

Autocheck: Inspection Service Application, Purchase Assistance, And Used Car Buying And Selling

ABSTRACT

Cars are one of the most popular modes of transportation in Indonesia. The high demand for new cars is often accompanied by economic considerations that drive consumers to switch to used cars as a more affordable alternative. However, buying a used car carries risks, especially regarding the condition of the car, which is not always known for certain. The limited knowledge of consumers often forces them to take the car to a workshop for inspection, which is time-consuming and less efficient. To address this issue, the Auto Check application was developed to make it easier for consumers to check the condition of used cars through inspection services. This application provides features for booking inspection services, order status notifications, and transaction history, aiming to offer comfort and efficiency in the used car purchasing process. With easily accessible inspection services, this application not only provides certainty for buyers but also enhances trust between used car sellers and buyers.

Keywords: used cars, car inspection, digital application, inspection service, car condition.

1. INTRODUCTION

The used car market continues to show significant growth, especially in developing countries, including Indonesia. Based on research, one of the main factors driving consumers to switch to used cars is the affordability compared to new cars[1]. In addition, used cars have become a popular choice because their economic value is considered more in line with the needs of modern society. This trend also reflects consumer preferences for vehicles that can meet mobility needs at more affordable prices, as noted in various studies on the dynamics of the global automotive market[2]. Although interest in used cars is increasing, many consumers feel hesitant and worried about the condition of the car they are going to buy[3]. Because of the many components that need to be checked when buying a used car, if one does not understand and is meticulous in checking these components, there could be hidden problems. The issues referred to, such as hidden damage or other technical problems, often become obstacles for potential buyers. Therefore, used car inspection services become very important. The presence of inspection services helps reduce the risk of loss by providing certainty about the quality and safety of the vehicle before the transaction is made. Inspection services are highly needed by the community because they help reduce the risk of damage unknown to potential buyers or hidden problems. Consumers are now facilitated by technological advancements, allowing them to order inspection services quickly and conveniently without leaving their homes. This technology makes it easier for sellers and potential buyers to search for and offer used cars in the best condition.

The Auto Check application provides inspection services, purchase assistance, and the buying and selling of used cars, aiming to offer practical and reliable solutions for consumers who want to buy or sell used cars. By providing comprehensive inspection reports, this application is expected to make it easier for buyers to understand the condition before purchasing the desired used car, and for sellers, it can provide complete information and reveal the actual condition before selling their car. So, this application can provide added value for both sellers and buyers. This is demonstrated by the ease with which sellers can find buyers, as sellers are provided with the convenience of finding buyers due to the very clear condition of the cars being

sold. Then, for potential buyers, this application increases trust in the safety and condition before purchasing a car. For all parties involved in the buying and selling process, this application is helpful because of the quality assurance it provides.

In addition, the Auto Check application also serves as a solution to address the issues of time and energy constraints often experienced by consumers when wanting to buy or sell a used car. This application is expected to enable users to conduct transactions efficiently without needing to visit the location directly. For example, the buy-and-hold feature provides convenience for buyers to search for cars that meet their criteria with the help of professional inspectors, while the buy-and-sell feature helps sellers market their vehicles with transparent inspection data. The combination of modern technology and professional services not only enhances the efficiency of the process but also builds trust among all parties involved in the transaction.

2. RESEARCH METHODS

2.1 Related Work

The research conducted by Jevon (2023) discusses the analysis and design of a database for a used car buying and selling application to create a new business process that provides accurate information to help users quickly find information on buying and selling cars. The information on the specifications and features of the cars to be sold is currently incomplete, making it difficult for potential buyers to know the details of the used cars they intend to purchase. There is no feature that can suggest to potential buyers or sellers to repair the cars after an inspection has been conducted[7].

The research conducted by Hafiz (2023) reviews this to facilitate and enhance access for potential buyers in the process of searching, comparing, and purchasing used cars. The application needs to be designed with an intuitive and responsive user interface so that users can conduct transactions smoothly using web engineering techniques.[8].

The research conducted by Sultan and Zamroni (2021) discusses that product quality assurance is carried out by monitoring the product manufacturing process and finished products to ensure they meet the specified standards. This department is also responsible for handling consumer claims and providing OEM product sample data, as well as arranging the delivery of these samples according to consumer requests. Currently, data storage is done in two stages: first using a checklist, and then transferring it to Microsoft Excel every few days. This method is still considered less effective because it is difficult to monitor the actual data of processes and products in the field quickly, and report management takes a long time. The design and development of this application system aim to facilitate the storage of actual process and product data, make the data display easier to understand, and simplify report generation. This application is web-based and uses a MySQL database, allowing for the storage of large files and access from anywhere[9].

The research conducted by Wasesha (2023) discusses how owning a personal vehicle has become a primary asset for society to maintain productivity. The high price of new cars is the main factor for someone to switch to buying used cars. However, buying a used car is more risky. In choosing a quality used car that also meets your needs, a thorough selection and inspection by someone experienced in the field is necessary. Given this situation, many inspection services have emerged, offered both by individuals and institutions to those interested in used cars. This research aims to apply project management using the Scrum framework in the case study of designing an information system for ordering used car inspection services. The method used in this research refers to the Scrum framework. Scrum is a lightweight framework that helps people, teams, and organizations generate value through adaptive solutions for complex problems. The final result obtained from this research includes work details and scheduling, system flow design, and interface prototypes[10].

2.2 Research Framework

Figure 2: The Research framework diagram to explain how the AutoCheck application development is developed through several interrelated major stages. Firstly, Problem and Solution Analysis, where the problems encountered are analyzed in-depth; in this stage, the ideas of the features of the application to be developed have been gathered and are expected to meet the needs identified and challenges.

Once the analysis of the problem is complete, it proceeds with Application Design. Here, the structure and interface of the application are designed, basing the conception on needs that have already been analyzed. Application design is a guide in the development process in ensuring the application addresses the user needs efficiently.

The next stage is Application Development, which involves two major parts. Web-Based Applications are developed using the programming languages JavaScript, PHP, and jQuery, while the Android application is based on Kotlin to ensure that it functions on Android users.

Testing is done after the development is complete to ensure that the application works as it should. This testing also includes the functionality, reliability, and quality of the application to meet the users' needs.

The last stage is Maintenance, where the continuous improvement and upgrading of the application is done based on users' feedback and changes in needs that might arise in the future. This stage helps the application remain relevant and function well in the long run.

This overall diagram shows the complete overview of the application development workflow, starting from problem analysis to maintenance of the application post-launch.

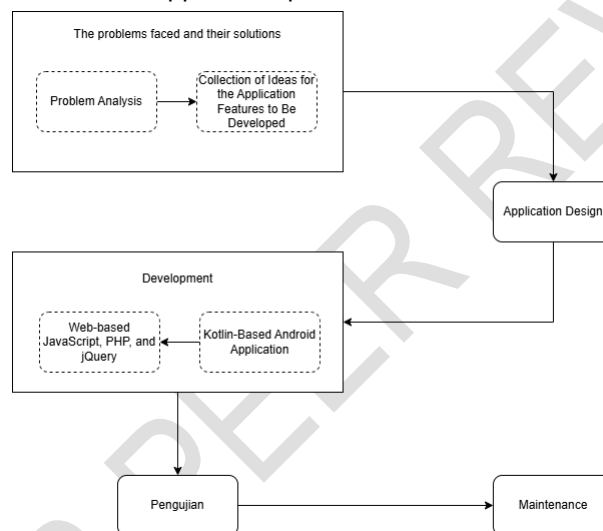


Fig. 1. Research Framework

2.3 Research Framework

Figure 2 shows the system architecture for the inspection service application, buy-and-hold, and buying and selling used cars. This system is composed of a mobile application, database, backend API, website, and jQuery, integrated for efficiency and quick response.

The application is designed on Kotlin, an open-source development platform for Android devices. It enables users to access various services like vehicle inspection, car consignment, and reselling of used cars. Users can manage their transactions directly through the application with an intuitive and responsive interface.

MongoDB serves as the database to store user data, transactions, inspection results, and information regarding used cars on sale. Being a NoSQL database, MongoDB was chosen due to its scalability and handling of unstructured data, which would cater to the needs of the ever-evolving application.

Express.js, a framework that runs atop Node.js, is used in creating the backend API. It would act as the primary link among the mobile application, website, and database. Key functions of the API will involve checking user login, transaction information, and the list of used cars for sale. This API allows data access centrally and processes it much faster.

The website is developed using a combination of PHP and Node.js. The PHP will handle the display aspects of the page, while Node.js will handle communications with the API to pull data from the database. The website offers an alternative to users who are more comfortable accessing services through a browser.

jQuery used on the website is for manipulation of DOM elements, speeding up user interactions, and making asynchronous requests to an API. Due to jQuery, the website doesn't need to reload a page all the time in order to offer dynamic content to its user..

2.4 System Recommendations

In this section, it will be explained about before and after the development of the AutoCheck application. The condition before the system was created in Figure 3, patients registered by sending data to the hospital's WhatsApp, after which the registration staff manually entered the data into the system. This was inefficient and could lead to data entry errors, such as incorrect patient data entry or mistakes in managing queues. After that, the confirmation of the registration will be sent to the patient, which contains the patient's queue number. However, the patient does not know when their turn will arrive, resulting in an inability to know their position in the queue or the estimated waiting time needed.

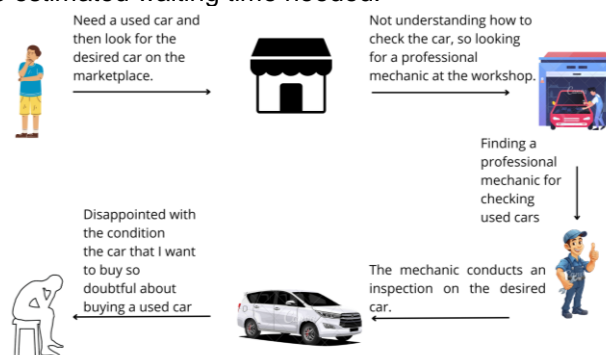


Fig. 2. Architecture model before the system is created

Through online patient registration, patients can create an account on the Healthyline application. After creating an account, patients can register at the hospital by filling in the required data directly in the application. Registration will be confirmed by the hospital and the application will send a registration confirmation containing information about the patient queue. The application displays real-time queue information currently happening at the hospital so that users can know their position in the queue or the estimated waiting time required. In addition, the application will also send notifications to remind users of their scheduled doctor appointments, as well as notifications if there are any schedule changes as illustrated in Figure 4.

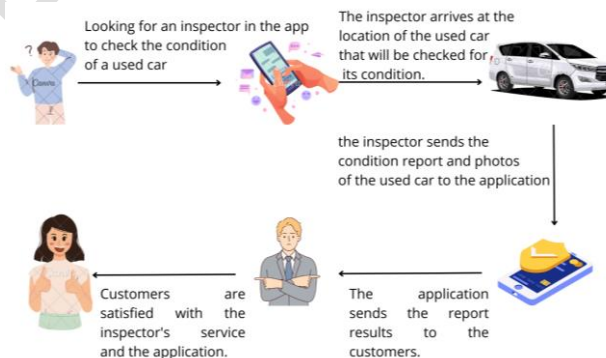


Fig. 3. Proposed system architecture

3. RESULTS AND DISCUSSION

At this stage, the application is developed, tested, and evaluated. Testing is conducted to assess the performance and functionality of the application to ensure it meets expectations.

3.1 Result

In analyzing problems and solution ideas that have been carried out through qualitative data collection using the observation method. As explained in Figure 1, the stage through the literature study produces data on functional and non-functional requirements, (materials) namely:

In Table 1, consumers must input the desired used car, such as the brand, type, or name of the car if using the inspection service. In the buy request menu, there is a slight difference, namely the addition of distance and the budget that the consumer has. Then, for the last menu, which is the used car buy and sell menu, the seller is required to fill in the name, car brand, price, and description of the car to be sold.

Table 1. Functional Requirements

No.	Functional Requirements	Description
1	Input Requirements	The required input consists of the name and type of the desired used car.
2	Process Requirements	The application can respond and manage a large amount of data in a short time. The application is also available at all times to ensure users can access the service whenever needed.
3	Output Requirements	The application can provide reports related to existing features and services such as inspection reports, consignment purchases, and sales transactions.

In the development of the AutoCheck application, a supporting operating system is required; the author uses Windows 10 64-bit. For development, Visual Studio Code IDE and Android Studio are used for the Android environment development. The database will be stored in MongoDB, with management done through an API created using Express.js, and the website using PHP.

Table 2. Non-Functional Requirements

No.	Non-Functional Requirements	Spesification
1	Software Requirements	<ul style="list-style-type: none"> Operating System: Windows 10 64-bit IDE: Visual Studio Code and Android Studio Hosted Database: MongoDB
2	Hardware Requirements	<ul style="list-style-type: none"> RAM: Minimum 16GB Prosesor: Intel(R) Core(TM) i5-11400H Storage : SSD 1TB

Figure 5 is a context diagram that illustrates the main flow of information in the "Inspection, Purchase, and Sale of Used Cars Service Application." This diagram shows three main actors, namely Users, Admin, and Inspectors, as well as the data interactions that occur between them and the application system. Users can access application features such as making payments, registering personal data and email, viewing used car information in the showroom, and obtaining information related to inspection schedules, used car inspection form results, and bills. This interaction shows that users act as consumers who use the service for various needs, ranging from inspections to buying and selling used cars.

Next, the Admin and Inspector have specific roles in supporting the smooth operation of the application services. The Admin is responsible for processing user data, such as payment information, inspection results, and inspection schedules, as well as managing information related to the internal needs of the application. Meanwhile, the Inspector is responsible for providing reports on used car inspection results, managing car descriptions, and providing users with information related to inspection schedules. With this organized data flow, the context diagram explains how the application functions as a connector between users, admins, and inspectors to create an integrated and efficient service experience.

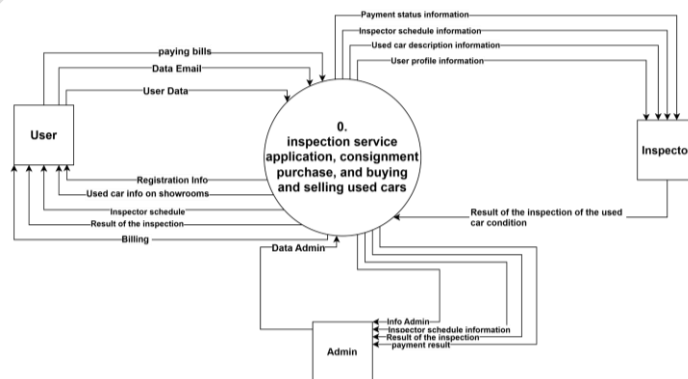


Fig. 4. Context Diagram

The In Figure 7 is the Entity Relationship Diagram (ERD) that illustrates the database structure for the inspection service, consignment purchase, and buying and selling of used cars application. This diagram shows the entities, attributes, and relationships between the entities within the system. There are five main entities, namely Admin, Inspector, Buyer, Seller, and Car, each of which has related attributes.

The Admin entity is responsible for managing the entire system, with attributes such as id_admin, name, email, and password. The Inspector entity has attributes id_inspector, name, email, password, and phone_number, which describe the data of the inspector responsible for the vehicle inspection process. Meanwhile, the Buyer and Seller entities each have attributes such as id_buyer, name, email, password, and phone_number to store information about users involved in the buying and selling transactions.

The relationship between entities is shown with several connections. For example, the Car entity, which has attributes such as car_id, name, car_brand, condition, price, and description, can be linked to the Used Car Buy and Sell entity, the Used Car Consignment entity, or the Used Car Inspection entity. These three relations have additional attributes such as address, price, and other details relevant to each process.

Additionally, there is a Transaction entity that serves as the main link between users and the payment process. This entity includes payment data consisting of attributes such as payment_id, payment_type, and description. With the existing relationships, this diagram provides a complete overview of how data is managed within the application, from the user login process to the execution of transactions and used car inspection services.

At the application testing stage, Autocheck uses the blackbox testing method with the aim of ensuring that every function in the application operates as expected. This testing focuses on the input provided and the output generated. Blackbox testing includes testing main features, such as ordering inspection services, consignment buying, and buying and selling cars. Here is an example of the blackbox testing results that can be seen in Table 3.

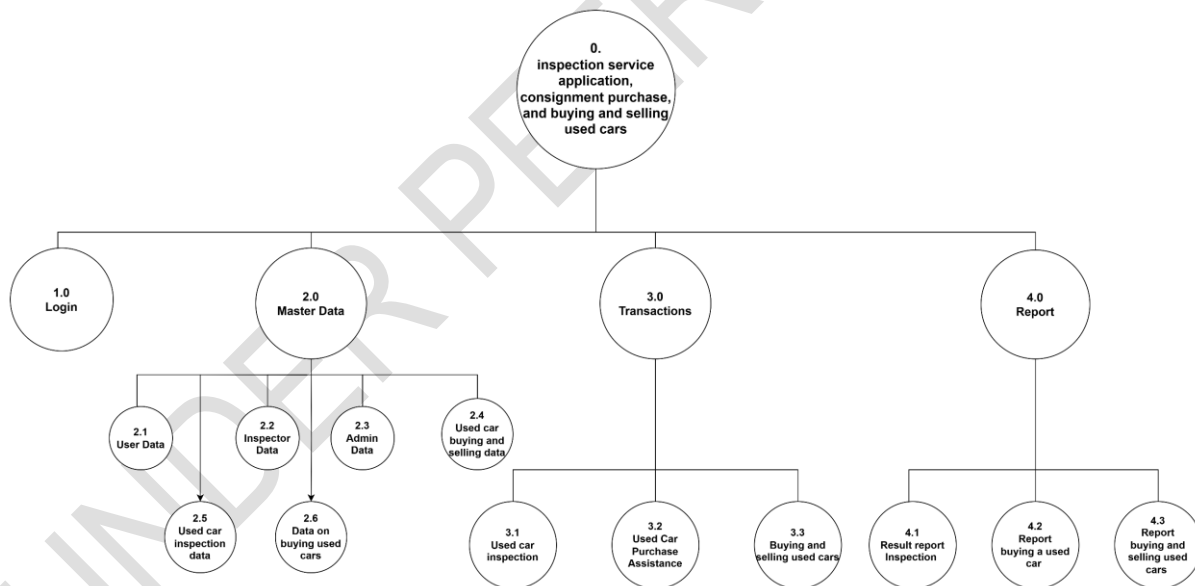


Fig. 5. Hierarchical Diagram

Table 3 shows the results of the Blackbox testing conducted to ensure that the main functions in the application operate as expected. Testing was conducted on various features, such as Register, Login, Inspection Booking, Notifications, and Transaction History, with test scenarios designed to simulate various usage conditions.

In the Register feature, the testing ensures that the added user data is successfully stored in the database, and the results meet expectations. Next, the Login feature was tested with user scenarios, and the inspector successfully logged into the homepage, as indicated by the message "login successful." Both of these tests were declared Pass because the actual results matched the expected results.

Testing of the Inspection Booking feature involves two scenarios: booking an inspection at an unavailable

location and processing a payment transaction. In the first scenario, the application successfully displayed a message indicating that the inspector is not available at the user's location. In the second scenario, the payment status was checked, and the transaction data was successfully saved to the database with the message "payment successful." Both of these scenarios were also declared Passed.

The Notification feature was tested by ensuring that the application can display order result notifications in the notification menu, while the Transaction History feature was tested to ensure that the order history and process can be displayed in the history menu. Both features were also declared Passed, as the actual results matched the expectations.

Overall, the testing shows that all the main features of the application function well according to the designed scenarios.

Next, the author will present the results of the application flow design that was created.

Table 3. Blackbox Testing

Feature	Testing Scenario	Expected Outcome	Actual Results	Status
Account Registration	User adds an account	User data has been successfully saved in the database.	User data is stored in the database.	Passed
Login	Users and inspectors can access the home menu.	The application can respond to user and inspector accounts and then display the home menu.	Displaying successful login message	Passed
Inspection Order	Ordering inspection services at an unavailable location.	Application Check if Inspector Available at Seller's Location	to Displaying inspector message not available at your location	Passed
Inspection Order	Updating the queue status from "Waiting" to "In Progress".	Conducting a transaction.	Displaying a success message and saving it to the database.	Passed
Displaying Notification	Checking the notification menu for order results.	The application can display transaction notifications.	A notification message appears.	Passed
Transaction History	Checking the order history menu	The process and order history can be displayed in the history menu.	Displaying the service process.	Passed

Assisted Transaction	Purchase	Pay the bill and save the data into the database	Displaying payment success notification and data successfully saved into the database	data successfully saved into the database	Passed
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UNDER PEER REVIEW

Here is the flow of the designed application program, which will be briefly explained and later detailed. The program flow begins with the user first logging in to access the application's features. After successfully logging in, users are directed to the home menu, where they can select the desired service. To use the inspection service, users need to fill out the vehicle data form that will be inspected. Next, users are directed to the transaction menu to complete the payment. If the payment process is successful, the application will display a payment and order notification in the notification menu, while the order history menu will show information related to the ongoing order process.

In image 7, the login menu is displayed where users are required to enter their email and password to access the application. If users do not have an account, a registration feature is available by clicking the text "Don't have an account?" on the login page. The registration process includes filling out a form consisting of an email, password, and phone number. After the user successfully fills in all the required data, the application will direct them to the home menu to start using the services.

The home menu is the main service center in the application. In this menu, there are three main services: vehicle inspection service, car purchase assistance service, and used car buy-sell service. Each service is designed to meet the user's needs related to used cars.

Additionally, there are four navigation buttons at the bottom of the home menu, namely the notification button to view alerts, the transaction history button to monitor activity history, the profile button to access user information, and the home button to return to the main page.

With the designed flow, it is expected that users can access each service easily and effectively, from logging in to completing transactions. This ensures a more efficient and transparent user experience in managing their needs related to used cars.

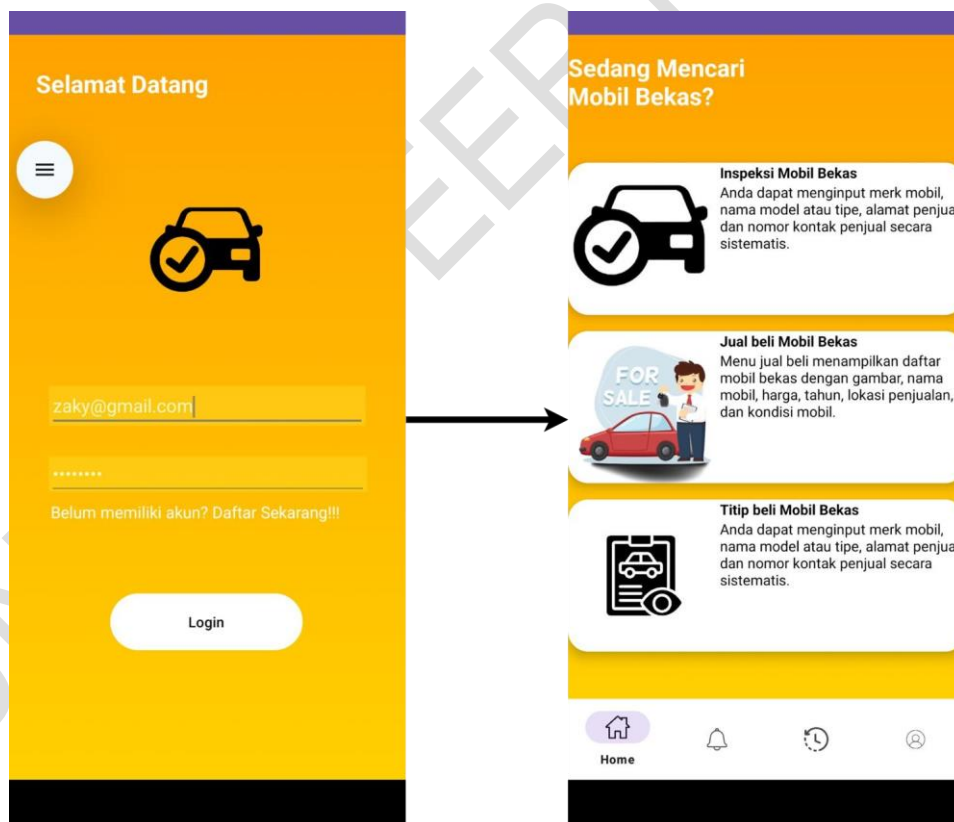


Fig. 6. User Login

In the inspection menu, users are required to fill out the provided form starting with the address of the used car seller. When users have filled in the address and other necessary forms and then press the "Proceed to transaction" button, the application will validate whether the inspector is at the address provided by the user. If the inspector is available at the user's address, the application will display a message indicating

that the inspector is available and will move to the transaction menu. If the opposite occurs, the application will display a message indicating that the inspector is not yet available at the address provided by the user. When that happens, the user cannot proceed to the transaction menu.

In the transaction menu, there is a display showing the total bill that the user must pay, including a breakdown of costs for transparency. The bill here corresponds to the service chosen by the user and the fees that must be paid. When the user successfully completes the payment, the application will display the message "transaction successful." The transaction will then be sent to the transaction database and displayed in the notification and transaction history menus. However, if the payment fails, the application will respond by displaying the message "transaction failed," and the user will not be able to proceed to the next process.

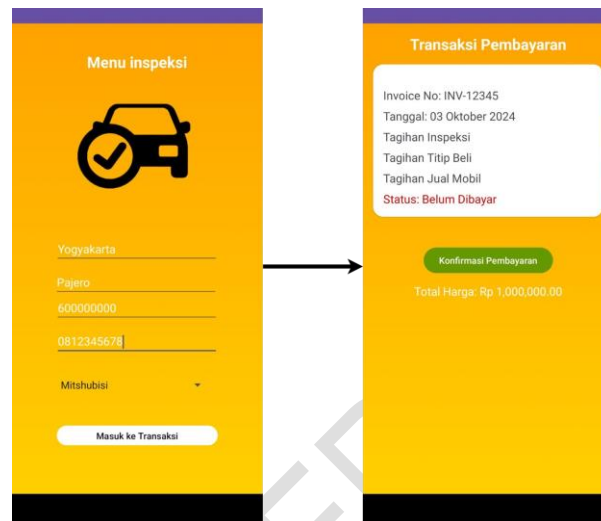


Fig. 7. Flow Notifications Inspection Transaction

In the notification menu, it displays orders placed by users. Notifications can be clicked to show clearer information. If the user has not ordered any services available in the application, the application will display "no notifications yet."

In the transaction history menu, there are processes and order history by the user. Orders made by the user can be clicked to display the details of the orders made. There are several statuses, namely the order is being created, processed, and completed.

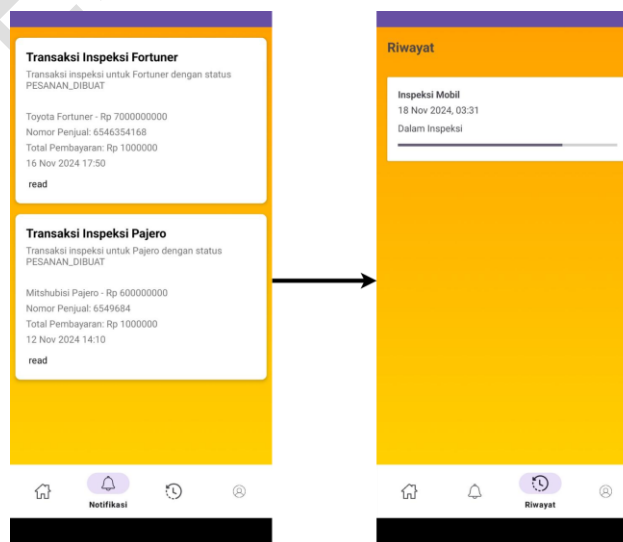


Fig. 8. Flow Notification Flow And Order History

In The following is a page, "Car Purchase Deposit Menu," which is used to fill in the details of the car purchase deposit transaction. Here, the user can input several information such as the model of the car to be ordered- for example, "Avanza"; the user's initial capital, 1,000,000,000 IDR; the number of cars to be checked, 3; the distance to search, 50-100 km; and the brand of the car-for example, "Toyota". The bottom button provides "Proceed to Transaction", which acts to advance to the second step of the transaction.

There is also a page titled "Payment Transaction" on the screen to the right that showcases a summary of the deposit against a car purchase. The invoice information includes the date (01/01/2024) and invoice ID: INV - 12345. This page is divided into two sections: "Transaction Details" and "Input Details." In the "Transaction Details" section, it shows information such as the initial capital of Rp 1,000,000,000.00, the number of cars being inspected, which is 3, the distance to search, ranging from 50 to 100 km, and cost breakdowns, which include Basic Fee of Rp 0.00, Search Fee of Rp 600,000.00, and Delivery Fee of Rp 200,000.00. Thus, the total cost to be paid is Rp 1,800,000.00. Meanwhile, the "Input Details" section is supposed to show detailed information from user input, but it is empty. At the bottom, there is a green button labeled "Confirm Payment" that allows users to confirm the payment and proceed with the process.

In general, this is a two-step flow in the car purchase deposit service, where users fill in the transaction data first and then view a cost summary before confirmation of payment.

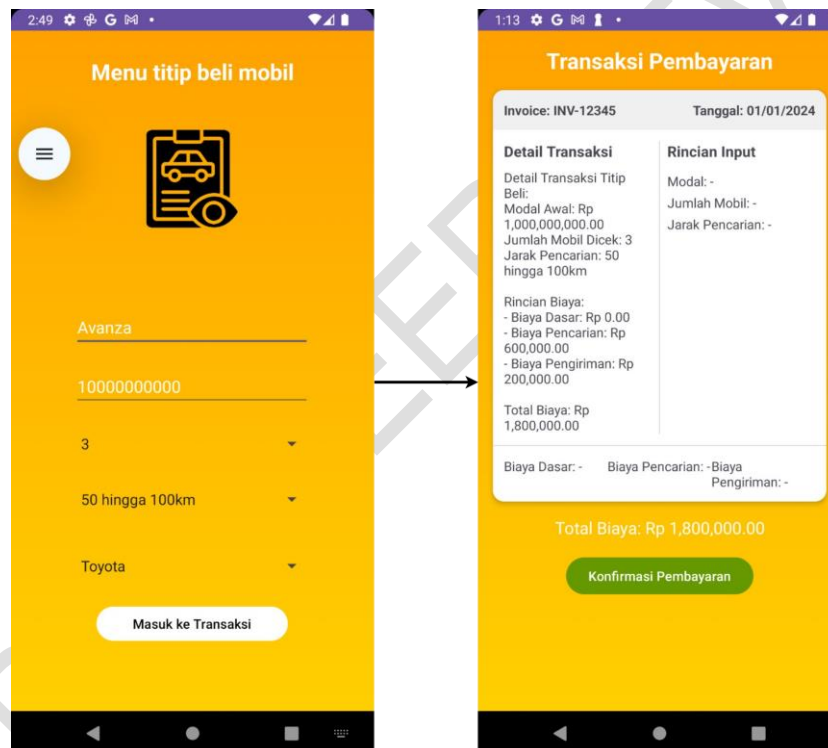


Fig. 9. Purchase Order Flow

3.2 Discussion

The results of the testing using the Blackbox method show that all the main features of the application function well according to the testing scenarios. Testing on the Register feature ensures that the user data entered is successfully stored in the database, which is an important foundation for login validation. Additionally, the Login feature allows users and inspectors to enter the application by displaying the home menu according to their respective roles, thereby proving that the authentication process is functioning well.

In the Inspection Booking feature, testing covers two scenarios: ordering inspection services at an unavailable location and processing a payment transaction. In both cases, the application successfully responded appropriately, either by displaying a message that the inspector was unavailable or by ensuring the transaction was recorded when the payment was successful. This shows that the system has been

designed to handle potential obstacles such as unavailable locations or failed transactions, thereby providing a more reliable experience for users.

The Notification and Transaction History features also proved to work as expected. The notification menu is able to display the relevant transaction status, while the transaction history makes it easier for users to see the process and status of their orders. The results of this testing show that the application has met the main functional requirements, including data storage, authentication, transactions, and reporting, which support the main goal of the application as a practical solution for used car inspection and transaction services.

4. CONCLUSION

This research successfully developed an integrated application for inspection services, purchase deposits, and buying and selling used cars, aimed at facilitating safer, more transparent, and more efficient used car transactions. This application allows users to conduct vehicle inspections, place orders for car purchases, and sell or buy used cars through a single, easily accessible platform. Based on the results of testing and evaluation, this application can enhance user trust in the used car transaction process. As a development suggestion, this application can be improved by adding additional features such as financing simulations, insurance integration, and expanding services to more regions. Further research can focus on optimizing the car search algorithm to be smarter and enhancing user experience through AI and machine learning technology for more accurate car recommendations.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The author hereby states that generative AI technology, namely ChatGPT 4.0 and Quillbot Translator, has been used during the writing process of this manuscript to assist in translating text from Indonesian to English. The use of this generative AI technology was carried out because the author is not yet very familiar with certain terms in the manuscript. For example, the prompt used was 'titip beli mobil bekas,' and the AI's translation was 'Used Car Purchase Assistance.' All use of this generative AI is carried out while maintaining the accuracy and precision of the translation results.

REFERENCES

- [1] N. S. E. Kurniawati And R. G. Artaningrum, "Implementation of Marketing Strategy to Increase Used Car Sales at Heaven Motor," *Accounting, Finance, and Management Studies*, Vol. 4, No. 1, Pp. 69–79, Jul. 2024, Doi: 10.35912/Sakman.V4i1.3166.
- [2] A. I. Lestari, Verawaty, Setya Ega Susanto, Baharuddin, And Budhi Krisnanto, "Analysis of Cultural, Social, Personal and Psychological Factors on Consumer Decisions to Buy Used Cars at Dealers in Makassar City," *Nitro Management Science Journal*, Vol. 1, No. 2, Pp. 182–192, Dec. 2022, Doi: 10.56858/Jsmn.V1i2.98.
- [3] A. Nugraha, "Marketing Mix Analysis in Used Car Sales at Perkasa Mobil," *Journal of Business Administration, Faculty of Social and Political Sciences, Mulawarman University*, Vol. 10, No. 4, Pp. 273–278, 2022, [Online]. Available: [Http://E-Journals.Unmul.Ac.Id/Index.Php/Jadbis/Index](http://E-Journals.Unmul.Ac.Id/Index.Php/Jadbis/Index)
- [4] G. Gushelmi and D. Guswandi, "Used Car Selection Decision Support System Using the Analytical Hierarchy Process Method," *Journal of Technology and Business Information Systems*, Vol. 3, No. 2, Pp. 380–386, Jul. 2021, Doi: 10.47233/Jteksis.V3i2.259.
- [5] O. D. Wahyurini, "Development of Innovative Applications with Information Transparency for Used Car Buying and Selling Using Design Thinking," *Kesatria: Journal of Information System Applications (Computers and Management)*, Vol. 5, No. 3, Pp. 825–835, 2024.
- [6] D. A. Wasesha, "Creation Distributed Under Creative Commons Attribution 4.0 International License. Implementation of Scrum Framework in Project Management of Used Car Inspection Service Ordering Information System Design," *Journal Of Information System, Applied, Management, Accounting And Research*, Vol. 7, No. 3, Pp. 842–853, 2023, Doi: 10.52362/Jisamar.V7i3.903.
- [7] Jevon, "Database Analysis and Design for Used Car Sales Application," 2023.
- [8] A. Hafiz, "Modeling of Used Car Sales System Using Web Engineering," *Scientific Journal of Informatics and Computer Science (Jima-Ilkom)*, Vol. 2, No. 1, Pp. 19–25, Mar. 2023, Doi: 10.58602/Jima-Ilkom.V2i1.14.
- [9] P. Studi Teknik Elektronika Polytechnic Gajah Tunggal, F. Zamroni, And S. Raki Muhamad, "Design and Construction of Process and Product Inspection Application System in Qa Motorcycle Based on Web,"

Journal of Instrumentation and Informatics Technology (Jiti), Vol. 2, No. 2, 2021, [Online]. Available: <https://jurnal.poltek-gt.ac.id/index.php/jiti/57>

[10] D. A. Wasesha, "Creation Distributed Under Creative Commons Attribution 4.0 International License. Implementation of Scrum Framework in Project Management of Used Car Inspection Service Ordering Information System Design," *Journal Of Information System, Applied, Management, Accounting And Research*, Vol. 7, No. 3, Pp. 842–853, 2023, Doi: 10.52362/Jisamar.V7i3.903.

[11] D. A. Wasesha, "Creation Distributed Under Creative Commons Attribution 4.0 International License. Implementation of Scrum Framework in Project Management of Used Car Inspection Service Ordering Information System Design," *Journal Of Information System, Applied, Management, Accounting And Research*, Vol. 7, No. 3, Pp. 842–853, 2023, Doi: 10.52362/Jisamar.V7i3.903.

[12] G. A. Bushido, A. Asmendri, And L. S. Muklis, "Development of Electronic Administrative Archive Application at Sma N 1 Batusangkar," *Edusaintek: Journal of Education, Science and Technology*, Vol. 10, No. 3, Pp. 876–897, Jun. 2023, Doi: 10.47668/Edusaintek.V10i3.817.

[13] S. F. Giwangsa, "Development of Quartet Card Media in Elementary School Social Studies Learning," *Pedagogy: Journal of Educational Research*, Vol. 8, No. 1, May 2021, Doi: 10.25134/Pedagogi.V8i1.3992.

[14] B. J. M. Putra, A. Fu'adi, And D. A. F. Yuniarti, "Analysis And Design Of Pacitan Tourism Information System With UML And ERD," *Information System For Educators And Professionals: Journal Of Information System*, Vol. 7, No. 1, 63, Dec. 2022, Doi: 10.51211/Isbi.V7i1.1920.

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