Infotmatics Management, Engineering, and Information System Journal, Vol. 2, No. 1, June 2024, 8-15
E ISSN : 3025-5384, DOI : https://doi.org/10.56447/imeisj

Goods Asset Information System with Application (QR) Code (Study At One of The Schools in Bandung)

Nur Muhammad Fadlan Fadhila[1], Miftah Fahmi[2], Rini Risanti[3], Asep Sudrajat[4], Nanang Suciyono[5]
STMIK Mardira Indonesia [1,2,3,4,5]
Email: nmfadlanf@gmail.com[1], miftah@stmik-mi.ac.id[2], rini@stmik-mi.ac.id[3], asep.sudrajat@stmik-mi.ac.id[4], nanang@stmik-mi.ac.id[5]

Abstract

The advancement of science and technology has enhanced the efficiency of all forms of information communication. Using two-dimensional barcodes enables the linkage between the virtual realm and the physical world, with the QR code being the most prevalent type of two-dimensional barcode. Each year, there have been significant advancements in information technology. Asset items are present in each laboratory or room of a school in Bandung. Evidence gathered at this educational institution suggests that the administration of inventory data could be more efficient. The school administrators affirm that they continue to rely on human data entry.

Moreover, manual data entry is considered inefficient, and data processing tends to be sluggish. The data in question refers to the information regarding the assets. The Asset Validation application is developed utilizing the SDLC (System et al.) methodology and UML (Unified et al.) for design. The utilized programming language is PHP, or Hypertext Preprocessor, in conjunction with a MySQL database. When the URL is executed in a web browser, the system provides a description of the URL, compares it with the database, and subsequently presents it in the web browser. The outcome of the Asset Validation application is a QR code utilized to store the URL, signifying the precision of the asset item. This study also conducted a performance comparison with three analogous apps. These three comparison programs were selected based on their similar visual QR code output, although their scanning outcomes differ due to distinct features.

Keywords : *QR Code, SDLC (System Development Life Cycle), Unified Modeling Language (UML), PHP (Hypertext Preprocessor), MYSQL, Goods Assets*

INTRODUCTION

The advancement of science and technology has enhanced the efficiency of all forms of information communication. Using two-dimensional barcodes enables the integration between the virtual realm and the physical world, with the QR code being the most prevalent type of two-dimensional barcode. Each year, there has been substantial advancement in information technology. (Abdurahman, 2018) This circumstance could be more efficient; hence, a system is required to tackle it. Inventory management is documenting and analyzing data about the stock of goods a company possesses. Regrettably, this matter has not been considered sufficiently, resulting in a lack of clarity regarding the purpose and function of inventory management. Efficiently controlled assets can significantly enhance an organization's endeavors' seamless functioning and prosperity. (Nurelasari, 2020)

Asset items are present in each laboratory or room of a school in Bandung. Evidence gathered at this educational institution suggests that the administration of inventory data remains inefficient. The school administrators affirm that they continue to employ manual data entry. Moreover, manual data entry is deemed to be ineffective, and data processing tends to be sluggish. The school authorities also note the frequent movement of goods from their original placement to another. This phenomenon arises

due to the unauthorized removal of objects by individuals who are not the rightful owners or liable for the said items. When the goods are displaced from their original position, it becomes challenging to verify the inventory.

Goods Assets

Inventory management is overseeing the stock of all goods with monetary worth, which is relevant to individuals, businesses, and governments. (Sallaby & Kanedi, 2020) Assets are tangible or intangible resources that possess economic worth, are utilized or operated to generate money and have a prolonged lifespan. For instance, this includes tangible assets such as land, equipment, machinery, buildings, roads, irrigation systems, and networks, as well as the documentation of currently constructed goods. Companies can carry out asset inventory activities at least once a year due to the necessity of having the necessary facilities and infrastructure for work. (Usnaini et al., 2021)

QR Codes

A QR code is an optical label containing machine-readable information about a specific item or product. Information in a barcode is encoded unidirectionally or in a single dimension. In contrast, a QR code, a type of two-dimensional code, encodes information in horizontal and vertical directions. This text is highly legible and has a high capacity for retaining vast information. (Setiawan & Wijaya, 2020)

Figure 1. Example of a QR Code form

A QR-Code comprises black modules, or square dots, placed in a square grid on a white backdrop. It may be scanned by imaging devices like cameras and then processed using error correction techniques to ensure accurate image interpretation. (Afriansyah, 2022)

Codeigneter

CodeIgniter is a PHP web framework developed by Rick Ellis in 2006. It boasts a streamlined and highly adaptable design. Developers are still free to build specific codes within the application using traditional methods or without relying on the framework. (Muhaimin & Nurhidayati, 2024)

CodeIgniter, the PHP framework that serves as a toolbox for developers creating online applications, is designed with user-friendliness in mind. Its objective is to expedite project development compared to starting from scratch by writing code. CodeIgniter offers a repertoire of libraries for commonly used applications, and accessing these libraries is straightforward. Developers can streamline system or project development and reduce the amount of code required by utilizing the CodeIgniter framework, making the development process more comfortable and less daunting. (Mandala & Susanto, 2023)

PHP

According to Hartati, (2020), PHP is a programming interpreter that converts source lines into machine code that the computer can directly comprehend during code execution.

Ciptadi et al., (2023) states that PHP, technically known as PHP: Hypertext Preprocessor, is a server-side script that is integrated into HTML. PHP is an acronym for Personal Home Page Tools. This script enables the integration of an application into HTML, transforming a static web page into a dynamic one. Server-side refers to the execution of program code on the server, with the subsequent transmission of results to the browser.

From the definitions provided, it can be inferred that PHP (PHP: Hypertext Preprocessor) is a programming language utilized for converting lines of program code into machine code that a computer can comprehend. This technology operates on the server side and can be integrated into HTML.

MySQL

MySQL, the most widely used open-source SQL database management system, is designed with the user in mind. Its user-friendly interface, multithreading, and multi-user support make it an efficient and dependable choice for a wide range of users. MySQL has several benefits, which include:

1. The source code of MySQL is readily accessible and available at no cost.
2. The syntax of the language is straightforward and uncomplicated.
3. Accessing the database is straightforward.
4. MySQL can run many threads simultaneously, making it suitable for installation on servers equipped with multiple CPUs.
5. It is compatible with widely used programming languages such as C, C++, Java, Perl, PHP, and Python.
6. It is compatible with multiple systems.
7. The database system offers various column types, simplifying the configuration process.
8. The security systems are robust, with host verification.
9. It provides ODBC support for Windows operating systems.
10. It can handle records with either fixed or variable-length columns.

MySQL and PHP are interconnected systems. PHP syntax enables the creation of databases. Data inputted via a web application utilizing server-side scripting, such as PHP, can be directly loaded into the MySQL database on the server. In contrast, the web application itself is hosted on a web server.

The author is interested in undertaking research on using QR codes to establish an efficient asset information system.

METHOD

Research methods are systematic and rigorous approaches to gathering data for specific aims and applications. The research methodology employed in this study is descriptive analysis, which seeks to elucidate phenomena, events, or incidents to address diverse issues. The employed techniques are:

1. Field Study

   This approach entails directly accessing the field, the primary source of the required data
2. Interview

   This data-gathering approach is employed to guarantee the veracity of the gathered data
3. Analysis of Documents

   This approach, the analysis of documents, is a crucial part of the study process. It entails gathering data and information from several sources, including written papers, journals, and electronic files. These documents play a significant role in facilitating the study process pertaining to the author's objectives and aid in resolving challenges that form the theoretical basis.

System Development Methods

The system development methodology employed is object-oriented analysis and design (OOAD). Object-Oriented Analysis and Design (OOAD) is a system development approach that emphasizes objects more than data or processes. This technique encompasses three fundamental characteristics: object, inheritance, and object class.

An object is a construct with characteristics and functions that operate using these characteristics. Objects are conceptual representations of real-world entities that combine data and processes to simulate the structure and behavior of those entities. An object class is a group of objects with identical characteristics and actions. Inheritance is a characteristic that occurs when entity types or object classes are structured hierarchically, and each entity type or object class acquires characteristics and methods from its predecessor.

RESULT AND DISCUSSION

Ongoing Analysis

The ongoing analysis process in the Asset Inventory Information System can be applied to an Activity Diagram to illustrate the sequence of process activities as follows:

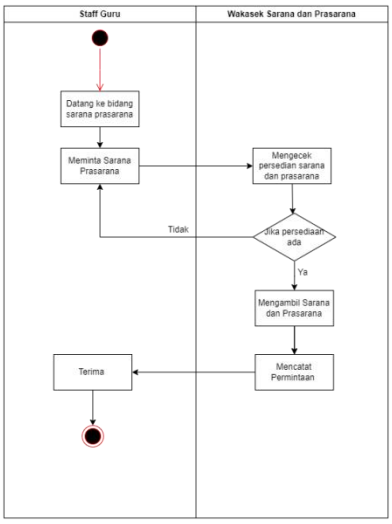

Figure 2. Current Analysis Process

Analysis of the Proposed System

Based on the research of the existing system, the author suggests creating an application for an asset inventory information system at a school in Bandung, utilizing QR codes. This user-friendly program is designed to support the Facilities and Infrastructure department in their tasks, ensuring a smooth transition to the new system.

The suggested Use Case provides a comprehensive description of the actions carried out within the system. This graphic will illustrate the processes in a collection of use cases, actors,

and their interconnections portrayed in a use case diagram.

The proposed use case for one of the schools in Bandung is as follows:

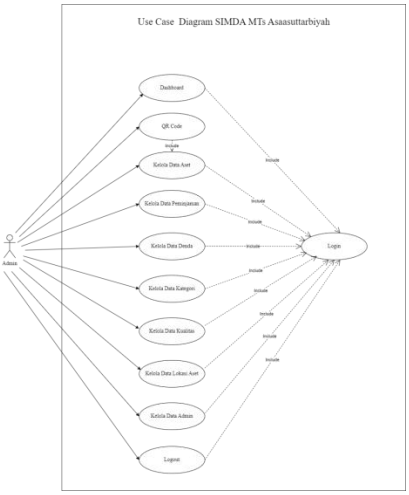

Figure 3. Ucecase Diagram

SYSTEM DESIGN

Sequence Diagram Design

The Sequence Diagram depicts the chronological order of operations executed within the system to accomplish the objectives of the use case. The procedure for analyzing and designing the Sequence Diagram using Unified Modeling Language (UML) is as follows:

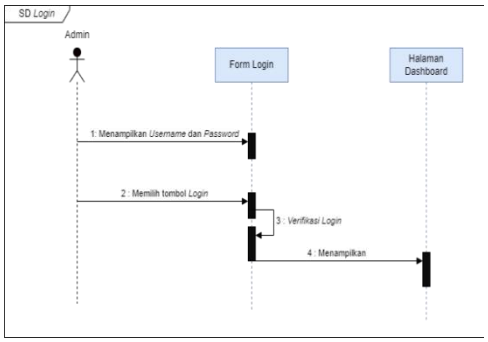

Figure 4. Login Sequence Diagram

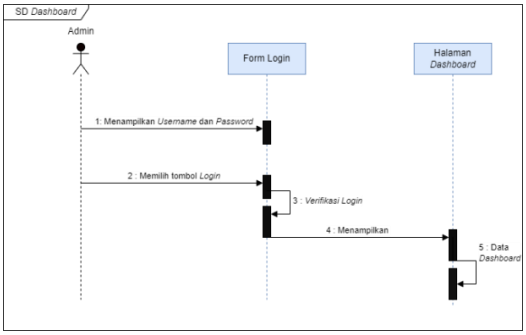

Figure 5. Dashboard Sequence Diagram

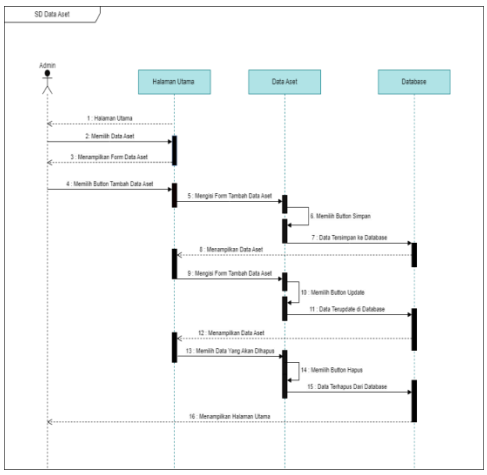

Figure 6. Sequence Diagram of Asset Data

Designing Class Diagrams

A class diagram is a graphical representation that illustrates the structure and relationships of classes in a software system in development. The Class Diagram illustrates the interconnections among classes within the system under development and their collaborative efforts toward accomplishing a specific objective. Here is an illustration of the Class Diagram:

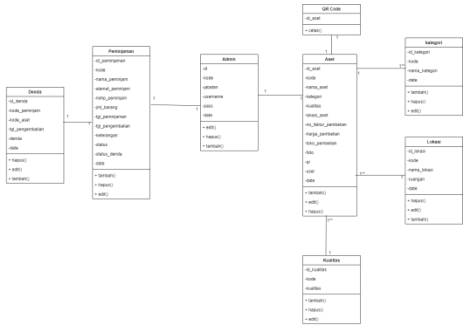

Figure 7. Class Diagram

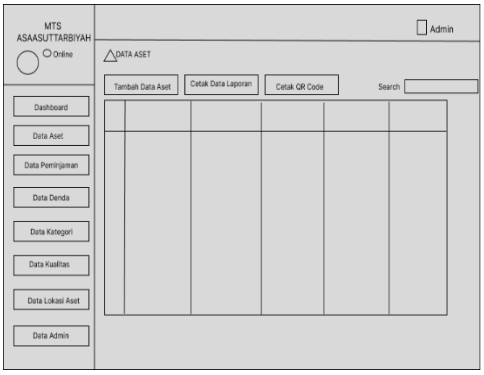

Figure 10. Asset Data Interface Design

Interface Design

Interface design refers to the process of designing the user interface that serves as the bridge between the user and the software being built.

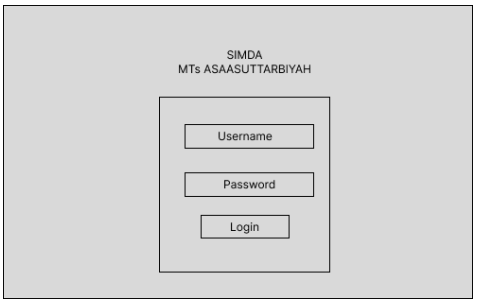

Figure 8. Login Interface Design

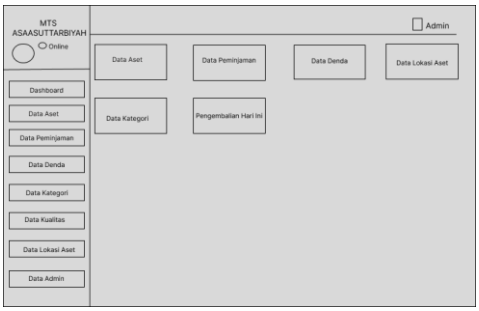

Figure 9. Dashboard Interface Design

SYSTEM IMPLEMENTATION

Interface Implementation

Interface implementation refers to how the application's visual design is presented and how each form's functionality is designed to serve its objective. Below is a summary and description of each display developed to illustrate the interface implementation method.

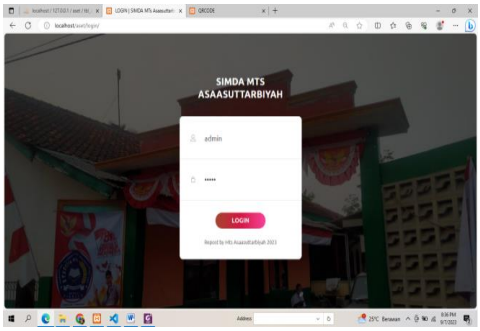

Figure 11. Login Page

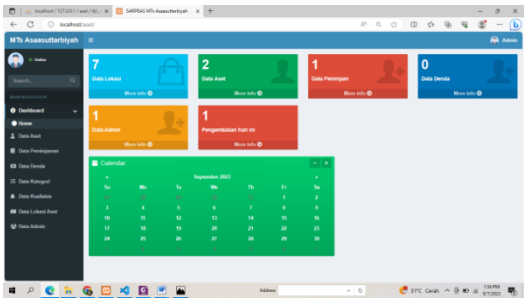

Figure 12. Dashboard page

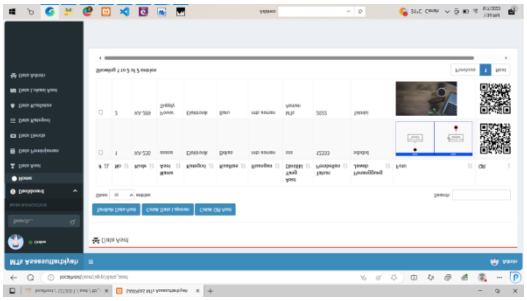

Figure 13. Asset Data Page

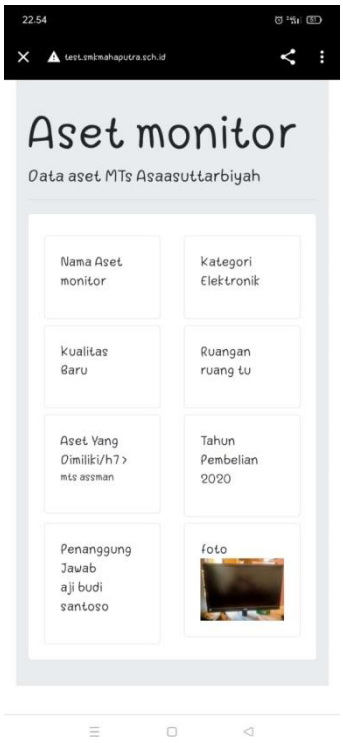

Figure 14. QR Scan Results

CONCLUSION

The author's research yields multiple discernible conclusions. The suggested information system, with its capability of generating QR codes for goods, can streamline administrative activities performed by the staff responsible for managing facilities and infrastructure. By organizing items into categories and providing a search function for item names and transaction records, the system ensures that no data is lost, even in situations where there is a lapse in recording equipment and borrowing transactions.

The proposed information system can provide reports on borrowings and lost objects within defined time periods. These reports can be generated in Excel or PDF formats. This feature enables the deputy head staff responsible for facilities and infrastructure to report to the principal.

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