The Development of a Mobile Application for Passenger Fare Guide for the City of Cagayan de Oro

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ABSTRACT

This study stemmed from the need for the public to be aware of the exact amount of fares when riding a Public Utility Jeepney (PUJ), the most common public utility vehicle used by majority of commuters in Cagayan de Oro (CDO) City. However, until now, the city still used traditional information dissemination and free access to digital fare matrix with routing guides remains unavailable for commuters as far as Information Technology aspect is concerned.

Thus, the researchers developed a mobile application named “CDO Fair Fare” in coordination with the information and formulas given by the Land Transportation Franchising Regulatory Board in Region-X. The researchers installed an Admin System on a personal computer (with Windows Operating System) to update fare and route information, thus creating the “CDO Fair Fare” Mobile Application.

The beta application underwent human-testing and overall survey result yielded a rate of 37.52 percent from the respondents, which is equivalent to an “agree” respond when it comes to the application’s efficiency. Therefore, the developed system CDO Fair Fare mobile application was can be deemed effective to the commuters if this will be put to actual use, with recommendations that this application can be upgraded or improved by future researchers/developers.

Key Words: Land Transportation Franchising Regulatory Board, Colorum, Public Utility Jeepneys, Commuters, Routing Guide, Mobile Application.

1.0 INTRODUCTION

In the continuing evolution of innovation, everybody lives in a fast-paced technology
era wherein a wide range of internet resources are becoming dependent to touchscreen mobile “smart” devices run mostly by Android Operating Systems. An example of this will be the Smart Phones that has introduced new possibilities in human lifestyle. This software can help the mobile phone be more useful to the user.

In Tagbilaran City, Bohol the LTFRB regional office warned the drivers and operators of PUJs to give discount to students and senior citizens. Failure to do will mean drivers and operators will be slapped with severe penalties, said regional director Ahmed Cuizon. Cuizon urged those who are not given this privilege to report to the authorities concerned erring drivers for failure to honor the law providing for discounted fares. The Expanded Senior Citizens Act of 2010 also known as Republic Act No.9994, as amended, provides tax privileges. A senior citizen or elderly under the law refers to any resident citizen of the Philippines at least 60 years old. By that, this application will provide the exact fare for jeepneys, and passengers will be informed to avoid future conflict with PUJ drivers because the application details were based from the LTFRB data.

The problem states that based on the current state, the city’s fare matrix with routing guides was not available for an easy and understandable reference for the commuters in Cagayan de Oro City, as far as digital technology or Information Technology is concerned.

The study aims to develop a mobile application that will give the city’s fare matrix information with routing guide for the commuters of Cagayan de Oro City. Specifically, the study aims to design a fare matrix mobile application with mapping and routing guides, to develop and implement a fare matrix mobile application that contain routing guides, and to conduct user testing to identify if the system helps commuters in Cagayan de Oro City about fare and maps.

2.0 Methodology
2.1 Design of the System
2.1.1 Use Case Diagram

In Figure 1, shows the passenger can view the calculated fare from his/her source and destination, can view the map and be able to know the details of his route. The passenger can be able to view the routes from the LTFRB copy.
2.1.2 Implementation
CDO Fair Fare Mobile Application was designed using Java programming language and SQLite Database. The passenger will type an input of his/her starting point and destination. The passenger can use the application even without an internet connection. The SQLite database will give a response if the starting point and destination’s input will match. It will show the calculated fare, its route, how many rides to the passenger’s destination, and it will also suggest the shortest route in order to arrive at the desired destination faster after the entered inputs of the user matched route in the SQLite database.

![Diagram of CDO Fair Fare System Architecture](image)

**Figure 2.** CDO Fair Fare System Architecture.

2.2 Testing
The researchers conducted a preliminary testing by doing assumptions for beta testers that have android phones because the CDO Fair Fare application required an Android OS smart phone to work. The researchers chose the BSIT first year level students of Mindanao University of Science and Technology because most of the first year students are new for traveling around Cagayan de Oro City. There are 9 sections with 40 students in each, comprising the first year class under the BSIT program. From there, the researchers chose seven respondents from BSIT-1R2 who were willing to participate in the orientation conducted by the researchers. During the testing the researchers guided the beta testers on how to install the Google Play Services (to be able to use the google map which is in the application) and the CDO Fair Fare application. After the installations were completed, the researchers let the respondents to use and find the vulnerabilities of CDO Fair Fare mobile app. After five minutes, the researchers conducted three tests which were asked to the respondents to input the source and destination. The test was conducted in order to know the effectiveness and the accuracy of the mobile application.
3.0 Results and Discussion

The calculated percentage in each table of the tests conducted was from \((n/35) \times 100\) where \(n\) was a number of votes in the survey and the 35 (7 multiplied by 5) where 7 is the number of respondents and 5 where the number of questions in each test category, multiplied by 100 and came up with the total percentage. Results show that 37.52 percent agree on the effectiveness of the system.

**Table 1: Overall Result Survey**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Fair</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Usefulness</td>
<td>37%</td>
<td>24%</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>II.</td>
<td>Ease of Use</td>
<td>25.71%</td>
<td>48.57%</td>
<td>28.57%</td>
<td>0%</td>
</tr>
<tr>
<td>III.</td>
<td>Satisfaction</td>
<td>42.86%</td>
<td>40%</td>
<td>17.14%</td>
<td>2.86%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>35.19%</td>
<td>37.52%</td>
<td>18.90%</td>
<td>2.62%</td>
</tr>
</tbody>
</table>

**Figure 4:** Land Transportation Franchising Regulatory Board Routes.

Figure 4 shows the route information provided by the LTFRB.
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Figure 5 shows the options of choosing the areas in CDO. The landmark on map is for the tourists that do not know where the particular area is.

Figure 6 shows the landmarks in the map. Tap the location indicators (pin-like shapes) to know the name of the place. It is also for choosing the source and destination of the commuters.
Figure 7: Route Details.

Figure 7 shows the chosen route example, from MUST going to Balulang. After the search route button was tapped, it displayed the recommended routes showing the regular fare, the jeep liners that must be taken, and the seniors/students/disabled privilege fares. It also showed how many rides the commuter must take (single and double-rides only). The commuter can tap the route for further details.

Figure 8: Map Guide.
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Figure 8 shows the mapping guide of the user’s source and destination.

![Route Info](image)

**Figure 9:** Route Information.

Figure 9 shows the all details of the chosen routes. It contains the regular and discounted fare, the distance from the source and destination and the jeep liner to be taken.

![PDF Files](image)

**Figure 10:** PDF Files

Figure 10 shows the route information from the LTFRB in a PDF format.

4.0 Conclusion and Recommendations
CDO Fare Fair system showed that there is a strong probability it can help the commuters in riding the jeepneys within Cagayan de Oro city. The result of the overall survey preference of the system is agreeable having 37.52 percent under the
usefulness, ease of use, and satisfaction questionnaires. This resulted on the reference of the commuters in the city’s jeepney fare matrix deemed as more convenient. Graphs of the jeepney routing paths will be the passenger’s destination guide. Shortest paths of the jeeps’ destination route will lessen the passenger’s transportation time. The researchers recommend the following:

First, the CDO Fair Fare Android mobile application can be extended to support other Operating Systems like iOS in order to serve more the passengers who used smart phones with different OS in Cagayan de Oro City. Second, you can improve the application to triple-rides or more. Third, you can add new features to the application, such as a hotline number or email address to LTFRB that can directly cater the complaints of the passengers in the fare matrix.

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