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Designing a Mobile Application for Lidya Sari Sarolangun General Practitioner Clinic Using the Prototype Model

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Abstract

Lidya Sari General Practitioner Clinic is a primary healthcare facility where administrative processes, data recording, and patient services are still managed manually. This condition creates several challenges, including data redundancy, risk of record loss, delays in service delivery, and difficulties in retrieving patient medical histories. To address these issues, this study aims to design and develop a mobile-based clinic information system tailored to user needs and operational workflows. This research applies a qualitative approach through direct observation and structured interviews with clinic staff, including doctors and administrative personnel, to identify existing problems and define system requirements. The system is developed using the Prototype model, allowing iterative refinement based on user feedback. System modeling is conducted using Unified Modeling Language (UML), consisting of use case diagrams to describe user interactions, activity diagrams to illustrate workflow processes, and class diagrams to define system structure and database relationships. The developed application includes features for managing patient data, doctor data, appointment registration, medical records, prescription management, drug inventory, and practice schedules. The system is implemented using Android-based mobile technology with a PHP Laravel framework and MySQL database to ensure data integration and accessibility. System validation is performed using the Black Box Testing method to verify that all functional components operate according to the specified requirements. Testing results indicate that the system functions properly without critical errors. This study is expected to contribute to improving clinic service efficiency and serve as a reference for future development of healthcare information systems.

Keywords: Clinic Information System, Mobile Application, Prototype, UML, Black Box Testing

1. Introduction

The development of information technology in the last twenty years has brought about significant transformations in almost all sectors of human life, including in the health sector. The use of information technology is not only limited to tools, but has become a strategic element in supporting the improvement of the quality of health services. Technology integration is able to speed up work processes, expand access to information, and support decision-making. According to Nainggolan et al., (2025) The development of digital health has also been adopted globally, where various health facilities have begun to switch from manual methods to electronic-based information systems.

One of the important aspects of health services is the management of medical records. Medical records contain the patient's identity, examination history, medical procedures, laboratory results, and therapy administration. Along with the development of regulations, the Indonesian government has mandated the implementation of electronic medical records (RME) which emphasizes the security, confidentiality, and affordability of patient data access. Digitization of medical records is also considered important because it is able to minimize recording errors that often occur in manual systems[2]. Thus, the existence of RME is not only a modernization trend, but also a legal obligation and a fundamental need to ensure the quality of health services (Sholkhan, 2024).

In addition to medical records, another important aspect is the management of prescriptions and medication supplies. Drug management that can cause *medication* errors, service delays, and the risk of drug vacuums that can harm patients. Recent research shows that the application of electronic medical record information systems also plays a role in monitoring the distribution and availability of drugs more systematically[4]. With a digital system, the process of recording prescriptions and drug stocks can be transparent, as well as minimizing the risk

of data loss. This is in line with the results of the research Aulia et al., (2024) which emphasized that the application of electronic medical records in the reporting of inpatient diseases is able to support the control of drug distribution and pharmaceutical needs. Clinic administration is not only limited to managing medical records and drug prescriptions, but also includes patient registration, archiving and daily report management. Patient administration is the main foundation because it determines the smooth flow of medical services as a whole Shalihin et al., (2022). Facts on the ground show that there are still many clinics in the area that rely on manual systems with notebooks and physical archives. This condition causes various problems such as long queues, the risk of data loss, service delays, and difficulties in searching for old archives.

The use of mobile applications in health services is considered more feasible than web-based systems because of its portable nature and can be accessed at any time. This is in line with the health service digitalization policy which is stated to improve the accessibility and quality of community services Kementrian Kesehatan RI, (2022). In addition, the results of the survey [8] shows that internet users in Indonesia reach 210 million people or around 77% of the population, with the majority of access done through mobile devices.

The use of mobile applications is also in line with the needs of medical personnel and patients in the clinic. Patients can register without having to come in person, while medical personnel can access medical records and manage prescriptions more quickly. As explained by Siregar, (2024) Regarding Medical Records, the implementation of electronic medical records is expected to be able to improve services and ensure the availability of patient data in real-time. In this case, the mobile platform provides an advantage because it can be used directly by patients and medical personnel in the field without the need for additional devices.

The use of mobile applications in healthcare is very supportive of the needs of patients and medical personnel in clinics. Patients can register online without the need to come in person, while medical personnel can access medical record data and manage prescriptions. For example, Shalihin et al. (2022) who found that the implementation of an online outpatient registration system can simplify services while reducing the queue for the patient registration process. In addition, a study conducted by Yuliana & Fitrianingsih, (2025) at Pertamina Hospital Balikpapan found that the use of e-prescriptions significantly reduced drug waiting times and increased patient satisfaction. With the existence of regulations, statistical data support, and research results, mobile applications have become a more relevant choice than the web in the context of developing health information systems in clinics.

The results of initial observations carried out at the Lidya Sari General Practitioner Clinic, Sarolangun, show that the entire administrative process is still carried out manually. Patient registration, medical record recording, prescription administration, and drug stock management are still written using books and stored in physical archive folders. All administrative activities are handled by only two employees who work alternately. With an average number of patients of 20-30 people per day, this manual system poses various obstacles, such as long queues, long waiting times, potential for patient data to be exchanged, risk of losing archives, prescription recording errors, and uncontrolled drug stocks. Because there is only one doctor on duty at the clinic, the service process is often hampered. This clinic operates every day from 08.00-22.00 WIB, and does not serve BPJS patients, so all medical costs are borne independently by the patient. Some patients even complain that they have to come early just to get a registration queue number.

The use of mobile applications in healthcare is very supportive of the needs of patients and medical personnel in clinics. Patients can register online without the need to come in person, while medical personnel can access medical record data and manage prescriptions more quickly. Research Suhermawan & Oktariyanda (2025), shows that the design of the Mobile-based outpatient queue application is able to reduce waiting time and avoid queue accumulation at the health center. Similar results were found by Yuliana & Fitrianingsih, (2025) also proves that the use of Mobile JKN has a positive effect on patient registration while increasing hospital patient satisfaction. With the results of the study, the use of mobile applications is seen as more relevant than web-based systems in supporting the development of health information systems in clinics.

In this study, the development of the system will use a prototype model. This model is considered appropriate because it allows users and developers to conduct initial evaluations of the system quickly so that less clear specifications can be clarified earlier (Ayu et al., 2021). In addition, the prototype model is also applied in the development of management information systems. The system can be adjusted through repeated revisions based on user feedback Thus, doctors, administrative staff, and patients can be actively involved from the early stages of design so that the resulting system meets the real needs in the field. Based on the problems that have occurred above, the purpose of this study is to provide a solution by designing a mobile application for clinic service

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information system that can help doctors and administrative staff in managing patient data, queues, medical records, and drug management at the Lidya Sari General Practitioner Clinic, Sarolangun. This research is outlined in a final project titled "Designing the Mobile Application of the Lidya Sari General Practitioner Clinic Using a Prototype Model.

2. Research Methods

This study employed a qualitative field research design combined with a Prototype-based system development approach. The research was conducted at Klinik Dokter Umum Lidya Sari from November 2025 to February 2026 to develop and validate a mobile-based clinical administration application.

Data were collected through direct observation, structured interviews, and technical references. Observations were carried out during routine clinical activities to document workflows such as patient registration, medical record recording, prescription handling, drug stock management, and reporting. Structured interviews were conducted with one doctor, one administrative staff member, and five patients, each lasting approximately 20–30 minutes, using a predefined question guide to identify functional and usability requirements.

System design was modeled using Unified Modeling Language (UML), including Use Case, Activity, and Class Diagrams. The Class Diagram was translated into a relational database structure for implementation. The application was developed using Android Studio (frontend) and PHP (backend), covering core modules: patient registration, medical records, prescription management, drug inventory, and report generation. Development followed two prototype iterations[13], [14]. The first iteration involved requirement translation into mockups, prototype implementation, and user testing. The second iteration focused on revisions based on user feedback and re-validation. System functionality was tested using Black Box Testing by defining input scenarios and verifying expected outputs for each core feature. Testing was repeated until no critical functional errors were identified.

3. Results and Discussions

3.1. Analisis Kebutuhan

Based on the results of observations and interviews conducted at the Lidya Sari General Practitioner Clinic, Sarolangun, it is known that the service system that is running is still carried out manually and has not been computerized. The entire administrative process uses notebooks and physical archives, from patient registration to report making. This condition poses various obstacles in data management and service efficiency.

The patient registration process is carried out by recording identities such as name, address, age, and complaints in the registration book. After that, the patient waits for the doctor's turn to be examined. The results of the diagnosis and medical procedures are recorded manually in the medical record book, then the administration of drugs is also documented in writing by the officer. The payment process and the creation of administrative reports are carried out without the help of a computerized system. This kind of work pattern has the potential to cause long queues, service delays, recording errors, difficulty finding patient history, and incompatibility of drug stock data with actual conditions.

Data collection in this study was carried out through face-to-face interviews with doctors, administrative officers, and patients. Through this process, information is obtained about service flows, operational constraints, and user needs for a more effective system. The data from the interview results are then analyzed qualitatively to formulate the needs of the system to be developed.

The results of the needs analysis show that the proposed system must meet both functional and non-functional needs. Functionally, the system must be able to manage patient data, registrations, medical records, medication data, doctor's practice schedules, examination results, and provide user reporting and authentication features (login and logout) with actors consisting of admins, doctors, and patients. Non-functionally, the system must have fast performance in displaying and searching data, ensure privacy protection through restricting access rights, use appropriate technology for Android-based mobile applications, be developed using the Prototype method, and be able to run stably on smartphone devices with internet connection support[15].

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Based on these problems and needs, it is proposed to design a mobile application-based Clinical Information System. This system is designed to facilitate patient data management, online registration, examinations, drug stock management, and the creation of service reports in an integrated manner. Admins have the right to manage all data and reports, doctors can access and fill in test results and view patient history, while patients can register online, view doctors' schedules, and access examination history. With the Prototype model approach, the system is developed gradually through evaluation and refinement based on user feedback to suit the clinic's operational needs.

3.2. Prototype Design and Manufacturing

Database design is an important part of the development of information systems because it functions as a structured and interconnected data storage medium. The database in the Lidya Sari General Practitioner Clinic Information System is designed using MySQL, because it is able to manage data, support data integrity, and be easily integrated with the system. The database structure consists of several main tables that are used to support the clinical service process and drug stock management.

1. Table User

Table 1. User

No	Field Name	Data Type	Remarks
1	Id_Admin	Int	Primary Key
2	Email	Varchar	
3	Password	Varchar	
4	Nama_Admin	Varchar	

2. Table Doctor

Table 2. Doctor

No	Field Name	Data Type	Remarks
1	Id_Dokter	INT	Primary Key
2	Nama_Dokter	VARCHAR	
3	Email	VARCHAR	
4	No_Telp	VARCHAR	
5	License_Nomber	VARCHAR	

3. Patient Table

Table 3. Patients

No	Field Name	Data Type	Curiosity
1	Id_Pasien	Int	Primary Key
2	Name	Varchar	
3	Email	Varchar	
4	No_Telp	Varchar	
5	No_Rekammedis	Varchar	

4. Table Appointment

Tabel 4. Appointment

No	Field Name	Data Type	Curiosity
1	Id_Pasien	INT	Primary Key
2	Doctor_Schedule_Id	INT	
3	No_Antrian	VARCHAR	
4	Appointment_Date	VARCHAR	

5. Table Diagnoses

Table 5. Daignoses

No	Field Name	Data Type	Curiosity
1	Id	INT	Primary Key
2	Appointment_Id	INT	
3	Complaint	VARCHAR	
4	Diagnosis_Notes	VARCHAR	

6. Doctor's Schedule Table

Table 6. Doctor's Schedule

No	Field Name	Data Type	Curiosity
1	Id_Dokter	INT	Primary Key
2	Day	VARCHAR	
3	Is_Active	VARCHAR	

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4	Start_Time	VARCHAR	
5	End_Time	VARCHAR	

7. Medication Table

Table 7. Medication

No	Field Name	Data Type	Curiosity
1	Id_Obat	INT	Primary Key
2	Name	VARCHAR	
3	Stock	VARCHAR	
4	Type	VARCHAR	

1. Resep_Items

Table 8. Resep_Items

No	Field Name	Data Type	Curiosity
1	id	INT	Primary key
2	Diagnosa_id	INT	
3	Obat_id	INT	
4	Quantity	VARCHAR	
5	Dosage	VARCHAR	

2. Roles

Tabel 9. Roles

No	Field Name	Data Type	Curiosity
1	id	INT	Primary key
2	Name	VARCHAR	
3	Guard_name	VARCHAR	

After designing the database structure which includes the User, Doctor, Patient, Appointment, Diagnoses, Doctor Schedule, Medication, Resep_Items, and Roles tables, the next stage is the design and implementation of the user interface that is integrated with the database structure. Each table that has been designed becomes the basis for the development of features on the system, so that the relationship between the interface and data management can run synchronously. The user interface design is designed to provide a visual overview of the clinic information system to be developed. This design aims to ensure that every feature required by the user can be displayed in a clear, structured, and easy-to-use manner. The interface design is arranged in two platforms, namely website-based for admins and doctors, and mobile-based for patients.

Figure 1. Login Page

In the design of the website interface, the first display that is designed is the login page as the user's authentication gateway before accessing the system. After successfully logging in, users are directed to a dashboard page that displays a summary of information and the system's main menu. Furthermore, a doctor data management page was designed that functions to add, change, and delete doctor information. Patient data pages are provided to manage patient identity and information in a structured manner. The doctor's schedule design allows for practice scheduling, while the treatment history page displays the patient's complete examination history. In addition, there is a medication management page that is used to record and monitor the stock of medications in the clinic.

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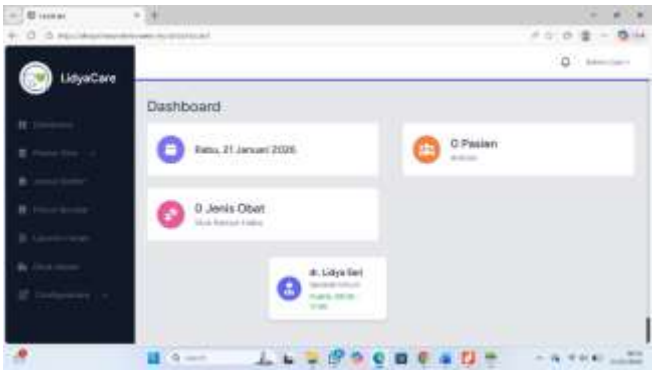

Figure 2. Dashboard Page

In the design of the mobile interface, the initial display is in the form of a login page that allows patients to log in to the system using their respective accounts. After logging in, users are redirected to the home page which displays the main menu of the app. There is a registration page for online patient registration. The medical records menu is designed to display the patient's examination history, while the medical record details page provides more detailed information about the results of the diagnosis and medical procedures. In addition, there is an identity page that contains the patient's personal data and a page about the clinic that provides general information about the services and profile of the Lidya Sari General Practitioner Clinic.

Figure 3. Login Mobile

The refine stage is carried out based on user input on the prototype that has been tested beforehand. One of the main suggestions is the addition of a daily report feature, because previously the system had not provided an automatic recapitulation of services. Users, especially admins, still have to manually recap the number of patients, service types, and transactions.

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Figure 5. Mobile Dashboard

Based on this input, the system is updated by adding a daily report menu that is able to display and summarize service data based on specific dates. This feature is accessible to admins and comes with report printing options for administrative and evaluation needs. In addition, menu simplification and rearrangement of the dashboard display to make it more concise and easy to understand. The results of the prototype improvements include updating the dashboard design and adding a special page for daily reports.

Figure 6. Patient Medical Records

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The user interface development stage is carried out based on the design that has been refined in the previous stage. The implementation of the interface is focused on ease of navigation, clarity of information, and consistency of appearance between menus. Each feature that has been designed at the design stage is realized into a system display that can be accessed by admins, doctors, and patients according to their respective access rights. Thus, the mobile application interface of the Lidya Sari General Practitioner Clinic not only meets functional needs, but also supports the comfort and efficiency of users in carrying out clinic service activities.

3.3 Prototype Trials

System testing is done using the Black Box Testing method to ensure that each function in the application runs according to the user's needs without looking at the program code structure. The test is focused on the compatibility between the input provided and the output generated by the system. The testing process was carried out on three main actors, namely admins, doctors, and patients.

In the admin actor test, all features were tested starting from the login process, dashboard access, doctor data management, patient data, doctor schedule, treatment history, medication management, daily reports, to the logout process. Sign-in testing includes true, incorrect, or incomplete data entry scenarios, and the system successfully displays the appropriate validation. In the doctor and patient data management feature, the system is able to display add forms, save new data, make edits, and display validation messages when the data is incomplete. The doctor's schedule feature also runs well, including the add, edit, activate and deactivate functions of the schedule, as well as data deletion. Drug stock management successfully displays, adds, and updates data with appropriate validation. The daily report feature is able to display a recap of services automatically. All tests on admin actors show valid results as expected.

In the doctor actor test, the system was tested on login features, patient queue management, diagnostic filling, drug prescribing, and logout. The system successfully validated the login process. On the patient queue menu, doctors can view the list of patients, fill out complaints and diagnostic records, and save examination data. The system is also capable of displaying error messages if the diagnostic or prescription data is not filled in completely. The drug prescription feature is integrated with drug data and can store data well. All functions in the doctor actor run according to the test scenario and are declared valid.

In patient actor testing, testing is performed on login features, dashboards, registration, medical records, identity, clinic information, and logouts. The system successfully displays login validation for both true and incorrect data. On the registration menu, patients can select a doctor and the system displays the queue status after successful registration. The medical records menu is able to display the patient's examination history. The identity feature allows patients to update their personal data with a validation system in case of incomplete data. The clinic menu displays general information about the clinic's services. All test results on patient actors show that the system works according to the needs that have been designed. Based on the overall Black Box Testing process, all the main features of the Lidya Sari Sarolangun General Practitioner Clinic mobile application run according to the expected results. No critical functional errors were found, so the system was declared suitable for use according to the clinic's operational needs.

Through the development of the Lidyasari Sarolangun General Practitioner Clinic Application, it was carried out using Android Studio and Visual Studio Code as development environments, as well as the PHP-based Laravel framework with the support of MySQL databases. In the initial stage, the preparation of needs is carried out through observation and direct interviews with the clinic, accompanied by the collection of supporting documents as material for the preparation of reports. Through this process, an overview of the system is being run, the problems faced, possible alternative solutions, the proposed system design, and the needs of the system which includes functional and non-functional aspects.

The system design stage begins with modeling using the Unified Modeling Language (UML) which consists of three main diagrams. Use Case Diagrams are used to illustrate the interaction between users and systems. Activity Diagrams model the flow of service processes that occur within the system, while Class Diagrams describe the structure of the system that includes classes, attributes, methods, and relationships between classes that are then implemented into the database structure.

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The next stage is system development, which is the process of implementing the design into the form of an application that can be executed. All system components are developed gradually and in a structured manner, including the creation of key functions, database management, and user interface integration. The development process uses Android Studio for mobile applications, Visual Studio Code as a code editor, Laragon as a local server, and Laravel as a backend framework. The features developed include patient data management, doctor data, examination registration, medical records, drug prescriptions, and practice schedules according to the results of previous needs analysis.

Once development is complete, the system enters the testing stage to ensure that each function performs according to design. The testing method used is Black Box Testing, which focuses on testing system functionality based on input and output suitability without reviewing program code. The test is carried out by running all the main features of the system to ensure that there are no functional errors. The test results show that all features can function according to the needs that have been set.

The final stage is the implementation of the system by hosting applications to the server so that they can be accessed online. Thus, the system can be used in real-time by the clinic to support data management and services. Based on all the stages that have been passed, the application is declared ready to be used in full at the Lidyasari Sarolangun General Practitioner Clinic.

4. Conclusion

This research aims to design and develop a mobile application-based Lidya Sari General Practitioner Clinic Information System as a solution to administrative problems that are still carried out manually. Based on the results of the needs analysis, system design using the Unified Modeling Language (UML) approach, as well as the development with the Prototype model, the system was successfully implemented in accordance with the functional and non-functional needs that had been determined. The system built is able to support the management of patient data, registration, medical records, drug prescriptions, doctor's practice schedules, and service reports in an integrated manner. The system testing process is carried out using the Black Box Testing method by verifying the compatibility between the input and output on each key feature. The test results show that all system functions are running according to the specifications that have been designed, without finding any critical functional errors. This shows that the system has met the operational needs of the clinic. Furthermore, the system that has been developed is implemented in the hosting environment so that it can be accessed online and used in real-time by the clinic. Thus, the clinic information system built is declared feasible to be used as a support for the administrative and service process at the Lidya Sari General Practitioner Clinic.

Reference

[1] F. A. Nainggolan, Anna Tirawani Ambarita, Agustatius Sitepu, Keleng Ate Ginting, and Layari Tarigan, "Implementation of JKN Mobile Application-Based Health Services in Reducing Queues at the Karang Anyer Health Center Beringin District Deli Serdang Regency," *Jurnal Kesmas Dan Gizi (Jkg)*, vol. 7, no. 2, pp. 311–318, 2025, doi: 10.35451/jkg.v7i2.2679.

[2] T. Larasati, A. I. Fardiansyah, D. Saketi, and A. N. Dewiarti, "The ethical and legal aspects of health policy on electronic medical records in Indonesia," *Cepalo*, vol. 8, no. 2, pp. 103–112, 2024.

[3] M. Sholkhan, "Implementasi Rekam Medis Elektronik Dan Kajian Hukumnya," *Konstitusi: Jurnal Hukum, Administrasi Publik, dan Ilmu Komunikasi*, vol. 1, no. 3, pp. 39–54, 2024.

[4] X. Liu, R. Shah, A. Shandilya, M. Shah, and A. Pandya, "A systematic study on integrating blockchain in healthcare for electronic health record management and tracking medical supplies," *J. Clean. Prod.*, vol. 447, p. 141371, 2024.

[5] L. Aulia, Candra Mecca Sufyana, and Irda Sari, "Perancangan Sistem Informasi Rekam Medis Elektronik Dalam Pelaporan 10 Besar Penyakit Rawat Inap," *Decode: Jurnal Pendidikan Teknologi Informasi*, vol. 4, no. 2, pp. 533–546, 2024, doi: 10.51454/decode.v4i2.589.

[6] F. Shalihin, A. P. Wicaksono, S. Farlinda, and M. R. Pratama, "Perancangan dan Pembangunan Sistem Pendaftaran Online Pasien Rawat Jalan di RSUD Asembagus Situbondo," *J-REMI : Jurnal Rekam Medik dan Informasi Kesehatan*, vol. 4, no. 1, pp. 12–23, 2022, doi: 10.25047/j-remi.v4i1.3349.

[7] Kementrian Kesehatan RI, "Kesehatan digital," no. April, 2022.

[8] APJI, "Laporan Survei Internet APJII 2011-2022," *Apjii*, no. April, pp. 2–5, 2022.

[9] R. A. Siregar, "182-Article Text-970-1-10-20240219," *Jurnal Ilmu Hukum Kyadiren*, vol. 5, no. 2, pp. 1–12, 2024, doi: 10.46924/jihk.v5i2.182.

[10] B. Yuliana and J. Fitrianingsih, "Pengaruh Penulisan E-resep dan Fasilitas Layanan Terhadap Waktu Tunggu Obat dan Kepuasan Pasien Rawat Jalan di Rumah Sakit Pertamina Balikpapan," vol. 4, no. 3, pp. 1670–1676, 2025.

[11] D. E. Suhermawan and T. A. Oktariyanda, "Efektivitas E-Health Dalam Peningkatan Layanan Publik di Puskesmas Sawahan Kota Surabaya," *Jurnal Penelitian Ilmu-Ilmu Sosial*, vol. 02, no. June, pp. 44–60, 2025.

[12] D. Ayu, N. Wulandari, A. Alfin, H. Bahar, M. G. Arfananda, and H. Apriyani, "Al-Ruhamaa ' Bogor Yatim Center Foundation," *Jurnal PILAR Nusa Mandiri*, vol. 17, no. 2, pp. 127–136, 2021.

[13] H. Gomaa, *Software modeling and design: UML, use cases, patterns, and software architectures*. Cambridge University Press, 2011.

DOI: https://doi.org/10.31004/riggs.v5i2.6909

[14] L. D. Fitrani and A. C. Puspitaningrum, "Utilization Of UML (Unified Modeling Language) In The Design Of Academic Information Systems Based On The OOAD Method," *Sistemasi: Jurnal Sistem Informasi*, vol. 12, no. 2, pp. 614–625, 2023.
[15] M. S. Kumar, A. Harika, C. Sushama, and P. Neelima, "Automated Extraction of Non-Functional Requirements From Text Files: A Supervised Learning Approach," *Handbook of Intelligent Computing and Optimization for Sustainable Development*, pp. 149–170, 2022.

DOI: https://doi.org/10.31004/riggs.v5i2.6909