

Design and Development of Management Information System on Website-Based Jempol Optical Shop Using the Laravel Framework

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Abstract

The management of inventory data and reports at the Jempol Optical shop is still manual, starting with the input of goods data relating to glasses, frames, lenses, and other optical accessories data. In addition, the preparation of sales reports is also still manual. It takes a system to collect data on optical goods and to prepare sales reports. This study aims to create a software system that can provide solutions with a website-based management information system using Laravel. The method used in this study uses SDLC (System Development Life Cycle), including literature studies to get references related to the system to be made, needs analysis of the Jempol Optical system to determine system requirements, design of the Jempol Optical system, manufacture of the Jempol Optical system, and system testing of Jempol Optics Website used for black box testing and usability testing. The result of the system created is a management information system with 2 actors (admin and employees) which has 18 features. In black box testing, the system can be used smoothly, and all features can be used according to their functions with a percentage of 100% success. The results of usability testing carried out by shop owners and employees of the Jempol Optical shop, the application is good from the results of tests carried out with a result of 4.2 out of a maximum value of 5. From the test results by giving several statements, it can be concluded that the user agrees with the system that has been made.



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I. INTRODUCTION

Utilization of technology is necessary for better business management [1]. Technology is currently advancing, so many businesses use it. This is very important because using technology improves business management and helps business-people grow their businesses. For example, information systems are used in business store management.

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Jempol Optic Shop is a store that sells various optical needs such as glasses, frames, lenses, and other accessories. This store was just founded in 2020 and currently still uses a manual system to manage product and transaction data. As explained by [2] that doing business manually is very risky, because manual data recording is prone to errors and is inaccurate. Switching from a manual system makes finding data more difficult and takes longer.

In previous studies that had been implemented [3] at the Tanaka Optical store, they experienced problems with inputting product data and sales transaction records which were still manual. The solution is to create a sales information system that simplifies business processes. A similar study was conducted by [4] entitled Web-Based Optical Information System which was conducted at Sulistyoyo Yogyakarta Optical Shop. Sulistyoyo Optical Shop has the same problem, namely manual data management. By implementing an information system, it makes it easier to recap sales transaction data.

From the problems in Jempol Optical Shop, the authors provide a solution, namely the Design of a Website-Based Jempol Optical Shop Management Information System Using Laravel. Solutions were taken to make it easier to input product data, monitor stock, and view transaction reports. The application is expected to help businesses at the Thumb Optical Shop.

II. RELATED WORKS

The first research was conducted by [5] with the title "Implementation of the Laravel Framework on Ordering Information Systems Using Web-Based Futsal Fields in Zona Futsal Semarang". The results of his research are using the Laravel framework which is very helpful because it has many features that simplify and speed up system coding and user display.

The second research was conducted by [6] with the title "Design and Build a Website-Based Accounting Information System using the Laravel Framework" case study on Batik and Embroidery SMEs in Pakisaji Village, Malang Regency. The results of the research show that Laravel helps developers in designing, simplifying, and speeding up the system development process. The system that was created was also tested using the Black Box method and the results showed that the system was in accordance with the needs and could help SMEs manage financial transactions properly.

The third research was conducted by [7] with the title "Goods Management System at Mandiri Optik Condet Jakarta". The results of the research show that the goods management information system helps Optik Mandiri Condet in terms of processing data and making reports more easily.

The fourth study was conducted by [8] with the title "Web-Based Glasses Sales Information System on Yonotrend Optics". The result of this study is a sales information system that facilitates management and facilitates access to sales information at Yonotrend Optics with good speed, accuracy and accuracy.

The fifth research conducted by [9] entitled "Web-Based Boarding Management Information System". The results of the research show that the system is made based on a website so that it can be accessed from anywhere with internet access. The system was developed using PHP, HTML, and MySQL database. The results of the study show that the system can assist boarding owners in managing boarding houses and reducing risks in the room data input process and others.

III. METHODS

This research was conducted by following the System Development Life Cycle (SDLC) stage, which was implemented in the form of a flowchart. According to [10] a flowchart shows a sequence of stages of problem solving that is written or coded with special symbols that are logical and real. These stages are shown in Figure 1.

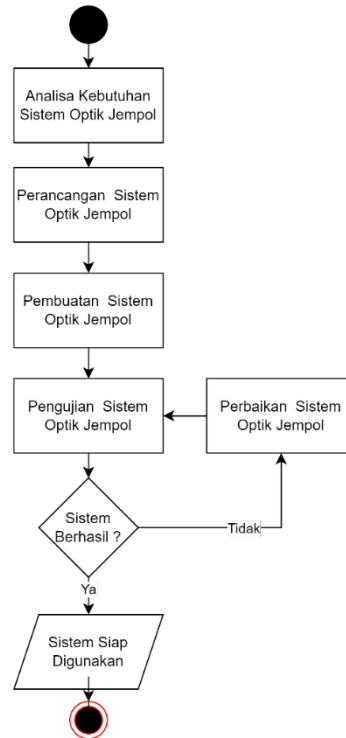


Figure 1 Research Methodology

The following is a description of the stages mentioned in the flowchart shown:

A. Jempol Optical System Needs Analysis

At this stage, observations were made to determine current business processes and interviews with the owner of the Jempol Optical store to identify deficiencies or problems with the system being used. Then, a map of system requirements will be created to be developed. According to [11] system requirements consist of two categories, namely functional requirements, and non-functional requirements. Functional requirements are descriptions of the features required by users, while non-functional requirements are supporting requirements for the system to be created. At this stage, researchers study the old system to get an idea in designing the new system and determine user requirements for the system to be created.

B. Jempol Optical System Design

At this stage, the researcher will develop a system design that matches the conclusions from the system requirements analysis that was carried out in the previous stage. Components of the system design include:

- At the design stage, business flows use UML (Unified Modeling Language) diagrams. UML is a modeling language for object-based software systems [12]. The UML used for business flow design is a Use Case Diagram to see who the user is and the activities that can be carried out, an Activity Diagram to make it easier to understand all processes in the system, and a Sequence Diagram to monitor the processes that occur in the system. The tool used is draw.io because it is easy to access via the website, easy to use, and free.
- In system design, the determination of the data to be entered into the system is carried out. The use of ERD is used to represent data requirements and relationships between entities in the database [13]. ERD was chosen because it is easy to understand and will be made using draw.io tools.
- The design of the system appearance utilizes Figma tools to create designs that will be applied to the system. Figma was chosen because it has many features and is easy to use, as well as being website-based so it doesn't require installation on a computer.

The system design stage aims to provide guidance to researchers during the system development process.

C. Manufacturing of the Jempol Optical System

At this stage, researchers will create a system using the PHP programming language and Laravel framework, and MySQL database, which is based on the results of the previous system design at the development stage. According to [14] Laravel is an open source and free framework for developing web applications that use the PHP language and is designed based on the MVC pattern by Taylor Otwell. The goal of the system development stage is to create a system that is complete and ready to be tested.

D. Jempol Optical System Testing

After the system development process is complete, the testing phase is carried out to ensure software performance. This is done to reduce the occurrence of errors and ensure that the system meets expectations. Testing is carried out by the owner of the Thumb Optics and their employees, potential system users. This process also involves evaluation to ensure the system is running properly. The testing method used is Black Box Testing and Usability Testing. According to [15] Black Box Testing is a testing method that focuses on the functional specifications of the software and allows the tester to determine a series of inputs and perform testing of the program's functional specifications. According to [16] Usability Testing is an evaluation method that involves direct users to assess the appearance of the site by testing the product directly.

IV. RESULTS AND DISCUSSIONS

A. Jempol Optical System Implementation

1) Jempol Optical System Needs Analysis

The results of the problem analysis at the Jempol Optical store through observation and interviews show that the unresolved problem is the problem of recording inventory management and sales reports. Therefore, it can be concluded that the system needed to overcome this problem is a system for recording inventory and sales transaction reports.

Furthermore, the needs mapping process is carried out to build a new system by considering functional and non-functional aspects. The results of this mapping can be found in tables 1 and 2.

Table 1 Functional Requirements

Business process	Legacy System Analysis	New system requirements	Usage
Recording of stock and sales of goods transaction reports at the Optical Jempol shop	It takes a long time to check the stock of goods. Sometimes the sale of goods is not recorded so they do not know if the goods needed are not available.	<ol style="list-style-type: none"> 1. Adding stock items 2. Changing stock items 3. Delete stock items 4. Keep records of sales of goods 	<ol style="list-style-type: none"> 1. Know the stock of goods available 2. Knowing the detail changes of the goods 3. Remove items that are no longer available 4. Knowledge of sales records

Table 2 Non-Functional Requirements

Hardware	Software
<ol style="list-style-type: none"> 1. Laptop processor Intel Core i5 4210U 2.7 GHz RAM 4 GB 	<ol style="list-style-type: none"> 1. Windows 10 Operating System 2. Browser Google Chrome 3. Sublime Text as code editor 4. XAMPP as localhost database and application

2) Jempol Optical System Design

The system will be created using two roles, namely admin and employee. To find out the activities that can be carried out by these two roles, it can be seen in the use case diagram, which is shown in Figure 2.

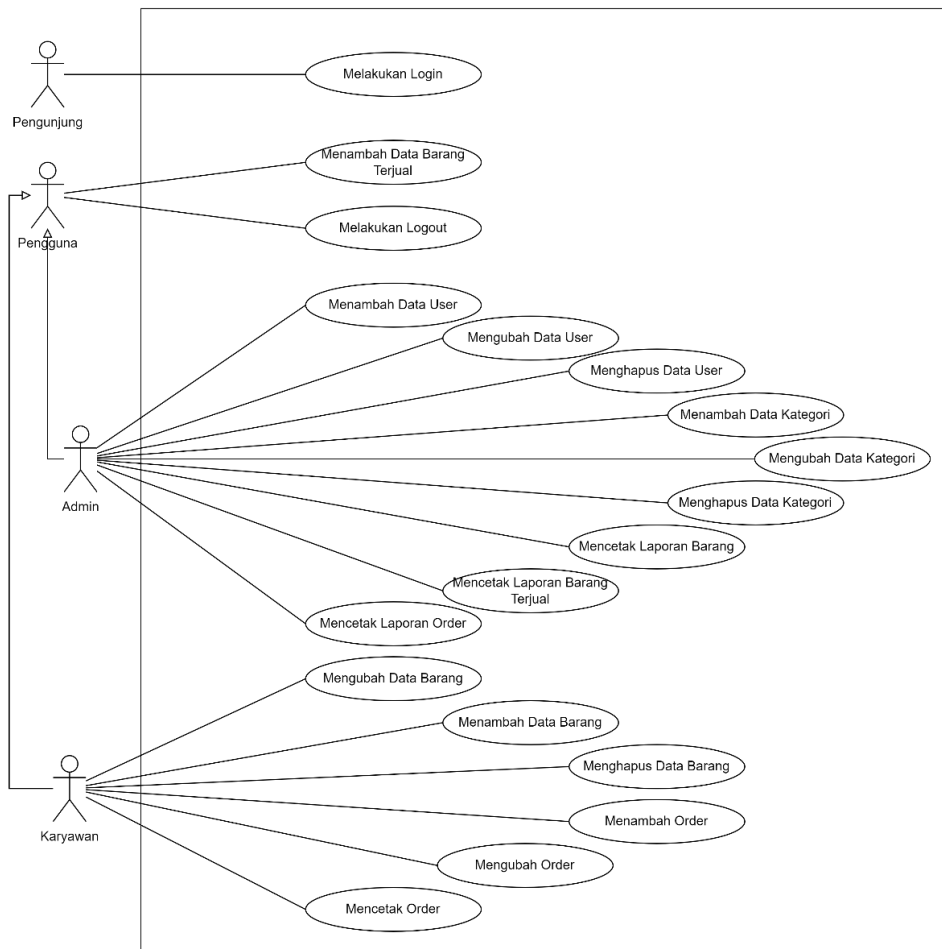


Figure 2 Use Case Diagram of the Thumb Optical Shop Management Information System

After the use case diagram is completed, the next step is to create another diagram. Then, a database design is created that will be used in the system, which can be seen in Figure 3.

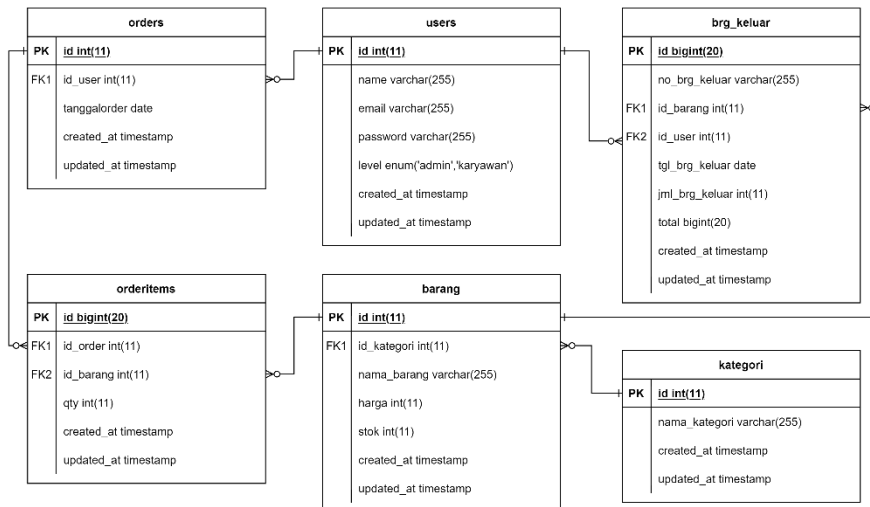


Figure 3 Database Design of Thumb Optical Shop Management Information System

3) Manufacturing of the Jempol Optical System

At this stage, the system is being created and this is the implementation of the design stage. The results of making the system can be seen in Figures 4 and 5.

- Role Admin

Login

Home Admin

Data User

Category Data

Sold Goods Data

Goods Data Report

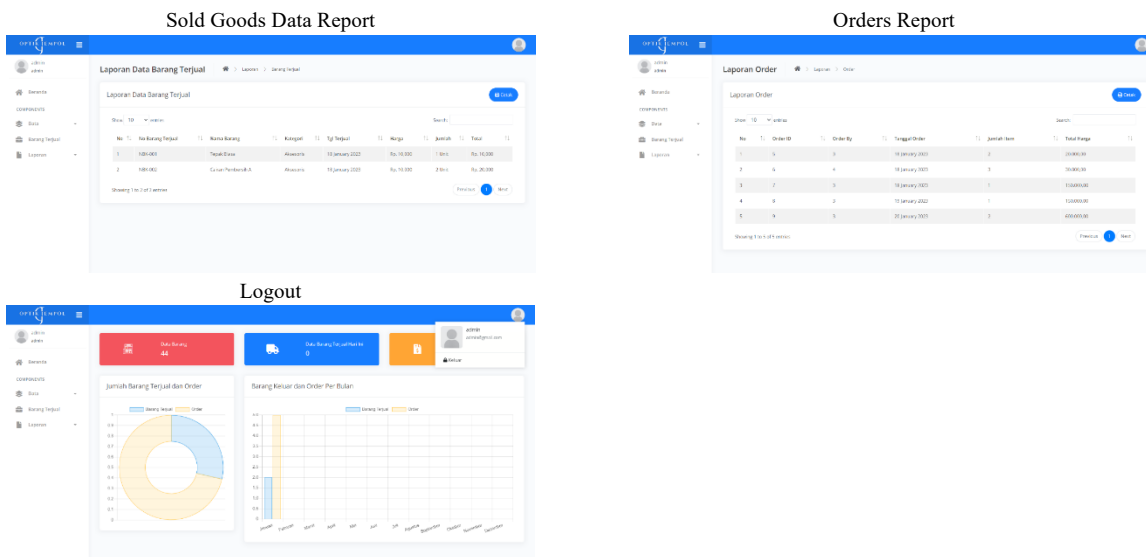
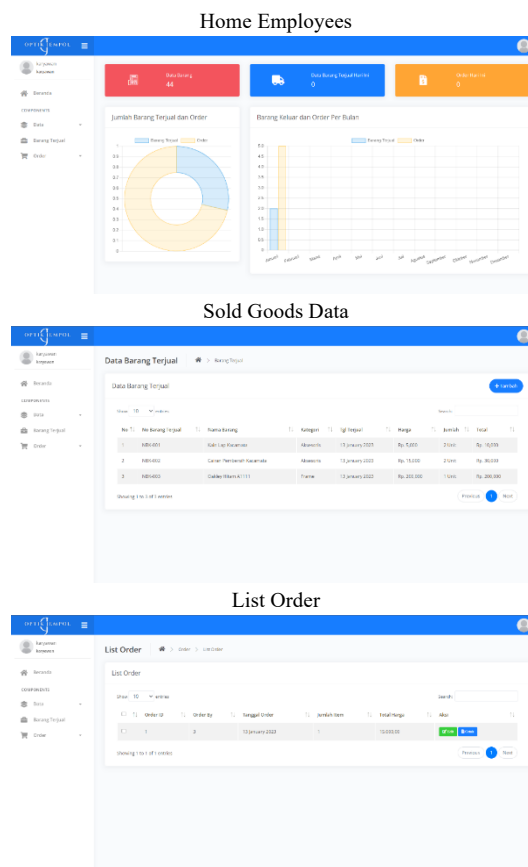
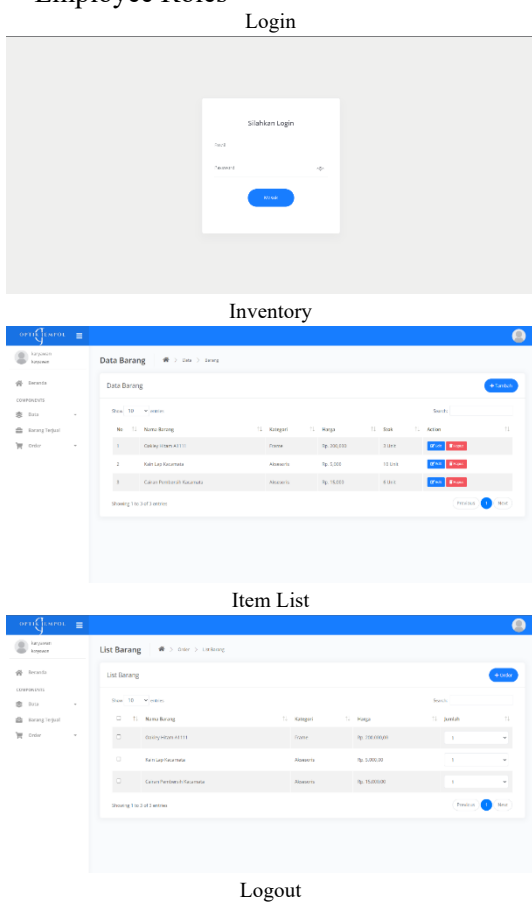


Figure 4 Admin view

Employee Roles



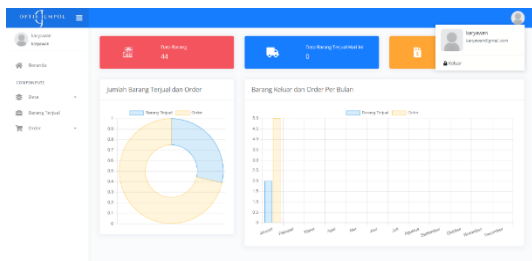


Figure 5 Employee Display

B. System Testing

1) **Testing Black Box Testing**

After testing using black box testing, the results show that all features and systems run smoothly during testing. All 18 features tested worked, with a 100% success rate. Therefore, the system is ready to use.

2) **Test Usability Testing**

Table 3 Usability Testing

No	Statement	Mark
<i>Learnability</i>		
1.	The writing on the application display is easy to read and clear	4
2.	The information you are looking for can be found on the menu	4,5
3.	The application display is easy to understand	4
<i>Efficiency</i>		
4.	The selected menu can be displayed quickly	4,5
<i>Memorability</i>		
5.	Still remember how to use the app	4,5
6.	The application flow is easy to remember	4
<i>Errors</i>		
7.	There is no error menu	3,5
8.	There is no menu that is clicked does not give any response	3,5
9.	There are no confusing menus	4,5
<i>Satisfaction</i>		
10.	The information displayed is good	5
11.	The use of this application has helped work	4,5
12.	Application usage experience	3,5

*Score Rating 1-5 with the following assessment criteria:

- 1 = Disagree
- 2 = Disagree
- 3 = Enough
- 4 = Agree
- 5 = Strongly Agree

From these results it can be seen that:

a) **Learnability**

This aspect gets an average value of 4.2. If converted to a scale of 5 then it is included in the rating scale of 4.

b) **Efficiency**

This aspect gets an average value of 4.5. If converted to a scale of 5 then it is included in the rating scale of 5.

c) Memorability

This aspect gets an average value of 4.25. If converted to a scale of 5 then it is included in the rating scale of 4.

d) Errors

This aspect gets an average value of 3.83. If converted to a scale of 5 then it is included in the rating scale of 4.

e) Satisfaction

In this aspect, the average value is 4.3. If converted to a scale of 5 then it is included in the rating scale of 4.

After adding up the scores from all aspects and dividing by the maximum value, then multiplying by 5, the result is 4.2. This shows that the test results show that the user agrees with the application in terms of Learnability, Efficiency, Memorability, Errors, and Satisfactions.

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the development of a management information system for the Optical Jempol store, the following conclusions can be drawn:

1. The problem with the Optical Jempol store is that there are no detailed records for stock and reports. Functional requirements include inventory records and reports of goods sold. Non-functional requirements include hardware such as laptops and software such as Windows operating systems, browsers, code editors, and XAMPP.
2. The results of the system design include diagrams such as use case diagrams, activity diagrams, and sequence diagrams. Then, the database uses ERD and system interface design. The result of the system development is a website-based Thumb Optic Shop Management Information System using Laravel and has 2 actors, namely admin and employees. There are 18 features available in the system.
3. Test results on the Thumb Optic Shop Management Information System through black box testing and ease of use testing. The results of black box testing on the 18 features tested showed results that were in line with expectations, had no errors or bugs and had a 100% success rate. The results of testing the ease of use by shop owners and employees of the Optik Thumb shop show that the application is good through tests conducted with a result of 4.2 out of a maximum value of 5.

The limitation of this research is that it does not include the payment transaction process in the Optical Jempol shop business. Currently, transactions can be made in two ways, namely DP or paid off. However, this system does not yet have a feature to record the status of each transaction. Therefore, a suggestion for further research is to add a feature to record transaction status.

The suggestions that can be conveyed in further research based on these limitations are hosting the system and adding features for recording transaction status.

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