# A Design of Chao Phraya Express Boat Route and Tourist Attraction Application on Android

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**ABSTRACT:** *This paper aims to develop a design for the Chao Phraya Express Boat application and evaluate users' satisfaction with the Chao Phraya Express Boat application. In this paper, the Chao Phraya Express Boat application is developed to search the Chao Phraya Express Boat route, tourist attractions, and travel guide information. This application has been designed to present travel information, route map, timetable and emergency call. The results show that the users can search Chao Phraya Express Boat trip information using the pier's name or map. The application can display Chao Phraya Express Boat trip information such as the flag type, the distance between the starting point and the endpoint, timetable, transfer connection, fares and tourist attractions. The conclusion of the assessment of user satisfaction on the Chao Phraya Express Boat application for all the environments, the users have been highly satisfied.*

## 1. Introduction

Nowadays, People can easily access technology. Smartphones are another alternative to the popular choice. There are many smartphone functions such as camera, monitor and Internet technology. Users can use smartphone to benefit their lifestyles [1]. The September 2017 statistics also revealed that iOS and Android 6.0 remain the most widely-used mobile operating systems, with more devices moving to Android 7.0. Mobile OS numbers show Android is more popular than iOS, followed by Windows Phone in third [2]. Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other open-source software and designed primarily for touchscreen mobile devices such as smartphones and tablets [3].

Khunying Supatra Singhulaka established Chao Phraya Express Boat Co., Ltd. (CPEX) in September 1971. A concession right was granted to CPEX to provide river transportation service to passengers by the Harbor Department. Throughout the years of dedication, CPEX continues to deliver quality services by improving routes, safety and operation standards to serve the general public better and per the Thai Government's policy. Our total fleet of 65 boats comprises 15 super-size boats, which were granted the Boar of Invest (BOI) privileges and 50 regular-size boats. On average, each boat has a carrying capacity of 200 people. With a vision to achieve the highest standards in river transportation operation and safety, CPEX continues to lead, with the current process accommodating approximately 35,000 to 40,000 passengers

each day or 13.5 million passengers per year [4]. The Chao Phraya Express Boat service is a water bus, which carries passengers along the Chao Phraya, regularly serving thirty-eight stops from Rat Burana to Nonthaburi, covering a distance of 21 km. The route services are divided into four routes:

• Local line boat with no flag
• An express boat with orange flag
• An express boat with a yellow flag and an express boat with a green flag

Tresearchersers have acknowledged the problems that some of the passengers are facing on the transportation, such as lack of information on the transportation, fare rates, the time table and the transfer connection. Thus, the researcher developed Chao Phraya Express Boat route and tourist attraction application on Android to help the people they are select to travel by boat transportation in Bangkok more convenient and more accessible for people to use in daily life [5].

This paper proposes the Chao Phraya Express Boat route and the tourist attraction application on android. The application function is divided into two modes: online and offline mode. The language can be displayed in two languages: Thai language and English language. This paper presents the design and implementation using Android Software Development Kit. This application has been developed using Android Studio [6], Java [7], NetBeans [8], HTML [9], PHP [10], Adobe Photoshop [11] and MySQL [12]. The remainder of this paper is organized as follows. Section 2 describes related work. Section 3 explains the system overview and methodology. The implementation and testing are presented in Section 4. Section 5 demonstrates the result of the Chao Phraya Express Boat route and tourist attraction application on android. Finally, the conclusion discussed in Section.

## 2. Related Work

Roy Deddy Hasiholan Tobing [13] presented the application provides contents related to the latest tourism information, favourite attraction spots/points of interest, or offers from some service providers. The application implements Google Map Application Program Interface (API) to provide location-based service for users. Moreover, the data used for the mobile application is fetched from the server using a web service. Social media are also integrated into the system to provide a better user experience and share tourism information.

Meiliana et al., [14] presented a feature that provides information about all ongoing or upcoming events in Indonesia, which are drawn from the database implemented using MySQL. Events data in the database were inputted by the admin using a web-based application as the user interface and SQL code to manipulate the data. After the data is inputted, all events are viewed in the mobile application's Event menu. The user can view the detailed location of the desired event based on the Google Map API coordinate, which is stored in the database too. There are also searching option to look for the event based on name or city, which the application retrieves from the user input and search the database using SQL command. Jian Meng and Neng Xu [15] presented that mashup technology is useful for this application.

Along with web-based applications becoming richer and related technologies becoming more mature, Mashups based on open web APIs have shown the power of integrating applications and data sources to create novel and situational web services to serve users' needs. The advantage of mashup technology is extensively exploited for the application of mobile devices. A mashup can combine two or more data sources (content or service) to provide users with several new services or contents. More importantly, it is a lightweight web application program. The data or contents are mashed up on the mashup server side. Furthermore, whether the mobile client is a Web browser or not, it can understand the data format or contents. Pooja D. Watkar and Prof. M. R. Shahade [16] presented the Smart Travel Guide design and implementation of a mobile application.

Mobile users can get tourism guidance information they need anytime and anywhere. The application's purpose is to find the user's current location. The Mobile Location Protocol (MLP) is an application-level protocol for receiving the position of Mobile Stations (MS: mobile phones, wireless devices, etc.) independent of underlying network technology. The MLP serves as the interface between a Location Server and a location-based application. Google apps or services may use Location History and Location Reporting data. For example, Google Maps may use it to improve your search results based on the places you have been and your location data from all devices where you are logged into your Google Account and have enabled Location Reporting.

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| Ability of Application | Related work | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1.  Find a station nearby. | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ |
| 2.  Show tables to depart. | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ |
| 3.  Show time table. | ✗ | ✓ | ✓ | ✗ | ✗ | ✓ |
| 4.  Show connection points to other    passengers. | ✗ | ✓ | ✗ | ✗ | ✓ | ✓ |
| 5.  Show an important place or station area attractions. | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ |
| 6.  Can write a review that place. | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |
| 7.  Be alert when approaching the destination. | ✗ | ✓ | ✗ | ✗ | ✗ | ✓ |
| 8.  Have a phone number for emergency? Moreover, can call out immediately in case of an emergency. | ✓ | ✗ | ✗ | ✗ | ✗ | ✓ |
| 9.  Show fares. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 10.  Show the boat route. | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 11.  Users can chat with other accounts. | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |

Table 1. Comparison between our application and related works

Knung Korrakanchana [19] Presented BTS on-to-go application on android. The application will show tourist attractions to choose where to go. When the user selects a location, the application will display the destination station and the source station from the nearest station. The application can display fare and how to get from the terminal to that location.

Soontorn Auksorncherdchoo [20] presented the BKK BTS Fare application on iOS. The application will surely help calculate fares from the origin and destination stations. Subsequently, the application would display fares in the travels of the user.

Pongsakorn [21] presented the Chao Phraya application on iOS. The application can find travel information by the Chao Phraya express boat. There is also interesting function, including: Map, Find restaurants, Transfer connection.

Number (1) Tourism Promotion of Rattanakosin Application

Number (2) Sansaab Application

Number (3) BTS On To Go Application

Number (4) BKK BTS Fare Application

Number (5) Chaophraya Application

Number (6) Chaophraya Express Boat Application

## 3. The System Overview

The section introduces the analysis and design of the Chao Phraya Express Boat Route and Tourist Attraction Application on Android. The Chao Phraya Express Boat services are divided into four routes as follows:

1. Local Line Boat (No Flag) (Time: 6.20 - 8.20, 15.00 - 17.30) Round trip services from Nonthaburi Pier to Wat Rajsingkorn Pier stopping at 34 piers.

| Application Categories | | | | |
|---|---|---|---|---|
| **Login** | **Travel** | **Route Map** | **Emergency Call** | **Time Table** |
| Select Language | Type of Flag | Map | Name of phone number | Orange flag's time table |
| Register | Distance from Soure to Destination. | Location of pier | Phone number | Green flag's time table |
| | Travel Time | Navigation | | Yellow flag's time table |
| | Transfer Connection | Notification on arrival | | No flag's time table |
| | Fares | | | |
| | Tourist Attraction | | | |

Table 2. Chao Phraya Express Boat Application Categories



Figure 1. Use Case Diagram

2. Express Boat (Orange Flag) (Time: 05.50 - 19.00) Round trip services from Nonthaburi Pier to Wat Rajsingkorn Pier stopping at 18 piers.

3. Express Boat (Yellow Flag) (Time: 06.15 - 08.35, 15.30 -20.00) Round trip services from Nonthaburi Pier to Ratburana Pier, stopping at ten piers.

4. Express Boat (Green-Yellow Flag) (Time: 06.15 - 08.05, 16.05 - 18.05) Round trip services from Pakkret Pier to Sathon Pier, stopping at 12 piers.

### 3.1. System Analysis

The Chao Phraya Express Boat application categories are shown in Figure 1. When the user starts to use Chao Phraya Express Boat Route and Tourist Attraction Application, the user must log in and select the language between Thai and English. Then, it will go to the main page. If the user has no username and password, the user has to register before login in. The application's primary function has four parts: travel information, route map, time table and emergency call. After that, the user can select the desired menu, and the application program will display the detail to the user selected in each menu.

### 3.2. Use a case Diagram

The use case diagram shows the relation between users and applications, as shown in Figure 1. When the users' Table 2. Chao Phraya Express Boat Application Categories start the application; the application will enter on the main page. The main page has four menus: travel information, route map, timetable and emergency call. The travel information can search from the name of the pier or pier map. After selecting the searching method, the travel detail will show the type of flag, distance from source to destination, travel using time, transfer connection, fares and tourist attraction. The timetable shows the service route and time to travel by using a local line boat (no flag), an express boat with an orange flag, an express boat with a yellow flag, and an express boat with a green flag. The route map shows the map, location of the pier, navigation and notification before arriving at the destination pier. The emergency call indicates the name of the department and phone number.
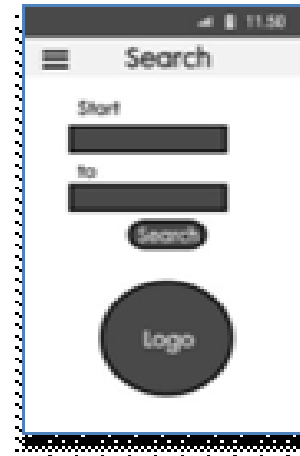
### 4. Design Application

The design of the user interface is presented in this section. The user interface has two main screens, as shown in Figure 2. The application has been developed using Android Studio [6] with Java programming language [7], NetBeans for assistance in Java [8], HTML programming language [9] and PHP programming language [10]. This application uses MySQL database [12] for storing data, and the graphic user interface (GUI) is designed by Adobe Photoshop [11].

### 5. Demonstration of Chao Phraya Express Boat On Android

### 5.1. The main function of the Application

This section demonstrates the recommender system for Chao Phraya Express Boat On Android. The application



(a) Search by name of pier



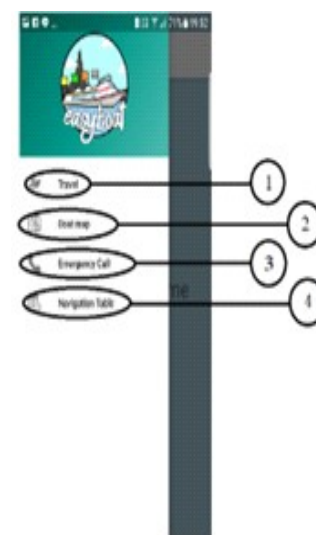(B) Search by pier map

Figure 2. Design Application



Figure 3. Tab Bar

program will enter the page when the users start to use the application.

### 5.1.1. Tab bar

This page allows the user to process the application's functionalities by selecting Travel, Route map, Emergency call and Timetable. There are four main functions: number 1 is the Travel menu, number 2 is the Route map, number 3 is the Emergency call, and number 4 is Timetable.

### 5.1.2. Travel Page

This activity is the Travel Page. The travel page allows the users to select the starting pier and the end pier, then click the search button. After that, the travel information will show the detail of travel by using the Chao Phraya Express Boat.
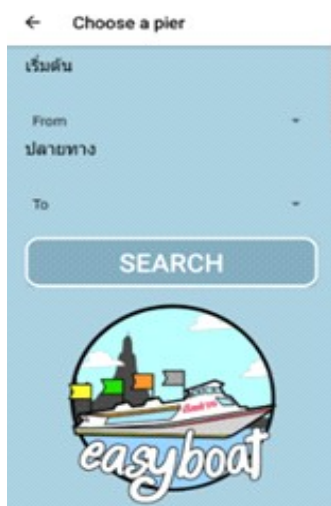


Figure 4. Travel Page

### 5.1.3. Route map

The screen will display the route map. The users will be able to view the location of the pier on the map.



Figure 5. Route Map

### 5.1.4. Emergency call

Emergency call will display a list of name of department and emergency phone numbers. The user can click on the button icon to make a phone calls when the emergency is occur.



Figure 6. Emergency Call

Figure 4. Travel Page 5.1.3. Route map The screen will display the route map. The users will be able to view the location of the pier on the map. Figure 5. Route Map 5.1.4. Emergency calls will display a list of names of departments and emergency phone numbers. The user can click on the button icon to make a phone call during an emergency.

### 5.1.5. Time table

This screen will display the Timetable following the type of boat. The user can click to select the colour of the boat flag; then, the application will show the timetable details.



Figure 7. Time Table

| Topic assessment | X | S.D. | Results |
|---|---|---|---|
| 1. Usability | | | |
| 1.1 Usability | 4.50 | 0.63 | High |
| 1.2 Travel search system is not complicated. | 4.43 | 0.51 | High |
| 1.3 Application allows the user to travel by the Chao Phraya express boat easier. | 4.43 | 0.73 | High |
| 1.4 The information in the applications to meet the needs of users. | 4.50 | 0.74 | High |
| 1.5 Application options allow more convenient for people traveling by the Chao Phraya express boat. | 4.53 | 0.50 | Highest |
| sum | 4.48 | 0.53 | High |
| 2. The elements | | | |
| 2.1 The design of the application screen. | 4.03 | 0.51 | High |
| 2.2 Colors within applications and application suitability. | 4.10 | 0.61 | High |
| 2.3 The color and font size within applications are appropriate. | 4.17 | 0.61 | High |
| 2.4 Images and symbols, easy to understand. | 4.47 | 0.70 | High |
| sum | 4.19 | 0.64 | High |
| 3. In quality | | | |
| 3.1 Useful to the user. | 4.83 | 0.38 | Highest |
| 3.2 Simple operation, convenient and quick. | 4.60 | 0.50 | Highest |
| 3.3 Travel information is full details. | 4.53 | 0.57 | Highest |
| 3.4 Overall satisfaction | 4.57 | 0.57 | Highest |
| sum | 4.63 | 0.52 | Highest |

Table 3. The result of the user satisfaction evaluation

### 5.2. The Satisfaction of Users

The questionnaire is created to evaluate user satisfaction with the Chao Phraya Ex-press Boat route and tourist attraction application on android. The questionnaire consists of five rating scales as follows.

Level 1 Satisfaction is the lowest level.
Level 2 Satisfaction in the low level.
Level 3 Satisfaction in the medium level.
Level 4 Satisfaction at the high level.
Level 5 Satisfaction at the highest level.

For a definition of the measurement, the research has determined that the criteria used to give meaning to the concept of Beat (Beat, 1986: 195).

1.00 - 1.50: Satisfaction in the lowest level.
1.51 - 2.50: Satisfaction in the low level.
2.51 - 3.50: Satisfaction in the medium level.
3.51 - 4.50: Satisfaction at the high level.
4.51 - 5.00: Satisfaction at the highest level.

The results of the user satisfaction evaluation from the Chao Phraya Express Boat application are used by 30 passengers who use the Chao Phraya express boat service. The satisfaction evaluation questionnaire is con-

cerned with the performances and functions of the application. The questionnaire can be summarized into three aspects: First, the usability and user's satisfaction are considered high ($\bar{x}$ = 4.48, S.D. = 0.53). Second, the elements, the user's satisfaction are considered as high ($\bar{x}$ = 4.19, S.D. = 0.64) Third, the quality, the users' satisfaction are considered as highest ($\bar{x}$ = 4.63, S.D. = 0.52). The overall results of the satisfaction evaluation questionnaire are considered as high ($\bar{x}$ = 4.44, S.D. = 0.59).

## 6. Conclusion

This paper presents the Chao Phraya Express Boat route and tourist attraction application on android. This application was developed to search for travel information by the Chao Phraya Express Boat. The searching function is divided into two forms: searching from a name list of piers and searching from a pier map. The language can be displayed in two languages: Thai language and English language. This application can display travel information, period of travelling, timetable, fare rates, tourist attractions, and emergency calling function when in inevitable accidents. The researchers have uploaded the the Play Store on Android, which is already qualified and authorized to be officially available for the users. The overall assessment of user satisfaction with the Chao Phraya Express Boat route and tourist attraction application on android is highly satisfactory.

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