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WEB-BASED NAVIGATION AND ATTRACTION INFORMATION SYSTEM FOR TOURISTS IN DUNIA FANTASI AMUSEMENT PARK

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Abstract-Amusement Park is the perfect destination for all-ages with plenty of attractions for both families and thrill-seekers. To accommodate the various attractions, the park built must be huge. Because of those, the tourist may struggle to select an attraction to ride, waiting hours in a long queue line, and getting overwhelmed by exploring the enormous park. Every amusement park all over the world is experiencing this issue, including Dunia Fantasi. This final project development aim to build an information system that amusement park tourists, in this case, Dunia Fantasi, could use while touring the park. The project presents a tourist information system with a navigation system and queue line management system to help tourist enjoy their experience in Dunia Fantasi to the fullest. In addition, the Dunia Fantasi management will also benefited from better customer satisfaction. The system will consist of attractions description, estimated waiting time, Dufan map, the number of capacity available, and which attraction are available to ride.

Keywords: tourism, amusement park, navigation system, queue management system, attraction, ride, dunia fantasi

I. INTRODUCTION

Dunia Fantasi or Dufan has been Indonesia's favorite amusement park since 1985. Thirty-six years and still going strong, Dufan has grown and developed many additional attractions. Currently, there are 17 outdoor attractions and 7 indoor attractions with 5 uniquely themed areas. This causes Dufan to be visited by both local and foreign tourists. On 2019, Dufan has reached an exhilarating 9,3 million visitors [1]. On their busy day, there won't be any area without tourists. Entrance, rides, food court, exit gate, all of them are packed with people.

Dufan provides countless promo for its ticket and over one type of annual pass. The ticket marketing strategy brings more tourists to Dufan. The queue waiting time for one ride can reach up to 1 - 2 hours on sunny days. When it's raining, the indoor attraction will get more attention with multiplied waiting times on each ride. But this didn't stop tourists from visiting and enjoying Dufan. There are complaints about the crowdedness but so far, nothing too serious [2]. For this, Dufan generated a way to mitigate lengthy queue lines by selling premium and fast track tickets which allow its buyer to 'cut' the line and have the first seat on the ride.

Despite the premium and fast track ticket, Dufan doesn't actively prevent crowding. Every person who has seen and experienced Dufan will know that both the fast track and the regular queue are almost the same length, sometimes exceeding the queue area that has been provided. But this doesn't stop people from visiting the park. Even in the current pandemic, Dufan didn't see any shortage of tourists [3]. Without a doubt, Dufan is a go-to vacation destination for people of all ages.

In today's 4.0 digital era, Dufan can benefit from using information systems to manage their attraction, queue line, navigation, and improve the tourist experience. The information system will feature queue line management that allows tourists to book an attraction, a notification feature to know which attractions are available or not, and a navigation system to explore the park with ease.

The objective of the application is to benefit both the management and tourist of Dunia Fantasi by having the included function:

1. Allow tourist to navigate easily the various attractions on the amusement park by using the website's navigation feature. It will reduce the time the user will take in navigating the park, especially newcomer whom have not been familiar with the park area.
2. Allow tourist to book an attraction from anywhere around the park. The user doesn't need to wait long line in the heat anymore. They can do it whilst sitting in a restaurant or doing something else more useful than waiting.
3. Provide the information tourist need to know about Dunia Fantasi attraction such as the attraction description, precautionary, and estimated waiting time.
4. Provide customer satisfaction to the tourist that will have a good impact on Dunia Fantasi's management.

II. LITERATURE REVIEW

Waiting has always been one of the biggest issue service provider attempt to tackle. According to research, waiting

time has a detrimental influence on consumer perceptions of service quality and, as a result, on customer satisfaction [4], [5]. Knowing this, the service provider should try their best to provide solutions so customers get the best out of their time [6]. One of the service providers that struggles greatly because of the wait time is the amusement park service.

This lead to amusement park's managements to employ many strategies with one of them being virtual queueing system. They either develop their own system, such as Disneyland with their Disney Virtual Queueing System [7] or buy a technology such as Dollywood with the Lo-Q device [8]. Until this day, Dunia Fantasi still use the traditional queueing which give the author the inspiration to develop Dufan Navigation and Queuing System. The following is the comparison overview with the related works.

Table I.1 Comparison overview with related works

Component	Disney Virtual Queuing System	Lo-Q	Dufan Navigation and Attraction Information System
Attraction Navigation	x	x	✓
Attraction Description	x	x	✓
Attraction Virtual Queue	✓	✓	✓

III. DESIGN ANALYS AND IMPLEMENTATION SYSTEM

3.1 System Analysis

The web-based queueing and navigation system should be easily accessed with any browser and the layouts are responsive to any device such as iPad and Smartphone. The system will be developed with Laravel framework which uses PHP, HTML, CSS, JavaScript, and MySQL database.

The functional requirements for the application include the following.

Table 3.1.1 Functional Requirement

Function	Requirement
Register an account	The system must allow user to register their account to store it to the application database
Login to the application	The system must allow user to log into their account on the application by entering their email and password.
Edit User Profile	The system must allow user to edit their account data on the application
Navigation	The system must allow the user to search for an attraction through the application's map
Queueing to an attraction	The system must allow Tourist to queue virtually in the attraction that they choose.
Manage Queue	The system must allow the Operator to manage the virtual queue line by confirming if a queue batch has finished.
Manage Attraction	The system must allow Admin to add, edit, delete, open, and close an attraction in the application.
Manage Operator	The system must allow the Admin to add Operator and assign an attraction to an Operator.
View Attraction Report	The system must allow the Admin to view the attraction's performance report.

The following are the use case diagram which depicts the relationship between the tourist, operator, admin, and system. In Figure 3.1, there are three actors: the tourist, who will use the app to navigate through Dunia Fantasi and queue virtually for an attraction. Second, there's the admin, who's in charge of managing the attraction and the operator. Finally, there is the operator who is directly responsible for the queue.

Figure 1. Use case Diagram

3.2 System Design

The system design consists of researching and designing the UI/UX of the system as well as the database.The following is the mock-up of the main features of the application, the home page, navigation page, and queueing page created using Figma.

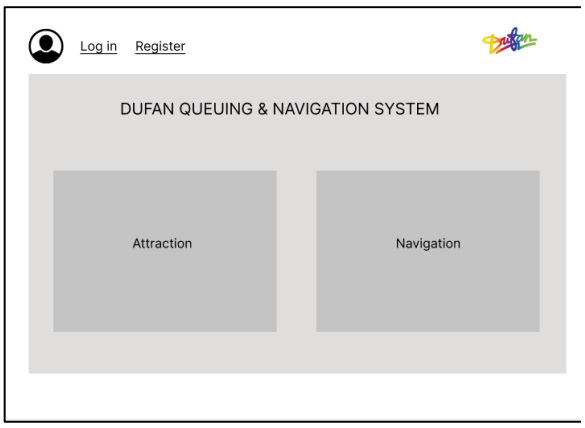

Figure 2. Homepage

Figure 3. Queueing Dialog Box

Figure 4. Navigation Page

And the following is the entity relationship diagram for the database design.

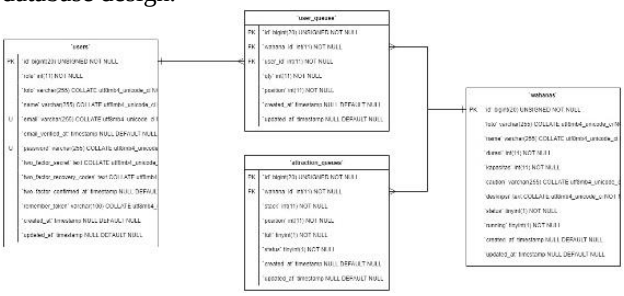

Figure 3.3.3.2 Entity Relationship Diagram

3.3 System Implementation

The system implementation phase consists of the building of the application and implementing the research and design done before. Figure 5.1, 5.2, and 5.3 display is the final result of the main features interface development.

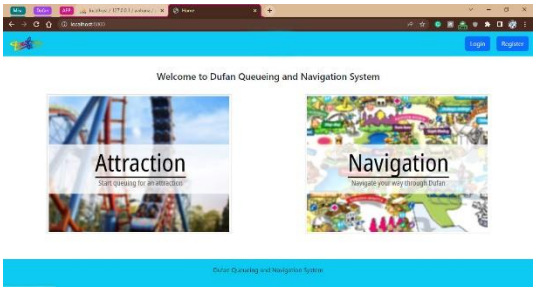

Figure 3.3.1 Homepage

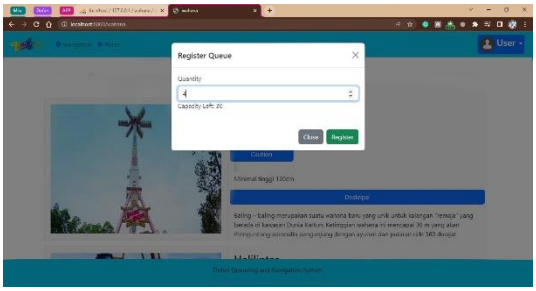

Figure 3.3.2 Queuing Dialog Box

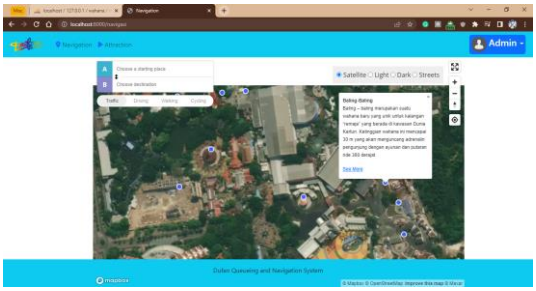

Figure 3.3.3 Navigation Page

3.4 System Testing

The system testing consists of testing the application to find bugs or errors that could be improved. Overall, the testing is successful considering all the features works accordingly. Table 3.1 shows the testing scenario for the tourist features, which are the main features of the application.

Table 3.4.1 Tourist Feature Testing Scenario

Test ID	Scenario	Expected Result	Evaluation
T07	Go to the attraction page	The attraction page will load, showing the image, name, duration, capacity, description, and requirement of various	As Expected

		attractions as well as the queue option.	
T08	Go to the navigation page	The navigation page will load, showing the map of Dunia Fantasi	As Expected
T09	Start Queueing On an Attraction	The system will store the tourist data into the selected attraction, virtually queuing the user.	As Expected
T10	Cancel Queueing	The system will delete the user data from the selected attraction.	As Expected
T11	Search the location of an attraction	The system will show the attraction searched by the user.	As Expected
T12	Navigate to the attraction	The system will show the route to the selected attraction.	As Expected

IV. CONCLUSION

Dunia Fantasi has been Indonesia's favorite amusement park since 1985 and is visited by both local and foreign tourists. On a busy day, there won't be any area without tourists. Entrance, attractions, food courts, exit gate, all of them are packed with people. This cause crowding and long line especially in its attractions. On famous attractions, tourists need to queue for approximately 30-60 minutes to enjoy a 5 minutes' ride. Other than that, Dufan is huge, which causes new tourist to struggle to find their way around Dufan.

The Dufan Queueing and Navigation System is developed with that problem in mind. With the application, Tourist can queue for any attraction without having to stand physically in line. They can search for any attraction and the navigation feature will display the route they need to take. It's also easier for the operator to queue line since the queue batch and the attraction capacity are displayed in the application. The Dufan management, the application admin, can easily manage the attractions. They can add, edit, or delete any attraction as well as opening and closing it.

With the application, the author goal is to improve the tourist satisfaction and generate more revenue to Dunia Fantasi. It is hoped that Dunia Fantasi can keep striving as Indonesia's favorite amusement park for years to come.

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