Journal of Artificial Intelligence and Engineering Applications

Website: https://ioinformatic.org/

15th October 2024. Vol. 4. No. 1; e-ISSN: 2808-4519

Design of a Web-Based Inventory Management System for the Nutrition Installation at Harapan Sehat Hospital, Jatibarang

Deni Yuniarti [1]*, Jaka Subrata [2]

[1,2] Universitas Teknologi Digital
deniyuniarti671@gmail.com[1]*, jakasubrata2020@gmail.com[2]*

Abstract

The rapid development of information technology has had a significant impact on various sectors, particularly in business and economics. In the context of data management within companies, inventory systems play a crucial role in minimizing the potential manipulation of company assets. The inventory management system, which was originally handled manually, has now evolved into a website-based system. The main goal of this development is to reduce human error and increase efficiency in recording the flow of goods in and out. This system, designed specifically for the Nutrition Installation at Harapan Sehat Hospital in Jatibarang, aims to assist staff in efficiently recording and managing inventory while generating accurate reports based on the required data. The website is built using MySQL as the database for storing inventory information, with CSS and HTML for the interface, and PHP as the programming language to implement the system's functionality. This research employs a qualitative analysis approach, with data collection techniques including observations and interviews for primary data, as well as notes, books, and documents related to inventory as secondary data. It is expected that this inventory management system will effectively support inventory management needs at Harapan Sehat Hospital in Jatibarang, facilitating more efficient and accurate inventory control.

Keywords: *Goods, Recording, Inventory, Information System.*

1. Introduction

With the rapid advancement of technology, information technology has become a key player in various sectors, particularly in business. The use of information technology, especially computers, has proven to be highly beneficial in managing and processing data. In this context, information technology plays a crucial role in supporting data management efficiency and accuracy, which ultimately contributes to economic revitalization and improved service quality across various fields. Furthermore, the demand for fast and accurate data management is becoming increasingly urgent due to the growing complexity of operational processes in organizations, including healthcare institutions. One of the most relevant technological implementations in the digital age is the use of web-based information systems. Websites can serve as platforms for presenting essential information, including interactive documents that facilitate data processing. In this regard, the application of information systems in hospitals, particularly in managing inventory in the nutrition installation, becomes highly significant. A computerized system is expected to simplify and accelerate administrative tasks related to inventory management, minimizing the errors often encountered in the manual systems still commonly used [1].

RS Harapan Sehat Jatibarang is one of the hospitals facing challenges in managing inventory in its nutrition installation. Currently, the process of recording inventory is still carried out manually, which often leads to discrepancies between the reported data and the actual physical stock. The manual process, carried out by warehouse staff, is time-consuming, which increases the likelihood of errors in recording incoming and outgoing items. Given these circumstances, there is a need for a system that can simplify the inventory recording process while ensuring greater accuracy of the data [2]. Therefore, the proposed solution is to develop a web-based information system for recording the movement of goods in and out of the nutrition installation warehouse. This system is expected not only to speed up the recording process and reduce errors found in the manual system but also to provide warehouse administrators with real-time access to inventory data. A web-based information system enables all relevant inventory information to be accessed quickly and easily, facilitating more accurate decision-making by those responsible [3].

In the development of this information system, the design, development, and testing processes must be thoroughly conducted to ensure that the system meets the users' needs effectively. Additionally, comprehensive and structured documentation is essential to support system maintenance in the future. The development of this information system will also require considerable costs, such as for hosting services and other supporting infrastructure, which must be carefully considered to ensure the system runs smoothly after implementation [4]. The quality of the user experience is a critical factor in the development of this system, particularly in terms of ease of use for warehouse administrators [5]. The system must be user-friendly to ensure that users can quickly adapt to and maximize the functionalities provided by the system. This is expected to improve efficiency and effectiveness in the operation of RS Harapan Sehat Jatibarang and positively impact the overall hospital operations. Thus, this research focuses on the design and development of a web-based information system for

recording and managing inventory in the nutrition installation warehouse at RS Harapan Sehat Jatibarang. Through this system, it is expected that inventory management will become more efficient, accurate, and easily accessible, ultimately enhancing operational performance at the hospital.

2. Research Methodology

The research methodology used in this study consists of several stages designed to effectively and systematically collect data to support the development of an inventory management information system at the Nutrition Installation of RS Harapan Sehat Jatibarang. The data collection methods used in this study include observation, interviews, and library research. Each of these methods was chosen to obtain valid and reliable information from various sources relevant to the research topic. The first method used is observation, observation is a data collection technique through direct observation of the phenomena that occur [6]. In this study, observation was conducted in the field, specifically at the Nutrition Installation of RS Harapan Sehat Jatibarang, with the aim of analyzing the current inventory system. The data collected through this observation allows the researcher to systematically record and observe the problems present in the inventory management process at the hospital, providing an accurate picture of the current situation [7].

The second data collection method is the interview explain that an interview is a two-way communication process conducted to collect data from respondents through questions and answers [8]. In this research, interviews were conducted with the Head of the Nutrition Installation Room at RS Harapan Sehat Jatibarang. The aim of the interview was to gather information related to the existing inventory system and to explore in more detail the problems faced by the hospital in managing inventory. The results of these interviews were used to further investigate the system requirements proposed in this study.

In addition to observation and interviews, this study also uses library research. Library research is a data collection technique that involves searching for references from books, journals, and other scholarly sources related to the research [9]. In this study, library research was conducted to find references on inventory management information systems, including textbooks, academic journals, and articles available online. These sources were used as the theoretical foundation to analyze and design the proposed information system, and to strengthen the arguments in this research. Once the data was collected through observation, interviews, and library research, the next stage is the analysis method. At this stage, the primary focus is to understand the problems at hand and identify the system requirements to be implemented based on the background and problem formulation. The first step in the analysis is conducting a survey of the existing system. This survey was carried out at the Nutrition Installation of RS Harapan Sehat Jatibarang by directly observing the processes that occur and conducting interviews with the Head of the Nutrition Installation Room regarding the current information system. The purpose of this survey is to identify the strengths and weaknesses of the existing system and to understand how the system can be improved.

After the survey is conducted, the next step is to analyze the findings from the survey [9]. The data collected from observation and interviews is then analyzed to identify patterns and problems in the inventory management process. This analysis also includes understanding the barriers in the current system, so that appropriate solutions for system improvement can be formulated. Additionally, at this stage, an identification of the information needs that are lacking in the existing system is carried out, including the documentation of incoming and outgoing goods, as well as the processes involved. Identifying these information needs is crucial to determining the information system required for the new system. The researcher will analyze various aspects necessary for the inventory management system, such as the data and information that need to be recorded, and how this information can be accessed more easily and efficiently. The next step is identifying the system requirements, which aims to formulate the technical specifications for the system to be developed, such as features and functionalities that need to be included to ensure that the system operates effectively.

The next method used in this research is the system design method. In this study, the system design was carried out using Unified Modeling Language (UML), which is one of the commonly used methods for system design in software development. UML helps the researcher to describe and design the system in a structured and clear manner. At this design stage, several UML diagrams were created, including Use Case Diagram, Activity Diagram, Sequence Diagram, and Class Diagram. These diagrams are created to depict the procedures and workflows in the proposed system, and to assist developers in understanding and implementing the proposed inventory management information system. Through these systematic stages, it is expected that an information system will be developed that can improve the efficiency and accuracy of inventory management at the Nutrition Installation of RS Harapan Sehat Jatibarang [10]. Each stage in this research methodology is interrelated and complementary, ensuring that the results obtained are optimal in designing and developing a system that meets the needs of the hospital. This study is expected to contribute significantly to the improvement of inventory management systems in the healthcare sector, particularly in hospitals.

3. Result and Discussion

In the system under analysis, there are several stages involved in managing inventory. The process begins with the recording of incoming goods, which is handled by the logistics department. This step includes documenting the type of goods, the quantity, and the date the goods are received in the warehouse. Once the data is recorded, the items are then cross-checked to ensure that the physical goods match the recorded data. This initial verification ensures that any discrepancies between the inventory records and physical stock can be immediately addressed. Following this, goods that are distributed or used in the facility, such as for the nutrition installation, are logged as they leave the inventory. This process mirrors the recording of incoming goods, with a focus on the quantity of goods being dispensed, their type, and the date of their removal. This helps ensure that every item that leaves the warehouse is documented properly, maintaining an accurate record of stock levels for future reference.

The entire inventory documentation process is clearly illustrated in *Figure 1*, which shows the flow of goods within the system. This diagram depicts how goods are recorded manually in logbooks and then entered into a digital system to monitor the available stock. The flow ensures that both the physical inventory and the recorded data remain aligned, making it easier to track inventory movement and reconcile any discrepancies.

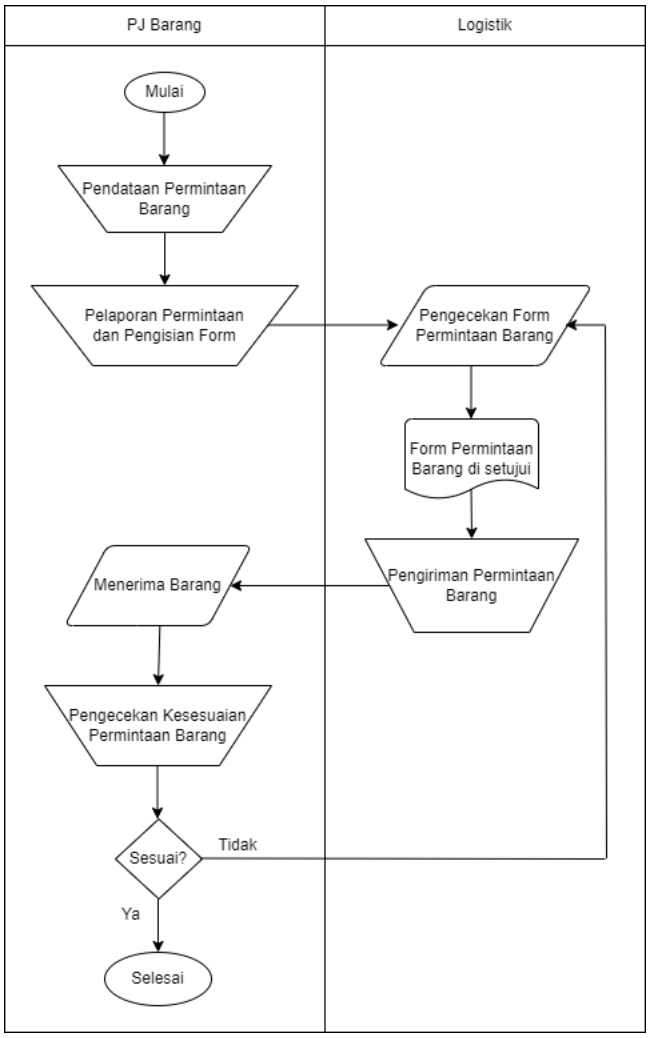

Fig. 1: Flow of Document in the Goods Inventory System.

Next, a periodic stock-taking process, known as stock inpatient care, is conducted to ensure that the quantity of items on hand matches the records. This procedure involves setting specific dates to record the available stock. The stock inpatient care serves as a vital step in detecting discrepancies in inventory records, ensuring that the data remains accurate and up-to-date. This process is especially crucial in large institutions like hospitals, where accurate inventory management is essential for smooth operations. The stock-taking procedure requires that all goods are inventoried, and any differences between the physical count and the recorded data are promptly addressed. The information gathered during stock inpatient care is entered into the system, allowing for a real-time update of inventory data. By performing regular stock takes, the organization can identify issues early and prevent overstocking or stockouts, which could disrupt operations.

The entire inventory process, from recording incoming and outgoing goods to performing stock takes, relies heavily on the collaboration between several departments. Admin staff oversee the management of the information system, including data input, monitoring of stock, and ensuring the system is well-maintained. Meanwhile, the logistics department handles the physical tasks of managing deliveries, storage, and distribution of goods. These roles are crucial to maintaining a smooth flow of operations and ensuring that essential items are available when needed. In conclusion, the inventory management system at RS Harapan Sehat Jatibarang, as outlined through the various steps, is designed to ensure that goods are consistently tracked and managed. With the cooperation of both the administrative and logistics teams, the system helps maintain the accuracy of inventory data and ensures that any discrepancies are addressed in a timely manner. The regular stock inpatient care process and the comprehensive recording of goods entering and leaving the warehouse are essential in maintaining this accuracy.

3.1. Usecase Diagram

In this study, there are two main actors interacting with the inventory system at the Harapan Sehat Jatibarang Hospital's Nutrition Installation, namely Admin and Logistics. The Admin has access to perform several operations, such as inputting incoming items, inputting outgoing items, and checking the available stock. The Admin's role is crucial in managing data related to goods, from receiving to distributing the items to meet the nutritional installation needs. As the main manager of the system, the Admin is also responsible for ensuring the accuracy of the inventory data. On the other hand, Logistics has more limited access, only able to view the available stock in the system. The Logistics team functions as a support role in managing the goods, though they are not involved in data input or goods distribution processes. Their role is more focused on monitoring and reporting the available stock, which is important information for the Admin in the inventory management process. To clarify the relationship between the actors and the system, the following Use Case Diagram is presented, illustrating the interactions within the system. This diagram shows that the Admin has broader access rights, while Logistics can only access information regarding the available stock.

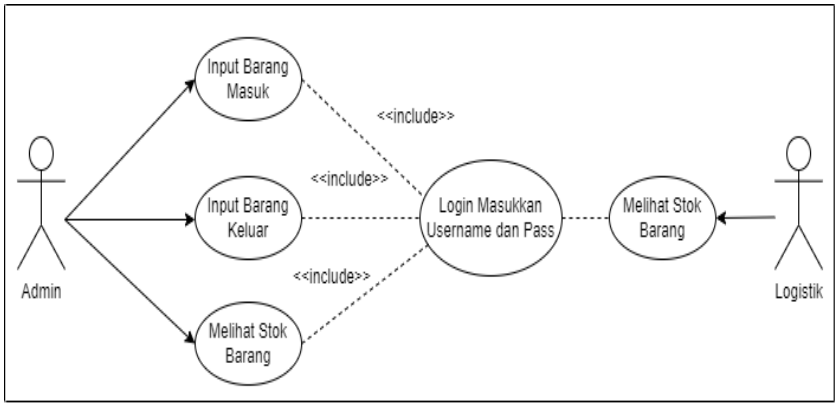

Fig. 2: Usecase Diagram in the Goods Inventory System.

With the Use Case Diagram, the reader can easily understand the overall flow and access rights of each actor in the system. The Admin is responsible for inputting and managing inventory data, while Logistics can only view the stock levels. This reflects the clear division of tasks between the two actors to ensure the smooth operation of the nutritional installation. In this scenario, the Admin has the authority to increase or decrease stock levels through the input of incoming and outgoing goods. The process of recording incoming items includes data such as the quantity and type of goods received, while outgoing items are recorded based on requests or predefined needs. Using this system, the Admin can easily track the movement of goods and ensure that the data is always updated. Logistics, on the other hand, is tasked with monitoring and verifying the availability of goods in the warehouse. Although they are not directly involved in data input, Logistics plays an important role in ensuring that all items recorded in the system are available according to the requests. With this limited access, Logistics can provide the necessary information to the Admin to take further action in managing the goods.
In conclusion, the interaction between Admin and Logistics in this inventory system reflects the importance of collaboration between both parties in managing goods at the Nutritional Installation. With a well-structured and integrated system, both actors can perform their tasks more efficiently, and the process of monitoring and managing the inventory becomes more transparent and well-organized.

3.2. Class Diagram

In this study, the analyzed system focuses on managing the inventory of goods within the Nutrition Installation at RS Harapan Sehat Jatibarang. This system plays a vital role in ensuring that goods are efficiently tracked and distributed within the installation to meet the needs of the facility. The system is built using a class-based architecture, where different classes represent distinct components of the system, and each class has a specific function. The primary components of this system include the Admin, Logistics, Goods, Stock, and Transaction classes. These entities are interconnected to ensure smooth and accurate inventory management, and their relationships are represented through the class diagram. At the heart of this system is the Admin class, which is crucial in overseeing the entire inventory management process. The Admin has broad responsibilities, including the input of goods entering and leaving the system. This class manages data such as the type of goods, the quantity of goods received, the date of arrival, and details about any goods that have been dispatched based on the installation's needs. The Admin is also tasked with validating each transaction performed by the Logistics class, ensuring that data entered into the system is accurate and up-to-date. Moreover, the Admin ensures that the system runs smoothly by maintaining the integrity of the goods inventory, checking stock levels, and updating the records to reflect any changes in the warehouse.
While the Admin has extensive access to all the components of the system, the Logistics class plays a more limited yet critical role. The primary responsibility of the Logistics class is to manage the distribution of goods within the installation. However, unlike the Admin, the Logistics personnel do not have permission to input or modify data. Instead, they can only view the stock levels of the goods. This feature ensures that the Logistics team has access to real-time data on the available goods, which helps them allocate resources effectively and avoid shortages or overstocking. By monitoring stock levels through the Stock class, the Logistics team ensures that the goods are distributed in alignment with the needs of the Nutrition Installation, facilitating a smooth workflow in the distribution process.
The Goods class plays an important role in storing detailed information about the items within the inventory. Each good is represented as an object within this class, characterized by several attributes, including the name, type, and quantity of the item. The Goods class functions as the central repository of data about the items in the system, and it is a key resource for both the Admin and Logistics classes. The Admin uses the Goods class to input and update data regarding the inventory, while the Logistics class refers to it to monitor the availability of specific goods in the warehouse. This structure ensures that both roles—admin and logistics—have access to the necessary data to carry out their respective tasks efficiently. In connection with the Goods class, the Stock class specifically manages the quantity of goods available in the warehouse. The Stock class ensures that real-time inventory levels are accurately tracked. This class is directly linked to the Goods class, as the quantity of each good in stock is determined by the number of items received and issued over time. When goods are received, the Admin updates the Stock class to reflect the increase in inventory, and when goods are issued or dispatched, the Admin also updates the stock count to reflect the changes. However, the Logistics team, although they interact with the Stock class, is not involved in modifying the stock data. Instead, they only view the current stock levels to ensure that goods are available when needed. The Transaction class is integral to tracking the flow of goods within the system. It records the events that occur when goods are received or dispatched from the warehouse. Each transaction is logged with key details, such as the type of transaction (whether inbound or outbound), the date of the transaction, and the quantity of goods involved. The Transaction class ensures that all movements of goods are accurately documented, providing a clear record of how inventory levels change over time. This class is linked to both the Goods and Stock classes, as each transaction affects the quantity of goods available in the warehouse. Through this relationship, the system maintains an up-to-date inventory, ensuring that all transactions are properly reflected in the stock data. The class diagram provides a visual representation of the relationships between these components, clearly illustrating how they interact with one another. The Admin class, for example, is connected to both the Goods and Stock classes, allowing the Admin to manage and update inventory data. The Logistics class, while not able to modify data, is connected to the Stock class to view available inventory. Similarly, the Transaction class is linked to both the Goods and

Stock classes, ensuring that all changes to the inventory are properly recorded and reflected in the system. These relationships are essential for maintaining a well-organized and efficient inventory management system, and the class diagram serves as a valuable tool for understanding how each component functions and interacts with the others. By visualizing the system with a class diagram, it becomes easier to understand the overall structure and function of the inventory management system. This diagram provides clarity on how each class fits into the broader workflow, helping stakeholders better understand the roles of different components. Furthermore, this structure allows for future scalability and flexibility in the system. As the system evolves, new classes can be added, or existing ones can be modified, with the clear relationships between them ensuring that any changes do not disrupt the overall functionality. The class diagram serves as a foundational element of the system, enabling stakeholders to develop, troubleshoot, and optimize the system as needed.

In conclusion, the class diagram serves as a crucial element in understanding the architecture of the inventory management system at RS Harapan Sehat Jatibarang's Nutrition Installation. It defines the roles and interactions of the Admin, Logistics, Goods, Stock, and Transaction classes, ensuring that each component plays a vital part in the smooth functioning of the system. By using the class diagram, developers and system administrators can quickly identify how the system works, troubleshoot potential issues, and expand the system to meet future needs. Additionally, the diagram provides a roadmap for the development of the system, ensuring that all stakeholders are aligned in their understanding of the system's components and their interactions.

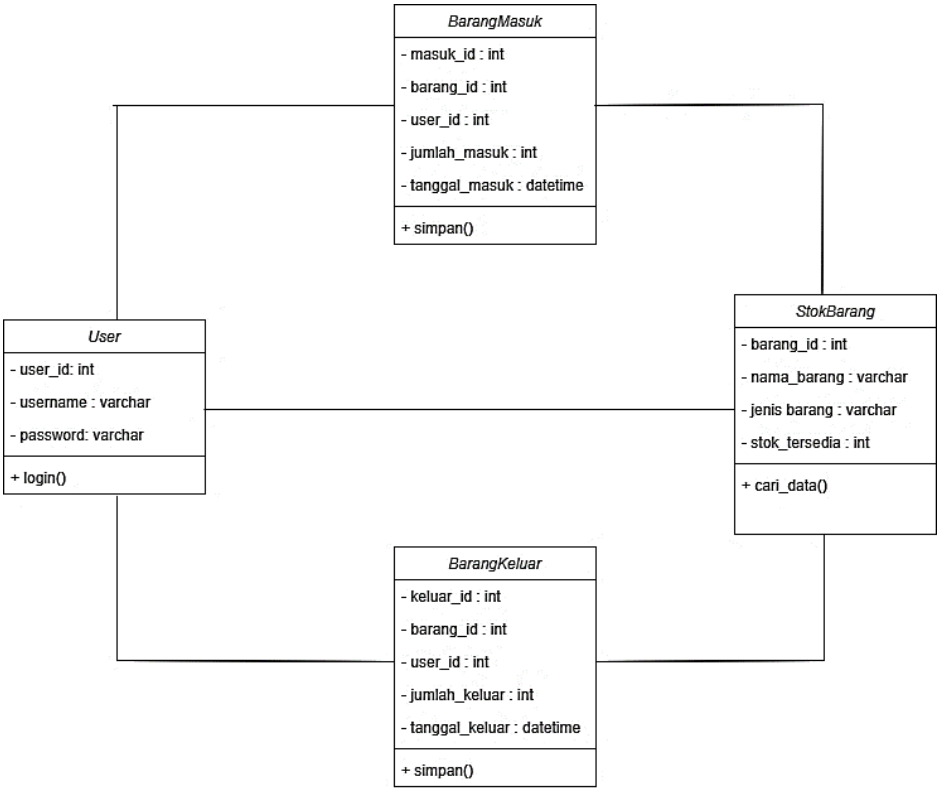

Fig. 3: Class Diagram in the Goods Inventory System.

4. Conclusion

After the design and development of a web-based information system for managing the inflow and outflow of goods in the warehouse of the Nutrition Installation at RS Harapan Sehat Jatibarang, it can be concluded that the system designed contributes significantly to the process of goods and inventory management at the hospital. The system includes various interconnected stages, from the request for goods to the receipt and issuance of goods. With this system, inventory management can be carried out in a more structured and efficient manner compared to the manual method previously used. The current system allows users to process goods requests needed in a more systematic way. The inventory recording process at RS Harapan Sehat Jatibarang involves detailed stages, starting from the request for goods by relevant parties in the Nutrition Installation, checking the request, and finally receiving the goods into the warehouse. This stage is crucial to ensure that the goods received match the request and are in good condition, reducing potential errors that may occur in manual processes. This system is also designed to simplify stock checks, ensuring that every request and issuance of goods is properly recorded.

However, the manual recording system previously used still poses the potential for errors in data recording and management. This is often caused by human error, such as negligence in entering data or mistakes in calculating the number of goods entering or leaving. Therefore, it is essential for the Nutrition Installation management to have a more advanced and automated system for inventory recording. The web-based system provides an effective solution to minimize errors in the recording process and ensures that inventory data is always accurate and up-to-date. Accurate and timely inventory recording is crucial for the smooth operation of the Nutrition Installation. Every item that is received or issued must be clearly recorded to prevent overstocking or stockouts, which could affect service delivery to patients. With the designed information system, every transaction related to goods can be automatically recorded, and the system can generate real-time reports on the available stock in the warehouse. This will make it easier for the administration and management to make decisions about purchasing or issuing goods in the future. One of the main advantages of the developed system is its ability to control inventory levels

regularly, both during transactions and at other times. With the integrated information system, both the Admin and Logistics can easily access inventory data and check the availability of goods. This monitoring process is essential to prevent stockouts that could disrupt operations and services at the Nutrition Installation.

In addition, this web-based information system also provides ease in maintaining and updating data. Any changes in stock can be updated in real-time, allowing management to always have up-to-date information about the available goods. Therefore, inventory management becomes more transparent and accountable, which is highly beneficial in improving hospital operational efficiency.

In terms of usage, this system is also designed to be accessed by two main types of users: Admin and Logistics. The Admin has broader access rights, which include entering data for goods coming in and going out, as well as managing stock levels. Meanwhile, Logistics only has the right to view available inventory data but does not have the authority to modify data. This division of tasks helps create a structured system and reduces the potential for data misuse.

With all the benefits offered by this web-based information system, it can be concluded that the implementation of this system in the Nutrition Installation at RS Harapan Sehat Jatibarang will enhance efficiency, accuracy, and transparency in inventory management. This system is also expected to reduce reliance on the manual process, which is prone to errors, and to facilitate more effective monitoring and control of goods inventory. In the future, further development of this system could include additional features to support more comprehensive management, such as integration with other hospital systems or adding modules for automatic inventory needs analysis. Thus, the development of this system can be seen as an initial step toward implementing a more modern and efficient inventory management system at RS Harapan Sehat Jatibarang, which in turn will support the improvement of service quality at the hospital. Furthermore, this system can serve as an example for other hospitals that wish to develop similar systems for managing goods and inventory, ensuring optimal operational sustainability.

References

[1.] Arifin, N. Y. (2016). Analisa Perancangan Sistem Informasi. *Journal of Engineering and Information Technology for Community Service*, *1*(1), 1–5. https://doi.org/10.33365/jeit-cs.v1i1.126.

[2.] Hidayatullah, A. A., Safriadi, N., Pratama, E. E., & Asrin, F. (2023). Sistem Informasi Marketplace Penyewaan Lapangan Futsal di Kota Singkawang Berbasis Website. *Jurnal Ilmiah ILKOMINFO - Ilmu Komputer & Informatika*, *6*(2), 204–215. https://doi.org/10.47324/ilkominfo.v6i2.207.

[3.] Pratama, A., Penulis Korespondensi, N., & Pratama Submited, A. (2023). Analisis Dan Perancangan Sistem Informasi Persediaan Barang Berbasis Web. 4(2), 114–120. https://doi.org/10.33365/jtsi.v4i2.2558.

[4.] Muammar Khadapi, & Ramadani, S. . (2024). Optimization Of Sandal Production Using Linear Programming. *Journal of Artificial Intelligence and Engineering Applications (JAIEA)*, *3*(3), 631–638. https://doi.org/10.59934/jaiea.v3i3.470.

[5.] M. Khadapi, A. M. H. Pardede and N. Novriyenni, "Providing Recommendations to New ILMCI Edu Voucher Customers Using the Market Basket Analyst Algorithm," *2023 International Conference of Computer Science and Information Technology (ICOSNIKOM)*, Binjia, Indonesia, 2023, pp. 1-6, doi: 10.1109/ICoSNIKOM60230.2023.10364536.

[6.] Muammar Khadapi and V. M. Pakpahan, "Analisis Sentimen Berbasis Jaringan LSTM dan BERT terhadap Diskusi Twitter tentang Pemilu 2024", *JUKI*, vol. 6, no. 2, pp. 130–137, Nov. 2024.

Septiani. (2020). Perancangan Sistem Informasi Persediaan Barang Studi Kasus di Vahncollections. *Jurnal Sisfotek Global*, *9*(1), 137–142. https://doi.org/10.38101/sisfotek.v9i1.267.

[7.] Siska Narulita, Ahmad Nugroho, & M. Zakki Abdillah. (2024). Diagram Unified Modelling Language (UML) untuk Perancangan Sistem Informasi Manajemen Penelitian dan Pengabdian Masyarakat (SIMLITABMAS). *Bridge : Jurnal Publikasi Sistem Informasi Dan Telekomunikasi*, *2*(3), 244–256. https://doi.org/10.62951/bridge.v2i3.174.

[8.] Tumini. (2020). Sistem Informasi Berbasis Web Sma Al- Mukhtariyah Mamben Lauk Berbasis Php Dan Mysql Dengan Framework Codeigniter. *Infotek : Jurnal Informatika Dan Teknologi*, *3*(1), 79–83. https://doi.org/10.29408/jit.v3i1.1793.

[9.] Wicaksono, R. P., & Widodo, A. (2020). Sistem Informasi Persediaan Barang Berbasis Web Pada CV. Patriot Kencana Medika Kudus. *SIMADA (Jurnal Sistem Informasi Dan Manajemen Basis Data)*, *3*(1), 42–50. https://doi.org/10.30873/simada.v3i1.2035.

.