https://doi.org/10.35877/jetech2711

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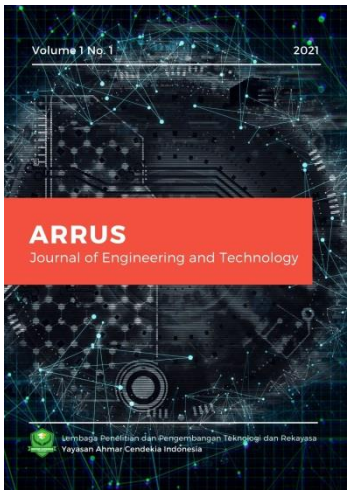
ISSN : 2776-7914 (Print) / 2807-3045 (Online)



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RESEARCH ARTICLE

Enhancing Leave Management through an Online Employee Leave Application System

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Abstract: The manual leave application process at PT. Citra Bonanza Expresspresents several challenges, including inefficiencies and potential errors in leave recording. This study aims to develop and implement a web-based leave application system to address these issues. Utilizing the waterfall methodology, the system development involved requirement analysis, system design, implementation, testing, and maintenance. The results demonstrate significant improvements in efficiency, accuracy, and transparency. The automated system streamlines the leave application and approval processes, eliminates errors, and provides real-time access to leave information. Comprehensive reporting capabilities enable data-driven decision-making for management. The successful deployment of the system underscores its potential applicability in other organizations with similar challenges.

Keywords: Online leave application, Employee leave management, Web-based system, Human resource information system, Digital leave application system.

1. Introduction

Leave application is a crucial aspect of human resource management in companies. An efficient leave application system not only assists employees in easily submitting leave requests but also aids management in monitoring and managing employee leave effectively (Bassil, 2012). PT. Indomarco Adi Prima, one of the major companies in Indonesia, faces challenges with a manual leave application system, leading to inefficiencies and potential errors in leave recording.

The use of information technology in human resource management can provide an effective solution to this issue. Developing a web-based leave application information system is a strategic step to enhance operational efficiency and reduce administrative burdens (Sommerville, 2011). This system is designed to facilitate employees in submitting leave requests online and assist management in real-time monitoring and analysis of leave data (Pressman, 2014).

The system development method used in this study is the waterfall method, which is one of the classic approaches in software engineering (Sommerville & Sawyer, 1997). This method involves several stages, including requirement analysis, system design, implementation, testing, and maintenance (Jalote, 2005). The system testing was conducted using the black box method to ensure that the system functions as expected without examining the internal structure of the source code (Yourdon, 1989).

This study aims to design and implement a web-based leave application information system at PT. Indomarco Adi Prima. The developed system is expected to increase the efficiency

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of the leave application process and provide ease for employees in submitting leave requests (Humphrey, 1995).

2. Literature Review

2.1. Online Leave Application Systems

The transition from manual to online leave application systems has become a pivotal focus in enhancing organizational efficiency and employee satisfaction. Research indicates that online leave application systems streamline the leave request process, reduce paperwork, and minimize errors associated with manual entries (Basili, 2012). These systems allow employees to submit leave requests from anywhere, at any time, thereby improving convenience and productivity (Sommerville, 2011). A study by Zhang et al. (2018) in the Journal of Organizational and End User Computing highlights that such systems also lead to better compliance with organizational policies and regulations.

2.2. Web-Based Systems in Human Resource Management

Web-based systems have revolutionized human resource management (HRM) by providing scalable and flexible solutions for various HR functions, including leave management. The implementation of web-based systems facilitates real-time data access and management, leading to more informed decision-making processes (Pressman, 2014). Such systems also support the integration of various HR activities, making it easier for HR departments to handle multiple tasks efficiently (Kan, 2002). A paper by Lee and Lee (2017) published in the International Journal of Human Resource Management discusses the positive impact of web-based HR systems on organizational efficiency and employee engagement.

2.3. Benefits of Digital Leave Management

Digital leave management systems offer numerous benefits, such as automated leave balance calculations, streamlined approval workflows, and comprehensive reporting capabilities. Automated systems reduce the administrative burden on HR personnel and provide accurate, up-to-date information on employee leave balances and histories (Yourdon, 1989). Additionally, digital systems enhance transparency and accountability by allowing employees and managers to track leave requests and approvals in real-time (Humphrey, 1995). According to a study by Chen et al. (2019) in the Journal of Applied Psychology, digital systems also improve overall employee satisfaction by providing greater transparency and reducing processing times.

2.4. Methodologies for System Development

The waterfall methodology, a linear and sequential approach to software development, has been widely used in developing robust and reliable information systems. This methodology involves distinct phases: requirement analysis, system design, implementation, testing, and maintenance (Jalote, 2005). Each phase must be completed before the next begins, ensuring a structured development process and thorough validation at each stage (Sommerville & Sawyer, 1997). Despite its rigidity, the waterfall model is particularly effective for projects with well-defined requirements and low uncertainty (Bassil, 2012). A study by Petersen et al. (2014) in the Journal of Systems and Software highlights the suitability of the waterfall model for large-scale enterprise system development projects.

2.5. Case Studies on Leave Management Systems

Several case studies have demonstrated the successful implementation of online leave management systems. For instance, a study by Rumbaugh, Jacobson, and Booch (2004) highlights the positive impact of a web-based leave management system in a large corporation, noting significant improvements in process efficiency and employee satisfaction. Another study by Bertalanffy (1968) emphasizes the importance of a user-centric design in developing effective leave management systems, which ensures that the system meets the actual needs of its users. Additionally, research by Dutta and Sarkar

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(2016) in the Journal of Global Information Management showcases how web-based leave management systems can be tailored to meet the specific needs of different organizational cultures and structures.

3. Research Method

The research uses a development method called the waterfall method, which is derived from the approach used in descriptive-qualitative research. This method is a sequential software development process where progress is viewed as continuously flowing downward (like a waterfall) through phases of planning, modeling, implementation (construction), and testing.

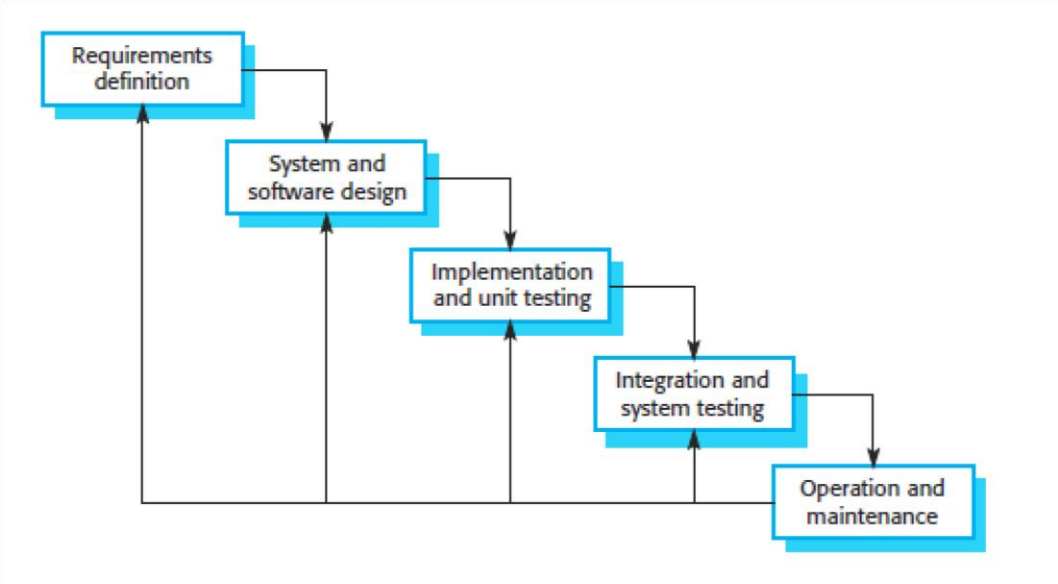

Figure 1. Waterfall Method

3.1. Analyze

3.1.1. Analysis of the Current System.

The analysis of similar websites related to leave request submission systems aims to evaluate the functionalities and workflows of existing web designs. This evaluation helps to identify which functionalities and workflows can be adopted in the researched system based on the benefits already achieved by similar websites. Additionally, it seeks to find added value from the programming language that will be developed by the author in this study. This research employs a single model, the Waterfall model, which is a system development method with the following stages:

a) Planning Stage

Defining the project scope and objectives. Identifying the necessary resources and timeline. Establishing project deliverables and milestones.

b) Analysis Stage

Gathering and analyzing user requirements. Documenting functional and non-functional requirements. Identifying system requirements and constraints.

c) Design Stage

Creating system architecture and design specifications. Developing data models and user interface designs. Planning system integration and testing strategies.

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d) Development Stage

Writing and compiling the code based on design specifications. Performing unit testing and debugging. Integrating system components and performing system testing.

The reason for choosing the Waterfall model for system development is its structured stages, which facilitate the author in completing this research efficiently and effectively. The structured approach ensures clarity and systematic progress through each phase, aiding in the successful and timely completion of the research.

3.1.2. Analysis of Problem

The current problem analysis highlights the development of technology and information, which is increasingly utilized by various companies to facilitate tasks, including the leave request process. However, many companies still do not realize that technology can also be used for leave request submissions.

To address the issue of the inefficiency of conventional leave request systems, a solution is needed through the design of a web-based leave request system. This will make it easier for employees to submit leave requests.

3.1.3. Solution Prosedure Solving

The leave request process using a user-friendly website can facilitate employees in submitting leave requests, making it efficient in terms of time and cost, and providing good service for companies to employees who want to take leave. This is particularly important for employees at PT Citra Bonanza Express, where almost all employees rely on manual labor, necessitating a well-designed system for the leave request process.

3.2. Design

a) Use Case Diagram

A Use Case Diagram is a depiction of the interactions between a system and its environment. The Use Case for Employee Leave Requests shown on Figure 2.

b) Activity Diagram

An Activity Diagram is an action or activity that includes choices or repetitions with a visual workflow. The Activity Diagram for Mail Archive Management shown on Figure 3.

c) Sequence Diagram

This sequence diagram is commonly used to illustrate scenarios or sequences of steps taken in response to an event to produce a specific output, detailing the internal changes that occur and the output generated. The sequence diagram shown on Figure 4.

d) Database Design

Database design is the process of determining the content and arrangement of data needed to support various system designs. The objectives of database design are to meet the information needs that specifically address user requirements and their applications, and to facilitate the understanding of the information structure. The database design shown on Figure 5.

4. Results and Discussion

4.1. System Specification

System specification is a document that serves as the foundation for designing hardware, software, databases, and the people involved. This document outlines the functions and performance of the computer system and includes the constraints that govern its development process.

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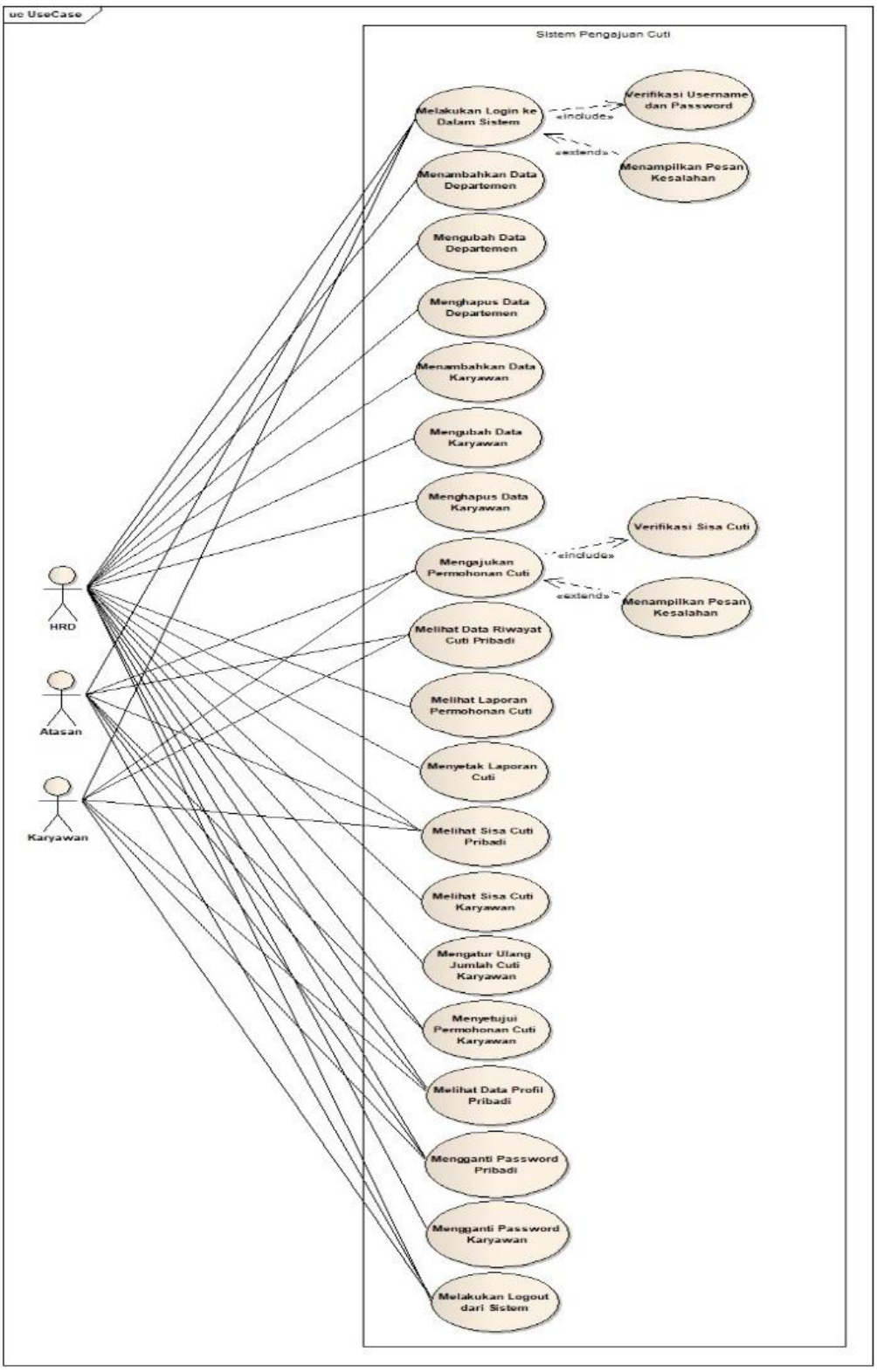

Figure 2. Use Case Diagram

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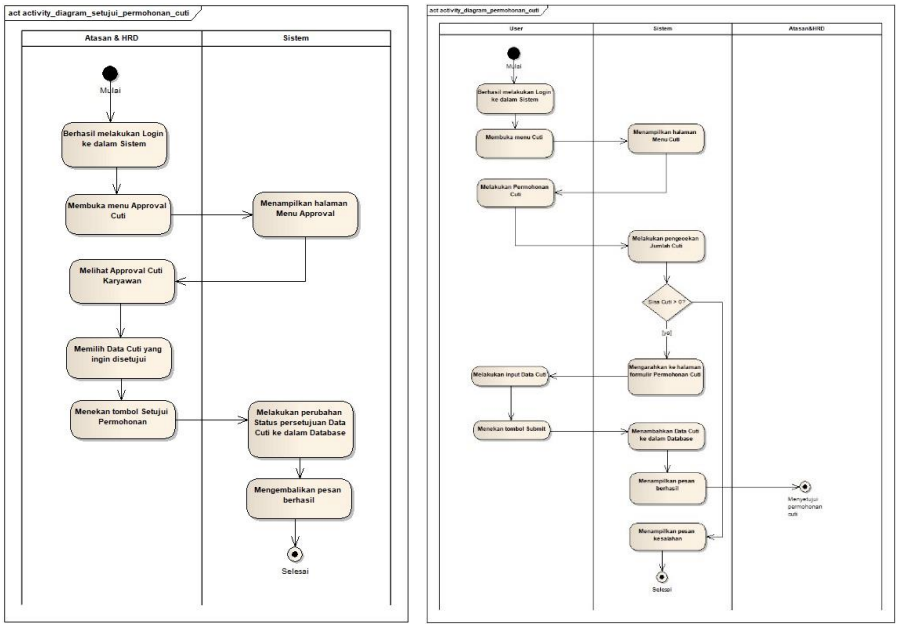

Figure 3. Activity Diagram

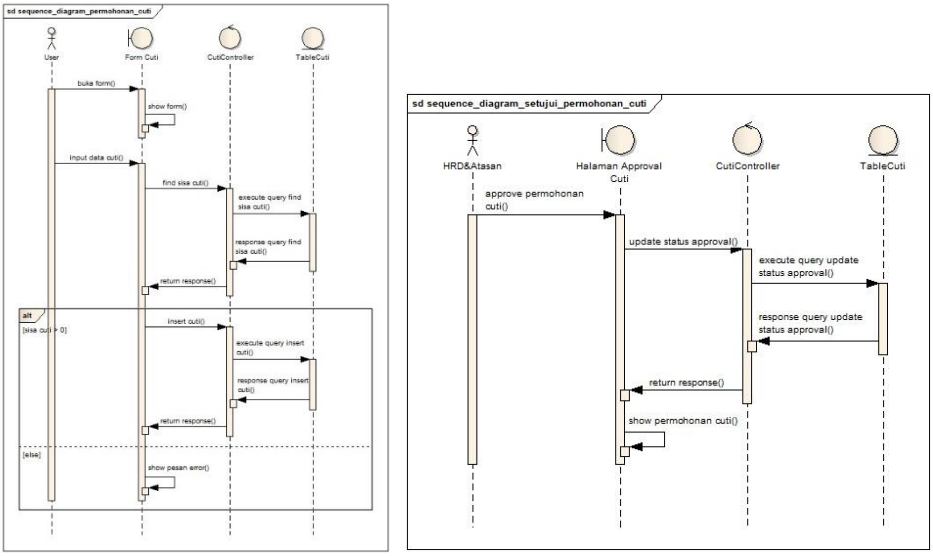

Figure 4. Squence Diagram

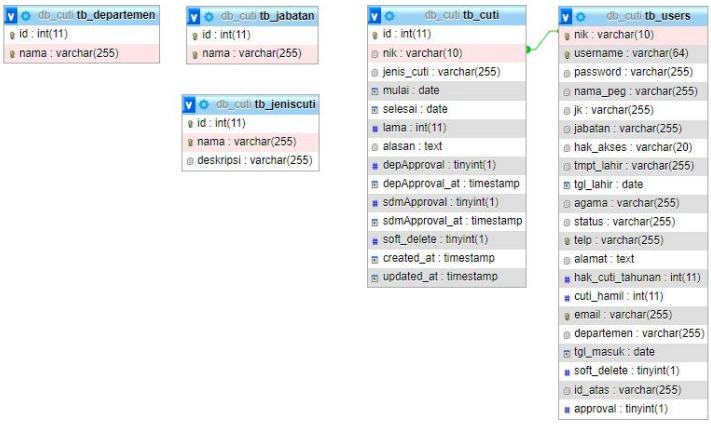

Figure 5. Database Relational

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a) Minimum Specification Hardware
To implement the application program being developed, we need hardware in the form of a laptop. The higher the specifications of the computer used to build the application, the better the quality and performance of the application will be. Here is the list of hardware used to develop the Web-Based Leave Request System for Employees at PT Citra Bonanza Express:
Prosesor : Intel Core 2 Duo
RAM : 4GB
Storage : SSD 120GB

b) Minimum Spesificatin Software
For the development of a web-based system, we need various supporting software. The website development process requires software such as a code editor, local server, database management system, and others. Using the right software, website development can be carried out more efficiently and effectively.

Here is the list of software used to develop the Web-Based Leave Request System for Employees at PT Citra Bonanza Express:

Sistem Operasi : Windows 7
Web Server : XAMPP
Web Browser : Google Chrome
Code EditoR : Visual Studio Code

4.2. Application Usage

Here is the procedure for using the web-based employee leave request application:

a. Run XAMPP, then activate Apache to run the application and MySQL to run the Database Server. This ensures that the application can run smoothly.

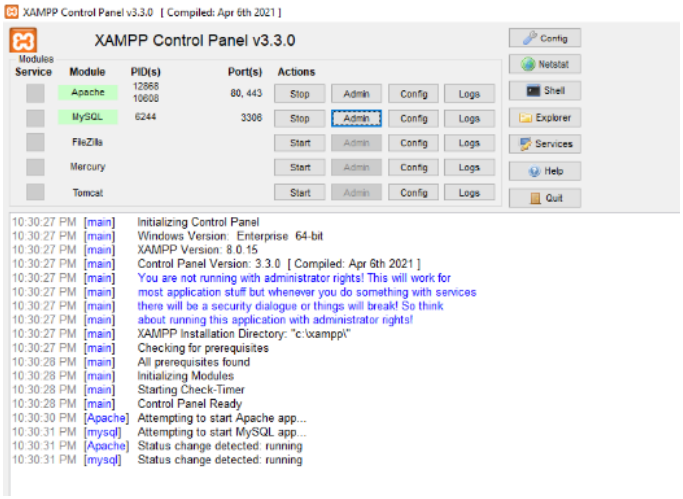

Figure 6. XAMPP Contro Panel Display

b. Run XAMPP, then activate Apache to run the application and MySQL to run the Database Server, so that the created application can function properly.

c. After that, open Google Chrome and type "http://localhost/cuti" in the URL bar. Google Chrome will then display the Login page. Enter the provided Username and Password, then click the Login button. The system will verify the Username and Password against the database. If the Username and Password are successfully verified,

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the user will be redirected to the Dashboard page. If the verification fails, an error message will be displayed.

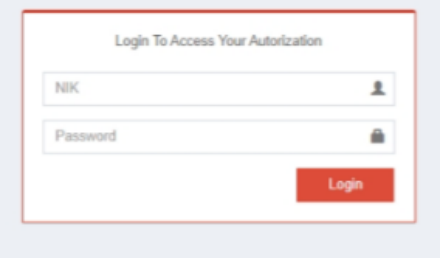

Figure 7. Login Menu Display

d. After a successful login, the Dashboard page will be displayed. This page is divided into three roles: HRD, Supervisor, and Employee. The HRD Dashboard page contains the following menus: Dashboard, Master Data with sub-menus: Employee, Department, Position, and Leave Type. There is also the Leave Approval menu and the Report menu with sub-menus: Approved and All.

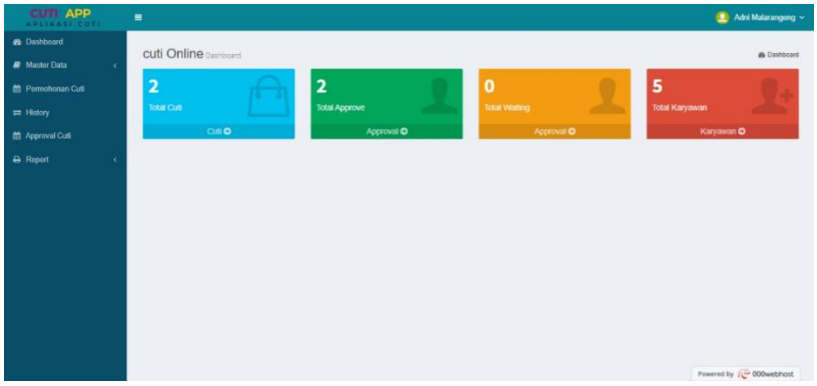

Figure 8. Dashboard Display

e. The Employee Master Data page is used for managing employee data. On this page, HRD can view registered employee data, see detailed employee information, add new employee data as a user with the default password '123', modify registered employee data, delete employee data, and change the employee's password with the default password '123'.

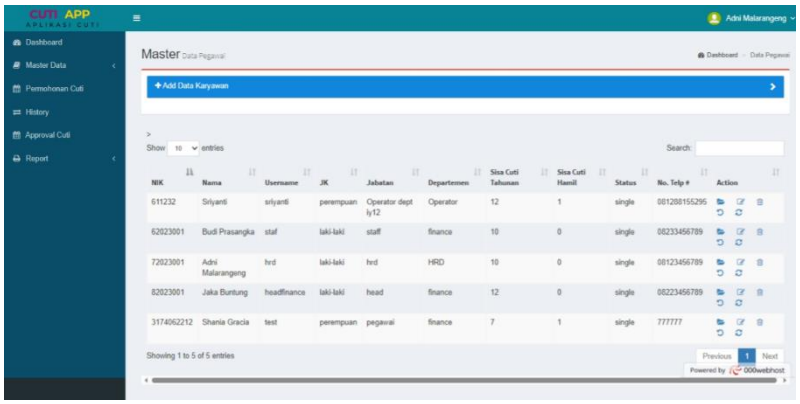

Figure 9. Master Data Display

f. The Leave Application page is a form for leave requests. Employees and Supervisors can fill out leave data through the Leave Application menu.

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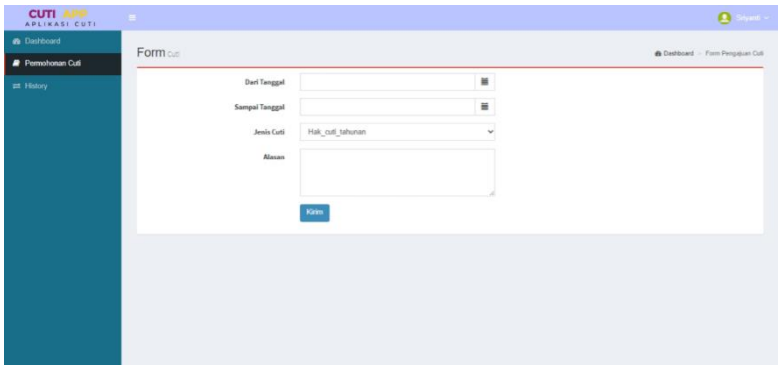

Figure 10. Input Leave Data Display

g. The Approved Report Page is a list of leave requests that have been approved by HRD and supervisors. On this page, HRD can view the list of approved leave requests and download the list in PDF format.

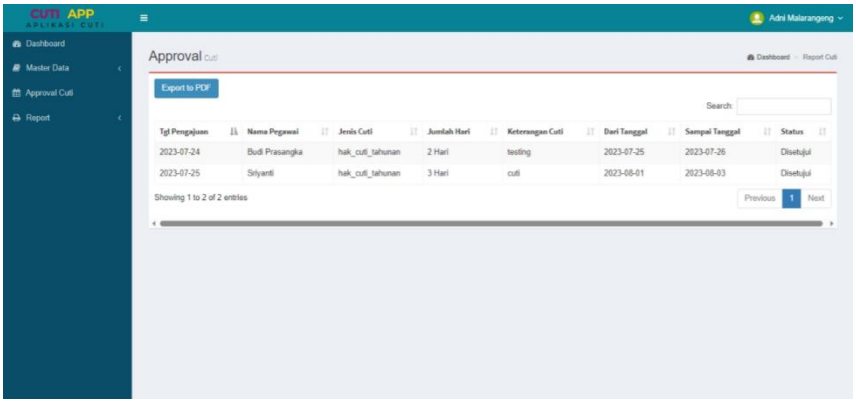

Figure 11. Report Aproved Page Display

h. The Report All page is a page containing the complete list of registered leave requests. On this page, HR can view all the leave requests that have been submitted and download the list of leave requests in PDF format.

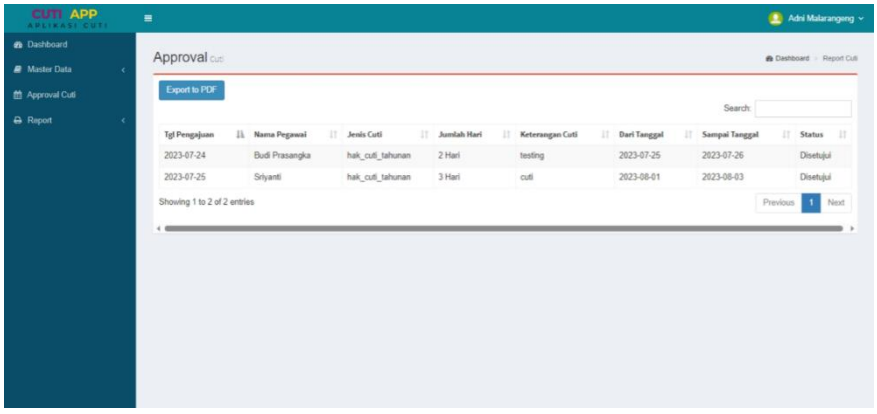

Figure 12. Report Aproved All Page Display

i. The History page is a page that shows the entire history of leave requests that have been submitted. Both supervisors and employees can view the leave request history.

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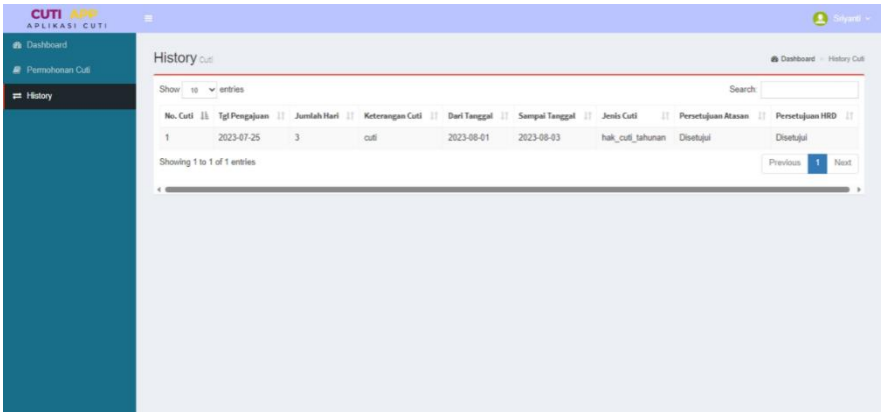

Figure 13. History Report Page Display

j. The Leave Approval Page is a page for supervisors to approve employee leave requests. On this page, supervisors can view a list of their subordinates' leave requests, approve leave requests, reject leave requests, and download leave requests in PDF format.

k. Testing

Greenit (2018) explains that Blackbox Testing is a software testing method that involves execution through test data and functional examination of the software without considering its internal structure or source code. Observations are made through test data to check the functionality of the software itself. In Blackbox Testing, the evaluation is done only on the external interface and its functionality, without examining the details of its internal processes. This testing focuses solely on the input and output processes that occur without considering how these processes occur in detail.

Table 1. Blackbox Testing Table

No	Item	Desain	Results
1	Login	User logs into the system	Successful
2	Add Department	HR adds department data	Successful
3	Edit Department	HR edits department data	Successful
4	Delete Department	HR deletes department data	Successful
5	Add Employee	HR adds employee data and creates login credentials for the employee	Successful
6	Edit Employee	HR edits employee data	Successful
7	Delete Employee	HR deletes employee data	Successful
8	Submit Leave Request	Supervisor/Employee submits a leave request	Successful
9	Leave Request History	Supervisor/Employee views the history of leave requests, both ongoing and completed	Successful
10	Leave Request Report	HR views the history of leave requests, both ongoing and completed	Successful
11	Print Leave Request Report	HR prints the report of leave requests, both ongoing and completed	Successful
12	Remaining Leave	Supervisor/Employee views the remaining leave balance for one year	Successful
13	Employee Remaining Leave	HR views the remaining leave balance of employees for one year	Successful
14	Reset Annual Leave Balance	HR resets the annual leave balance of employees	Successful
15	Approval of Leave Requests	Supervisor/HR approves employee leave requests	Successful
16	Profile	Supervisor/Employee views complete personal data	Successful
17	Change Password	Supervisor/Employee changes the old password to a new password	Successful
19	Logout	User logs out of the system	Successful

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5. Conclusion

The literature reviewed underscores the significant advantages of transitioning to online leave application systems, particularly in terms of efficiency, accuracy, and transparency. The successful application of methodologies like the waterfall model in system development further highlights the importance of a structured approach in achieving these benefits. The insights gained from various case studies can guide the implementation of similar systems in other organizations, enhancing their HR management capabilities and overall operational efficiency.

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