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Employee Leave Application System for DPRD Office of North Sumatra Province

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ABSTRACT

This research focuses on designing a web-based employee leave application system for the Wasbang Room at the North Sumatra Provincial DPRD Office. The goal is to develop a system that improves the efficiency of managing leave requests by simplifying the application process, accelerating data processing, providing transparent access to leave balances, and generating reports more effectively for leadership through centralized database storage. The system design is modeled using Unified Modeling Language (UML), specifically use case diagram, to illustrate system functionality and user interactions. The web-based platform allows access for employees, supervisors, and administrators with role-based access control. System functionality is tested using the black box testing method, focusing on core features such as login, employee data input, leave submission, leave approval, administrative data management, and leave history tracking. Test results confirm that all features operate according to the expected scenarios and that the system provides appropriate validation feedback for invalid inputs. This system has proven to enhance the speed and accuracy of the leave approval process, reduce the risk of manual data loss, and improve the accountability of personnel records. The novelty of this research lies in its integrated design approach, which incorporates organizational authorization flows and traceable leave documentation accessible by administrators. Overall, this study demonstrates the value of web-based information systems in optimizing administrative processes. The proposed solution is functional, user-friendly, and adaptable to other organizations with similar administrative needs. It is expected to support data-driven managerial decision-making and accelerate the digital transformation of personnel systems.

Keywords: Web-Based System, Leave Application, Information System, Administrative Efficiency, DPRD North Sumatra

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1. INTRODUCTION

In the rapidly growing era of digitalization, efficiency in human resource management is an urgent need in various agencies, including in government and private environments. One of the administrative processes that often takes time and effort and has the potential to cause errors is the process of applying for and managing employee leave. By streamlining this process through automated systems, organizations can reduce the likelihood of errors and enhance employee satisfaction by

providing a more transparent and user-friendly experience. Implementing such solutions can lead to significant time savings and allow HR personnel to focus on more strategic initiatives that contribute to organizational growth (Sinaga & Aida, 2025).

The North Sumatra Provincial DPRD Office as one of the institutions that has a large number of employees still uses a manual leave process, starting from submission using printed forms to verification and approval by superiors directly. This condition causes accumulation of documents, process delays, lack of historical documentation system recorded in the usual conventional archivist. Therefore, enhancing this workflow holistically requires a technology-based approach (Al-Faruqy & Ramadhani, 2024).

The issues stemming from this manual method pertain not just to efficiency but also to data accuracy and the integration of information between the personnel department and leadership. Numerous instances identified in the field indicate the presence of overlapping leave applications, the misplacement of application files, and delays in the verification and documentation process (Wibowo & Rizal, 2024). This undoubtedly affects the organization's overall performance, since an ambiguous leave process might result in erratic work schedules, diminished work discipline, and even administrative disputes. The lack of an integrated digital system hinders management's ability to swiftly and effectively summarize and analyze leave data.

The initial observation revealed that the North Sumatra DPRD Office possessed fundamental technological infrastructure, including a local network and computer equipment, although it had not been properly leveraged to enhance internal processes. These basics offer a substantial potential to establish an application system capable of managing the complete leave process, encompassing submission, verification, approval, and automated documentation. A pertinent strategy is the creation of a web-based application system accessible to all employees and stakeholders in a real-time, integrated format.

This research's problem formulation encompasses numerous critical aspects: (1) Design and implement a leave application system tailored to the organizational requirements of the North Sumatra DPRD Office, (2) structure the application flow to ensure comprehensibility and usability for all users across diverse technical competencies, and (3) evaluate the system's effectiveness regarding functionality utilizing the appropriate software testing methodology, specifically the Blackbox method. This research emphasizes the technical aspects of development and the generation of practical value for the organization.

This study's system utilizes a UML (Unified Modeling Language)-based software engineering methodology, employing use case diagrams and activity diagrams to accurately depict the system's requirements and processes (Rifki et al., 2023). Testing is conducted comprehensively utilizing the Blackbox method to guarantee that all functions operate in accordance with user expectations (Rifki & Syamia, 2024). This system encompasses key functions such as user authentication, employee data entry, leave request submission, supervisor endorsement, administrative dashboard, and application history tracking. The web-based system architecture facilitates connectivity across organizational components without dependence on a particular physical site, hence endorsing the principle of flexible labor.

The installation of this system is anticipated to establish an efficient, rapid, transparent, and thoroughly documented leave process flow. Management will more easily oversee employee leave metrics, while employees will have enhanced clarity and efficiency in the submission and approval procedures. This method systematically upholds the principles of effective governance in staff

management by ensuring data accountability, enhancing time efficiency, and minimizing paper usage (paperless). It also offers enduring advantages regarding internal audit and human resources performance assessment.

This research proposes the establishment of a web-based system using a contemporary framework that is aligned with the current architecture of the North Sumatra DPRD Office. The system features an intuitive UI, strong login security, and the ability to document all operations within the system (activity log). Alternative options, including mobile applications, were evaluated; however, primary emphasis was placed on the web version to ensure reliability, cost-effectiveness, and ease of installation. The decision was based on the trend of developing web-based management information systems to improve the operational efficiency of organizations, including in terms of human resource management. In the context of employee leave management, the information system not only functions as a data input tool but also as a monitoring, documentation, and accountability tool for employee performance.

Research conducted by (Taufik et al., 2022) designed the development of an employee leave submission system application designed to produce an employee leave submission information system that can be more effective in managing employee leave data and can overcome the problem of human error, due to the limitations of physical document archives that are vulnerable to loss and physical damage. In addition, (Ningsih et al., 2023) applied the UML modeling approach to describe a web-based leave information system developed for government agencies, which included Use Case, Activity, and Class Diagrams.

This project aims to design, implement, and evaluate a web-based employee leave application system to replace the existing manual method at the DPRD office in North Sumatra. This research aims to significantly improve the development of information systems for personnel management at the institutional level. This research brings in a digital process for approving leave requests that fits the agency's needs, checks the system using a Blackbox method, and creates a complete system model based on UML standards (Alda & Rifki, 2022). This research presents a solution for handling leave application history in a structured and systematic manner, designed for the development of a leave document archivist and recording the leave quota history of each employee at the institution.

2. LITERATURE REVIEW

2.1. *Implementation of Leave Request Digitization*

Leave is a status that allows a person to be absent from work for a certain period of time due to annual leave, maternity leave, vacation, or other approved reasons. Permission or absence from work relates to employee leave caused by certain circumstances stipulated by the regulations and policies of the institution, agency, or company, in accordance with the Labor Law of the Republic of Indonesia No. 13 of 2013 (Hamzah et al., 2023). Leave includes the right of employees to temporarily absent themselves from work as needed. Employee leave allows employees to be absent from work for a specified period of time while maintaining their employment status. There are several categories of leave, such as annual leave, holiday leave, and sick leave. In addition, certain companies may offer special leave for personal issues, childbirth, or other extraordinary situations, depending on company policies and labor regulations (Charles & Pradesan, 2022).

In supporting the recording of leave application history, a platform is needed that can accommodate these needs. One of them is a web-based application, that can visualize a series of leave application processes in stages. In the application, it can also be used in motorizing the remaining time,

leave quota, and leave permits that can be approved or rejected, as well as proposals accompanied by reasons for leave rejection that can be written by the leadership. This can be done with the aim of providing open information for employees at the institution related to the application for leave made.

2.2. Programming Languages

HTML, or HyperText Markup Language, is a scripting language used to create and structure web pages. Based on the definitions above, it can be concluded that HTML is a scripting language format designed for distributing information, as well as for creating documents and developing applications that run on web pages (Ramadhani & Firmansyah, 2022) (Ananda & Ihsan, 2024).

PHP (Hypertext Preprocessor) is an open-source scripting language used to create dynamic web pages based on client requests(M. Wicaksono & Pamungkas, 2022). As a server-side scripting language, PHP integrates with HTML, allowing developers to efficiently manage and process data on the server side. With support for various databases such as MySQL, PostgreSQL, and SQLite, PHP has become one of the most popular programming languages for developing interactive and data-driven web applications (Miftachudin, 2022) (Nugroho & Rahmadani, 2024).

One of the web design languages that can control the appearance of a web page by designing text formats such as font, color, margins, size, and more. CSS (Cascading Style Sheets) is a type of programming language used to manage the styling of web components, transforming them into a more visually appealing and attractive web design (Nur & Yani, 2024) (Syahputri & Dewi, 2024).

JavaScript is a scripting language that consists of a set of instructions used to control various aspects of a system, particularly in web development. Based on the statement above, it can be concluded that JavaScript is a script-based programming language that integrates with HTML to enhance the interactivity and functionality of web pages (Firmansyah & Indahyanti, 2022). JavaScript enables developers to manage dynamic elements such as form validation, animations, DOM manipulation, and server communication through technologies like AJAX. With its extensive capabilities, JavaScript has become one of the primary programming languages for modern web application development (Rafi & Indahyanti, 2022).

MySQL is an open-source Database Management System (DBMS) used to manage databases, alongside other DBMS options such as Oracle, MS SQL, and PostgreSQL (F. W. Wicaksono, 2024). MySQL utilizes SQL (Structured Query Language), which is the standard language for accessing relational databases. SQL consists of commands embedded within specific DBMS software, enabling efficient database management. Based on these definitions, SQL can be concluded as a programming language specifically designed for database access and management (Mauliddiyah, 2021).

2.3. Unified Modeling Language (UML) and Testing

The Unified Modeling Language (UML) is widely acknowledged as a system design tool in software engineering. UML facilitates the representation of system architecture and dynamics, with this research concentrating on use case diagrams and activity diagrams. UML enhances comprehension within the development team and expedites the system validation process prior to implementation. UML facilitates stakeholders in recognizing possible concerns early in the design process by offering a clear visual depiction of user interactions and workflows. This proactive strategy improves communication, facilitates more effective project management, and eventually results in superior software solutions (Saleh et al., 2024).

In software testing, the black box testing method is a prevalent technique for evaluating system functionality from the end user's viewpoint, without examining the internal architecture of the program . This method effectively identifies the conformity between inputs and outputs and assesses system responses under harsh conditions. Consequently, Blackbox is employed to evaluate functionalities including login, leave submission, approval, and history within the produced system. This research integrates a UML-based software engineering methodology with the Blackbox testing technique, resulting in an immediately usable application and a reproducible model for personnel system development. This literature study establishes a conceptual framework for developing an adaptive solution aimed at enhancing efficiency and transparency in the leave request process. This adaptive system seeks to enhance communication between employees and management, guaranteeing that all demands are recorded and addressed promptly. Moreover, it creates a structure for ongoing enhancement, facilitating regular updates and improvements informed by user feedback and changing organizational requirements. By integrating these components, the system not only rectifies existing inefficiencies but also cultivates a culture of responsiveness and accountability inside the business. This strategy aims to improve employee satisfaction and optimize resource allocation, resulting in a more productive workplace.

3. METHODS

This study employs a Research and Development (R&D) methodology, focused on researching, designing, and developing a web-based application for employee leave management (Saleh et al., 2023). This method emphasizes not only the comprehension of phenomena but also the development of technical solutions to field-related issues, including the manual process of submitting and managing employee leave.

3.1. Data Collection

Data collection is done to get a comprehensive picture of system requirements. The methods used include

1. Observation:

   DPRD Sumatera Utara conducted an examination of the leave application procedure to ascertain the current process and the issues that often arise within it. The team identified several areas for improvement, particularly in terms of communication between departments and clarity of leave application guidelines. By resolving these difficulties, they sought to optimize the process and improve overall efficiency for both personnel and management. Some of the problems encountered include leave requests still using physical documents that are vulnerable to aging, outdated management of leave request history, and leave quota calculations that are still kept in the personnel record book.
2. Interview.

   Interviews were conducted with parties directly involved, especially the personnel administration department, employees, and supervisors. The results of the interviews were used to formulate system requirements and identify related features. The elements were then prioritized according to their potential impact on overall efficiency and staff happiness. This collaborative strategy ensured that the new system would meet the needs of all stakeholders and promote a more efficient workflow. Some of the findings in the interviews revealed several things, including the need to record employees' remaining leave quota, leave application history (leave application form, leave approval/denial form, and official leave

letter), and the option to print leave documents in digital format to be officially signed by authorized leaders.

3. Literature Study:
   A literature study was conducted to identify relevant solutions based on previous research and the development of personnel information systems in the government sector. Based on the available literature, digital-based systems for leave applications have been widely implemented in various agencies to overcome problems commonly found in manual processes, such as bureaucratic delays, duplication of documents, and loss of physical archives. The system is tailored to the needs of the staffing division at the institution.

3.2. Usecase Diagram

A usecase diagram is a UML (Unified Modeling Language) diagram that depicts the interactions between users (actors) and a system. This diagram illustrates the primary functions accessible within the system and designates the individuals authorized to utilize them. By delineating these interactions, stakeholders can enhance their comprehension of the system's requirements and guarantee that all user scenarios are addressed throughout the development process. Moreover, use case diagrams work as an essential communication instrument among developers, clients, and project managers, enhancing clarity in discussions on expectations and functionalities. Consequently, they assist in aligning project objectives with user requirements, thus facilitating a more successful system deployment. Moreover, integrating comments from all stakeholders helps improve the precision of the diagrams, hence increasing their efficacy in directing the development team. This collaborative method cultivates stakeholder ownership and enhances adaptability to changes during the project lifespan (Widyatmoko & Pamungkas, 2022).

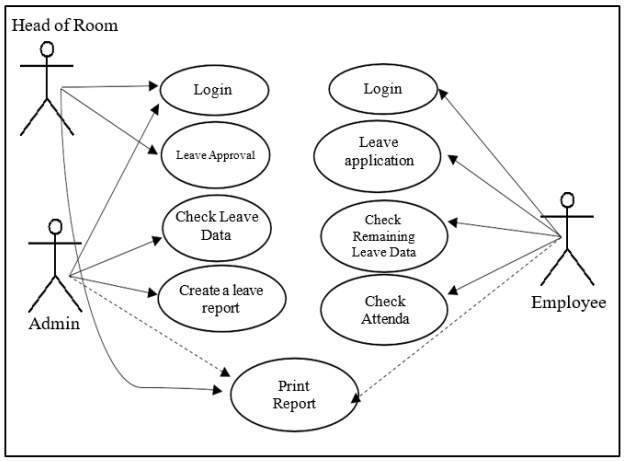

Figure 1. Usecase Diagram

This use case diagram depicts the interaction between actors (users) and the system for employee leave management. The three primary participants are the Head of Room (Department Head), Administrator, and Employee. The figure illustrates the distinct functions (use cases) that each actor is capable of executing. The Department Head possesses numerous tasks inside the system. They can access the system, authorize or deny employee leave requests, and review employee leave records. These activities enable the room supervisor to effectively oversee and manage employee leave. The administrator also plays a vital part in the system. Users can access the system, examine employee leave

information, generate reports pertaining to employee leave, and print leave reports. These functions facilitate the thorough documentation and accessibility of all leave-related data for record-keeping purposes. The employee engages with the system mostly to oversee their leave. Users can access the system, submit leave applications, verify their remaining leave balance, and review their attendance records. These features equip employees with essential tools to monitor and administer their leave efficiently.

4. RESULTS AND DISCUSSION

4.1. Design of Proposed Website Appearance

In this study, it is proposed to develop a website interface that is expected to be functional and usable. The academic information system website interface includes several display features, such as:

1. Login Page View

   The login page is the initial interface accessed by users prior to joining the employee leave application system. Consequently, the design of the login page must prioritize usability, security, and alignment with the requirements of users at the North Sumatra DPRD Office. In this context, login serves as the mechanism to guarantee that all system activities are conducted by users possessing approved access permissions commensurate with their roles and responsibilities.

   In the implementation phase, we developed the login page with a straightforward yet effective user-friendly interface design. The primary elements of this presentation are two input fields: Username/NIP and Password, along with a "Login" button. Furthermore, further components are incorporated, including an institutional logo and a concise description of the system to elucidate the application's identification. The design is adaptable and accessible on both mobile and desktop devices.

   From a technical perspective, input validation is implemented in layers. Client-side validation prevents users from submitting forms with empty data, while server-side validation ensures that the data entered actually matches the data in the user database. If the username and password combination does not match, the system will display an error notification such as “Username or password not found,” which assists the user in correcting the input error. Figures 2 and 3 illustrate the login pages for users and administrators.

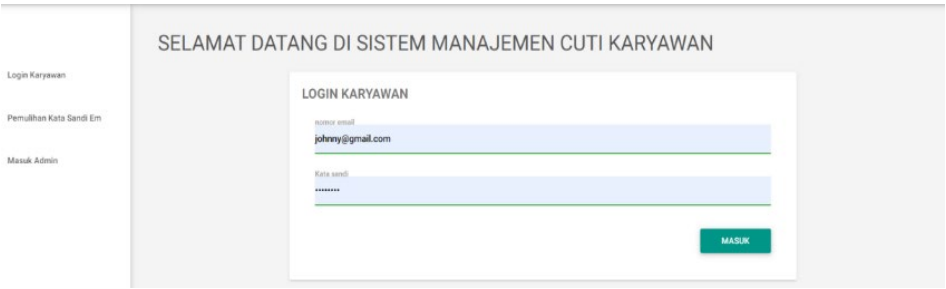

Figure 2. Employee and Admin Login View

Figure 3. Admin login view

2. Display employee data input using employee accounts
   The interface for employee data entry is a crucial feature of the system, particularly in enhancing the accuracy and completeness of personnel information. This feature enables employees with an active account to independently enter or modify their personal information via the offered online interface. This aligns with the notion of a self-service system that enhances operational efficiency and diminishes reliance on administrative personnel.
   The employee data entry interface comprises many primary fields that indicate identity and job status. The display elements typically comprise
   a. NIP (Employee Identification Number/Employee Code) is automatic and non-editable.
   b. Full Name (First Name and Surname)
   c. Place and Date of Birth
   d. Gender
   e. Position
   f. Address
   g. City of Residence
   h. Country of Residence
   i. Email
   j. "Update" button

   Every field has been equipped with input validation, encompassing both format requirements (e.g., dates must adhere to a valid format) and mandatory fields. The form design is straightforward and user-friendly, facilitating data entry for employees. Real-time notifications regarding success or problems in form completion are delivered by inline validation, exemplified by messages such as “Data successfully saved” or “Please fill in all required fields.” Access privileges are restricted to accounts with employee roles, which can only modify their own data within this input view. This constitutes an implementation of Role-Based Access Control (RBAC) that enhances the application's security features. The display for inputting or updating employee data is seen in Figure 4.

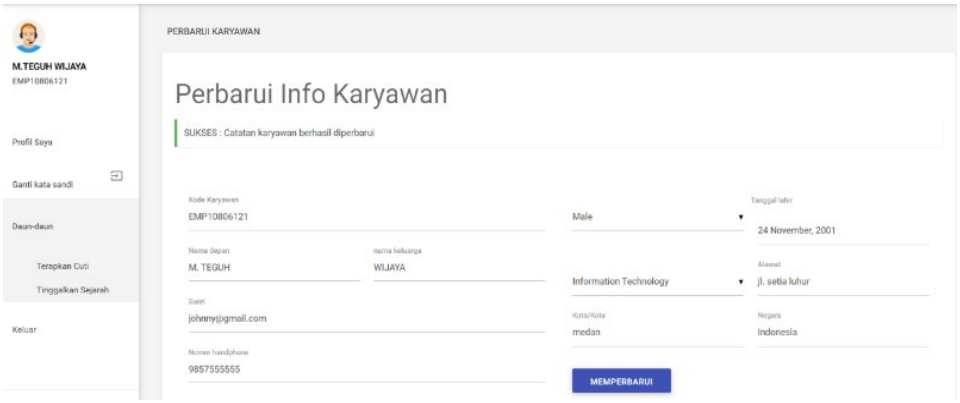

Figure 4. Display for Inputting or Updating Employee Data

3. Display of employee leave application menu

   The employee leave request menu is an essential component of the leave application system, serving as the primary method for staff to submit leave applications electronically. This function substitutes the manual procedure that formerly utilized paper forms, thereby accelerating the administrative process and enhancing the precision of the requested leave data. This menu is developed with the ideals of simplicity, responsiveness, and informativeness in mind for user interface. Employees who have signed into the system can access this menu via the dashboard, labeled as "Apply Leave." Upon menu selection, the system presents a leave request form comprising several primary components as follows:

   a. Leave Category: Dropdown menu featuring options including Restricted Holiday (RH) and Annual Leave.
   b. Commencement Date of Leave: Select the date utilizing the date picker.
   c. Leave End Date: the subsequent date entry utilizing the date picker.
   d. A rationale or explanation for the necessity of leave documented on the employee form detailing the grounds for the leave application.

   The system will automatically log the submission time and indicate the initial leave status as "Awaiting Supervisor Approval." Input validation is performed to guarantee that:

   a. The departure date must be specified, and the conclusion date cannot precede the commencement date.
   b. A leave type must be chosen.
   c. The reason for leave must be provided.
   d. The duration of leave is consistent with the relevant policy.

   Upon successful application, the user will receive a notification indicating, "Leave request successfully submitted and pending supervisor approval". Figure 6 illustrates the menu display of the Leave Submission Page. Figure 5 illustrates the menu display of the Leave Submission Page.

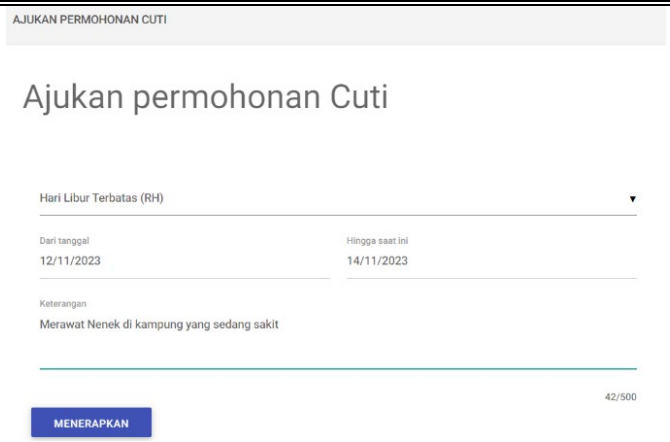

Figure 5. Leave application menu

4. Leave Approval Page Display

   The Leave Application Approval page is exclusively accessible to those designated as direct supervisors or officials authorized to approve leave requests. This feature serves as a critical verification point in the leave process flow prior to the approval or rejection of the leave request. Consequently, this display must be crafted with a focus on information clarity, navigational simplicity, and data security.

   Upon logging into the system and selecting the "Leave Approval" menu, the supervisor will be presented with a list of pending leave requests. Each request is presented as a table or card list encompassing the following information:

   a. Employee Name
   b. NIP (Employee Identification Code)
   c. Role
   d. Category of Leave
   e. Commencement and Conclusion Date
   f. Duration in Days
   g. Justification for Absence
   h. Current Leave Status (Pending Approval)

   Each request concludes with the primary action button, designated for reviewing the specifics of the leave request. Superiors can access comprehensive information regarding the employee's proposed leave by selecting one of two actions:

   a. Authorize Absence
   b. Decline Leave (with justification for denial to be provided)

      The system will update the request status and inform the pertinent employee through the system (or email, if applicable) if an action is chosen. The outcome of the decision is documented in the history log.

   The system enforces validation to ensure that decisions are made solely once per request and exclusively by authorized supervisors. The approval option will be absent if the leave status has already been authorized or rejected. This feature inhibits action duplication and guarantees the precision of the track record. Figure 6 displays the personal leave approval page. Meanwhile, Figure 7 displays a list of cumulative leave applications and the status of leave approval. Meanwhile, the detail view of leave referral can be seen in Figure 8.

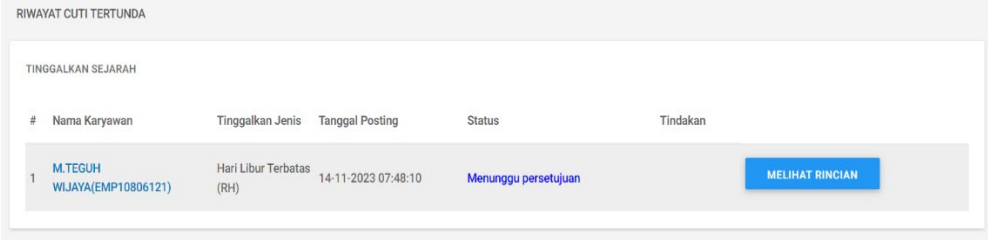

Figure 6. Personal Leave Approval Page Display

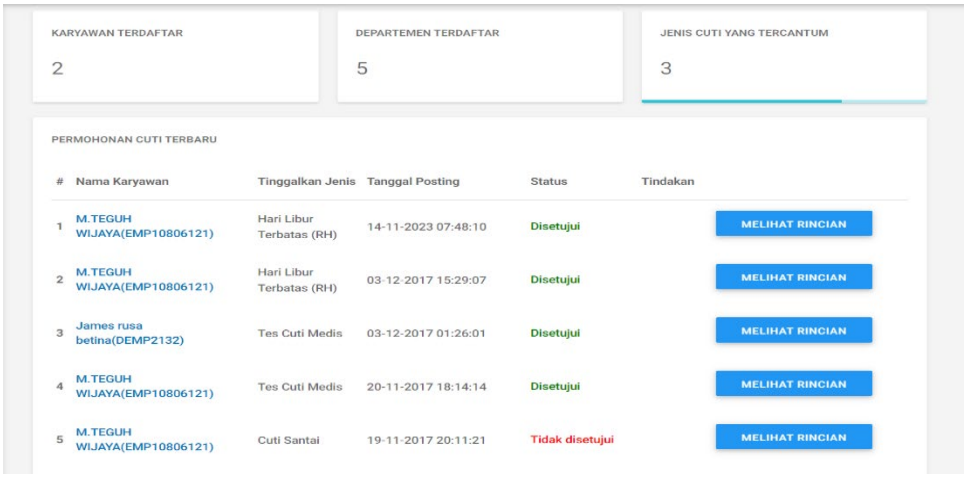

Figure 7. Display of Cumulative Leave Approval Page

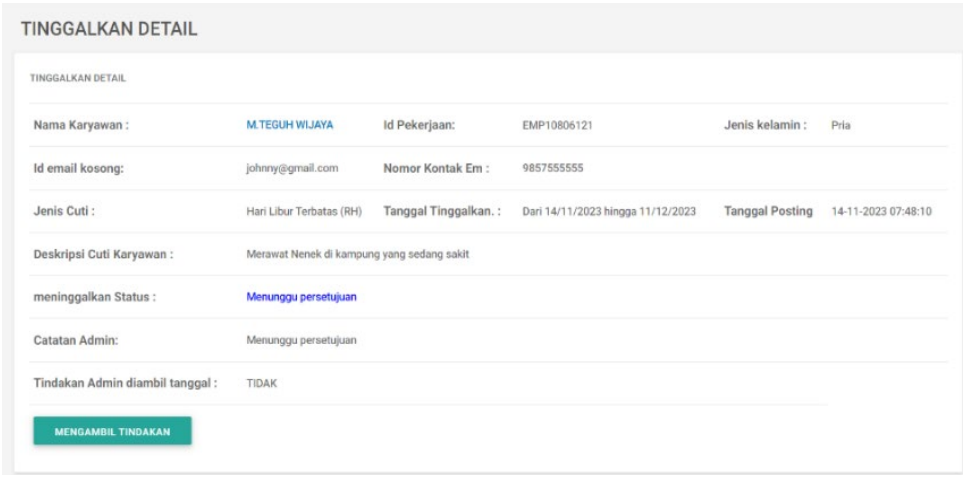

Figure 8. Detail View of Leave Referral

4.2. Testing the Leave Application Using Black Box

The black box method is a software testing technique that emphasizes evaluating system functions without any knowledge of the internal structure or source code. This method evaluates the system's adherence to its functional standards and its responsiveness to user inputs. Within the framework of the Employee Leave Application System at the North Sumatra DPRD Office, blackbox testing is conducted to verify that all primary functions function successfully, yield appropriate outputs, and deliver suitable notifications or validations in the event of input mistakes. The subsequent table presents test results derived from several key features of the system:

Table 1. Application Testing with Blackbox Method

No	Tested Features	Test Scenario	Input/Test	Expected Results	Test Results
1	System Login	Username and password match.	**Username:** admin **Password:** admin123	User successfully logs in and is directed to the dashboard	Valid
		Username and password incorrect	**Username**: admin, **Password**: incorrect	Error message: "Username or Password incorrect"	Valid
2	Employee Data Input	Admin fills in all data correctly	**Name**: Ahmad, **NIP**: 123456, **Position**: Staff	Data is successfully saved and appears in the employee list	Valid
		One of the fields is empty	Name blank, NIP filled	A message appears: "Name cannot be empty"	Valid
3	Employee Leave Request	Input all complete and correct leave data	**Type**: Annual, **Date**: July 1-3, **Reason**: Vacation	Application successfully submitted, status "Awaiting Approval"	Valid
		Finish date is earlier than start date	**Start Date**: July 5, **End Date**: July 3	Message: "The finish date cannot be earlier than the start date"	Valid
		Reason for leave is left blank	**Reason**: " Blank"	Message: "Reason for leave must be filled in"	Valid
4	Approval of Leave by Superiors	Superiors approve the application	Click the "**View Details**", "**Apply Action**" button	Leave status changes to "Approved"	Valid
		The supervisor refuses without filling in the reason	Click the "**View Details**" button, "**Decline**"	A message appears: "Please fill in the reason for rejection"	Valid

5. CONCLUSION

The development of the Employee Leave Application System for the DPRD Office of North Sumatra Province has produced a web-based system for employee leave applications specifically designed to improve efficiency, transparency, and accuracy in the process of managing employee leave within the DPRD Secretariat of North Sumatra Province, especially in the Wasbang room. This system facilitates the process of applying for leave digitally, monitoring leave balances in real-time, and assisting leaders in accessing leave reports systematically through a centralized database. System testing was conducted using the black-box method, which focused on testing system functionality without looking at the program code. The test results show that all main features, such as leave submission, checking remaining leaves, leave approval, document printing, and input validation, run well in accordance with the system requirement specifications. The system is also able to handle input error conditions by providing appropriate feedback to users. Thus, the system has met the functional criteria formulated in the design stage. Although testing is limited to functional aspects through the

black-box method, the results show that this application is feasible to implement as a digital solution for managing employee leave within the DPRD Sumatra Utara.

REFERENCES

Al-Faruqy, O. K. M. F., & Ramadhani, F. K. (2024). Web-Based E-Borrowing Information System PT. Telkom Access. *Jurnal Metrokom: Media Teknik Elektro Dan Komputer*, *1*(2), 146–159.

Alda, M., & Rifki, M. I. (2022). Implementasi Metode Triple Des Pada Aplikasi Keamanan Pesan Berbasis Mobile. *JOINTECS (Journal of Information Technology and Computer Science)*, *7*(1), 17–26.

Ananda, S., & Ihsan, M. (2024). Web-Based Information System for PLN ULP Helvetia Inventory Repair. *Jurnal Metrokom: Media Teknik Elektro Dan Komputer*, *1*(2), 160–170.

Charles, E. P., & Pradesan, I. (2022). Pembuatan Sistem Infromasi Cuti Pegawai Menggunakan Metode Rational Unified Proccess pada PT. Dewa Sukses Mandiri. *INFORMASI (Jurnal Informatika Dan Sistem Informasi)* , *14*(2), 149–161.

Firmansyah, M. A. B., & Indahyanti, U. (2022). Employee Payment Information System Design at PT Tamanaco Perancangan Sistem Informasi Penggajian Karyawan Pada PT Tamanaco. *… of Engineering and Life …*, *2*(2).

Hamzah, E., Sunoto, A., & Almustaqim, A. (2023). Perancangan Sistem Informasi Pengajuan Cuti Online Pada Dinas Perhubungan Kota Jambi. *Jurnal Manajemen Teknologi Dan Sistem Informasi (JMS)*, *3*(1), 313–322. https://doi.org/10.33998/jms.2023.3.1.775

Mauliddiyah, N. L. (2021). *Sistem Informasi Penjualan Alat Dan Barang Elektronik Di Sahabat Merbau Sentosa*. 6.

Miftachudin, M. (2022). Penerapan Sistem Ujian Online Terhadap Kemampuan Dasar Pemrograman PHP Berbasis Website. *Teknologipintar*, *2*(1), 1–12.

Ningsih, N. P. R., Dewi, K. C., & Laksana, I. (2023). *Business Process Re-Engineering Pada Cuti Pegawai Di Distrik Navigasi Tipe A Kelas II Benoa*. Politeknik Negeri Bali.

Nugroho, A., & Rahmadani, N. F. (2024). Web-based Visit List Information System at the Ministry of Religious Affairs of Deli Serdang Regency. *Jurnal Metrokom: Media Teknik Elektro Dan Komputer*, *1*(2), 58–74.

Nur, A., & Yani, I. (2024). *Pengembangan Rekayasa Perangkat Lunak Online Sistem E-Recruitment pengawai PT . FM Global Logistics Berbasisi web*. *02*(03), 468–479.

Rafi, S. I., & Indahyanti, U. (2022). Women's Clothing Application by Using Waterfall Method in the Form of Website of Rafika Modes UMKM. *Procedia of Engineering and Life Science*, *2*(2). https://doi.org/10.21070/pels.v2i2.1211

Ramadhani, D., & Firmansyah, B. (2022). Sistem Informasi Peminjaman Ruangan Berbasis Web Pada Institut Bisnis Dan Informatika Kosgoro 1957. *Jurnal Nasional Informatika*, *3*(2), 42–48.

Rifki, M. I., Raditya, M. E., & Hasugian, A. H. (2023). Text Data Security Application Using a Mobile-Based Base64 Algorithm. *Instal: Jurnal Komputer*, *15*(02), 224–235.

Rifki, M. I., & Syamia, N. (2024). Message Security Application Using Mobile-Based AES Algorithm. *Journal of Computer Science, Information Technology and Telecommunication Engineering*, *5*(2), 595–606.

Saleh, A., Azmi, F., Dharshinni, N. P., & Perangin-Angin, D. (2024). Recommendation system for determining learning strategies using collaborative filtering techniques. *AIP Conference Proceedings*, *2987*(1).

Saleh, A., Laia, Y. R., Gowasa, F., & Sihombing, V. D. (2023). Iris Recognition Using Hybrid Self-Organizing Map Classifier and Daugman's Algorithm. *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, *7*(1), 105–112.

Sinaga, Y. A., & Aida, M. (2025). WEB-BASED EMPLOYEE LEAVE APPLICATION SYSTEM AT THE DINAS PENANAMAN MODAL DAN PELAYANAN TERPADU SATU PINTU KOTA

MEDAN. *Jurnal Metrokom: Media Teknik Elektro Dan Komputer*, *2*(1), 1–17.

Syahputri, R., & Dewi, A. K. (2024). Hajj Service User Feedback Information System at The Office of The Ministry of Religion of The Deli Serdang District Based on Web. *Jurnal Metrokom: Media Teknik Elektro Dan Komputer*, *1*(2), 103–120.

Taufik, R., Permana, A. A., & Marfino, M. A. (2022). Rancang Bangun Sistem Informasi Pengajuan Cuti Berbasis Web Pada Pt. Tribuana Gasindo. *JIKA (Jurnal Informatika)*, *6*(1), 99–104.

Wibowo, M. A., & Rizal, K. (2024). Perancangan Aplikasi E-Cuti Pegawai Pada Suku Dinas Pendidikan Wilayah II Jakarta Pusat Berbasis Website. *Journal of Information System, Informatics and Computing*, *8*(2), 162–174.

Wicaksono, F. W. (2024). Perencanaan Absensi Kehadiran Berbasis Online Guna Mempermudah Proses Pendataan. *Computing Insight : Journal of Computer Science*, *5*(1), 22–27. https://doi.org/10.30651/comp_insight.v5i1.12005

Wicaksono, M., & Pamungkas, J. (2022). Membuat Web Server Menggunakan Debian 10 Pada Virtual Machine. *Aisyah Journal of Informatics and Electrical Engineering Universitas Aisyah Pringsewu*, *4*(1), 17–26.

Widyatmoko, W., & Pamungkas, N. (2022). Pemodelan Unified Modeling Language pada Sistem Aplikasi Pariwisata (SiAP). *Jurnal Bumigora Information Technology (BITe)*, *4*(1), 73–84. https://doi.org/10.30812/bite.v4i1.1871