separately. This unit testing can be done for small code units or generally not larger than the class [7]. Therefore testing in this study is more directed at whether each code in the function features developed can run well or not. Integration testing is validating that two and more units or other integrated department to work together correctly and tend to focus on interfaces specified in low-level designs [8]. The test in this study was used to validate the output data from each feature function developed between the android application and the use of an API (application program interface).

3. Results and Discussions

Therefore, one type of the trips that are common carried out by tourists is backpacking, which is to travel independently and cheaper than usual with matters more regarding the cost or expense that they will afford from beginning until the end in the specific location. This character type of user become the main persona of this application. Based on the system development process used is the rapid application development method, as follows, an explanation of the results of all phase based iterations:

A. Plan Requirements

The result of this stage is to get a user requirement, namely the need for software development obtained from the results of observations from existing applications. Based on observations, there are no features that accommodate relationships with customers. Therefore, the primary attribute that developer should consider regarding the preparation of plan requirements that it should be accessible, clear, specific, precise and accurate. The requirements management plan is used to document the information necessary to effectively manage project requirements from identification, monitoring to delivery. The responsible authorities have discretion to decide what information should be included within their local list, of course the collaboration with other tourism attraction should be done accordingly and contractual before the list of budget have been calculated. The exact and compact strategy is extremely important to support the implementation of features related to the requirement analysis, which it must ensure that the information requirements are clear, justified and proportionate. On the other hand, every local validation requirements should help understand on how the proposed development is implemented. Undermine the policy of the state or of the adopted development plan where possible, local validation requirements are identify non-informational size thresholds, if necessary, take a phased approach required information such as scale or proposed sensitivity. This process have been conducted in the system internally without customer realization to avoid burden and confusion. Therefore, clarify what information is needed to meet the requirements and focus on promoting a proportional approach and simplicity. Meanwhile, you need to provide assistance for each element of the requirement. Of course, if you get more information or answers to queries, you need to be clear. Therefore the application requires some additional features. Additional feature specifications can be seen in table 1.

| No. | Details of System Requirements | Description | Actor |
|-----|--------------------------------|-------------|-------|
| 1.  | Budgeting                      | The process of doing budgeting by inputting data on a mobile application | Customer |
| 2.  | See budgeting results          | See the results of budgeting | Customer |
| 3.  | Update budgeting               | The process of updating by entering data back on the mobile application. | Customer |

Filtering Management

| No. | Details of System Requirements | Description                                    | Actor |
|-----|--------------------------------|------------------------------------------------|-------|
| 4.  | Filtering                      | The process of doing budgeting by inputting data on a mobile application | Customer |
| 5.  | See filtering results          | See filtering results                          | Customer |
| 6.  | Update filtering               | Update filtering process by inputting data back. | Customer |
### Sorting Management

|   |   |   |
|---|---|---|
| 7. | Sorting | The process of sorting by selecting the sorting criteria on the mobile application. | Customer |
| 8. | See the results of sorting | The process of displaying a list of data that has been sorted | Customer |
| 9. | Update sorting | Update sorting process by re-selecting the sorting criteria on the mobile application. | Customer |

### B. Design Process

To do a user-design analysis, it is necessary to make a diagram that describes the actors involved and what access rights can be performed by the actor based on the results of the functional requirements analysis that has been done before. The diagram created is use case diagram, which is created to have one actor involved, namely the customer. Customers have four activity rights, namely, doing budgeting on tourist attractions (tourism), filtering tourist attractions (tourism) and lodging (homestay), doing sorting on tourist attractions (tourism) and lodging (homestay), and the last is to see the list of products whether it is a list of tourist attractions (tourism) or a list of homestays. Industry 4.0 refers to increasing competitive pressures, reduced margins, the availability of new technologies and marketing development techniques to shows more sophisticated decisions to be successful and sustained. Data management is absolutely essential for an organization because the management processes considering that relevant and important data is acquired, validated, stored, protected, presented and processed through accessibility, reliability, and timing, which meet the customer needs. It is also the process of processing the data and developing data structures, practices and procedures that regularly implement these aspects. All this process facilitates and facilitates the workflow, as a result, many of the data management faces to maintain huge amounts of data, take an interactive approach, take no manipulation and data processing, have ownership of segmented data and lead the data culture issues [1][10].

### C. Implementation

At this stage, the developer develops the design into a program. Information system design is carried out based on needs analysis and user design analysis. In the usecase diagram, it has one actor involved, the customer to do sorting, filtering, and budgeting for tourism (tourist attractions) and homestays (lodging places). The design made in the form of a user interface display developed in a mobile application. The results of designing this information system can be seen in figure below. The ongoing check process with the target user actually leads to a progressive enhancement of the product as a form of hill climbing and a well-known mathematical procedure for finding local optimizations [11][12][13]. Gradual product innovation is a small change in the product that results in improved performance, reduced costs, increased desirability, or simply a new model release. By implementing search, filtering, and sorting as a budgeting form, you can expand your alternative navigation to your customers and get a travel experience.

![Figure 1. Interfaces Sample of Sorting, Searching and Filtering in Backind Apps](image-url)
4. Conclusion
The development of the budgeting module on the mobile-based Backind application at Backind startup is designed using the Rapid Application Development method which includes 3 phases, namely the requirement planning phase, design process and implementation to facilitate users in finding tourism (homestay) according to the wishes and budget of the user. The features developed in this application are features of sorting, filtering, and budgeting. This application development uses the Java programming language and Android Studio code editor. In actual, most successful products have undergone continuous incremental innovation aimed at reducing costs and increasing effectiveness.

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