

Development of a Vehicle Driving Permit Submission Website (TIMK) Using the Prototype Method at Hang Nadim International Airport

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Abstract

The manual submission process for the Vehicle Driving Permit (TIMK) at Hang Nadim International Airport poses issues including delays, misrecording, and document loss. This research aims to develop a web-based permit application system using the prototype method to improve efficiency, transparency, and accuracy in administrative procedures. The system was developed using HTML, CSS, and JavaScript in Visual Studio Code and includes features such as digital application forms and admin verification. The development stages followed the prototype method: communication, quick design, building the prototype, and obtaining user feedback for iterative improvements. System testing with IT experts and airport staff using black box testing confirmed the system's functionality and feasibility. The findings demonstrate that the web-based TIMK system can streamline application processes and align better with airport operational standards.



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1 INTRODUCTION

According to the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 167 Year 2015, all drivers operating vehicles in airport restricted areas must hold an official permit issued by the airport authority. This regulation aims to ensure aviation safety and prevent incidents caused by untrained or unauthorized personnel. At Hang Nadim International Airport, one of Indonesia's busiest airports, the current manual system for issuing the Vehicle Driving Permit (TIMK) is prone to delays, data errors, document loss, and potential misuse.

In today's digital era, information technology is no longer just a support tool, but a necessary element for effective administration [1]. Web-based systems enable remote access to data and streamline services [2]. Previous studies have shown that digital licensing systems can save time and reduce costs [3]. However, most of these systems have been implemented in other locations, such as the E-PAS system at Sultan Thaha Saifuddin Airport [4]. Therefore, this research focuses specifically on developing a TIMK web application tailored for Hang Nadim International Airport.

A website is a text-related entity that extends across one or more interconnected browser windows [5]. Website is one of the services accessed by computer users connected through hypertext facilities to display data in the form of text, images, sound, animation, and other multimedia [6]. Website is a collection of information in the form of web pages combined within a single URL. In general, a website is understood as a collection of pages consisting of several sections that contain information in digital form, such as text, images, and animations, which are provided via the internet and can be accessed worldwide by anyone with an internet connection [7] [8].

Currently, the use of technology as a learning medium has become common for the general public. In addition to being used to access learning materials, technology can also be utilized as a medium for disseminating information [9]. The prototype method is a system development or design method that involves introducing or familiarizing the system to prospective users [10]. With this system, it is expected that the process of issuing TIMK at Hang Nadim International Airport can be carried out more quickly, transparently, and accurately.

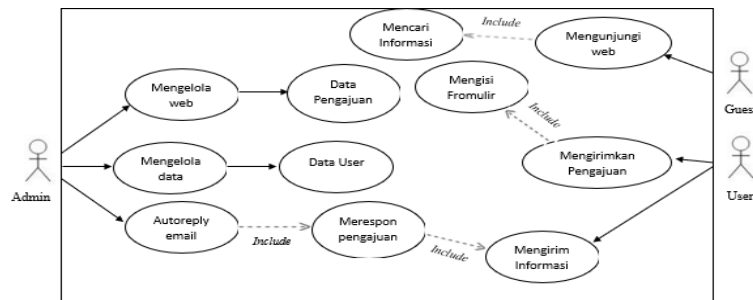


Figure 1 Use Case Diagram

The image above represents a Use Case diagram consisting of three actors who use the website: Admin, Guest, and User, which explains the relationship between the actors and the system. The User has a role to access the view and submit requests on the web pages within the website, while the Admin has a role to manage and access the website.

2 METHOD

In this research process, research and development methods and black box methods are used for application testing. Research and Development (R&D) research method is a research method used to produce certain products and test the effectiveness of these products [11]. One of the development models in this method is the prototype development method. The prototype method is one of the methods used in software development with the prototyping method, developers and clients can interact during the system prototype development process [12].

The system that has been built is then presented to the users, so they have the opportunity to provide feedback and suggestions for improvements to the system. This way, the system is expected to be effective and aligned with the user expectations [13] [14]. Prototyping goes through five processes, namely communication, quick plan, quick design, prototype construction, and delivery & feedback. These processes can be explained as follows: Communication, Quick Plan, Modeling Quick Design, Construction of Prototype, and Delivery & Feedback [15].

At the application testing stage, the Black Box method is used often called Black Box testing. Black box testing is a stage used to test the smoothness of the program that has been created. This testing is important so that there are no errors in the flow of the program that has been created. Black box testing is testing software in terms of functional specifications without testing the design and program code." Another definition of Blackbox testing is a type of testing that treats software whose internal performance is unknown." Black Box Testing focuses on the functional specifications of the software, a collection of input conditions, and testing the program's functionality [16] [17] [18].

3 RESULTS

This web project was developed using a combination of modern front-end technologies, namely HTML5, CSS, and pure JavaScript, without any back-end framework. The main project folder consists of subfolders such as assets for storing images and icons, styles for CSS files, and scripts for JavaScript. For the styling process, the author used external CSS designed in a structured manner, with a class-based approach to ensure reusability and greater efficiency. JavaScript is used to manage interactivity, navigation effects, and temporary data storage using local Storage. Below is the result of the website design, which will be explained as follows:

1. Home Page



Figure 2 Home Page

2. About Us Page



Figure 3 About Us Page

3. Regulation Page

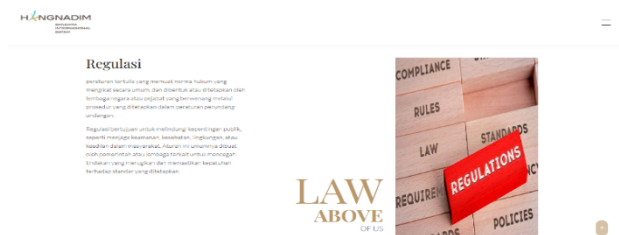


Figure 4 Regulation Page

4. Information Page



Figure 5 Information Page

5. Vehicle Driving Permit Page



Figure 6 Vehicle Driving Permit Page

6. Vehicle Access Pass Page



Figure 7 Vehicle Access Pass Page

7. Airport Access Pass Page



Figure 8 Airport Access Pass Page

8. Contact Us Page

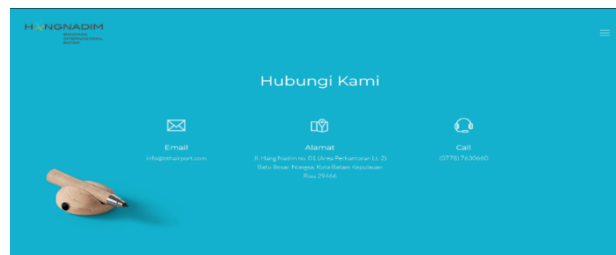


Figure 9 Contact Us Page

The procedure for applying for a Vehicle Driving Permit (TIMK) using the website can be done by filling out the Google Form available on the website. The following are the steps for submitting a TIMK application:

1. Access the Website Page



Figure 10 Access the Website Page

2. Go to the menu page



Figure 11 Go to the menu page

- Click the Information menu



Figure 12 Information menu

- Vehicle Driving Permit Page



Figure 13 Vehicle Driving Permit Page

- Form Page

Figure 14 Form Page

Website Testing

Testing of the system being developed is carried out using the black box method which focuses on the functional specifications of the web.

Table 1 Black Box Testing of the Web

NO	Testing Activity	Expected Result	Testing Result	Conclusion
1	Sidebar menu button	Displays features (Information, Contact Us, Regulations, About Us)	Valid result displays these features	[✓] Matches [] Fix
2	Hang Nadim logo	Displays the feature leading to the Home page	Valid result displays the Home page	[✓] Matches [] Fix
3	Learn More button	Displays the feature leading to the About Us page	Valid result displays the About Us page	[✓] Matches [] Fix
4	Information button	Displays the feature leading to the Information page	Valid result displays the Information page	[✓] Matches [] Fix

5	Contact Us button	Displays the feature leading to the Contact Us page	Valid result displays the Contact Us page	☒ Matches ☐ Fix
6	Regulations button	Displays the feature leading to the Regulations page	Valid result displays the Regulations page	☒ Matches ☐ Fix
7	About Us button	Displays the feature leading to the About Us page	Valid result displays the About Us page	☒ Matches ☐ Fix
8	Social Media button	Displays links to YouTube, Instagram, Facebook	Valid result displays YouTube link	☒ Matches ☐ Fix
9	CLICKHERE button	Displays the feature leading to Google Form	Valid result displays Google Form	☒ Matches ☐ Fix

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