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Implementation of Web-Based Real-Time Laundry Status Tracking System

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***Abstract*--The lifestyle of Indonesian society, particularly Generation Z, is characterized by a preference for practicality and a strong reliance on technology. This lifestyle pattern often reduces Generation Z's interest in household chores, such as washing and organizing clothes. Laundry services have therefore become a popular solution, especially in urban areas. However, customers often face difficulties in monitoring the progress of their laundry in real time, leaving them uncertain whether their laundry is completed or still in process. To address this issue, this study aims to design and implement a web-based laundry status tracking system that provides customers with real-time information on their laundry progress. The system was developed using modern web technologies, employing the Laravel framework for the backend and Bootstrap for the frontend. The system also integrates additional features such as delivery and pickup options, payment methods, and progress tracking. Moreover, it provides a user-friendly interface for administrators to manage laundry data and for customers to monitor their orders. Testing results indicate that the system successfully provides accurate and real-time information, enhances transparency, and increases customer satisfaction. This system is expected to support laundry businesses in improving operational efficiency and service quality.**

***Key words*: Customer satisfaction; Laravel framework; Laundry service; Real-time tracking; Web-based system.**

I. INTRODUCTION

The development of technology and changes in people's lifestyles, particularly Generation Z in Indonesia, have had a significant impact on various aspects of daily life. Generation Z, who grew up in the digital era, is characterized by their desire for practicality and speed in almost everything [1]. Their reliance on technology has influenced their habits and preferences, including in carrying out household chores such as washing and organizing clothes. This condition has led to an increase in demand for laundry services, especially in urban areas, where busy activities and limited time encourage people to use such services [2].

Although laundry services have become a solution for many people, customers often face difficulties in monitoring the progress of their laundry in real time. The inability to know whether their clothes are completed or still being processed may cause inconvenience and dissatisfaction [3]. This presents a challenge for laundry service providers to deliver more transparent and efficient services.

Previous research on laundry information systems has primarily focused on digitizing manual processes for internal management. For example, a web-based system for recording laundry transactions [4]. Another system was developed to improve data accuracy and reporting [5]. Similarly, an Android-based system was implemented to simplify transaction recording [6]. Furthermore, a web-based system was designed for Laundry Cucimania in Depok to replace conventional record-keeping, improving efficiency and minimizing errors [7]. An Android-based system for Rumah Laundry was built to streamline data management and reporting [8]. A PHP-based system for Quality Fresh Laundry Pekanbaru was proposed to support administrative data entry and documentation [9]. An Android-based ordering system in Palembang was developed to help owners compete and make it easier for customers to find laundry services [10]. While these studies contributed to digitalize operations and improving administrative processes, they mostly concentrated on internal management and ordering functions without providing real-time status tracking features.

Meanwhile, literature on real-time web systems emphasizes the importance of responsiveness and event-driven architectures to support customer satisfaction [11], [12]. Studies on usability and

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user experience also highlight that transparency and accessibility are key determinants of service quality [13], [14]. However, such insights have rarely been applied in the context of laundry management systems. Most existing implementations do not yet provide customers with real-time information about their order progress, which reduces transparency and may lower customer trust.

Compared to these previous works, this study focuses on implementing a real-time tracking system using Laravel, Bootstrap, and MySQL. While prior studies mainly concentrated on internal management and transaction efficiency, this research contributes by providing transparency to customers through status monitoring features. Thus, it extends existing work by integrating operational efficiency with customer-oriented real-time tracking.

This study aims to design and implement a web-based laundry status tracking system that can provide real-time information to customers regarding their laundry progress. The system is developed using modern web technologies, utilizing the Laravel framework for the backend and Bootstrap for the frontend. For data storage, the system employs MySQL database, which is well-known for its reliability in managing structured and efficient data. MySQL was chosen due to its capability in handling transactional data effectively and its high compatibility with the Laravel framework. With this system, laundry businesses are expected to improve operational efficiency and service quality. The system not only provides convenience for customers but also helps service providers in managing laundry data more systematically and effectively. Therefore, this web-based laundry status tracking system can serve as an innovative solution to meet the needs of Generation Z, who demand practical, fast, and transparent services.

II. METHOD

This study adopts the Rapid Application Development (RAD) methodology, which emphasizes fast and iterative development by involving active user participation throughout the process. The RAD model was chosen because it is suitable for projects that require quick delivery without compromising the quality of the system [15], [16], [17]. The stages of RAD in this research are as follows:

A. Requirements Planning

At this stage, researchers conducted interviews and observations with laundry service providers and customers to identify problems and needs. The main requirement identified is the need for a web-based system capable of providing real-time updates on the status of laundry orders. In addition, several supporting features were identified, such as order management, delivery and pickup services, payment options, and a user-friendly interface for both administrators and customers.

B. System Design

The system design stage involved the development of system architecture, database design, and user interface mockups. The design was created using Unified Modeling Language (UML) tools, including use case diagrams, activity diagrams, and class diagrams. The database was designed using MySQL to ensure structured and efficient data management. The frontend was designed using Bootstrap to provide a responsive interface, while Laravel was selected as the backend framework for its robustness and scalability.

C. Construction

At this stage, the system was built based on the designs that had been created. The development process was divided into modules, such as order management, customer management, service management, status tracking, delivery, and payment. Each module was developed iteratively and tested immediately to ensure that it functioned according to user requirements. The use of Laravel as the backend framework facilitated rapid development with built-in features such as routing, authentication, and database migration.

D. Implementation

The system was then implemented and tested directly in a real environment. Administrators were trained to operate the system, including managing customer data, services, and laundry order status. Customers were given access to the system through a web-based interface to track their laundry status in real time. The implementation was accompanied by functional

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testing (Black Box Testing) and user acceptance testing (UAT) to ensure that the system worked according to expectations.

Through these stages, the RAD method allowed this research to build a functional and reliable system in a relatively short time while still accommodating feedback from both administrators and customers.

III. Result and Discussion

The web-based laundry status tracking system has been successfully implemented by utilizing the Laravel framework on the backend, Bootstrap on the frontend, and MySQL as the database. The implementation was carried out based on user requirements identified during the analysis stage, with emphasis on ease of use, access speed, and real-time transparency of laundry status. In general, the system provides two types of interfaces: an administrator interface and a customer interface. The administrator functions as the manager of laundry service data, while customers use the system to place orders, select services, and monitor their laundry status. The following describes the implementation of each main feature:

A. Admin Dashboard View

The admin dashboard, as shown in Fig. 1, provides a summary of essential information related to the number of orders, ongoing transactions, and transaction totals for the day and month. With the dashboard, administrators can monitor overall laundry operations in a single view, making management more efficient.

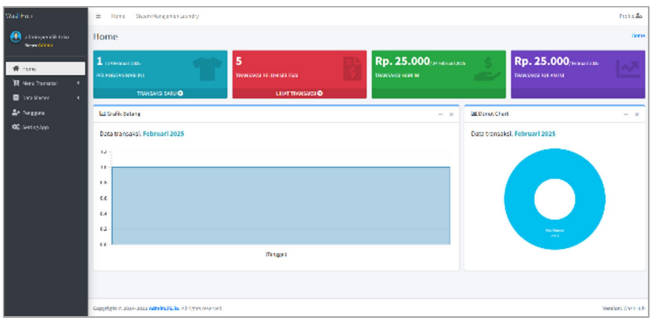

Fig. 1. Admin dashboard

B. Laundry Delivery View

This feature is used to record delivery details and the charges to be paid, as illustrated in Fig. 2. Administrators can manage laundry delivery information based on customer requests. The implementation of this feature helps customers who do not have time to visit the laundry outlet, making the service more flexible.

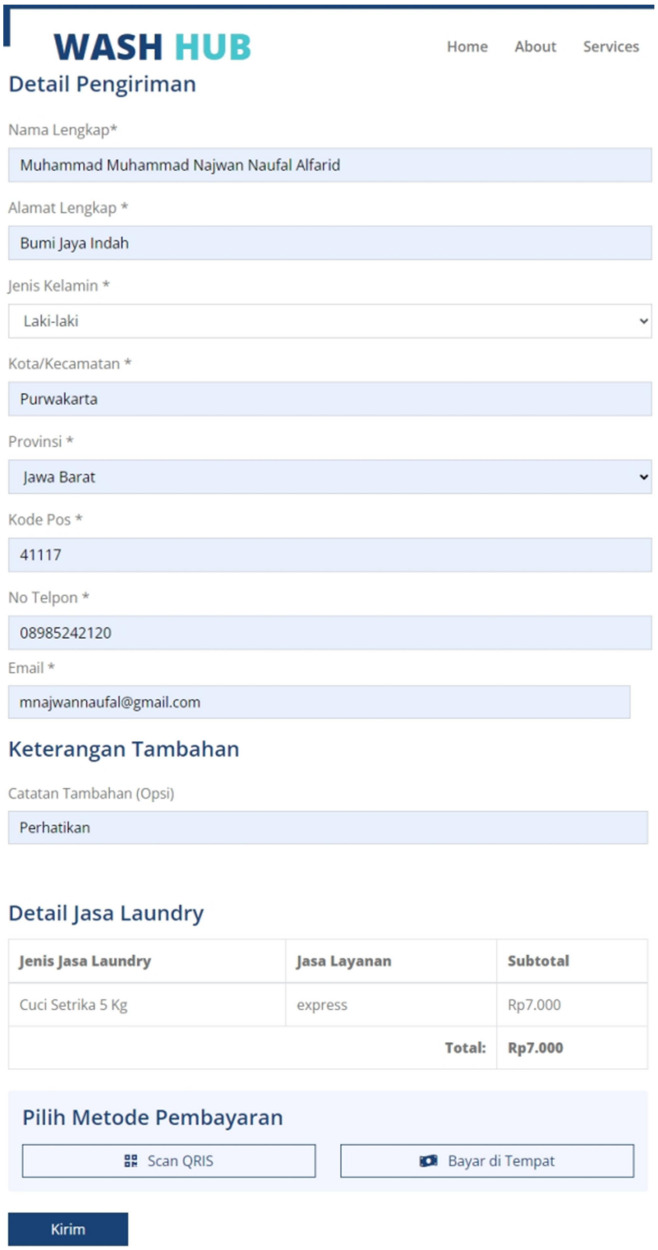

Fig. 2. Transaction view

C. Laundry Service Management View

In this feature, administrators can add, edit, or delete types of services offered, such as dry cleaning, wash and iron, or express services, as shown in Fig. 3. By managing service types, customers can choose the service that best suits their needs and preferences.

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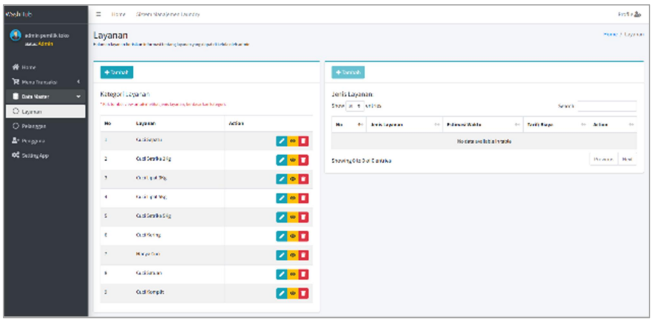

Fig. 3. Laundry service management

D. Customer Management View

The system provides a customer data management feature that stores information such as names, contacts, and addresses, as shown in Fig. 4. This feature helps administrators identify regular customers, monitor service usage habits, and improve customer relationship quality.

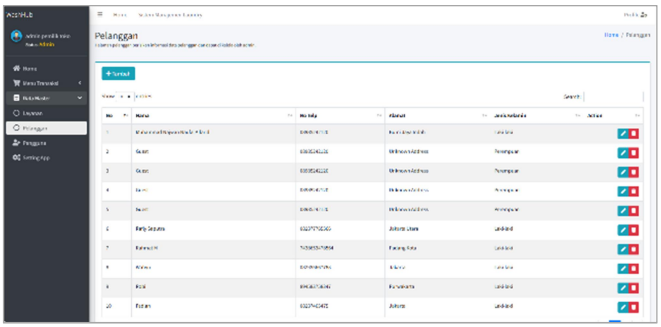

Fig. 4. Customer management

E. Laundry Status Tracking View

One of the main features implemented is real-time laundry status tracking. As seen in Fig. 5, customers can monitor the progress of their laundry, starting from washing, drying, ironing, to being ready for pickup. This feature provides full transparency to customers and reduces uncertainty regarding service completion.

F. Service Selection View

From the customer's side, the system provides an interface to select available laundry services. This interface is designed to be simple and easy to understand, allowing customers to quickly place orders according to their needs, as shown in Fig. 6.

G. Payment Methods View

To facilitate transactions, the system is equipped with various payment options, as shown in Fig. 7. Customers can choose between cash or cashless payments according to their preferences. This feature increases system flexibility and enhances customer convenience in transactions.

Fig. 5. Laundry status tracking

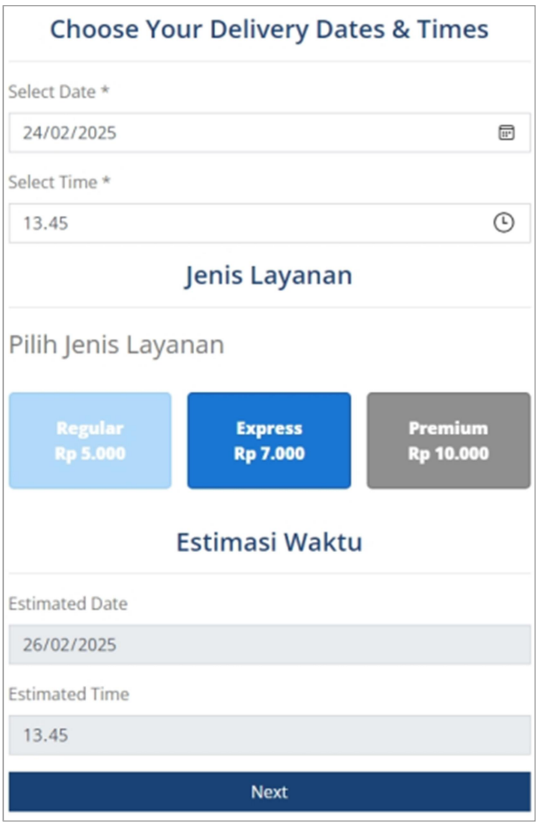

Fig. 6. Service selection

With the implementation results described above, the system successfully provides a practical and transparent solution for customers while also supporting operational efficiency for laundry providers. The main advantage of this

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system lies in the integration between order management, real-time status tracking, and practical payment support.

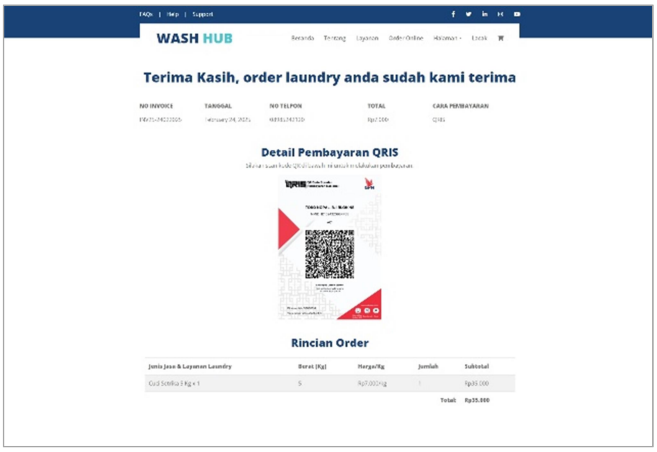

Fig. 7. Payment method

System Testing

System testing was conducted to ensure that all functions worked according to the defined requirements. Two testing methods were used: Black Box Testing and User Acceptance Test (UAT).

A. Black Box Testing

Black Box Testing was carried out by testing the functionality of the system without examining the program code. Each feature was tested based on its input and expected output [18]. Table I summarizes the results of the Black Box Testing. The results show that all main system features worked according to requirements, making the system ready for the implementation phase.

TABLE I
Black Box Testing Result

Main Feature	Status
Admin and Customer Login	✓
Input Order Laundry	✓
Update Status Laundry	✓
Tracking Status Laundry	✓
Service Management	✓
Customer Data Management	✓
Payment Method	✓
Delivery/ Withdrawal	✓

Note: ✓ = Successfully tested and functions as required.

B. User Acceptance Test (UAT)

In addition to technical testing, User Acceptance Testing (UAT) was conducted to evaluate user experience [19]. The UAT involved 30 respondents consisting of laundry customers and administrators. The aspects evaluated included ease of use, access speed, clarity of information, and overall satisfaction. The results indicate that most users found the system easy to use, fast, and informative (Table II). The overall average score was 4.56 out of 5, indicating that the system was well-accepted by users.

TABLE II
User Acceptance Test Result

Aspek	Skor
Ease of use	4.6
Access speed	4.4
Clarity of status	4.7
Interface appearance	4.5
Overall satisfaction	4.6

In addition to subjective evaluation, objective performance testing was carried out using Apache JMeter to simulate concurrent users [20]. The tests measured the average response time, throughput, and error percentage under different load conditions (10, 20, 50, and 100 concurrent users). Results showed an average response time of 0.85 seconds with 50 users as Fig. 8, throughput of 120 requests per second as Fig. 9, and an error rate below 2%, indicating the system's stability and scalability. Reliability testing over a 7-day observation period also demonstrated 99.2% uptime.

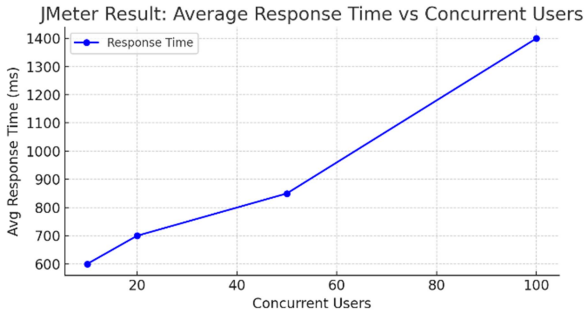

Fig. 8. Performance testing (response time)

Overall, the results demonstrate that the system can reliably support up to 50 concurrent users with response times below one second, which meets standard usability guidelines for web applications [21]-[22]. Although performance slightly decreases at higher loads, the system remains within an acceptable threshold for small

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to medium-scale laundry businesses. These objective performance metrics complement the User Acceptance Test results, providing a more comprehensive evaluation of the system.

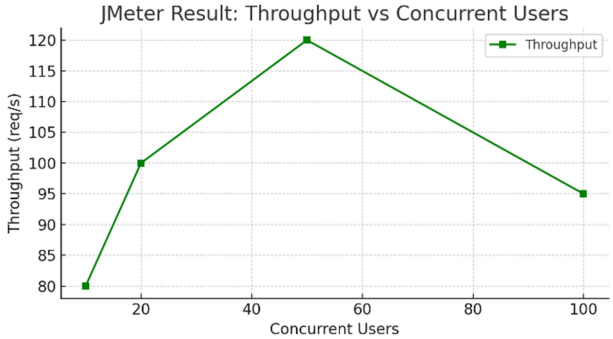

Fig. 9. Performance testing (throughput)

IV. Conclusion

This study successfully designed and implemented a web-based real-time laundry status tracking system using Laravel, Bootstrap, and MySQL. The system provides core features for service ordering, laundry status tracking, customer and service management by administrators, as well as flexible payment methods. Testing results showed that all features operated according to requirements, and the User Acceptance Test produced an average score of 4.56 out of 5, indicating that the system is easy to use, fast, and informative. The implementation of this system has proven to improve the operational efficiency of laundry services and service transparency for customers, particularly Generation Z who prioritize practicality. This system also lays the foundation for further development, such as the integration of automated notifications and mobile applications, to enhance overall service quality.

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