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Article

Optimization of Services in Workshops Thanks to The Use of a Website-Based Information System

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A B S T R A C T

This research aims to improve the quality of services at the Berkat Yakin Workshop through the development of a website-based information system. Compared to the previous manual service process, the proposed system integrates online service booking, customer data management, service history recording, and estimation of service time and processing costs in a single platform. The system was developed using the FAST method with the support of UML modeling, the Laravel framework, and a MySQL database. System testing was conducted using Blackbox Testing with the Equivalence Partitioning technique to ensure functional correctness. The results show that the proposed system is able to reduce service processing time, minimize data recording errors, and improve operational efficiency and service accuracy compared to the manual system. Overall, this system contributes to a more efficient, transparent, and structured service process at the workshop.

1. Introduction

Passenger cars play an essential role in daily transportation activities. To maintain optimal performance and safety, vehicles require routine maintenance such as engine oil, differential oil, and transmission oil replacement, as well as inspection of supporting components including grease, battery water, and radiator coolant (Pabuntang et al., 2020).

Automotive workshops play an important role in supporting these maintenance activities. Bengkel Berkat Yakin, located in Bangkinang City, is an automotive workshop that has been operating since 1988 and focuses on routine vehicle maintenance services. Service quality is a crucial factor in ensuring customer satisfaction and meeting customer expectations (Apriliana & Sukaris, 2022).

However, the service process at Bengkel Berkat Yakin is still largely managed using a manual system. The absence of a structured information system results in data inaccuracies, difficulties in tracking service history, limited access to service information, and inefficiencies in service delivery. Customers are often required to visit the workshop directly to obtain service information, which leads to longer waiting times, uncertainty in service scheduling, and reduced service transparency.

Previous studies have shown that website-based information systems can improve service efficiency and data management in automotive workshops. Nevertheless, the implementation of an integrated system that combines online service booking, service history recording, and estimation of service time and cost using the FAST method has not been widely applied in small and medium-scale workshops.

Therefore, this study proposes the development of a web-based service information system using the Framework for the Application of Systems Thinking (FAST) method to optimize service management at Bengkel Berkat Yakin. The proposed system is expected to improve service efficiency, data organization, and accessibility of information for both workshop owners and customers.

2. Literature Riview

2.1 Car Repair Shop

A car repair shop is a service facility that provides various types of vehicle maintenance and repair services to ensure optimal performance and safety. Common services include routine maintenance such as engine oil, gear oil, and axle oil replacement, as well as component replacement including air filters, oil filters, and other supporting parts. Effective workshop management requires accurate service records, structured scheduling, and reliable service information to support operational efficiency and customer satisfaction (Zakaria & Sifaunajah, 2024).

2.2 Optimization

Optimization refers to the process of achieving the best possible results effectively and efficiently by considering existing constraints. It is not solely focused on maximizing output or profit, but on identifying the most appropriate solution by balancing factors such as resource availability, service quality, turnaround time, risk, and customer satisfaction. In the context of service management, optimization can be achieved through the use of information systems that streamline processes, reduce errors, and improve service performance in a sustainable manner (Anshari et al., 2024).

2.3 Services

Service is an activity that involves interaction between service providers and customers to fulfill specific needs. High-quality service is characterized by speed, accuracy, clarity of information, and the ability to handle customer requirements effectively. The use of an integrated website-based information system can enhance service quality by enabling online service booking, scheduling, and service history recording. Such systems support faster service delivery, improve data accuracy, and contribute to increased customer satisfaction and operational effectiveness in workshops (Prima, 2020).

2.4 Information Systems

An information system is a set of interconnected components that work together to collect, process, store, and distribute information to support organizational activities and decision-making. In a workshop environment, information systems play an important role in managing customer data, service records, and transaction information in a structured and integrated manner, thereby reducing data errors and improving service efficiency (Subianto, 2021).

2.5 Website

A website is a collection of interconnected web pages that can be accessed through the internet using a web browser and identified by a Uniform Resource Locator (URL). Websites can present various types of information and services, including text, images, and multimedia content. In the context of service-based businesses, websites function as an effective platform for delivering service information, facilitating online interactions, and improving accessibility for users (Huda & Megawaty, 2021).

3. Research Methodology

3.1 Research Approach and Type

This study adopts a qualitative research approach to identify service-related problems and user requirements at the Berkat Yakin Workshop. The qualitative approach is used to obtain an in-depth understanding of existing service processes, user needs, and operational constraints.

To develop the proposed solution, this research applies the Framework for the Application of Systems Thinking (FAST) as a system development methodology. FAST is selected because it provides a structured and systematic framework for analyzing problems, defining system requirements, and designing information systems effectively. The stages implemented in this study include Scope Definition, Problem Analysis, Requirements Analysis, Logical Design, Physical Design, Construction and Testing, and Installation and Delivery. The application of FAST ensures that the developed website-based information system is aligned with user needs and service optimization objectives.

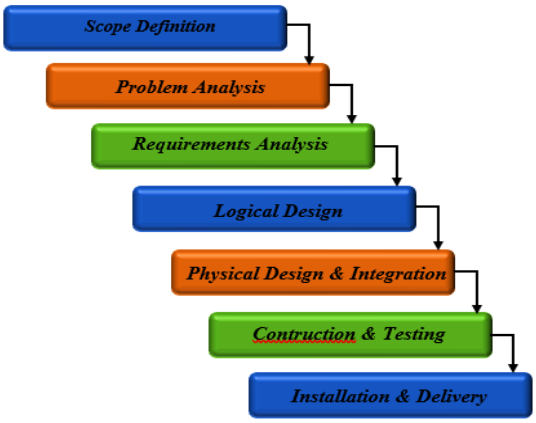

Figure 1. Systems Engineering Implementation Method Framework (FAST)

3.2 Data Collection Techniques (Revised)

Data collection in this study was conducted using observation, interviews, and documentation techniques to support system analysis and design.

a. Observation was carried out to examine existing service processes and data management practices at the Berkat Yakin Workshop, particularly those related to service booking, customer data recording, and transaction management.

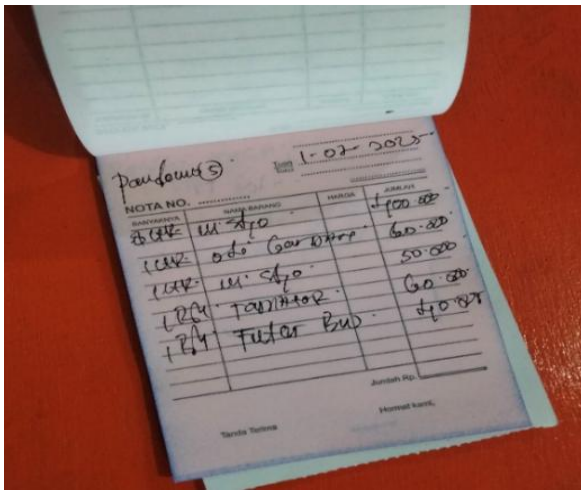

Figure 2. Transaction Notes

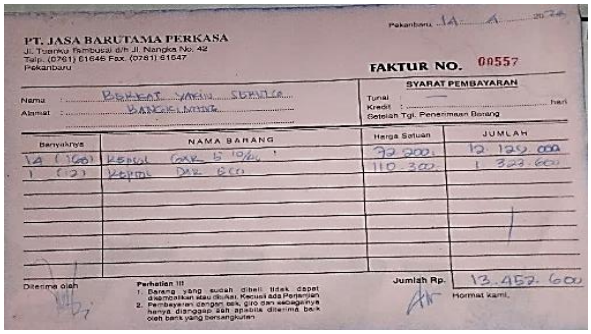

Figure 3. Oil Change Service Card

Figure 4. Goods Buyer's Note

4. Results and Discussion

The results of this study indicate that the developed website-based information system has a positive impact on service management at the Berkat Yakin Workshop. Based on the implementation results, the system is able to organize customer data, service history, and transaction records in a structured and centralized manner, replacing the previous manual recording process.

The online service booking feature allows customers to select service types, determine service schedules, and receive estimated service time and cost before visiting the workshop. This functionality reduces uncertainty in service scheduling and helps minimize service queues. From the workshop perspective, the system supports more efficient service planning and reduces the risk of data recording errors.

Furthermore, the application of the FAST methodology ensures that system development is aligned with user requirements identified during the analysis stage. Each system function was tested using Blackbox Testing with the Equivalence Partitioning technique, and the results show that all features function as expected without critical errors.

Overall, the implementation of the proposed system improves operational efficiency, enhances service transparency, and contributes to better service quality compared to the previous manual system. These findings are consistent with previous studies that highlight the role of information systems in optimizing workshop service management.

4.1 *Logical Design*

Logical design describes the structure of system functionality and user interactions using a Use Case Diagram. The diagram illustrates how the main actors, namely customers and the workshop owner, interact with the proposed website-based information system.

Customers are able to perform key activities such as account registration, login, selecting service types, scheduling service appointments, viewing service estimates, and monitoring service status. Meanwhile, the workshop owner is responsible for managing service data, customer information, service schedules, and monitoring service progress.

This logical design ensures a clear separation of roles and responsibilities between users and the system, and serves as a foundation for translating user requirements into system functions. By defining system interactions at this stage, potential functional gaps and inefficiencies can be identified before proceeding to physical design and system implementation.

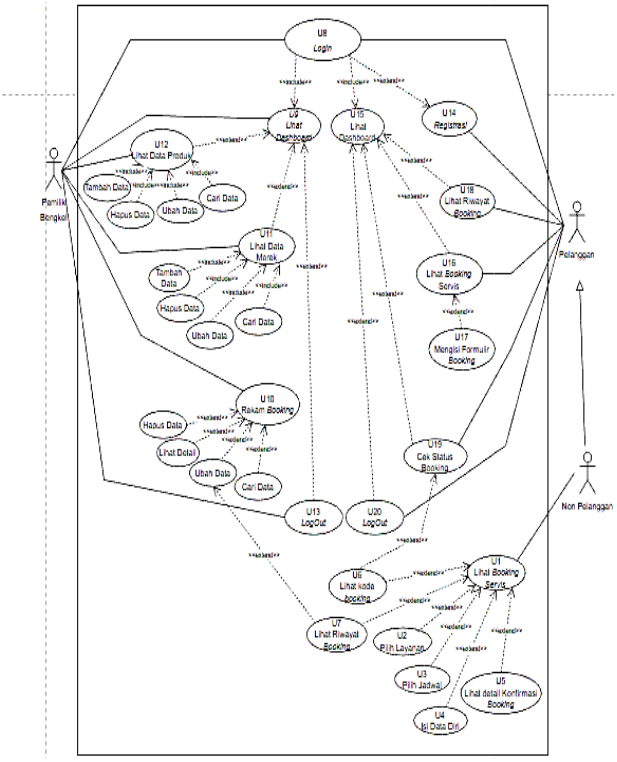

Figure 5. *Use Case Diagram*

4.2 *Physical Design & Integration*

The *Physical Design & Integration* stage includes creating user interface designs.

1. Login For Customers

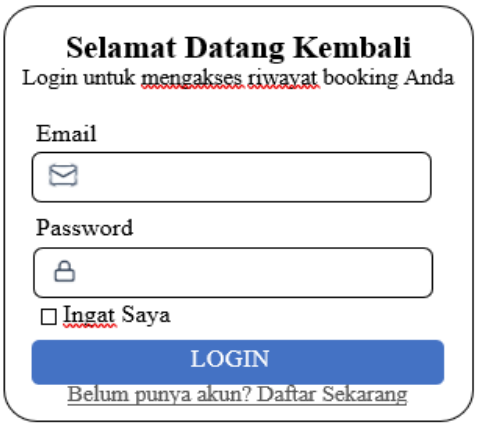

Figure 6. Login Design

The *login* page on the system is designed to ensure that only registered customers can access the information on the *website*.

2. Registration for customers

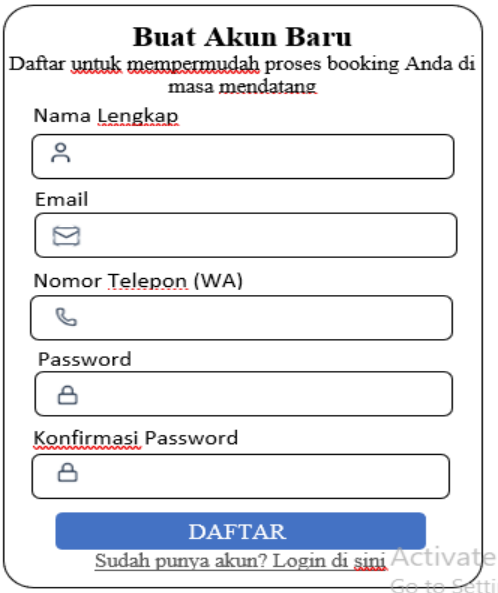

Figure 7. Registration design

The registration page on this system serves as a means for potential customers to create an account before being able to use the service features on the *website*. On this page, several inputs are provided that must be filled in by the user, including full name, email address, phone number, *password*, and password confirmation to ensure the suitability of the password entered.

3. Home for Customers

Figure 8. Main Page Design

The main page for customers on this system displays initial information about the workshop. At the top of the page there is a navigation menu that makes it easier for users to go to the home page, services, information about workshops, contacts, and the booking check feature. This page also displays a main banner containing an overview of the car service services provided, accompanied by the "*Book* Service Now" button that directs customers directly to the service booking process.

4. Halaman *booking* servis sekarang menu pilih layanan

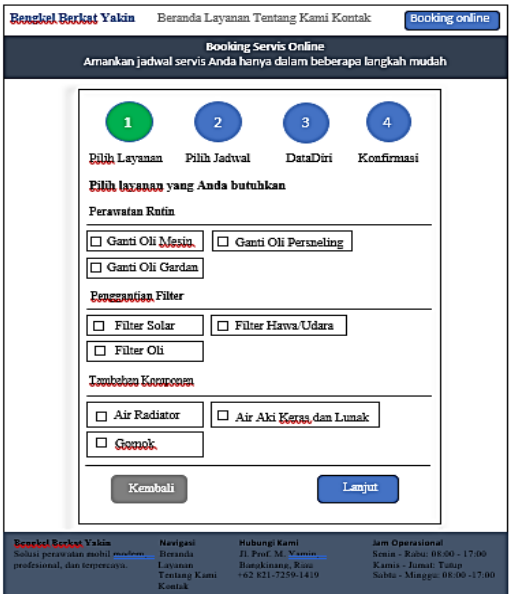

Figure 9. Page Design Select Service

The service booking *page* on the Select Service menu is the first stage that customers must go through before continuing the process of ordering vehicle service. On this page, various categories of services are displayed that can be selected according to your needs, including routine maintenance such as engine oil changes, gear oil, and axle oil; Changing filters such as diesel filters, air filters, and oil filters as well as additional services such as replacing radiator water, hard and soft battery water, as well as *applying grease* or scrubbing. Each type of service is provided in the form of a *checkbox* so that customers can choose more than one service at a time.

5. Now on the service booking page, select the schedule menu.

Figure 10. Page Design Select Schedule

The Select Schedule page in the service *booking* process is the second stage that must be filled by customers after determining the type of service needed. On this page, a date and time selection form is provided that allows customers to determine the service schedule according to their availability and convenience. Date inputs are displayed in calendar format to facilitate the selection process, while time options are provided in dropdown form so that customers can choose available service hours.

6. Now on the service booking page, select the schedule menu.

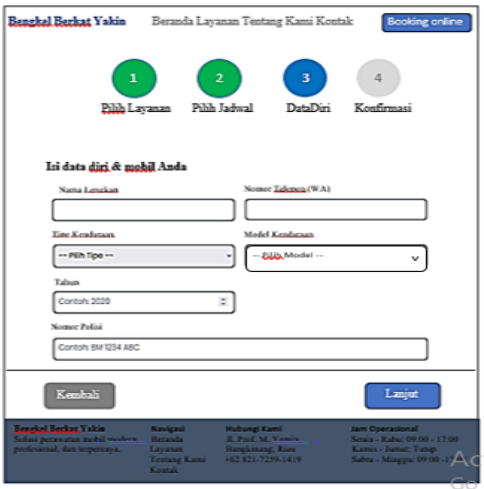

Figure 11. Personal Data Page Design

The Select Personal Data page is the third step in the *service booking* process which serves to collect customer information and vehicle details. This form contains inputs such as full name, phone number, vehicle type and model, vehicle year, and police number.

7. Service booking page now Confirmation menu

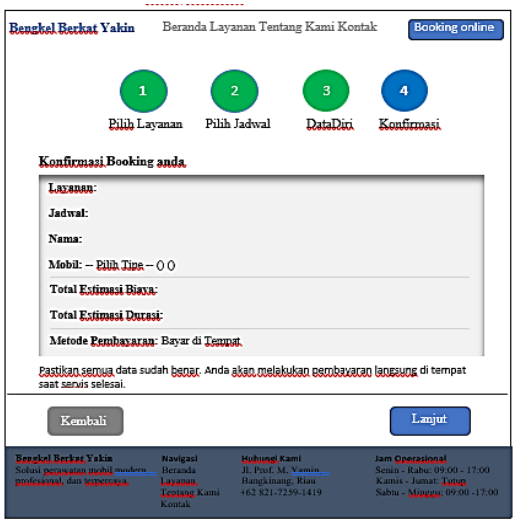

Figure 12. Confirmation Page Design

The Select Confirmation page is the last stage in the service *booking process* on the Bengkel Berkat Yakin information system, which displays a complete summary of the data that has been filled in by the customer, such as the selected service, service schedule, name, vehicle details, total estimated cost, and estimated processing time. All information is displayed in a structured manner to ensure customers can double-check the accuracy of the data before the *booking submission* is completed.

5. Service History Page

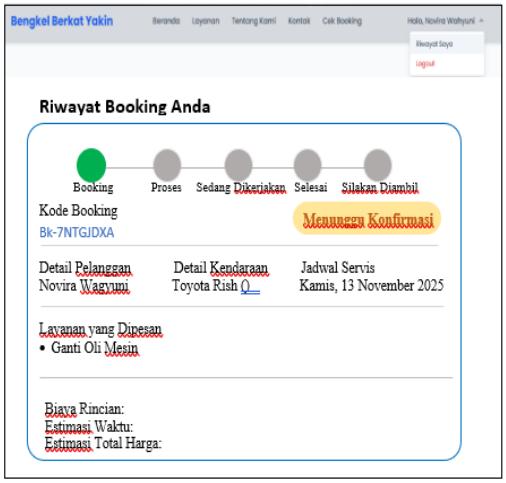

Figure 13. Service History Design

The service history page is designed to show you comprehensive information about the progress of the service *booking* process in a concise and easy-to-understand manner. It contains the *booking code*, customer identity, vehicle details, service schedule, and the type of service chosen. The stages of the work are displayed through progress indicators in the form of icons so that users can see the latest status, starting from the order stage to the service is ready to be taken. In addition, this page also displays estimated time and costs. Overall, this design makes it easy for customers to monitor the service process without needing to contact a workshop.

6. Conclusion

This study concludes that the development of a website-based information system using the FAST methodology is effective in optimizing service management at the Berkat Yakin Workshop. The proposed system successfully replaces manual service procedures by enabling structured management of customer data,

service records, and transactions, as well as supporting online service booking.

The implementation of the system improves operational efficiency, reduces data recording errors, and enhances service transparency for both customers and workshop owners. System testing using the Blackbox Testing method with the Equivalence Partitioning technique confirms that all system functions operate as expected and the system is stable.

Overall, this research demonstrates that the application of a website-based information system can contribute to improved service quality, data accuracy, and work effectiveness in automotive workshops.

References

Abdullah, A., Achmad, A., & Sahibu, S. (2021). Media Pembelajaran Interaktif Mata Kuliah Pemograman Web Berbasis Android. *Inspiration: Jurnal Teknologi Informasi Dan Komunikasi*, *11*(1), 45. https://doi.org/10.35585/inspir.v11i1.2626

Aldo, D., Habibie, D. R., & Susie, S. (2021). Metode FAST Untuk Pembangunan Sistem Inventory. *INOVTEK Polbeng - Seri Informatika*, *6*(2), 211. https://doi.org/10.35314/isi.v6i2.2080

Anshari, N., Hafizh, M. A., Putri, E. R., & Sihananto, A. N. (2024). *Metode Simulated Annealing untuk Optimasi Biaya Operasional Penerbangan*. *4*, 33–38.

Apriliana, A., & Sukaris, S. (2022). Analisa Kualitas Layanan Pada Cv. Singoyudho Nusantara. *Jurnal Maneksi*, *11*(2), 498–504. https://doi.org/10.31959/jm.v11i2.1246

Arnomo, S. A., & Yulia, Y. (2023). Metode Framework Application of System Thinking (FAST) Untuk Desain Sistem Pemesanan. *Jurnal Desain Dan Analisis Teknologi*, *2*(1), 121–128. https://doi.org/10.58520/jddat.v2i1.29

Audrilia, M., & Budiman, A. (2020). Perancangan Sistem Informasi Manajemen Bengkel Berbasis Web (Studi Kasus : Bengkel Anugrah). *Jurnal Madani : Ilmu Pengetahuan, Teknologi, Dan Humaniora*, *3*(1), 1–12. https://doi.org/10.33753/madani.v3i1.78

Azizan, I., Yona Sidratul Munti, N., & Adeswastoto, H. (2022). Planning Design A Website-Based Mechanic Information System In Bangkinang Kota. *Journal of Engineering Science and Technology Management (JES-TM)*, *2*(2), 65–70. https://doi.org/10.31004/jestm.v2i2.23

Bilal Abdul Wahid, Suharjanti, baginda oloan lubis, Frans edward schaduw, irwan agus sobari. (2023). *Penerapan Metode Framework Application Of System Thinking (FAST) Untuk Desain Sistem Informasi Kontrak Kerja Perusahaan Outsourcing*.

Darwi, M., Teknik, F., & Mulawarman, U. (2022). *Penerapan Metode Pieces Framework Sebagai*. *1*(2), 49–58.

Huda, N., & Megawaty, M. (2021). Analisis Kinerja Website Dinas Komunikasi dan Informatika Menggunakan Metode Pieces. *Jurnal Sisfokom (Sistem Informasi Dan Komputer)*, *10*(2), 155–161. https://doi.org/10.32736/sisfokom.v10i2.1018

Masrizal, Yunita, P., Ridarmin, Adrianto, S., & Sidiq, A. (2022). Aplikasi Kuis Islami Berbasis Mobile. *Jurnal Teknik Informatika Kaputama*, *6*(2), 757–766.

Namud, N., Hidayatullah, H., Anto, R., & Dores, A. (2022). Aplikasi Bengkel Reparasi Mobil Classic Berbasis Web (Studi Kasus : PT. Ramayana Mobil). *Jurnal SITECH : Sistem Informasi Dan Teknologi*, *4*(2), 155–164. https://doi.org/10.24176/sitech.v4i2.6831

Pabuntang, B., Neyland, J., & Arungpadang, T. (2020). Evaluasi Kualitas Layanan Jasa Pada Bengkel Otomotif Roda Empat. *Jurnal Online Poros Teknik Mesin*, *9*, 184–192.

Prima, H. I. B. (2020). Rancang Bangun Program Booking Online Bengkel Motor Berbasis Android. *Rancang Bangun Program Booking Online Bengkel Motor Berbasis Android*, *TA*, 1–95. http://repository.uinjkt.ac.id/dspace/handle/123456789/53639

Putra, D. W. T., Bulkis, H., Mandarani, P., & Syahrani, A. (2021). Metode Pieces Dalam Mengukur Tingkat Kepuasan Pengguna Portal Akademik. *Jurnal Sains Dan Teknologi: Jurnal Keilmuan Dan Aplikasi Teknologi Industri*, *21*(1), 50. https://doi.org/10.36275/stsp.v21i1.360

Robinson, J. J. (2016). DIAGRAM: A Grammar for Dialogues. *KHATULISTIWA INFORMATIKA*, *IV*(1), 27–47.

https://doi.org/10.1145/358315.358387
Sofiani, S., Kosasi, S., & Kuwai, S. M. (2024). *Perancangan mobile web bengkel mobil mizu pontianak*. *XIII*(2), 202–213.
Subianto, N. I. (2021). Sistem Informasi Layanan Jasa Bengkel Sepeda Motor. *Journal ILMIAH INFOKAM*, *17*.
Wahid, B. A., Suharjanti, S., Lubis, B. O., Schaduw, F. E., & Sobari, I. A. (2023). Penerapan Metode Framework Application of System Thinking (FAST) untuk Desain Sistem Informasi Kontrak Kerja Perusahaan Outsourcing. *Jurnal Teknologi Informatika Dan Komputer*, *9*(2), 1221–1234. https://doi.org/10.37012/jtik.v9i2.1734
Warjiyono, W., Fandhilah, F., Rais, A. N., & Ishaq, A. (2020). Metode FAST & Framework PIECES : Analisis & Desain Sistem Informasi Penjualan Berbasis Website. *Indonesian Journal on Software Engineering (IJSE)*, *6*(2), 172–181. https://doi.org/10.31294/ijse.v6i2.8988
Wilianti Aliman. (2021). PERANCANGAN PERANGKAT LUNAK UNTUK MENGGAMBAR DIAGRAM BERBASIS ANDROID. *Pharmacognosy Magazine*, *75*(17), 399–405. https://doi.org/org/10.36418/syntax-literate.v6i6.1404
Zakaria, A. V., & Sifaunajah, A. (2024). *RANCANG BANGUN SISTEM BOOKING ANTRIAN SERVICE BENGKEL MOBIL BERBASIS WEBSITE DENGAN FRAMEWORK CODEIGNITER 3*. *8*(6), 11671–11676.