Design of Information Systems Web-Based Car Parking Place Mall

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Abstract. The purpose of this research is to design a system that can help car owners to order parking spaces in malls online with web-based systems. The research method used was descriptive research method, to present a complete picture related to some of the variable situations examined. Data collection techniques use primary and secondary data and object-oriented system approaches, which support the design of web-based information systems. The results of this study can build software tailored to user needs, ease of use, and on time. This parking lot ticket booking website can simplify and simplify the selection of parking lots within the designated mall, allowing mall visitors to order online, and can reduce the number of people in getting a parking space at the mall.

1. Introduction

As the population grows more rapidly, the community is required to keep abreast of the development of the world itself, with the rapidly increasing community can also affect the number of vehicles becoming increasingly urban. The factor causes the desire of the community to get ease in carrying out their daily activities to encourage the rapid advancement of technology. At present the problem of parking in urban areas is the topic most widely discussed by the general public [1]. Car parking is a problem that is often encountered in metropolitan cities, dealing with the problem of finding a car park at a place where each mall takes a long time to find an empty parking space [2]. We conclude that parking is a separate problem experienced by some malls, from lack of space, increasing number of vehicles each year, or lack of staff and systems that handle it. The manual parking system is no longer an effective solution to overcome parking problems, one of the causes of parking problems is the lack of information on empty parking spaces known to mall visitors, so that car drivers have difficulty parking their vehicles. Many visitors have to queue long enough to get parking tickets, sometimes even waiting in line is not necessarily able to get a parking space. This certainly has the effect of loss in terms of the time spent queuing for a car park in the mall. Creating a web-based information system that aims to provide use for mall visitors so it is useful, when visitors use it to provide information on the availability of parking places on time so that they can book a secure parking place anytime and from anywhere, save time and effort, and pay electronics [3]. The internet is an information medium used by almost all institutions, organizations, businesses and individuals in introducing or promoting products or services [4]. With a site can build and support relationships with consumers through the internet can provide up-to-date information, and others.

From previous studies, there were those who explained the problem of parking lots, in their study explained the topic of transportation systems in urban areas, as well as the use of the number of vehicles in the transportation system that increased in finding parking spaces [5]. Problems with parking lots are an important concern in terms of occupation. In Indonesia, traffic problems have increased which cannot be denied, thus requiring a way to reduce traffic to automate the parking system by giving users prior information. By introducing a parking management system using an online application can solve the
problem of parking at the mall [6]. Gandhi and Rao in their research explained that parking systems using RFID sensors were used to locate the car and all details were accessed remotely through IoT. This system certainly helps users to find parking space availability with the help of Internet of Things (IoT) technology by providing information on free parking space [7]. Hany and all of them in his research explained that parking systems were developed in such a way that users could order their parking spaces via short message services (SMS) [8]. The provision of information about the parking management information system is expected to be able to curb and make parking more orderly and increase security in parking management [9]. Proposing a new smart parking system for the urban environment in the form of information from the application can provide optimal parking space based on the driver's cost function which combines distance to destination and parking fees [10].

Based on these problems, it requires something fast and efficient, one of which is the problem of availability in finding a parking space in a mall. The application of an electronic ticket ordering information system that aims to find a parking space is the right step as an effort to make time efficient in a transaction. Therefore, the author tries to design an electronic parking ticket purchase system. With the online parking ticket, it will improve the performance of business processes that occur in a mall. This is a challenge in itself to be able to design a parking system that can adjust the location of the car park and provide information for each available parking space. The online parking place information system is expected to help data collection and parking system reports, then help mall visitors to book parking tickets online, where in this system users do not need to come directly to the mall to get a parking ticket. The concept that will be made from this information system is to design a transaction model for booking tickets for online mall-based parking lots that can be accessed via the internet.

2. Method

In researching the parking ticket information ordering system, the author used primary data sources and secondary data sources as references in the research conducted. Primary data sources are obtained from direct observation and interviews, as well as secondary data sources from documentation relating to the process of developing a car park information system related to research, as well as the development of the system. This web application was built in the hope of simplifying and simplifying the selection of parking spaces within the mall. The research method used was descriptive method, to get the facts by searching, recording, and collecting the analyzed data. The web-based parking information system builder uses an object-oriented approach method. Design tools such as use cases, use case scenarios, and activity diagrams, then the development method using the prototype method. Because software development methods are designed to accept changes to improve existing prototypes and finally the software can meet user needs and is ready for use (Figure 1).
3. Results and Discussion

3.1 Analysis

The current parking system in the public mall uses an automatic parking gate system using a system that only provides information about the length of parking and the image of the vehicle used to obtain information on the costs to be paid. In the parking system there are some problems where mall visitors sometimes don't get parking because the mall parking attendant doesn't know that the parking lot is full [11]. In addition, another problem is that visitors sometimes do not know when entering the mall parking area will easily get an empty parking space, so it takes a long time to park and make mall visitors search for parking. The current system still makes mall visitors confused whether the parking lot is full or available, so when visitors take a ticket, visitors think that parking is available [12].

The problem makes many people think not to park their vehicles in the Mall, they will prefer a place farther away from the Mall but with the guarantee they get a parking lot easily and comfortably. From these problems, the idea was to create a system to make it easier for Mall visitors to get a parking space.

The system will be made based on the web in the form of applications in smartphones. Using smartphone applications because the majority of car users in in the world use smartphones in their daily lives. Smartphones represent an important part of modern life, because they enable us to communicate from nearly everywhere (as long a phone signal is available), access the Internet, check e-mails and social networks [13].
3.2 Planning

The purpose of designing an information system where a car park is at the mall is to make it easier to make it easier to search in-mall parking places online through the website, allowing visitors to book parking tickets online, thereby reducing the queue in getting a parking space at the mall. The system design phase is described as a design for building an information system. The procedure design phase will be explained by using object-oriented information system modeling with UML (Unified Modeling Language).

The following are the tools used in system design:

1. Analysis and design tools
   a. Use case serves to describe who actors are involved in the system and what is done by the actor (Figure 2).
   b. The use case scenario functions as the path of the use case process from the actor and system side.
   c. Activity diagram serves to describe the work flow or activity of a system that exists in the software / application (Figure 3).

| NO | FIGURE | NAME | EXPLANATION |
|----|--------|------|-------------|
| 1  | ![Actor Symbol](image) | Actor | Functionality provided by the system as units that exchange messages between units or actors, is usually expressed using the verb at the beginning of the phrase name use case. |
| 2  | ![Use Case Symbol](image) | Use Case | People, processes, or other systems that interact with information systems that will be created outside the information system that will be created themselves. |
| 3  | ![Association Symbol](image) | Association | Communication between actors and use cases that participate in use cases has interaction with actors. |
| 4  | ![Include Symbol](image) | Include | Additional use case relations to a use case and use case that are added require this use case to carry out its functions. |
| 5  | ![Extend Symbol](image) | Extend | Additional use case relations to a use case and use case that are added can stand alone even without additional use cases. |

*Figure 2. Use Case Diagram Symbols*
| NO | FIGURE | NAME             | EXPLANATION                                                                 |
|----|--------|------------------|-----------------------------------------------------------------------------|
| 1  | ![Initial Note](image) | Initial Note     | The initial status of system activity, an activity that has an initial status. |
| 2  | ![Activity](image)    | Activity         | Activities carried out by the system, activities usually begin with verbs.   |
| 3  | ![Branch](image)      | Branch           | Branching association where there are more than one activity options.        |
| 4  | ![Join](image)        | Join             | Merging association where more than one activity is combined into one.        |
| 5  | ![Complete Activity Flow](image) | Complete Activity Flow | The final status of the system, an activity diagram has a final status. |
| 6  | ![Swimlane](image)    | Swimlane         | Separate business organizations that are responsible for activities that occur. |

**Figure 3.** Activity Diagram Symbols

2. Design aids
   a. Microsoft Visio is used to make production tools such as use cases, and activity diagrams.
   b. Sublime Text 3 is used as a PHP programming language for web creation.
   c. Xampp is used as a database that uses MySQL.
   d. Adobe Muse
This study produced a parking information system application that was built using HTML web programming language as a static language, PHP as a dynamic language, and MySQL as a database.

3. Interface

User Interface used to make it easier for users to interact with this application so that it is expected to provide a comfortable feeling for its users. The User Interface is very important to be applied in web-based media because a lot or no of the web user is determined by how well the user interface is given. The following are some elements that will appear in the application's user interface to be created:

- **Clear**
  Provide a clear picture of this whole application, so that users know that this application has a clear function. In this case, the application that will be made must have visual characteristics that describe the car park.

- **Short**
  Today, smartphone users tend to choose a simple applications. This tendency arose when Apple made its appliance icon with a flat design until now smartphone users still like visuals that give a simple and brief impression.

- **Familiar**
  This application will be easily understood by car users in general. It is hoped that it will not be difficult for users of this application when using it.

- **Responsive**
  To maximize this application role, this application must be responsive. Responsiveness in this application is needed because the base flow data of vehicles in the Mall must be synchronized quickly. The system should always keep users informed about what is going on, through appropriate feedback within reasonable time [14].

3.3 Use Case Diagram

In the use case this diagram will describe several actors who interact with the system. Use case diagram parking information system can be described as follows (Figure 4):
Use case diagram modeling shows that the system has 2 actors who have different tasks and functions. The following is the description of each actor from the use case diagram of the car parking information system:

4. **Driver Actor**

To place a parking lot and purchase a parking ticket, visitors must register in the web application, then log in to be able to place a parking reservation. After that, visitors look for an empty parking space on the web, if there is an empty one and place an order on the parking lot. After that, it is continued in payment for proof of booking a parking lot. If you have made a payment, the system will show the parking electronic ticket to visitors.

5. **Admin Actor**

The system administrator must log in first to be able to manage parking data on the web. After that the admin looks at the data of visitors who have made an order in the parking lot. Admin will provide fees that must be paid to visitors to place a parking lot. If the payment has been made the admin will provide an electronic ticket that will be shown to visitors.
4. Conclusion

Based on the results of the design and evaluation of the system that has been submitted, it can draw conclusions with the existence of a web booking online parking lot at the Mall, important information data such as transactions, ordering data and parking tickets can be stored computerized in the database. The mall's car parking web can help visitors easily get a parking space via online booking, can provide parking space without having to come directly to the designated mall, and save time to get a parking space and provide new innovations for car drivers without having to fear of not having a place when I want to enter the mall parking lot when visitors have booked a parking space online.

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