VOL. 16, NO. 2, 2017, 26-30
www.fke.utm.my/elektrika
ISSN 0128-4428

ELEKTRIKA
Journal of Electrical Engineering

EasyGo: Android Application for Searching Bus, Train and Flight Tickets

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Abstract: Human dependency on technology cause rapid development in innovative smartphone applications worldwide. These applications exist to ease out common existing problems, such as finding the right transportation for travelling in a particular area. The traveller may consider several factors before choosing the transportation for the long journey, such as date and departure time, ticket prices and also the time taken to reach the destination. In this project, a smartphone application called 'EasyGo' is proposed. 'EasyGo' is an application that helps travellers to search for available bus, train or airplane tickets, according to their preference. The Android Studio platform is used to develop the application and required communication with the respective databases. The information about travelling details is extracted from the created database and connected flight application programming interface (API). This application should be able to help Android smartphone users to search the transportation tickets for travelling more easily by providing the exact time with a price list of available buses, trains and flights ticket, according to their destinations and departure date.

Keywords: Android Smartphone application, EasyGo App, Android Studio, application programming interface.

1. INTRODUCTION

Transportation and technology have become the essential components of our daily life. Buses, taxis, trains and others are examples of public transportation modes that are provided by the government and private companies in order to give convenience towards the folks [1]. However, choosing a travel mode is hard for multi-modal users when they have to decide either to travel by bus, train or flight.

Every traveller has different consideration before choosing the travel mode for his or her long journey. Travellers may consider the speed, cost, safety, comfort and environmental effect [2]. Typically, travellers take the cheapest or fastest transportation as priority in travelling for a long journey. The conventional ticket search platform for travellers is normally through travel websites that can provide public transportation and travel information [3].

With the fast growing of technology, people have easy access to internet through smart phone compared to computer [4]. Smartphones are called as a miniature computer because it replaces the usage of computers due to its flexibility that allow users to bring it anywhere. Nevertheless, the designed interface for smartphone application has limited screen space compared to the website version in the computer [5].

Hence, the smartphone application, called 'EasyGo' is developed in order to smooth out the problem faced by travellers. The EasyGo application is focusing on helping the travellers to find the tickets available on the chosen date with the total costs for any available transportation.

The main objective of this project is to develop an application for Android smartphone that can provides the price and duration list of tickets for two common travel modes in Malaysia, which are buses and trains and of flights ticket internationally.

The Android Studio Integrated Development Environment (IDE) platform has been used to design and develop the application for the land transportations. A special database is provided to support the buses and trains services. For flight transportation, wego.com platform is used to integrate with several airline partners using white label API. This will produce a mobile friendly website for searching local and international flight tickets.

2. RELATED WORKS

This section will review the literatures related to the selected area of study, which is the development of an Android application. The review describes the theoretical basis for the Android operating system and is followed by the basic concept of database development by using Apache, MySQL and PHP

2.1 Android Operating System

Android is the world's most popular mobile operating system (OS) that widely uses open source software stack for mobile users that has been developed by Google [6]. The aim of Android is to get all kinds of phones running like a computer with its free phone operating system and Google developed Android to allow phones to connect with the Web [7]. Android is capable to support a lot of

features, which covers the aspect of UI, connectivity, storage, media, messaging, web browser, multi-touch and tasking, multiple language, widget, GCM, Wi-Fi direct and Android beam. Android application development can be started by using Microsoft Window, Mac OS or Linux, with the installation of Java JDK and Android Studio [8].

2.2 Apache, PHP and MySQL

Apache acts as the web server for the PHP or MySQL web site created by the user. The Apache is free, open source, cross-platform, continuously develop and powerful [10]. On the other hands, MySQL is a database management system based on SQL that can act as a database for dynamic application. MySQL consists of more than one table and is capable to run in all platforms virtually. Due to the evolution of technologies, MySQL is now a powerful alternative to the commercial database product. While Hypertext Preprocessor or PHP is a command line scripting language for HTML embedded in the side of server.

2.3 Application Programming Interface (API)

An API is an interface or platform that can be programmed and customized by the other website or application developers. The API will act as messenger that takes the wanted request from the developers of the system and return the response back to the developer. For instance, single website has direct access to the information and it aggregates information from many different websites. The service interacts with the API that get information from the system over the internet and delivers it back to the service which then shows it to the user. Application data and devices also have an API that allow the computer to operate on it and that ultimately creates connectivity.

3. METHODOLOGY

In order to develop this project, the method used is divided into four (4) major steps which are setup, development, debugging and testing, and publish. This section will illustrates the architecture, flowchart and software development of the project.

3.1 System Architecture

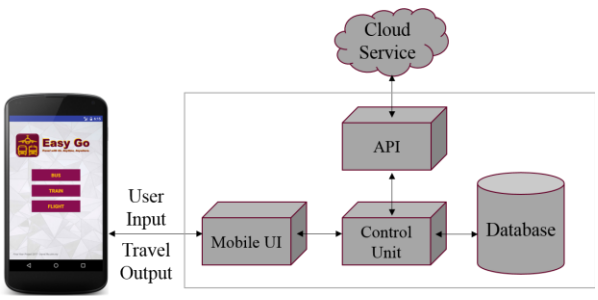

Figure 1. System architecture of the EasyGo app

System architecture of the application is based on three (3) major components as shown in Figure 1. The major components are mobile UI (User Interface), control unit and database. Basically, mobile UI will receive input from users and display the travel output that are extracted from the database or flight API. Control unit component handles the communication between every element in the system. The database acts as storage to save the information of users and information needed by users. The components are linked to each other and duplex connectivity is required for sending the request from a user and the response from the system.

3.2 System Flowchart

The page of main activity is where the user can choose the preferred public transportation. In the application, users may choose either to pick bus, train or flight from the main page.

When the 'BUS' button, 'TRAIN' button or 'FLIGHT' button is clicked the page of main activity will be switched to Bus Page, Train Page or Flight Page, respectively. Bus Page has the similar user interface with Train Page. This is because the information of both transportation is stored in EasyGo's database.

On the other hand, the information on available airlines is shown on the web page of EasyGo's website (www.cheapestflighticket.com). The website is connected to the flight API provided by Wego Flights API which allows users to search for flight tickets and availability in real-time across their airline partners. Figure 2 shows the Flight Page response towards the user interactions while Figure 3 shows the flow of the Bus and Train page whenever the user interacts with the application.

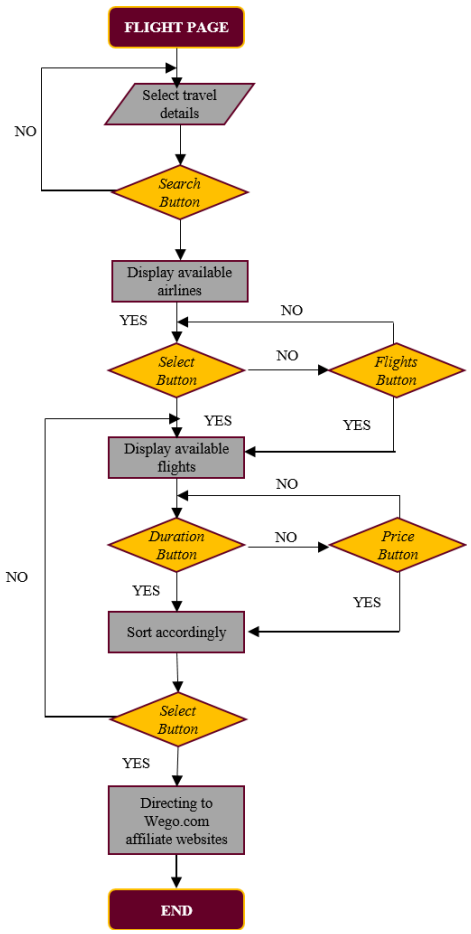

Figure 2. Flowchart of flight page of EasyGo app

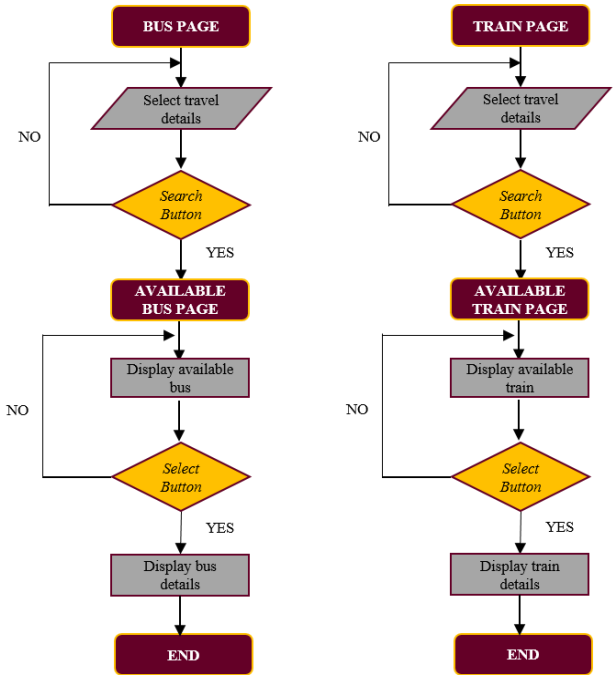

Figure 3. Flowchart of bus and train page of EasyGo app

3.3 Development Process

The development of this project consists of three (3) parts which are the development of Android application, accessible database and mobile-friendly website. The Android application is the core of this project. The database and website are needed for data extraction purpose. In the overall development of the application, the database and website must be completed first before the development process for the Android application take place.

Android Studio is a free IDE compiler for professional Android application development [12]. It includes extensible build tools called Gradle provides flexibility, customized build flavors, dependencies and others. On top of that, Android Studio includes a powerful code editor for a better programming process. XML, Java and manifest are the files that must be coded and edited in order to create and design a well-functioning Android application. The smooth and rich GUI features allow the preview of the layout on different device form factors. The main programming language of Android app is extensible markup language (XML) and Java. They are used to design the user interface and to establish the function of every designed interface in the application.

PhpMyAdmin is a PHP script for the purpose of MySQL server management via web interface for free [13]. PhpMyAdmin intends to handle a wide range of operations, which include managing database, tables, columns, relations, indexes, users, permission and others. The database is coded within the Macromedia Dreamweaver 8 platform and transferred from localhost to the database server (easygo.fke.utm.my) through File Transfer Protocol (FTP) software called FileZilla. The database and website development require the usage of HTML, PHP, JavaScript and CSS language.

For the mobile-friendly Flight Page website (cheapestflighticket.com/flights), the coding process is done through the features provided by Wego API Network (www.wan.travel) platform. By using these features the website is developed by setting the white label profile, editing the theme and customizing the advanced settings after CNAME DNS record is created. CNAME is a type of DNS resource which is used to specify and record the domain name as an alias for the other domain.

4. RESULT AND DISCUSSION

This section presents the results achieved from the completed work. The EasyGo application provides the service for searching the tickets for buses and trains for Malaysian user as well as flight for international users as shown in Figure 4.

Figure 4. Mobile interface of the main activity

4.1 Searching Flight Ticket

When 'FLIGHT' button is clicked on the main activity in Figure 4, the page is switched to the Flight Page. In this page, a user is required to complete the travel details, as shown in Figure 5. Once the details are completed, the user can click the search button and the available airline is listed as presented in Figure 6.

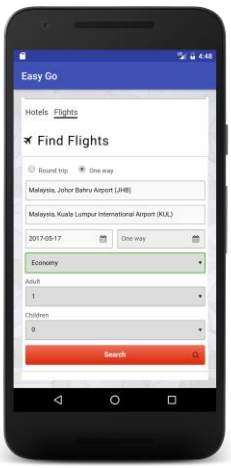

Figure 5. Mobile interface of the flight page.

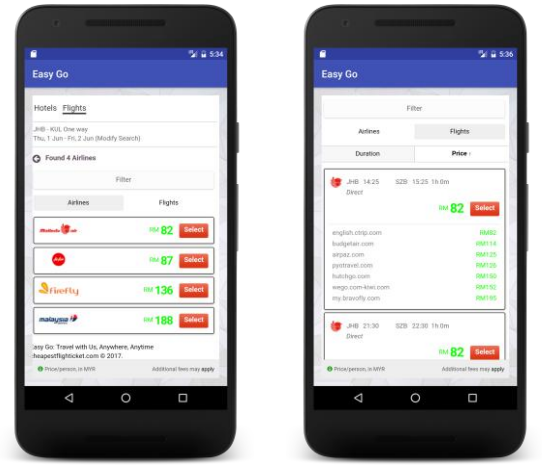

Figure 6. Available airlines and flights

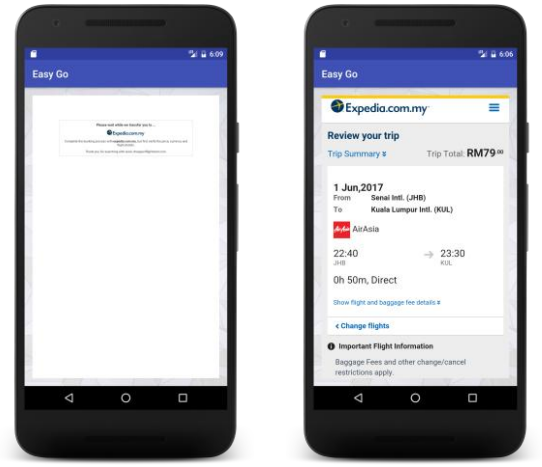

Figure 7. Directing to Wego Airline partners' website

Figure 7 shows the response of the application when the selection is made by the user. The web view will direct the user to the airline partners' website from which the booking process can be proceeded. From these example, it is cleared that the website is successfully connected to the Wego flight API. Moreover, the integration of the created website is compatible with the designed web view in the EasyGo application. The main website for flight searching engine is shown in Figure 8.

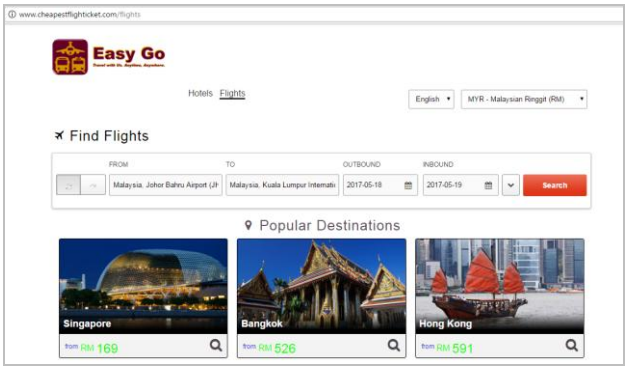

Figure 8. The main website for flight search engine (cheapestflighticket.com)

4.2 Searching Bus/Train Ticket

Figure 3 clearly illustrates that bus and train have the same user interface and shows the step by step process to search the available bus or train. For instance, a user from Johor is searching for a bus ticket to Kuala Lumpur. When 'BUS' button is clicked on the main activity page, the page is switched to the Bus Page. In it, the user is required to complete the travel details, which are the origin, destination and departure date, as shown in Figure 9. Once the details are completed, the user can click the search button and will be directed to the next page. Figure 10 shows the available buses is listed on the screen.

Figure 9. Mobile interface of the bus page.

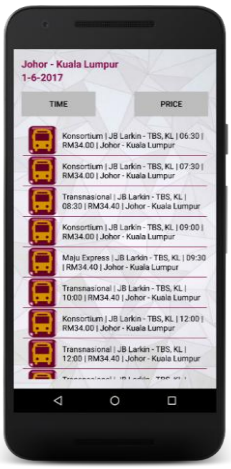

Figure 10. Mobile interface of the available Bus Page.

The travel information in Figure 10 is sorted according to departure time from the origin bus station. The information is extracted from the created database in phpMyAdmin as shown in Figure 11. For available bus page, the listed travel information shows several available bus service providers with different departure time and tickets price while for available train page, available trains are listed with the different departure time and tickets price by the main train service providers in Malaysia, Keretapi Tanah Melayu Berhad (KTMB).

id	bus_name	bus_route	bus_time	bus_price	bus_dest
1	Konsortium | JB Larkin - TBS, KL | 06:30 | RM34.00...	JB Larkin - TBS, KL	06:30	RM34.00	Johor - Kuala Lumpur
2	Konsortium | JB Larkin - TBS, KL | 07:30 | RM34.00...	JB Larkin - TBS, KL	07:30	RM34.00	Johor - Kuala Lumpur
3	Transnasional | JB Larkin - TBS, KL | 08:30 | RM34...	JB Larkin - TBS, KL	08:30	RM34.40	Johor - Kuala Lumpur
4	Konsortium | JB Larkin - TBS, KL | 09:00 | RM34.00...	JB Larkin - TBS, KL	09:00	RM34.00	Johor - Kuala Lumpur
5	Maju Express | JB Larkin - TBS, KL | 09:30 | RM34....	JB Larkin - TBS, KL	09:30	RM34.40	Johor - Kuala Lumpur
6	Transnasional | JB Larkin - TBS, KL | 10:00 | RM34...	JB Larkin - TBS, KL	10:00	RM34.40	Johor - Kuala Lumpur
7	Konsortium | JB Larkin - TBS, KL | 12:00 | RM34.00...	JB Larkin - TBS, KL	12:00	RM34.00	Johor - Kuala Lumpur
8	Transnasional | JB Larkin - TBS, KL | 12:00 | RM34...	JB Larkin - TBS, KL	12:00	RM34.30	Johor - Kuala Lumpur
9	Transnasional | JB Larkin - TBS, KL | 17:00 | RM34...	JB Larkin - TBS, KL	17:00	RM34.30	Johor - Kuala Lumpur
10	Transnasional | JB Larkin - TBS, KL | 19:00 | RM34...	JB Larkin - TBS, KL	19:00	RM34.30	Johor - Kuala Lumpur
11	Maju Express | JB Larkin - TBS, KL | 21:30 | RM34....	JB Larkin - TBS, KL	21:30	RM34.30	Johor - Kuala Lumpur
12	Transnasional | JB Larkin - TBS, KL | 21:30 | RM34...	JB Larkin - TBS, KL	21:30	RM34.30	Johor - Kuala Lumpur
13	Transnasional | JB Larkin - TBS, KL | 23:59 | RM34...	JB Larkin - TBS, KL	23:59	RM34.30	Johor - Kuala Lumpur
14	Maju Express | KL TBS - JB Larkin | 01:00 | RM34.3...	KL TBS - JB Larkin	01:00	RM34.30	Kuala Lumpur - Johor

Figure 11. The database for available buses (http://easygo.fke.utm.my/phpmyadmin)

5.0 CONCLUSION

The world's fastest-growing technologies, smartphones and the internet are converging to create a new generation of connectivity which allowing everything connected to the Internet to be controlled through smartphones. This project has successfully developed an application for the users of Android smartphone that provides the service for searching the ticket prices of three (3) common travel modes in Malaysia and around the world. The EasyGo application can help travellers to seek the suitable transportation according to their preference. The project can be improved further by integrating with the API to the service applications provided by local bus and train companies. In general this application can be of great benefit to the travellers to search for a convenient mode of transportation from smartphone.

ACKNOWLEDGMENT

I wish to express my deepest appreciation to all those who helped me in one way or another to complete this final year project. First and foremost, I thank Allah Almighty who provided me with strength, direction and showered me with blessings throughout. My gratitude to my supervisor, Mr. Alias Mohd for his continuous guidance and support. Also sincerest appreciation to my beloved parents and siblings for showering me with loves and encouragements. I also would like to dedicate my thanks to Madam Ruzanah Sahudi and Mr. Abdul Rahman Salleh for their help by providing the needed facilities for this project. I would like to thank my friends for their constant assistance and support. Lastly, I humbly extend my thanks to everyone who have co-operated with me throughout this project.

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