

Design of Automatic Scan Library Feature in Senayan Library Management System (SLiMS) Application

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Abstract

SLiMS (Senayan Library Management System) is an open source library management system, which aims to facilitate the management and search of book collections and develop existing capabilities in the library. One of the features in SLiMS (Senayan Library Management System) is bibliography, which functions to manage bibliographic and descriptive data from library collections, this process allows librarians to enter detailed information about collections owned by the library, such as title, author, publisher, year of publication, and other bibliographic information. Therefore, an automated system is needed by developing a collection data input system in the SLiMS (Senayan Library Management System) application to be more efficient and accurate. One approach that can be used is to adopt image recognition technology, such as that used in the Google Lens application or document scanners. By utilizing this technology, it is expected that librarians can input collection data quickly and reduce typing errors. This design uses the UML (Unified Modeling Language) method for software development and is described through use case diagrams and activity diagrams. The result of this design is an automatic data input system in SLiMS (Senayan Library Management System) with optic recognition.

Keywords.: Information System; SLiMS; Unified Modelling Language, OCR

A. Introduction

The In an era of rapid technological development, many library management systems have been built to meet the increasingly complex needs of libraries. The Senayan Library Management System (SLiMS) is a widely used system. Senayan Library Management System (SLiMS) is an open-source library management system that aims to facilitate the management and search of book collections and develop existing capabilities in the library (Soetrisno et al., 2022). SLiMS has been widely adopted and used in various libraries in Indonesia. This open-source library management system is not only applied in school libraries but also in college libraries, public libraries, and other types of libraries (M. M. Sari et al., 2023). SLiMS offers various features and functionalities to facilitate library management, including bibliography, circulation, collection inventory, and membership in reporting (Aswari et al., 2020). By utilizing the SLiMS library management system, work in the library can be made faster and more efficient. The features provided by SLiMS can improve the work performance and productivity in the library to achieve optimal work effectiveness (Siswadi, 2023).

One feature of SLiMS is bibliography, which manages bibliographic and descriptive data from library collections (Nadia Nur Azizah et al., 2022). This process allows librarians to enter detailed information about the collections owned by the library, such as the title,

author, publisher, year of publication, and other bibliographic information. In practice, the collection data input process for SLiMS is still performed manually by librarians. They must individually type all collected information into the application. This process requires time and energy, especially if the library has a large number of collections. In addition, the potential for typing errors is also quite high, which can affect data accuracy and the quality of library services (Iskandar & Wijayanti, 2022). Therefore, this design needs to be developed by developing a collection of data input systems in the SLiMS application to make it more efficient and accurate. The appropriate approach in this design is to adopt optical character recognition technology, such as that used in Google Lens applications or document scanners. By utilizing this technology, it is expected that librarians can quickly input collected data and reduce typing errors.

Several studies have been conducted on the relevant themes. First, the design was conducted by Naurah Nadlifah, Soiful Hadi, entitled "Web-based Library Information System Using Senayan Library Management System 9 Bulian." This research focuses on developing an SLiMS application as a whole, including the management of book data and library members (Nadlifah & Hadi, 2022). Second, research by Rizki Putri Nanda with the title "The Application of Senayan Library Management System (SLiMS) For Library Collection and Information Management at Religious Training Center of Aceh". This study explores and explains the process of optimizing library collection management at BDK Aceh through the application of a SLiMS-based library automation system (Nanda, 2022). Third, research conducted by Ahmad Ramadhani and Ahmad Shalludin entitled "Designing Document Archiving Applications Using Optical Character Recognition at the Kapuas Regency Personnel and Human Resources Development Agency Based on Visual." This study focuses on developing document archiving applications using optical character recognition technology, which is used to assist in data input processing, data retrieval, error reduction, and document preservation (Ramadhani & Shalludin, 2020).

This design aims to develop a collection of data input systems for SLiMS applications using the Unified Modeling Language (UML) approach. Specifically, this design aims to design a new collection of data input systems using UML diagrams, including use case diagrams and activity diagrams. Unlike the previous design, which focused on the development of the library information system as a whole, this design is more specific to the bibliography module, especially the collection data input process. The UML approach was chosen because it can provide a clear picture of the process flow and interaction between the actors in the system. In addition, the development of a collection data input system integrated with image recognition technology, such as Google Lens or document scanner. This approach has not been widely applied to previous designs related to library information systems. By adopting this technology, it is expected that the collection of data input process can be performed in a short time and accurately, thus supporting the work efficiency of librarians.

In designing the collection data input system in the SLiMS application, use-case diagrams and activity diagrams play an important role. The use-case diagram provides a depiction of the various actors involved in the system, outlining the specific functions that each actor can perform. The main actor involved in this design is the librarian, who has access rights to input collected data, changes collected data, and views the collection list. The activity diagram, on the other hand, explains the workflow in the collection data input system. This diagram shows the stages that the librarian goes through, starting from selecting the collection data input option and performing image recognition or document scanning, to saving the collection data into the system. The activity diagram can also

illustrate alternative paths, such as if an error occurs or if the librarian decides to cancel the data-input process (A. M. Sari & Yani, 2020). With the use case diagram and activity diagram, the design of the collection data input system in the SLiMS application becomes more structured and clear so that it can facilitate the development and implementation of the system.

Use cases help describe the interaction between users (actors) and the system. In the context of SLiMS collection data input, use cases provide a comprehensive overview of the functions that must be present in the collection data input feature and become part of the documentation that details user needs and ensures development in accordance with those needs. In addition, activity diagrams describe the process flow or activities that occur during collection data input, which is useful as a guide when implementing code, and facilitates testing by ensuring that each step has been implemented as well as more automated data validation and that the data entered is correct and consistent. Therefore, use cases and activity diagrams are important to use as a design model for the collection data input system in the SLiMS application to ensure the system is efficient, relevant, and able to optimally meet user needs.

The results of this design are expected to make a practical contribution to library managers, particularly in improving the efficiency and accuracy of the collection data input process in SLiMS applications. In addition, the findings of this design can also inspire further development of other features in SLiMS applications and become a reference for similar designs in the field of library information systems.

B. Research Method

In this design, the development process is described by a framework with clear stages to observe the flow. The framework of the stages of this design is as follows:

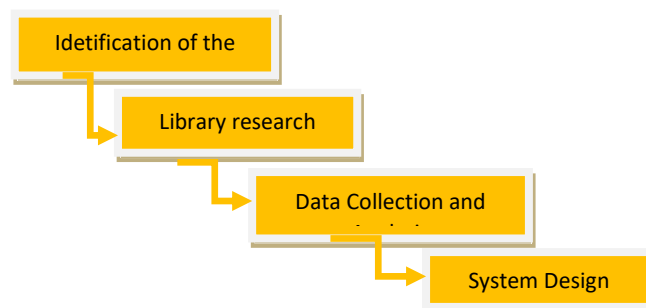


Figure 1. Design Stages

Based on the picture above, there are four stages in this design, which are described as follows:

1. Problem Identification

At this stage, the focus is on identifying the underlying cause of the problem. Although the performance of librarians in carrying out operations in the library is at an optimal level, the efficiency of librarians is hindered by the duration of time or takes a long time for book input procedures, because it is still manual from within the SLiMS application.

2. Library Research

A literature review is the opinion of experts on the topic under study, as well as the conceptual framework and theoretical basis for designing. A literature review is the

activity of reviewing or evaluating various literature published previously by academics and other researchers related to the topic we are studying (Masgo et al., 2024).

3. Data Collection and Analysis

Data collection techniques are the most important process and are a strategic step in designing to obtain data because by not knowing data collection techniques, researchers certainly do not obtain data that meet the standards set (Sugiyono, 2016). At this stage, data collection was carried out to obtain data and information about the library operational system with the SLiMS application using the following techniques:

a. Observation

Observation serves as a basic principle in scientific design, because through observation, conclusions can be obtained by relying on data in the form of empirical evidence and verifiable facts obtained through systematic investigation (Sugiyono, 2016). The data collection was performed by directly observing the collection data input process in the SLiMS application and practice. From the observations made, obstacles can be found in this system, which takes quite a long time in this process. Therefore, the design of an OCR-based system integrated with SLiMS can be projected to encourage efficiency and accuracy in the bibliographic data input process.

b. Documentation

Documents are written records of events that have occurred, presented in various formats, including written texts such as narratives and official documents, as well as visual representations such as images and other visual media (Sugiyono, 2016). Thus, documentation is an important activity for collecting data and information in a structured manner.

Data analysis is a systematic process of searching, organizing, and processing the data obtained (Sugiyono, 2016). Systematic analysis allowed the author to obtain targeted solutions based on the evidence found in the data. The data analyzed by the author is the collection data input process in the SLiMS application.

4. System Design

In the follow-up to the data management process needed in the SLiMS system, it is necessary to design the correct system. This step involves determining the appropriate system design using a Unified Modeling Language (UML) modeling approach. In this design, aspects that need to be considered include the use case diagram, activity diagram, input, process, and output design. All of these designs must consider the requirements of the SLiMS system so that the system can function effectively and efficiently.

C. Results And Discussion

Optical Character Recognition (OCR) Information System

An information system consists of collecting, storing, and analyzing data to achieve certain goals. Information systems function to receive input data, process the data, and then produce outputs in the form of reports or information that can be utilized by other systems. Information systems are also part of an organization's strategic activities to take actions and decisions (Prehanto, 2020). One technology that can be part of an information system is Optical Character Recognition (OCR). Optical Character Recognition (OCR) is a technology or algorithm used to scan and recognize text, numbers, and character patterns contained in an image or digital document (Alfarisi, 2020). OCR algorithms and programs are designed to detect and extract textual information from various sources such as photos, scanned documents, or PDF files. Through this process, data that were originally only in the form of images could be converted into a format that could be digitally

processed, such as text files or spreadsheets. Optical Character Recognition (OCR) has evolved significantly with AI algorithms such as artificial neural networks, machine learning, deep learning, and pattern recognition, which improve recognition accuracy (Shopon et al., 2020). In the context of bibliographic data management of book collections in libraries, Optical Character Recognition (OCR) information systems play an important role in incorporating collected data in books by automating the extraction and conversion of bibliographic information from physical books into digital data that can be managed and accessed, thereby reducing manual errors and improving efficiency (Chaudhuri et al., 2017). Thus, this technology not only speeds up the input of collected data but also ensures the accuracy and reliability of the extracted information, making it an invaluable tool for libraries and organizations that rely on data for their operations.

Senayan Library Management System (SLiMS)

Senayan Library Management System is a free and open source library software. This system is designed to meet the needs of automation in libraries. SLiMS offers comprehensive features and continues to be actively developed by a community of users and developers. This system can be utilized by libraries that have large collections, members, and staff. One of the advantages of SLiMS is its ability to run in both local and internet network environments (*Dokumentasi Penggunaan SLiMS 9 Bulian*, 2020). By using SLiMS, libraries can automate various processes, such as collection management, membership records, and staff management. The features available in SLiMS allow libraries to manage operations more efficiently and effectively.

Unified Modelling Language (UML)

Currently, the best approach that is widely used in creating information system designs is the object-oriented approach. This approach describes the system using UML (Unified Modeling Language) diagrams (Rahardja & Rahwanto, 2021). UML (Unified Modeling Language) is a visual language used to define and record systems in software engineering. UML offers a structured way to describe and communicate system design and architecture (Koç et al., 2021). In system design principles, UML not only focuses on operational optimization, but also includes standardization of results to save time and costs. The use of UML enables more efficient and consistent system development (Haviluddin, 2011). UML provides various types of diagrams that can help in describing and understanding the structure and behavior of the system to be built. In this design, the UML system used is a use case diagram and activity diagram.

Use Case Diagram

Use Case Diagram is a type of UML (Unified Modeling Language) diagram used to describe the interaction between the system and actors (users). Use Case Diagrams describe the nature of interactions that occur between system users and the system itself (Masgo et al., 2024). This diagram shows the roles of users (actors) and how they interact when using the system. Use Case Diagrams visualize system functionality from the user's point of view, so that it can help understand what needs and features the system should provide. In addition, use case diagrams can also be used to document use case specifications that will be implemented in the system (Masgo et al., 2024). Here are the usecases in this design:

UML Use Case Diagram

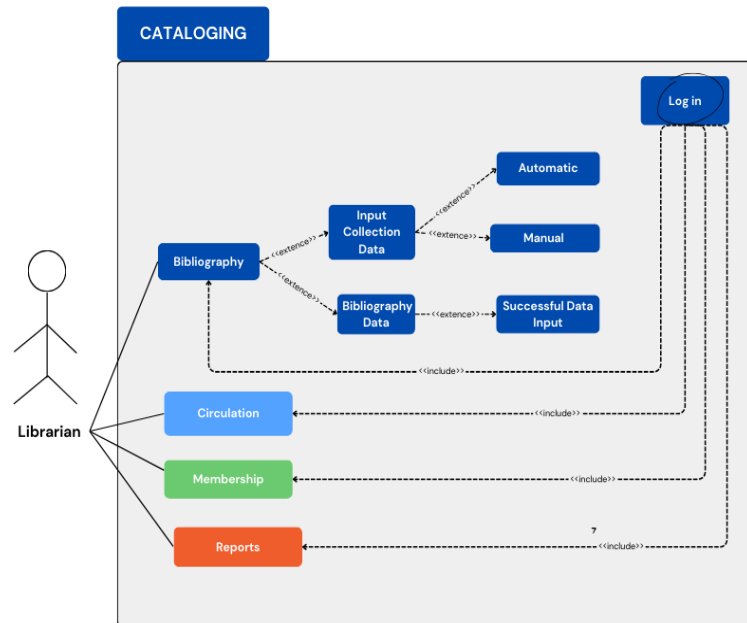

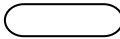
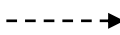
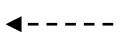



Figure 2. Usecase Diagram

Description:

-  : Actor
-  : Usecase
-  : Exclude
-  : Include
-  : Relation

Modeling actor interactions with the system there are four usecases, namely bibliography, circulation, membership and reporting. The usecase definition can be seen in table 1 below.

Table. 1
Cataloging Diagram Usecase Definition

No	Usecase	Description
1	Login	Is a process to log in the librarian, by entering the username and password.
2	Bibliography	Is a feature in the SLiMS application for cataloging library materials.
3	Circulation	A feature in the SLiMS application refers to functionality in the SLiMS application that handles activities such as borrowing, returning, fines, library access, and circulation statistics.
4	Membership	A feature of the SLiMS application that plays an important role in the library management system.
5	Reports	Is a feature in the SLiMS application that includes reports from all features contained in SLiMS..

Further modelling of actor interactions with the system in the specification there are two use cases, namely data input, and bibliographic data which can be seen in table 2 below.

Table. 2
Bibliography Usecase Diagram Definition

No	Use case	Description
1	Login	Is a process to log in the librarian, by entering the username and password
2	Bibliography	Is a feature in the SLiMS application for cataloguing library materials
3	Input Collection Data	This is the process of entering detailed information about the collection data owned by the library, such as title, author, publisher, year of publication, and other bibliographic information.
	Automatic	This is the process of entering detailed information about collection data using a machine with an image recognition technology system, such as that used in the Google Lens application or a document scanner.
	Manual	This is the process of entering detailed information about collection data manually by librarians by typing all collection information one by one into the SLiMS application.
4	Bibliography Data	A feature in the SLiMS application that stores detailed information about library collection data that has been successfully inputted, either automatically or manually.
	Successful Data Input	Is a process where collection data is successfully input, either automatically or manually and enters the depth of bibliographic data.

Activity Diagram

An Activity Diagram is a type of UML diagram used to describe the workflow or activity of a system, business process, or software feature. This diagram models how the activities in the system operate and interact with each other (Masgo et al., 2024). The Activity Diagram is an important starting point for the system design stage, which will be done immediately after the requirements analysis stage is completed (Masgo et al., 2024). The following activity diagram describes the collection data input system in the SLiMS application automatically:

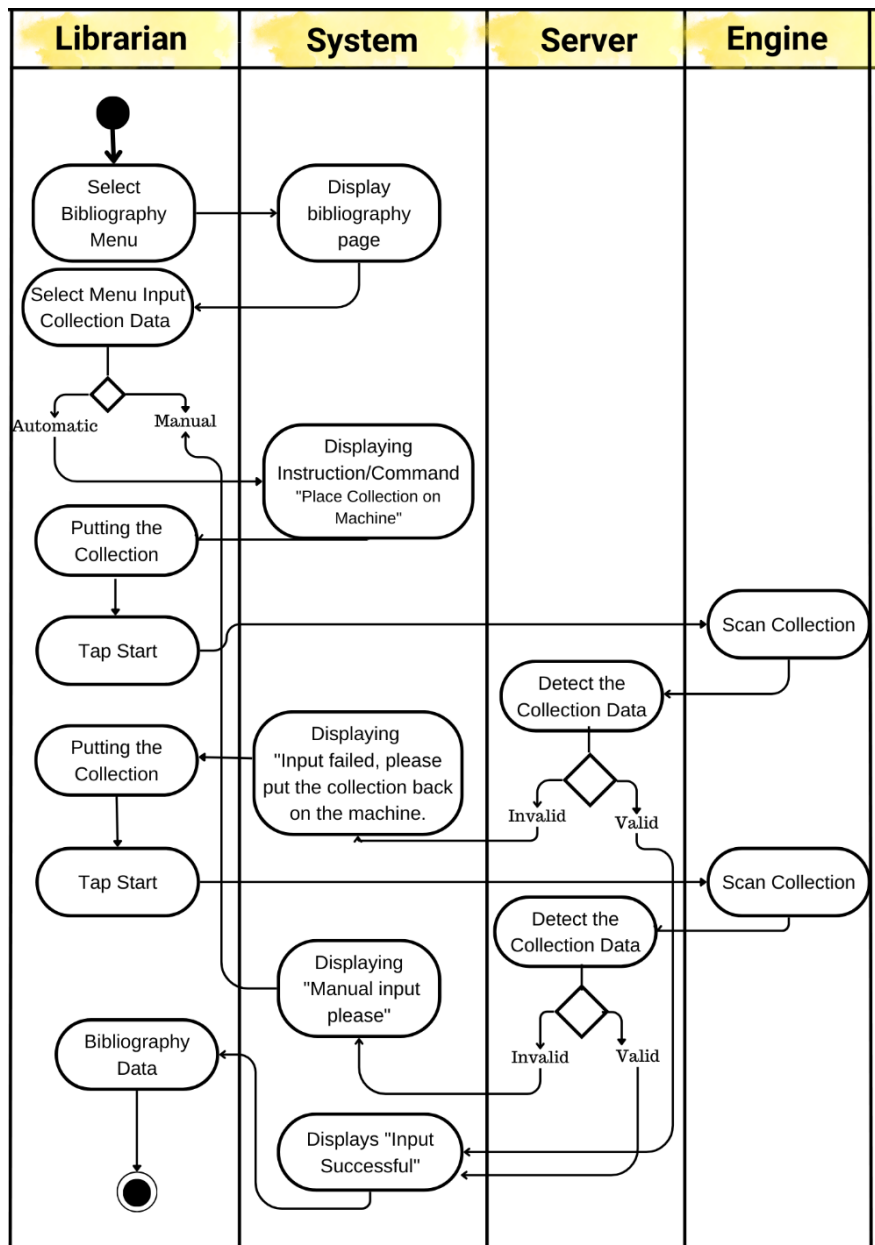
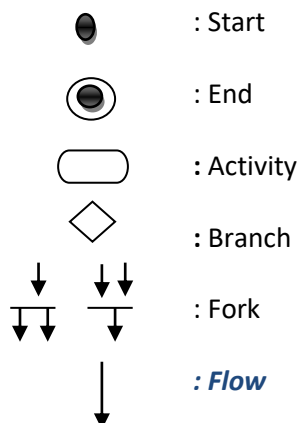


Figure 3. Activity Diagram

Description:



D. Conclusion

Based on the design carried out, this design discusses the use case diagram and activity diagram in the collection data input process in the SLiMS (Senayan Library Management System) application with an automated system, which uses UML (Unified Modeling Language). From the resulting modeling, there are actors involved in this system, namely librarians. Usecase modeling and activity diagrams are expected to provide recommendations for the flow of a system that has been made in this design, because usecase and activity diagrams can help to understand the needs, improve efficiency and data validation, so that the system to be built has functions that are in accordance with user needs.

References

- Alfarisi, R. E. (2020). *Rancang Bangun Aplikasi Terjemahan Bahasa Jepang - Indonesia Berbasis Android Menggunakan Tesseract Ocr*. Universitas Komputer Indonesia.
- Aswari, M., Kristiawan, M., & Fitria, H. (2020). Senayan Library Management System Application as Digital Library Management. *International Journal of Progressive Sciences and Technologies (IJPSAT)*, 20(2), 129–136. <https://doi.org/10.52155/IJPSAT.V20.2.1762>
- Chaudhuri, A., Mandaviya, K., Badelia, P., & Ghosh, S. K. (2017). *Optical Character Recognition Systems*. Springer. https://doi.org/10.1007/978-3-319-50252-6_2
- Dokumentasi Penggunaan SLiMS 9 Bulian. (2020). SLiMS Developer Community. <https://slims.web.id/web/pages/docs/>
- Haviluddin. (2011). Memahami Penggunaan UML (Unified Modelling Language). *Memahami Penggunaan UML (Unified Modelling Language)*, 6(1), 1–15. <https://informatikamulawarman.files.wordpress.com/2011/10/01-jurnal-informatika-mulawarman-feb-2011.pdf>
- Iskandar, I., & Wijayanti, L. (2022). IMPLEMENTASI SLiMS DI PERPUSTAKAAN PERGURUAN TINGGI. *Jurnal Ilmu Perpustakaan (Jiper)*, 4(2). <https://doi.org/10.31764/jiper.v4i2.9225>
- Koç, H., Erdoğan, A. M., Barjakly, Y., & Peker, S. (2021). *UML Diagrams in Software Engineering Research: A Systematic Literature Review*. 13. <https://doi.org/10.3390/proceedings2021074013>
- Masgo, Santoso, & Abe Wisnu Syaputra. (2024). Disain Implementasi Sistem Informasi Perpustakaan Institut Teknologi dan Bisnis Pelita Raya. *Jurnal Manajemen Teknologi Dan Sistem Informasi (JMS)*, 4(1), 607–616. <https://doi.org/10.33998/jms.2024.4.1.1533>
- Nadia Nur Azizah, Rukmana, E. N., & Rohman, A. S. (2022). Pemanfaatan Slims Dalam Sistem Katalogisasi Di Rumah Baca Anak Nagari Daerah Bukittinggi. *Jurnal Pustaka Budaya*, 9(2), 70–82. <https://doi.org/10.31849/pb.v9i2.8818>
- Nadlifah, N., & Hadi, S. (2022). Sistem Informasi Perpustakaan Berbasis Web Menggunakan Senayan Library Management System 9 Bulian. *Information Science and Library*, 3(1), 48. <https://doi.org/10.26623/jisl.v3i1.5107>
- Nanda, R. P. (2022). Application of Senayan Library Management System (Slims) for Library Collection and Information Management At Religious Training Center of Aceh. *Seulanga*, 1(1), 16–23. <https://doi.org/10.47655/seulanga.v1i1.3>
- Prehanto, D. R. (2020). *Buku Ajar Konsep Sistem Informasi*. Scopindo Media Pustaka.

- Rahardja, H. U., & Rahwanto, E. (2021). *UML Powered Design System Using Visual Paradigm*. Literasi Nusantara Abadi.
- Ramadhani, A., & Shalludin, A. (2020). Rancang Bangun Aplikasi Pengarsipan Dokumen Menggunakan Optical Character Recognition Pada Badan Kepegawaian dan Pengembangan Sumber Daya Manusia Kabupaten Kapuas Berbasis Visual. *Jurnal Sains Komputer Dan Teknologi Informasi*, 3(1), 76–82. <https://doi.org/10.33084/jsakti.v3i1.1759>
- Sari, A. M., & Yani, D. (2020). Implementasi Aplikasi Perpustakaan Online Pada Sekolah Menengah Kejuruan Berbasis Model UML. *Building of Informatics, Technology and Science (BITS)*, 2(2), 165–175. <https://doi.org/10.47065/bits.v2i2.543>
- Sari, M. M., Ilamsyah, I., & Fatmawati, L. (2023). Pemanfaatan Aplikasi SLiMS (Senayan Library Management System) pada Perpustakaan Universitas Raharja. *Cices*, 9(1), 102–112. <https://doi.org/10.33050/cices.v9i1.2582>
- Shopon, M., Diptu, N. A., & Mohammed, N. (2020). *End-to-End Optical Character Recognition Using Synthetic Dataset Generator for Noisy Conditions*. Spinger. https://doi.org/10.1007/978-981-15-3607-6_41
- Siswadi, S. (2023). Senayan Library Management System (Slims) Library Application Management in Madrasah Tsanawiyah. *International Journal of Multidisciplinary Research and Analysis*, 06(05), 2312–2323. <https://doi.org/10.47191/ijmra/v6-i5-59>
- Soetrisno, Y. A. A., Ajulian, A., & Denis. (2022). Development of Slims Framework Modification and Migration for Library Information System in Electrical Engineering Department, Diponegoro University of Indonesia. *International Journal of Scientific and Academic Research*, 02(04), 17–31. <https://doi.org/10.54756/ijisar.2022.v2.i4.3>
- Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.