Implementation of Management Information System Using Machine Learning Technology

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Abstract. Implementation of a management information system using Machine Learning technology with the aim of solving the problems owned by the shop owner, namely the owner has a problem in terms of increasing sales. Observation method as data collection by making direct observations of the object under study with the relevant agencies to collect data and information related to existing problems. Research on the implementation of information systems has succeeded in increasing sales by 1.5% each month, using Machine Learning technology, a product sales recommendation system. Because based on the existing problems required an information system to assist in increasing sales. Machine Learning technology used in this research is a product recommendation system that can affect sales increase.

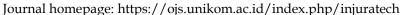**Keywords:** Management Information System, Machine Learning, Website

1. Introduction

As an entrepreneur, of course, we need to have a business strategy to develop a business, besides that an entrepreneur also needs to pay attention to how to manage books effectively and efficiently. Making a business strategy by looking at data and analysing independently is very time consuming because we need to be careful in analysing the data obtained as well as if managing the bookkeeping manually and still using paper is very risky because there are so many problems that occur if the bookkeeping is still manually and using the wrong paper. One example is that paper is easily torn and if it is exposed to water, the paper will be damaged and the books that are owned will be lost. Based on these two problems, we can use technology to solve them. Our bookkeeping management can use website-based POS (Point of Sale) technology so that bookkeeping can be done digitally, then with POS we can utilize stored data to solve problems making business strategies by utilizing Machine Learning technology to analyse data to create business strategies for the business to grow. The Machine Learning business strategy in this research is to make product recommendations for sale within a certain period of time, so that an entrepreneur can stock up on items recommended by machine learning and limit products that do not sell well in a certain period of time. [1].

As for the previous research on designing Web applications are built on many different web frameworks and developers have many different web frameworks to choose from when
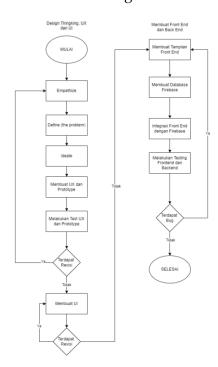
developing web applications. Each framework has its own advantages and disadvantages in a different perspective [2]. Testing is a very important phase of the SDLC where the software is checked properly and modifications are proposed. Web services are a widely used concept today due to the rapid popularity of Web services and less literature available on the performance of web services [3]. Data mining is a process used to analyse large databases to find useful patterns. Data mining can be used to study student behaviour from data collected using course management systems such as Moodle (Modular Object-Oriented Developmental Learning Environment) [4]. Following the rapid growth of social networking applications, Content Management Systems were developed to manage large amounts of data. All concepts and technologies used in the project are described in the appropriate sections. This project is a web-based application that can be used by companies as a Content Management System. The system acts as a centralized control panel and allows users to manage company product data [5]. Web development is growing exponentially these days for business purposes. The goal of web design is to provide a non-blocking environment using Node JS to improve the quality of its work process. It is designed with React JS in front-end development, which makes response faster to the browser, SEO friendly [6].

The purpose of this research is to solve problems owned by the owner, namely the owner has a problem in terms of increasing sales and also bookkeeping management. The research method used in this study is to use the observation method and the interview method.
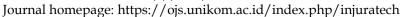
2. Method

The research method used in this research is the observation method and the interview method with the shop owner to find out the needs of the website that will be developed. Communication with users can provide good input for the development and completeness of the system. The system is designed using the React library to build the UI (user interface) of a website or web application and firebase as a website data repository [7, 8]. The system development steps are made on the Flowchart diagram shown in Figure 1.
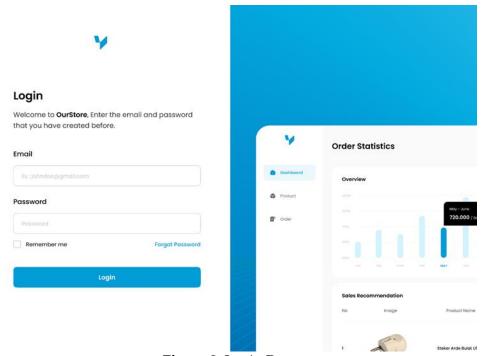
Figure 1. System developer flowchart

Empathize stage is the stage of understanding user problems. This Empathize stage goes through the interview process with the user. The purpose of this stage is to understand the problem carefully. After the Empathize stage where at that stage we understand a user problem, then at this stage we determine the core problem that focuses on the user by issuing useful ideas or solutions to solve the problem. Then from the ideas obtained at the Ideate stage, the ideas or solutions are applied to a physical form/prototype. Then, the Test Stage is the last stage and also as a feedback stage on the prototype made at the previous prototype stage. This feedback is very useful for improving the prototype. In the process of creating the UI (user interface), the component method is used for each UI element (user interface) which is often used as an example of a navigation bar [9]. Making data storage is done using the NOSQL method and testing is done using the survey method. The shop owner and website users will do testing on all existing pages and features to measure performance and SEO (Search Engine Optimization) is done using lighthouse.

3. Results and Discussion
3.1. Login page
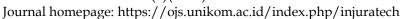The login page display is shown in Figure 2

Figure 2. Login Page

In Figure 2, there is a username and password form that can be accessed by users who have registered as admins, if the login is successful, they will enter the dashboard page.

3.2. Dashboard Page
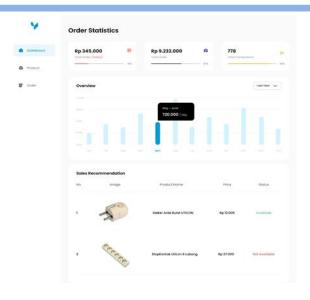The dashboard page display is shown in Figure 3

Figure 3. Page Dashboard

Figure 3 shows that after the user logs in, it will display sales graphs such as total daily to monthly purchases and display the number of transactions within a certain time and the application of machine learning as sales recommendations from retrieving the most product transaction data.

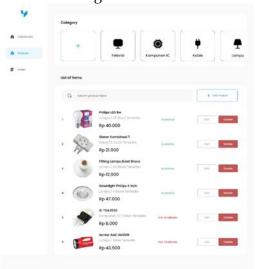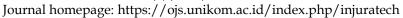### 3.3. Product Page

The product page display is shown in Figure

Figure 4. Product Page

Figure 4 shows the category of goods and the name, stock and price for each product, Users can display products by category, then Users can search for the product they want to search for
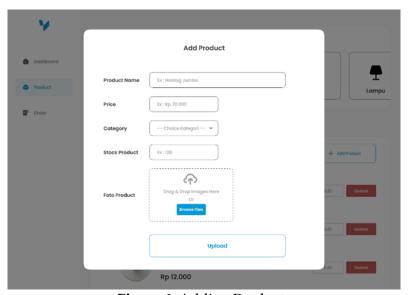
Figure 5. Add Category

Figure 5 Users can add product categories by entering category names and pictures
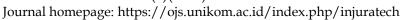

Figure 6. Adding Products

Figure 6 Users can add products, fill in the form by filling in the product name, category, stock quantity, price, product image
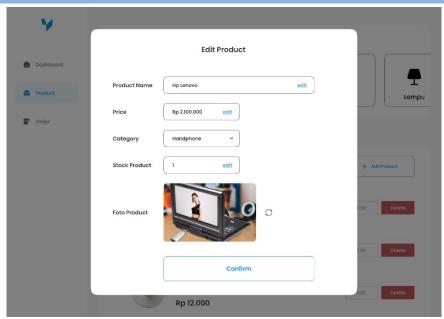
Figure 1. Editing Products

Figure 7 Users can edit pre-made products, such as name, category, stock quantity, price, product image

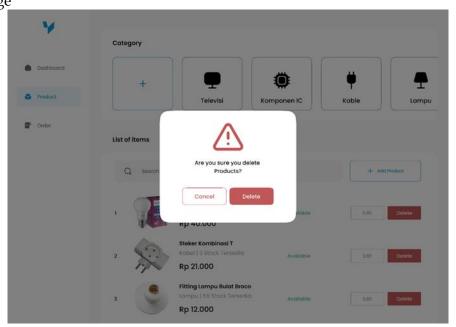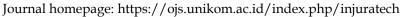**Figure 2.** Deleting Products

Figure 8 User can delete a product by displaying a warning with delete action to delete and cancel to cancel

3.4. Order Page
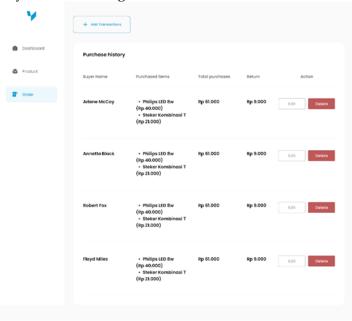The order page display is shown in Figure 9

Figure 9. Order Page

Figure 9 displays a table containing columns of buyer's name, orders purchased, total orders, returns. Users can Edit and Delete existing orders by clicking the action button on the table

3.5. Ordering Process
Users can add transactions by pressing the add order button on the order page

The user enters the name of the buyer and the order he wants to buy, the order can be more than 1. If you have clicked the pay button to make the payment shown in Figure 10.
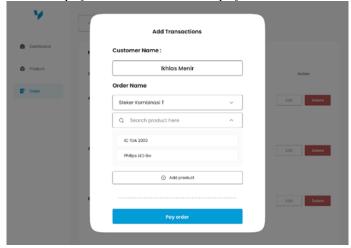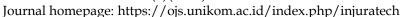

Figure 10. Add Order

The payment menu displays the total to be paid and the user enters the amount to be paid by the customer. If you click pay
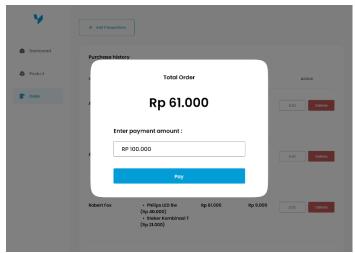

Figure 3. Number of Orders

Figure 11 appears after the user clicks pay; a purchase receipt will be displayed along with the change amount if any.
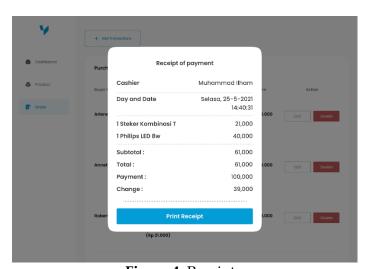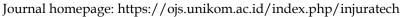

Figure 4. Receipt

Figure 12 appears after the order process is complete, the user can print a transaction receipt to be given to the customer as proof of the transaction. This website is designed to make it easier for shop owners to manage products to increase sales and solve problems experienced by shop owners, such as managing bookkeeping manually using paper which is very at risk of being torn, exposed to water, and lost. This research produces a website with POS (Point of Sale) technology so that the bookkeeping is done digitally and utilizes Machine Learning technology as a recommendation system in order to analyse business developments and display product recommendations that must be sold.

4. Conclusion

The implementation of a management information system using machine learning technology aims to make it easier for entrepreneurs who own shops to manage books and also increase sales by using machine learning assistance by providing product recommendations that must be sold by the entrepreneur. The web application that we created was made based on previous research which added features, namely machine learning to help increase sales [10].

Acknowledgement

References

[1] Kusuma, S. B. (2017). Perancangan Dan Pembuatan Sistem Aplikasi Point of Sale Berbasis Website Pada Ud. Es Drop Cita Rasa. *Jurnal Manajemen Informatika*, *7*(2).

[2] Johansson, J. (2021). Create React App vs NextJS: A comparison of two ReactJS based web application frameworks.

[3] Dhiman, S., & Sharma, P. (2016). Performance testing: a comparative study and analysis of web service testing tools. *International Journal of Computer Science and Mobile Computing*, *5*(6), 507-512.

[4] Aher, S. B., & Lobo, L. M. R. J. (2013). Combination of machine learning algorithms for recommendation of courses in E-Learning System based on historical data. *Knowledge-Based Systems*, *51*, 1-14.

[5] Khuat, T. (2018). Developing a frontend application using ReactJS and Redux.

[6] Baskaran, G., Saundariya, K., Prabakaran, D., & Senthilkumaran, R. (2022, February). A Web Application Based Administration Panel For Handyman Services. In *2022 IEEE Delhi Section Conference (DELCON)* (pp. 1-5). IEEE.

[7] Vipul, A. M., & Sonpatki, P. (2016). *ReactJS by Example-Building Modern Web Applications with React*. Packt Publishing Ltd.

[8] Banks, A., & Porcello, E. (2017). *Learning React: functional web development with React and Redux*. " O'Reilly Media, Inc.".

[9] Roldán, C. S. (2019). *React Design Patterns and Best Practices: Design, build and deploy production-ready web applications using standard industry practices*. Packt Publishing Ltd.

[10] Fu, M., Qu, H., Yi, Z., Lu, L., & Liu, Y. (2018). A novel deep learning-based collaborative filtering model for recommendation system. *IEEE transactions on cybernetics*, *49*(3), 1084-1096.