JURNAL TEKNOLOGI DAN OPEN SOURCE
Vol. 8, No. 2, December 2025, pp. 1120~1127
e-ISSN: 2622-1659, accredited Four Grade by Kemenristekdikti, Decree No: 152/E/KPT/2023
DOI: https://doi.org/10.36378/jtos.v8i2.5144

Digitization of Employee Attendance through a Web Based Electronic Attendance System at PT Dupoin Palembang Branch

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Article Info

Article history:

Accepted 11 28, 2025
Revision 12 17, 2025
Accepted 12 22, 2025

Keywords:

PT DUPOIN
Electronic Attendance System
Web
Conventional

ABSTRACT

PT DUPOIN Palembang Branch is one of the companies experiencing efficiency problems in its employee attendance management system. Currently, attendance recording is still carried out manually using paper-based documents stored in filing cabinets. Along with the increasing number of employees and operational activities, this conventional system has caused various issues, such as slow data recapitulation, frequent recording errors, and difficulties in conducting periodic attendance analysis. Moreover, the absence of an integrated attendance history makes it challenging for management to objectively evaluate employee discipline and performance. This study aims to address these issues by implementing a web-based electronic attendance system as a digitalization effort in human resource management. The proposed system enables real-time attendance monitoring, online access to attendance reports, and more transparent and accountable data management. Features such as user authentication, access control, automated reporting, and cloud-based data storage provide significant advantages over manual systems. In addition, the system supports flexible work models, including remote and hybrid working arrangements, while maintaining data accuracy and minimizing fraud through location- and time-based validation. The implementation of this system is expected to improve administrative efficiency, enhance decision-making, and support a more adaptive and productive work environment.

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1. Introduction

The rapid development of information technology in the last two decades has encouraged various industrial and public service sectors to digitize in every line of their operational activities. Digital transformation is a key element in creating efficiency, transparency, and speed of work that cannot be achieved with conventional methods. One of the vital aspects of the world of work that is affected by this advancement is the system of recording employee attendance or attendance. Employee absences are an important part of the human resource administration system that aims to record time of attendance, lateness, leave, leave, and other absences. Attendance is an employee attendance record that serves as administrative evidence of individual participation in work activities in a certain period. Attendance has an important value in supporting human resource management, especially in terms of performance evaluation, salary calculation, and compliance with attendance rules[1].

In Indonesia, digital transformation has become part of a national strategy that encourages various institutions, both government and private, to adapt to technology. One form of this transformation is the development of a web-based digital archive system, which allows users to store, access, and manage documents centrally. *Web-based systems* are the choice because of their flexible nature, easy access from various devices, and cost-effective infrastructure. In the context of archiving, web-based systems provide added value in the form of fast document searches, systematic archival grouping, and data protection with user authorization. This step is considered a solution to improve work efficiency and support transparency and accountability[2].

To answer these challenges, various organizations are starting to switch to web-based integrated electronic attendance systems. This system allows automatic and real-time attendance recording through technology such as QR codes, RFID, fingerprints, or login through employee personal accounts. With a web-based system, attendance data is stored digitally in a centralized database, making it easier to supervise by the administration and management departments. In addition, the data recorded automatically can be immediately processed into accurate reports and ready to be used in the decision-making process[3]

PT DUPOIN Palembang Branch is one of the companies that is facing problems related to the efficiency of the employee attendance system. The attendance system used is still manual, which uses paper recording stored in the filing cabinet. Along with the increase in the number of employees and operational workload, this system began to cause a number of problems, including the slow recapitulation process of attendance data, data input errors, and the lack of ability to conduct periodic attendance analysis. In addition, the absence of an attendance history tracking system makes it difficult for management to evaluate employee discipline and performance[4].

This condition shows that there is an urgent need to implement a web-based electronic attendance system that can provide solutions to various weaknesses of conventional systems. Digitization of attendance not only speeds up administrative processes, but also increases transparency and accountability in human resource management. Through a web-based system, management can monitor attendance directly, access reports anytime and anywhere, and conduct more objective evaluations. Features such as user access rights, authentication systems, automated reporting, and cloud storage are additional advantages that manual systems don't have[5]

The implementation of a web-based attendance system is also in line with modern work trends that demand flexibility and mobility. In remote work or hybrid work situations, the system is still able to record attendance effectively and maintain data accuracy. Employees can be absent from different locations without having to be physically present in the office, as long as they have internet access and account authorization. This creates a more adaptive and inclusive work environment, as well as encourages productivity while maintaining control over discipline. In addition, this system also facilitates the attendance validation process based on location and time, thus minimizing the possibility of fraud or recording errors. Integration with other systems such as work calendars, automatic notifications, and dashboards
visuals also support faster, data-driven decision-making.

Thus, the transformation towards digital is not only limited to following technological developments, but is also a strategic step in improving the competitiveness and quality of human resource management in the company. [6]

The development of a web-based electronic attendance system at PT DUPOIN Palembang Branch needs to consider various important aspects, ranging from user needs, organizational structure, to business processes that apply in the company. The system designed must be able to meet functional needs such as attendance recording, automated reports, and user authorization, but must also pay attention to usability aspects so that it is easy to use by all employees. In addition, the ease of integration with other internal systems in the company, such as HR management systems or work calendars, is a significant plus. [7]

As part of digital transformation, the development of a web-based attendance system must be carried out through a systematic and methodological approach. This process includes analyzing user needs, designing an intuitive interface, developing the server and database side (backend), and testing and evaluation stages to ensure the system runs as expected. The selection of the right development method, such as the waterfall method for projects that have fixed needs or prototypes for systems that require multiple iterations, must be adapted to the complexity of the project and the availability of resources. With a mature development approach, this electronic attendance system is expected to be able to become a long-term solution that is efficient, flexible, and adaptive to technological developments and the needs of PT DUPOIN Palembang Branch.[8]

2. Research Methods

2.1 Data Collection Methods

To support the implementation of practical work and system development, several data collection methods are carried out as follows: (Sugiyono, 2017)

a. Observation

Conducting direct observation of the manual attendance recording process at PT Dupoin Palembang Branch to understand the ongoing employee attendance workflow, starting from filling out the attendance list to attendance recapitulation.

b. Interview

Conduct interviews with administrative staff and personnel leaders to find out the problems faced in managing employee attendance, such as delays in data recaps, risk of manipulation, and the need for a more efficient and accurate digital-based attendance system [8] .

c. Literature Studies

Examine references from books, journals, and technical documents related to electronic attendance systems, web-based programming, as well as aspects of data security and digital employee attendance management. This study aims to provide a theoretical basis in the development of a web-based electronic attendance system that suits the needs of companies [9] .

2.2 System Development Methods

The system development method used in this project is the Waterfall model, which is a systematic and structured approach where each stage is carried out sequentially and cannot be continued to the next stage before the previous stage is completed. The stages in this model are as follows:

1. Needs Analysis

At this stage, the process of identifying and collecting information about system needs, both functional and non-functional needs, is carried out. Information was obtained through interviews with related parties and direct observation of the work process that runs in the organizational environment. The results of this stage become the basis for designing a system that suits the needs of users.

2. System Design

The system design stage is a process of transforming needs that have been analyzed into the form of technical designs. Activities in this stage include creating a user-friendly and easy-to-understand interface design, designing a database structure for efficient data management,

Use case Diagram

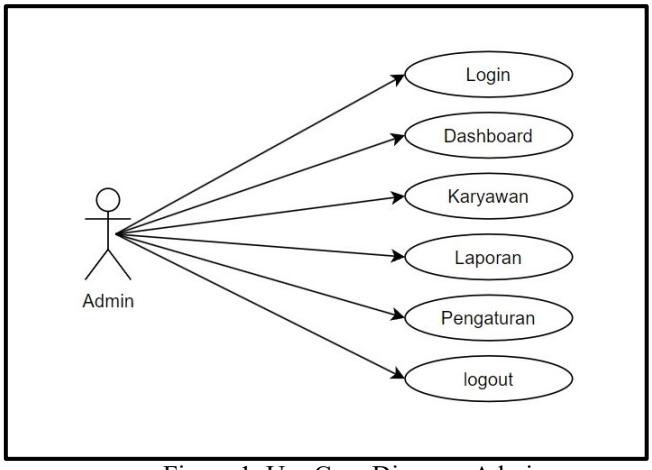
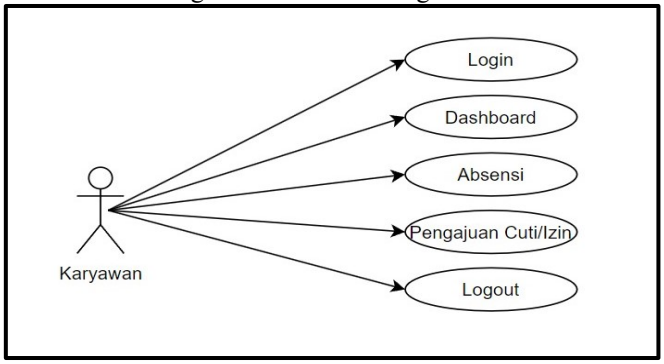
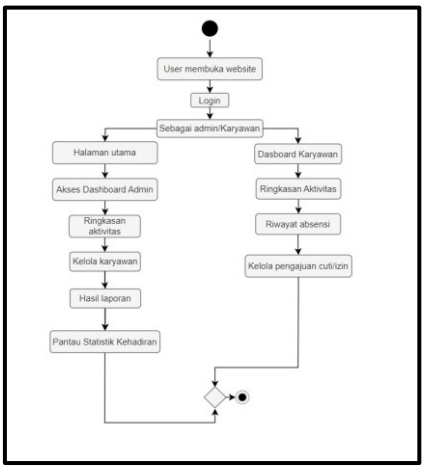


Figure 1. Use Case Diagram Admin



Picture 1 Use Case Employee Diagram

Diagram Activity



Picture 2. Diagram Activity

2.3 Implementation (Coding)

Once the system design is approved, the next stage is the implementation or creation of the program. In this process, the system is developed using the PHP programming language with the support of the **Bootstrap** framework for a responsive and attractive interface design. Data is stored and managed using **the MySQL** database management system, which allows for structured data storage and retrieval.

2.4 System Testing

This stage aims to ensure that all functions in the system run as designed and that there are no errors (bugs). Testing is carried out through direct testing in a work or laboratory environment, so that it can be found out whether the system is able to meet the needs of users well and reliably under real conditions.

2.5 Maintenance and Evaluation

Once the system has been successfully implemented and tested, the final stage is maintenance and evaluation. Maintenance includes bug fixing activities that may be found after the system has been used, as well as system updates according to new needs that arise. In addition, training activities are also carried out for administrative staff or system users so that they can operate the system effectively and efficiently.

3. Results and Discussion

3.1 System Overview

The web-based attendance system developed at PT DUPOIN Palembang Branch is a digital solution to record and monitor employee attendance in real-time. This system replaces manual logging methods that are prone to errors and inefficient. Web-based systems enable cross-device access as well as centralized and integrated attendance data processing.

a. The system was developed using the PHP programming language, the Bootstrap framework for the user interface, and MySQL as the database system. Access rights in the system are divided into three main roles, namely:
b. Admins, who have full control over data and settings
c. Employees, who can only attend and view their schedules and attendance history.

3.2 System Display and Functionality

a) Login Page

The login page is the main entrance to the attendance system. Users are required to enter **a username and password** to be able to access the system according to their respective access rights. The simple and responsive interface ensures users from different divisions can log in easily without any navigational difficulties.

Picture 3. Login page

b) Dashboard Administrator

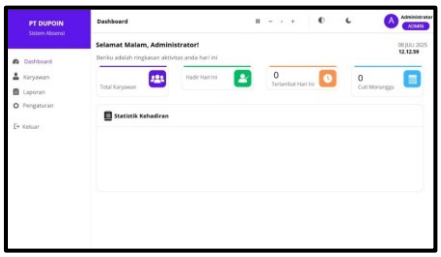


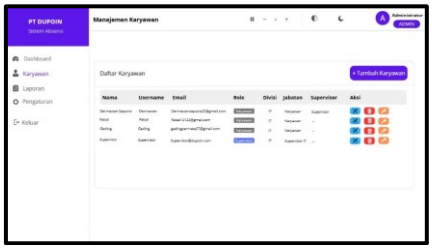
Figure 5. Dashboard Administrator

After successfully logging in, users with **the Administrator role** will be redirected to the dashboard page. This page provides a summary of daily attendance activities, which includes:

1. Total employees
2. Today's attendance
3. Number of delays today
4. Leave requests pending approval

This feature is very helpful for management in monitoring the daily performance of employees directly and in real-time.

c) Employee Data Management



Picture 4. Employee Data Management

On the Employee menu, admins can manage the data of all employees. The information recorded includes:

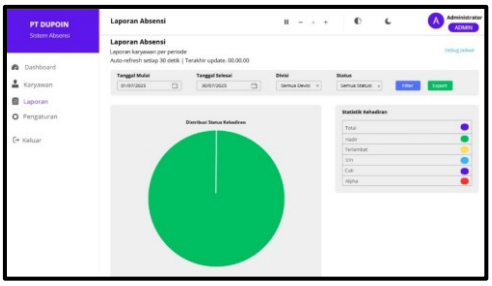
1. Full name
2. Powered by E-Mail
3. Email
4. Role (Employee/Supervisor)
5. Division
6. Position
7. Supervisor Name

Three action features are available:

8. Edit (blue icon)
9. Delete (red icon)
10. Reset Password (orange icon)

The + Add Employee button is used to add new hires to the system, making the administrative recruitment process faster and smoother.

d) Attendance Report



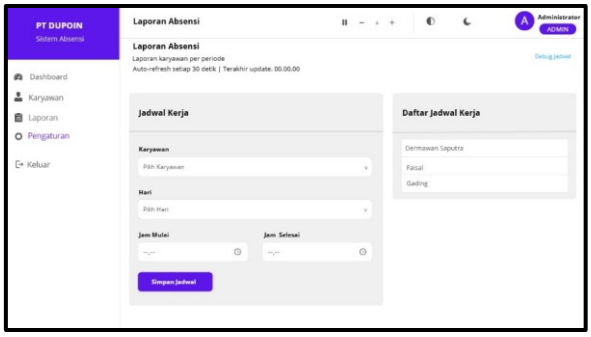
Picture 5 Attendance Report

This menu displays attendance statistics for a given period. Its important features:

1. Filter by start & end date, division, and attendance status (Present, Late, Permission, Leave, Alpha).
2. Attendance Status Distribution Graph in pie chart.
3. Color statistics to distinguish attendance status.
4. Feature export reports to external formats (PDF/Excel) for reporting or auditing purposes.

This report is useful for supervisors and HR to assess employee discipline levels based on objective data.

e) Work Schedule Settings



Picture 6. Work Schedule Settings

This menu is used to compile employees' work schedules according to the specified working days and hours. This feature consists of:

1. Employee selection dropdown
2. Weekday selection
3. Start and end time determination
4. Save Schedule Button
5. Work schedule list view in the right pane

Work schedule data is the main reference for the system in assessing the status of late or absenteeism automatically.

System Outcome Evaluation

From the results of system implementation and functionality testing in PT DUPOIN's work environment, several achievements were obtained:

Table 1. Evaluation of Results

Yes	Indicators	Before Digital Systems	After Digital Systems
1	Attendance recording time	Manual (±5 minutes/employee)	Automatic (instant)
2	Monthly attendance reporting	Manual via Excel	Automatic, just export
3	Access employee data	Paper archive	Online & real-time
4	Delay validation	Manual	Based on the system schedule
5	Data security	Vulnerable to loss or damage	Protected via system login

f) System Advantage Analysis

Web-based employee absence archive information systems have a number of significant advantages in supporting company operations. First, in terms of accessibility, this system can be accessed through various devices such as computers, laptops, tablets, and smartphones as long as they are connected to the internet. This provides high flexibility for users, both employees and admins, to access data anytime and anywhere. Second, this system increases the speed of reporting, because the process of exporting reports can be done with just a few clicks, without the need to compile reports manually like in conventional systems.

In addition, this system also encourages transparency and accountability, because superiors or supervisors can directly see employee attendance data in real-time without the need to wait for a written report from the HR department. Finally, this system is able to increase the efficiency of human resources, especially in reducing the workload of HR staff who previously had to recapitulation attendance data manually. With this system, the attendance administration process becomes more practical, accurate, and organized.

g) Constraints and Development Plans

1. Constraints:
2. The system does not yet support integration with the fingerprint machine.
3. There are no automatic notifications to users when they are late or absent.

h) Development plan:

1. Addition of a notification module via email or WhatsApp.
2. Automatic attendance device integration.
3. Location-based attendance feature (*geolocation*) for WFH/field employees.

4. Conclusion

With this system, the attendance recording process becomes faster, more accurate, and easier. Admins no longer need to do manual recaps because reports can be directly viewed and downloaded from the system. In addition, supervisors can also monitor the presence of their subordinates without having to wait for a report from the administration. Employees can also view their work schedules and attendance history independently. Overall, this system provides many benefits, including improving work efficiency, reducing administrative burden, and supporting attendance data transparency.

Suggestion

In order for this system to continue to grow and provide wider benefits for the company, the author gives some suggestions as follows:

1. Add additional features such as automatic notifications, fingerprint integration, or location-based attendance (GPS).
2. Conduct training for admins, supervisors, and employees so that they can understand how to use the system properly.
3. Backup data periodically, so that the information in the system remains safe and not lost in the event of a system failure.

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