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Designing a Web-Based Laundry Service Application For Strala Laundry

Cut Mutia[1]*, Fauziah[2], Irzon Meiditra[3], Fitra Yuda[4], Rizky Rahmansyah[5]

[1,2,4] Institute Technology Rokan Hilir, Science and Technology, Information System, Jl. Lintas Sumatera No.Km 167, Banjar XII, Kec. Tanah Putih, Kabupaten Rokan Hilir, Riau 28953, Indonesia
[3]Institute Technology Rokan Hilir, Science and Technology, Information Technology, Jl. Lintas Sumatera No.Km 167, Banjar XII, Kec. Tanah Putih, Kabupaten Rokan Hilir, Riau 28953, Indonesia
[5]University Prima Indonesia, Faculty of Psychology, Psychology, Jl. Sampul No.3, Sei Putih Bar., Kec. Medan Petisah, Kota Medan, Sumatera Utara 20118, Indonesia

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Corresponding Author:
fauziahnurgayo@gmail.com

Abstract
As daily activities become more hectic, the need for efficient laundry services is increasing. Currently, Starla Laundry relies on a manual system for operations, leading to challenges such as storing customer data in logbooks, creating complex reports, and slow transaction processes due to manual calculations. These issues make it difficult for the owner and admin to manage the business effectively amidst growing competition. To address this, a new application is proposed using PHP programming, a MySQL database, and Microsoft Visual Studio Code for data processing. The application aims to improve operational efficiency, simplify data management, and support business growth. It is expected to enhance customer satisfaction and open opportunities to optimize the business in the digital era. This study focuses on designing a laundry service information system using the System Development Life Cycle (SDLC) methodology, which includes planning, analysis, design, and implementation. The system was tested using Black Box Testing to ensure the software meets its requirements. The results confirm that all application functions work as intended, making it ready to streamline Starla Laundry's operations efficiently and professionally.

1. Introduction

In the digitalization era, information systems have undergone rapid advancements, driven by the increasingly complex and diverse needs of humanity. Technological progress plays a pivotal role in shaping various aspects of life. One of the key advantages of computerized systems lies in their ability to provide relevant, accurate, and timely information while offering numerous conveniences that enhance both efficiency and effectiveness [1]. The advancement of information technology has brought significant changes to people's lifestyles. One sector that has experienced positive impacts is the service industry, particularly laundry. The increasing busyness and mobility of society have driven the need for laundry services that are more efficient and easily accessible [2].

Designing a web-based laundry service application is an ideal solution to enhance efficiency and accessibility for businesses. Owners can easily input customer data, schedule pickups, and manage operations more effectively through an integrated system. This information system was developed using the System Development Life Cycle (SDLC) with the Waterfall methodology, a sequential approach covering requirements analysis, design, development, testing, and maintenance. The application was built with PHP, a MySQL

database, and the CodeIgniter Framework to simplify data recording, searching, and processing for the Starla Laundry owner. [3] This system excels in ease of use and operational efficiency, even for non-technical micro-business owners. Its interface is simple and intuitive, and it's compatible with both computers and mobile phones for flexibility. Key features like automatic customer data search, category-based daily transaction recording, and weekly sales reports speed up and improve data processing accuracy. Limited trials show it saves up to 50% on recording time and increases user satisfaction in laundry data management. [4]

The implementation of a web-based laundry service application not only simplifies operations for business owners but also enhances competitiveness in an increasingly tight market. With a structured workflow, operational efficiency is improved. Therefore, this study aims to design and develop a web-based laundry service application to improve service quality and operational efficiency in the laundry business [5]. The design of this application is expected to contribute positively to the growth of the laundry service industry, enhance customer satisfaction, and create new opportunities to optimize business potential in the digital era [5].

There have been previous studies on the design of laundry information systems. For example, a study was conducted on the design of a web-based laundry data management information system [2], and another study developed a laundry information system using the waterfall method [4]. Based on these two studies, the laundry industry is now considered one of the sectors with rapid growth in information technology. To support the development of laundry services, the implementation of information technology is crucial—especially since there are applications that can handle income reports and transaction data, which are believed to assist both laundry owners and users. However, laundry services have not yet fully utilized information technology to its maximum potential within the industry. The main difference between the previous studies and this research lies in the case study. This research specifically focuses on Starla Laundry.

Based on the issues mentioned, the author has designed a system aimed at addressing the challenges of optimizing computer usage while also making it easier for workers to input customer data. This system will organize customer information, making data retrieval more efficient. Therefore, this study is titled "Designing a Web-Based Laundry Service Application for Strala Laundry" [5].

2. Research Method

This research uses a System Development Life Cycle (SDLC) waterfall method to develop the system. This sequential and linear approach begins with public facility data collection, followed by a structured system design process to logically understand and analyze system development.[6].

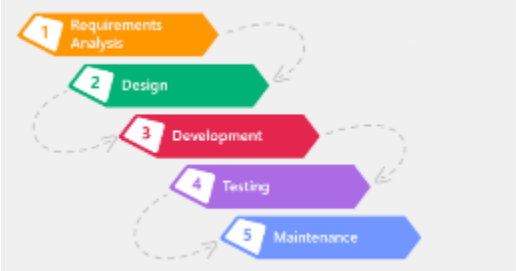

Figure 1 waterfall method

This study adopts the Software Development Life Cycle (SDLC) method with the waterfall model. This model consists of several phases, starting with the requirements analysis phase, followed by system and software design, then implementation or coding, followed by system testing using black box testing. and finally, the maintenance phase [7]. The Software Development Life Cycle is the process of creating or modifying software systems using models and methodologies that have been proven effective (based on best practices or methods that have been validated). Here's an explanation of the SDLC Waterfall model stages for developing the Starla Laundry Web-Based Information System. In requirement analysis stage, we gathered Starla Laundry's system requirements (customer data, transactions, wash status, payments, financial reports) to understand their expectations for a new web system. This resulted in an SRS document, which is now our development foundation[8]. In system design stage, once system requirements were set, the next step was detailed system design. This covered system structure, user interface (UI) design, database design, and business workflow. The

architectural design showed how components would interact, while UI design focused on user-friendliness. We used diagrams like flowcharts, use cases, and class diagrams for visualization [9]. After implementation, in integration and testing stage, the system undergoes rigorous testing in stages unit, integration, and system testing. Finally, blackbox testing is done with Starla Laundry to ensure it meets their expectations. Any issues found are fixed before launch [10]. In deployment stage, once the system has successfully passed all testing phases, it's deployed to the production environment. The system will be installed on a prepared and configured server to ensure stable operation. During this phase, Starla Laundry staff and managers will receive training to maximize their use of the system in daily operations [11]. The final stage involves maintaining and improving the system once it's actively in use. Maintenance aims to preserve system performance, fix any bugs that emerge, add new features as needed, and adapt the system to evolving business requirements and technological advancements. This is an ongoing process to ensure the information system remains relevant and optimally supports Starla Laundry's business performance [12].

Data collection techniques refer to methods or approaches used to gather data for research purposes. These techniques require strategic and systematic steps to obtain data that is both valid and reflective of reality. Additionally, these methods are typically utilized by researchers to collect data that pertains to abstract concepts, which are not represented in tangible forms but can only be observed through their application [13].

Figure 2. Flowchart Diagram

Observation is a data collection technique that involves a systematic and meticulous process of observing, recording, and analyzing events, behaviors, or situations within a real-world or controlled context. This technique is used to gather information directly from the source without significant intervention or manipulation by the researcher. Observation focuses on events or occurrences being studied through direct surveys conducted at Starla Laundry[14]. An interview is a structured communication process where the interviewer asks a series of questions to the respondent to gather information or gain insights on a specific topic. In this technique, the parties involved are employees of Starla Laundry, engaging in verbal question-and-answer sessions to obtain the necessary data and information for the research process [15]. A literature review is a systematic and comprehensive process of identifying, evaluating, and summarizing research, theories, and information from various literary works such as books, articles, journals, novels, poems, short stories, plays, and essays related to the research topic. This process aims to gain a deep understanding of the context, developments, and existing perspectives while identifying knowledge gaps or areas that require further research [16].

3. Result and Discussions

This study uses AHP to find the best feed for laying ducks by comparing factory, fermented, mixed, and organic feeds based on nutrition, price, and availability. In this use case diagram, both the Admin and Owner can only access the application after successfully logging in. Once authenticated, both actors can then access the system functionalities according to their predefined access rights [17].

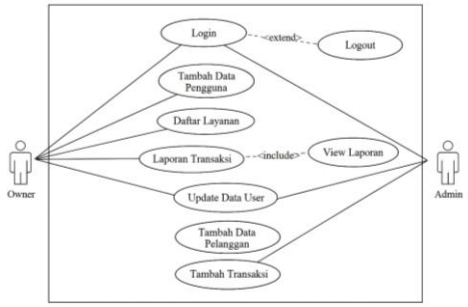

Figure 3. use case diagram

The system includes several key features designed to support efficient management at Starla Laundry. The Add User Data feature is exclusively available to the Owner allowing them to add, edit, or delete user accounts within the system. The Service List feature enables the Owner to manage all services offered by Starla Laundry, including adding new categories and service types, as well as modifying or removing existing ones. With the Transaction Reports feature, the Owner can access customer transaction records and generate output such as receipts. Lastly, the Update User Data feature can be used by both the Owner and Admin to modify their personal information, including editing and deleting their data as needed.

This Class Diagram for the Starla Laundry Information System visually represents the logical design and structure of the developed software. It illustrates the relationships between classes, the attributes contained within each class, and the functions and methods that support the system's operations. Figure 3 specifically demonstrates the inter-class relationships within the system, detailing the attributes and methods utilized to support the system's functionality.[18]

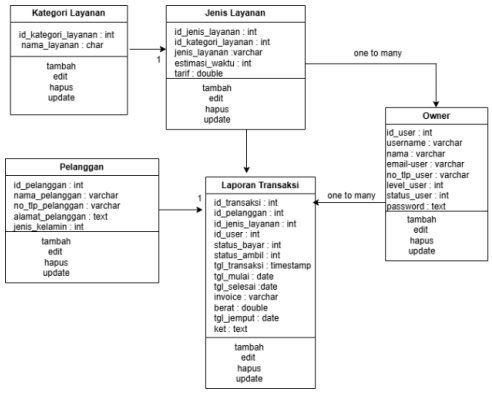

Figure 4. class diagram

When users launch the application, they'll see the Login Menu Page, which requires them to enter a valid Username and Password. This ensures only authorized users can access the application's features. Figure 5 illustrates the layout of this login form, showing the Username and Password input fields.

Figure 5. Login Page

The image shows the "Transaction Report" page of STARLA LAUNDRY, where users can filter completed transactions by date and pickup status. The table displays details like entry date, pickup date, invoice number, customer name, service type, total payment, status, and options to view or print.

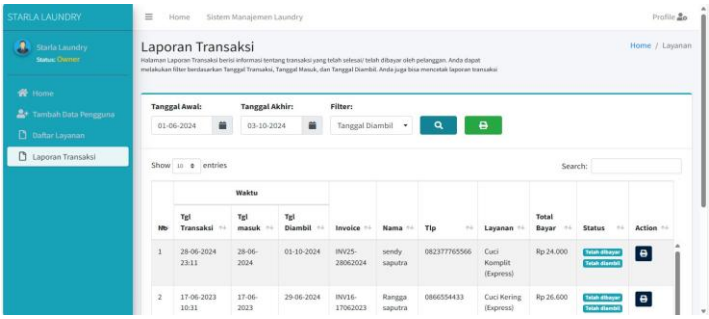

Figure 6. Transaction Report Page Display

The "Customers" page in the STARLA LAUNDRY system is the main place to manage customer data. Admins can add new customers using the "+ Add" button. A table shows customer details like name, phone, address, and gender, with edit/delete options in the "Action" column. You can also search and adjust the number of entries displayed.

Figure 7. Customer Data Page Display

Black Box Testing, also known as black box testing, is a method used in software testing. This process aims to evaluate software, either manually or automatically, to ensure that it meets the specified requirements. Additionally, this method is used to identify discrepancies between the expected results and the actual outcomes. The following are the results of the testing. [19]. System testing is a crucial stage for understanding a software's ability to handle errors. For this laundry service system, black-box testing is used to observe its reaction to various inputs. The goal of black-box testing is to verify that each process operates according to desired requirements. Testers can interpret input conditions as a set and conduct specific tests on system functions. Therefore, this testing method is a program execution approach aimed at identifying faults or errors, followed by making corrections so the system can be deemed fit for use [20].

Table 1. Black Box Testing

No	Tested Page	Test Data	Expected Results	Output	Test Results	User Feedback/Usability
1	Login Page	Input valid username and password	Redirected to home page	Login successful	Valid	Users found the login process easy to understand, but there was a suggestion to add a 'forgot password' feature
2	Add User	Input user name, email, and password	User data increases	User data increasing	Valid	The user addition process is quite intuitive, with no significant issues encountered
3	Update Latest User Data	Input new email and password	Data updated successfully	Data update saved	Valid	Users needed a bit of time to find the edit button, but everything went smoothly afterward
4	Add Customer	Input customer name, phone number, etc.	Customer data increases	Customer data increasing	Valid	Customer addition went smoothly, and the input form was clear
5	Add Transaction	Select customer, services, input quantity	Transaction data increases	Transaction data increasing	Valid	This section is slightly confusing for new users when selecting services and would benefit from a brief guide
6	Add Service	Input service name, price, etc.	Service data increases	Service data increasing	Valid	The process of adding services is easy, and the interface is clear.
7	Transaction Report	Input customer name	Report with customer data is displayed	Print report	Valid	The filtering feature proved to be very useful, with the print button being conveniently accessible

The system testing was conducted using the Black Box Testing approach on several key features of the application. The testing began with the login page, where the scenario involved users entering a valid username and password. The result showed that users were successfully logged in and redirected to the homepage. The login process was found to be easy to locate and understand. However, both testers and users recommended adding a “Forgot Password” feature to enhance convenience and flexibility, especially when login credentials are forgotten.

Next, the "Add User" feature was tested by entering a new username, email, and password. The system successfully recorded the new user data, reflected by an increase in the total number of users. This process was considered intuitive and easy to follow, indicating that the user interface in this section is well-designed and effective. For the "Update Latest User Data" feature, the test involved updating the email address of the most recent user. The data was successfully updated and saved. While the update process itself ran smoothly, some users initially struggled to find the “Edit” button. Once it was located, the rest of the process was seamless. Therefore, it is recommended to improve the placement or visual prominence of the “Edit” button to increase accessibility.

In testing the "Add Customer" feature, users were required to enter the customer's name, phone number, and other relevant details. The system successfully added the customer data, as evidenced by the increase in customer records. Users found the process smooth and intuitive, with a clear and user-friendly input form that reduced confusion. The "Add Transaction" feature involved selecting a customer, choosing a service, and entering the quantity to record a new transaction. The system successfully saved the transaction data. However, new users found this part somewhat confusing, particularly during the service selection process. They

suggested adding a brief guide or contextual hints to reduce confusion and improve the input process for first-time users.

The "Add Service" feature allowed users to enter the service name, price, and other relevant information. The data was successfully saved and appeared in the service list. This process was rated as very easy and efficient by users, who appreciated the clarity and simplicity of the interface. Finally, the "Transaction Report" feature was tested by entering a customer name to generate a report. The system successfully displayed the customer's transaction details and allowed the report to be printed. The filtering feature was found to be particularly helpful in quickly locating specific data. Additionally, the "Print" button's strategic placement near the search results made it easy for users to print the necessary reports.

Overall, the system performed successfully and was considered valid across all main features. While the overall usability was praised, a few minor recommendations from users can serve as valuable input for future improvements.

4. Conclusions and Future

The development of a web-based laundry service application using MySQL as the database and PHP as the programming language has proven effective in addressing data management challenges at Starla Laundry. Based on the identified problems, the author concludes that the implemented system has brought several improvements. First, the data search process has become faster and more efficient, allowing users to access the required information effectively. Second, the system is capable of generating accurate and up-to-date reports, making the output more reliable for informed decision-making. Lastly, overall work efficiency has improved, especially in handling data requests and producing more structured and organized reports.

Additionally, to further enhance user experience and adapt to evolving market trends, future developments could focus on creating a mobile version of the application. This would allow users to conveniently access services on-the-go. Furthermore, integrating digital payment options could streamline transactions and provide a seamless payment experience, aligning with current user behavior and expectations.

To ensure a smooth transition and optimal operation, user training and ongoing maintenance are crucial. Future enhancements should include loyalty programs, a customer feedback system for quality improvement, and a pickup and delivery service via the app to enhance convenience and service value for customers.

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