DESIGN AND BUILD A WEBSITE-BASED EMPLOYEE ATTENDANCE INFORMATION SYSTEM AT SATKER BEKANGDAM I/BUKIT BARISAN

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Abstract—*The employee attendance process at Bekangdam I/Bukit Barisan was previously conducted manually, which created potential problems such as recording errors, data loss, and delays in generating attendance reports. This study aims to design and develop a website-based employee attendance information system that supports computerized and accurate attendance recording. The system was developed using the Laravel framework as the backend, HTML and JavaScript as the frontend, and MySQL as the database management system. The system also utilizes Global Positioning System (GPS) technology to validate employee locations during the attendance process. The development method used in this research is Rapid Application Development (RAD), which consists of planning, system modeling, construction, and implementation stages. Performance testing using WAPT Pro with a simulation of 20 concurrent users for 10 minutes showed that the system successfully handled 20 user sessions with 646 pages accessed and 3,039 server request hits, with an average page response time of 0.61 seconds. Security testing using OWASP ZAP indicated that no high-risk vulnerabilities were found. In addition, User Acceptance Testing (UAT) involving 20 respondents showed that the system functions according to user needs. The results indicate that the developed system improves attendance recording accuracy, accelerates attendance reporting, and increases the effectiveness of employee attendance management.*

Keywords: *employee attendance system, GPS location validation, laravel framework, rapid application development (RAD), web-based information system.*

Abstrak—*Proses absensi pegawai pada Bekangdam I/Bukit Barisan sebelumnya masih dilakukan secara manual sehingga berpotensi menimbulkan kesalahan pencatatan, kehilangan data, serta keterlambatan dalam penyusunan laporan kehadiran. Penelitian ini bertujuan untuk merancang dan membangun sistem informasi absensi pegawai berbasis website yang mampu mendukung pencatatan kehadiran secara terkomputerisasi dan akurat. Sistem dikembangkan menggunakan framework Laravel sebagai backend, HTML dan JavaScript sebagai frontend, serta database MySQL sebagai media penyimpanan data. Sistem juga memanfaatkan teknologi Global Positioning System (GPS) untuk memvalidasi lokasi pegawai saat melakukan absensi. Metode pengembangan yang digunakan adalah Rapid Application Development (RAD) yang terdiri dari tahap perencanaan, pemodelan sistem, konstruksi, dan implementasi. Pengujian performa menggunakan WAPT Pro dengan simulasi 20 pengguna selama 10 menit menunjukkan bahwa sistem mampu menangani 20 sesi pengguna dengan 646 halaman diakses dan 3.039 permintaan ke server, dengan waktu respons rata-rata halaman sebesar 0,61 detik. Pengujian keamanan menggunakan OWASP ZAP menunjukkan tidak ditemukan kerentanan dengan tingkat risiko tinggi. Selain itu, User Acceptance Testing (UAT) yang melibatkan 20 responden menunjukkan bahwa sistem berfungsi sesuai kebutuhan pengguna. Hasil penelitian menunjukkan bahwa sistem mampu meningkatkan akurasi pencatatan, mempercepat penyusunan laporan absensi, serta meningkatkan efektivitas pengelolaan absensi pegawai.*

Kata Kunci*: sistem absensi karyawan, validasi lokasi GPS, framework laravel, rapid application development, sistem informasi berbasis web.*

INTRODUCTION

Work discipline is an essential element that plays an important role in achieving organizational effectiveness and operational efficiency, particularly in institutions that require a high level of discipline such as military organizations (Nawir et al., 2024). The success of operational activities in

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an organization is closely related to the discipline, punctuality, and attendance of personnel in the workplace. Therefore, the attendance system becomes a crucial component in monitoring employee presence and supporting the effectiveness of organizational performance. (Arifin & Sasana, 2022) state that work discipline is one of the most important functions in human resource management because it directly influences employee productivity and the achievement of organizational goals.

The Transportation Provision Unit of the Military Regional Command I/Bukit Barisan (Bekangdam I/Bukit Barisan) is a work unit within the Indonesian Army responsible for supporting logistics and transportation activities within the Kodam I/Bukit Barisan area. In carrying out its duties, Bekangdam I/Bukit Barisan manages a considerable number of personnel distributed across several operational sections. However, the attendance recording system currently implemented still relies on manual procedures using attendance sheets or personnel attendance logbooks. This manual system often creates several administrative problems, such as data loss, duplication of records, and errors in the process of recapitulating attendance data. As a result, the preparation of attendance reports becomes less efficient and prone to inaccuracies.

The rapid development of information technology has encouraged many organizations to adopt digital systems to improve administrative efficiency and data accuracy. Various studies have proposed the implementation of digital attendance systems to replace manual attendance processes. For example, (Toyyiba & Amalia, 2023) developed a barcode-based attendance system to improve the speed and accuracy of attendance data processing. Meanwhile, (Qois & Jumaryadi, 2021) proposed a smartphone-based attendance system that allows employees to record attendance digitally through mobile devices. In addition, digital databases enable attendance data to be stored centrally and managed more effectively (Setyaningsih, 2023).

Although several studies have developed digital attendance systems, most of them are designed for general office environments and primarily focus on simplifying the attendance recording process. These systems generally rely on a single verification mechanism such as barcode scanning or manual input, which still leaves opportunities for attendance manipulation. Furthermore, previous studies rarely consider the operational characteristics of institutions that require stricter attendance verification, such as military organizations that demand higher levels of discipline, accountability, and location validation during the attendance process. This condition indicates that there is still a gap in research related to the development of an integrated attendance information system that is capable of verifying both employee presence and location simultaneously in environments that require strict supervision.

Based on these considerations, this study proposes the development of a web-based employee attendance information system that integrates Global Positioning System (GPS) location verification and real-time photo capture features. The system allows personnel to record attendance using smartphones while ensuring that the attendance process is carried out within the designated office area. The integration of these features is intended to improve the validity of attendance records and minimize the possibility of attendance manipulation. In addition, attendance data are automatically stored in a centralized database, enabling administrators to monitor attendance records and generate reports more efficiently.

The system in this research is developed using the Rapid Application Development (RAD) method. This method is chosen because it emphasizes iterative development, rapid prototyping, and active user involvement during the system development process. By applying the RAD approach, the system can be developed more quickly while still accommodating user requirements and operational needs within the Bekangdam I/Bukit Barisan environment. The development process utilizes web technologies such as Laragon, Composer, and Visual Studio Code as the main development tools.

The novelty of this research lies in the integration of GPS-based location verification and real-time photo capture features within a single web-based attendance platform designed specifically to support the operational needs of Bekangdam I/Bukit Barisan. Unlike previous studies that generally implement a single attendance verification mechanism, this system combines multiple verification features to increase the accuracy and reliability of attendance records.

This study is expected to contribute both practically and academically. Practically, the proposed system can improve the efficiency, accuracy, and transparency of attendance management within Bekangdam I/Bukit Barisan. Academically, this research provides a reference for the development of integrated attendance information systems that combine location verification and digital documentation features, particularly for institutions that require high levels of discipline and accountability.

Therefore, the objective of this study is to design and develop a web-based employee attendance information system integrated with GPS

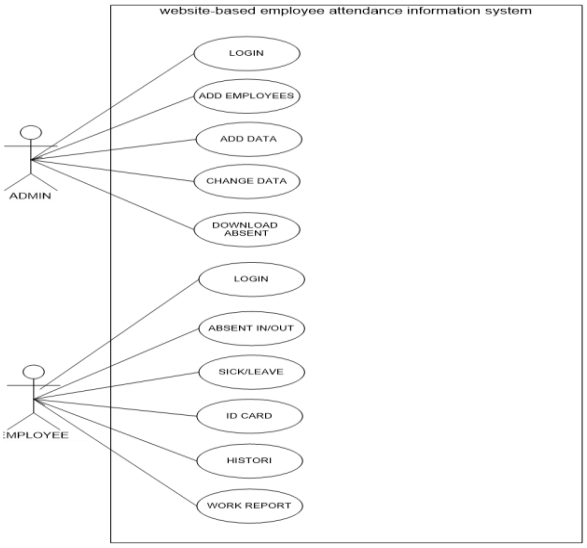
location verification and real-time photo capture to improve the accuracy and efficiency of attendance management at Bekangdam I/Bukit Barisan.

MATERIALS AND METHODS

This research employs the Rapid Application Development (RAD) method to develop a web-based employee attendance information system at Bekangdam I/Bukit Barisan. RAD was selected because it emphasizes rapid system development through iterative prototyping and continuous user involvement. Compared to traditional development methods such as the Waterfall model, which require a longer development cycle and rigid sequential stages, RAD allows faster system development and easier adjustment to user requirements. This approach is considered appropriate for this research because the developed attendance system must directly reflect the operational needs of personnel and administrators at Bekangdam I/Bukit Barisan. The use of RAD also supports the main objective of this study, which is to design and implement an effective, accurate, and practical attendance information system that can replace the existing manual attendance process.

The development process in this research follows several RAD stages consisting of planning, system modeling, construction, and implementation. In the planning stage, the researchers conducted an initial analysis of the problems related to the existing manual attendance system. At this stage, information was collected regarding attendance procedures, data management practices, and administrative constraints experienced by personnel responsible for managing attendance records. The results of this stage were used to identify system requirements, including the need for features such as login authentication, attendance check-in and check-out, photo capture during attendance, GPS-based location validation, and attendance reporting.

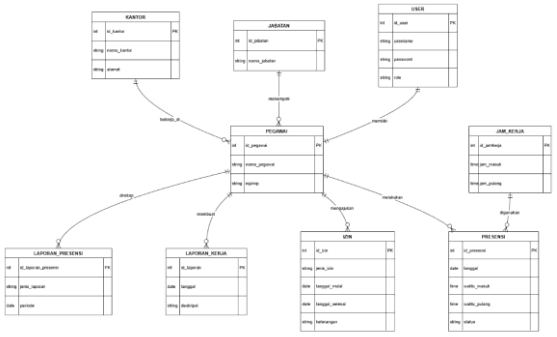
The system modeling stage aims to translate user requirements into a structured system design. In this stage, Unified Modeling Language (UML) diagrams were used to visualize the system architecture and validate functional requirements. The Use Case Diagram was used to identify the main actors involved in the system, namely administrators and personnel, and to describe their interactions with the attendance system. The use case diagram of the proposed attendance system is presented in Figure 1.



Source: (Research Result, 2026)

Figure 1. Use Case Diagram of the Attendance Information System

In addition, an Entity Relationship Diagram (ERD) was developed to define the database structure and relationships between entities such as users, attendance records, and system logs. The database structure designed for the system is illustrated in Figure 2.



Source: (Research Result, 2026)

Figure 2. Entity Relationship Diagram of the System

The construction stage involves the development of the system based on the design produced in the previous stage. The system was developed using the Laravel framework version 9 with the Model-View-Controller (MVC) architecture to support modular and structured application development. The database used in this research is MySQL to manage attendance data in a centralized manner. The development environment utilizes Laragon as a local server platform, Composer for dependency management, and Visual Studio Code as the main code editor during the programming process. The system is designed as a web-based application that can be accessed through a web

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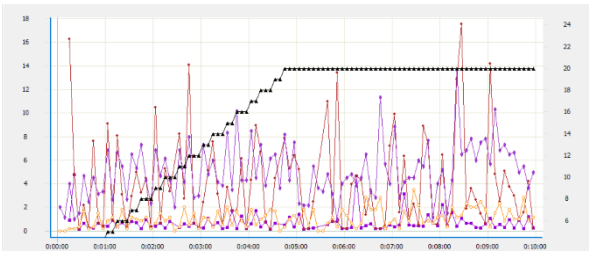
browser using an internet network and supports attendance recording through smartphones equipped with GPS and camera features.

Performance testing of the Bekangdam I/Bukit Barisan E-Presensi website was conducted using WAPT Pro to evaluate system stability and responsiveness under concurrent user access. The testing scenario simulated 20 active users (virtual users) accessing the system simultaneously for a duration of 10 minutes. During the testing process, the system successfully handled 20 user sessions, with a total of 646 pages accessed and 3,039 server request hits generated. The results showed that no failed sessions or failed page accesses occurred during the testing period, indicating that the system operated reliably under multiuser conditions. The average page response time was recorded at 0.61 seconds, while the response time including all page elements reached 3.29 seconds, demonstrating that the system is capable of providing relatively fast responses to user requests even when accessed concurrently. In addition, most HTTP requests were successfully processed by the server, and although 40 hit requests were recorded as failed, these did not affect the success of user sessions or page access. Overall, these results indicate that the Bekangdam I/Bukit Barisan E-Presensi system is able to handle simultaneous user access with good stability and reliability. The results of the performance testing conducted using WAPT Pro are illustrated in Figure 3, which shows the system's ability to handle concurrent user access during the testing process.



Source: (Research Result, 2026)

Figure 3. Performance Testing of the Bekangdam I/Bukit Barisan Attendance System

Security testing of the web-based employee attendance system was conducted using the OWASP ZAP (Checkmarx) tool to identify potential security vulnerabilities within the application. The testing process involved automated scanning that included spider crawling, active scanning, and analysis of application parameters and endpoints to detect possible security weaknesses. Based on the OWASP ZAP scanning report, particularly the *Alert Counts by Risk and Confidence*, the results indicated that no high-risk vulnerabilities were identified in the system. The detected issues were primarily categorized as low risk and informational alerts, which means that no critical vulnerabilities capable of directly compromising the system or accessing sensitive data were found. The results also indicate that the system has implemented basic security mechanisms adequately, including input validation and secure session management. Overall, these findings suggest that the Bekangdam I/Bukit Barisan E-Presensi system has a relatively good level of security and is safe for operational use, although further improvements in security configuration and system hardening are still recommended to minimize potential risks in the future. The detailed results of the vulnerability scanning conducted using OWASP ZAP are summarized in Table 1.

Table 1. OWASP ZAP Vulnerability Scanning Results

Risk Level	User Confirmed	High	Medium	Low	Total
High	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Medium	0 (0.0%)	2 (8.0%)	4 (16.0%)	1 (4.0%)	7 (28.0%)
Low	0 (0.0%)	2 (8.0%)	6 (24.0%)	1 (4.0%)	9 (36.0%)
Informational	0 (0.0%)	2 (8.0%)	5 (20.0%)	2 (8.0%)	9 (36.0%)
Total	0 (0.0%)	6 (24.0%)	15 (60.0%)	4 (16.0%)	25 (100%)

Source: (Research Result, 2026)

User Acceptance Testing (UAT) was conducted to evaluate the usability and functionality of the developed system from the user perspective. The UAT process involved 20 respondents consisting of administrators and personnel of Bekangdam I/Bukit Barisan who are directly involved in the attendance process. Each respondent was asked to use the system and provide an assessment based on several evaluation aspects, including system usability, feature functionality, ease of recording attendance, and the accuracy of attendance reports. The evaluation instrument used in this study was a questionnaire with three response options: Yes, Neutral, and No. The “Yes” response indicates that the system meets user expectations and operational needs, “Neutral” indicates that the system functions adequately but may still require improvement, and “No” indicates that the system does not meet user expectations. The success criterion for the UAT evaluation was determined based on the proportion of “Yes” responses obtained from all respondents. The

system is considered acceptable if the majority of respondents provide positive responses indicating that the developed attendance information system is able to support operational activities effectively and is easy to use in the Bekangdam I/Bukit Barisan environment.

The testing results indicate that the developed system performs well in terms of performance, security, and user acceptance. Performance testing using WAPT Pro with 20 concurrent virtual users for 10 minutes showed that the system successfully handled 20 user sessions with 646 pages accessed and 3,039 server request hits, without any failed sessions or page accesses. The average page response time was recorded at 0.61 seconds, while the response time including all page elements reached 3.29 seconds, indicating stable system performance under multiuser conditions. Security testing using OWASP ZAP also showed no high-risk vulnerabilities, with detected issues categorized only as low risk and informational alerts. Furthermore, the User Acceptance Testing (UAT) involving 20 respondents indicated that the majority of users provided positive responses, demonstrating that the system is suitable for supporting attendance management activities at Bekangdam I/Bukit Barisan.

RESULTS AND DISCUSSION

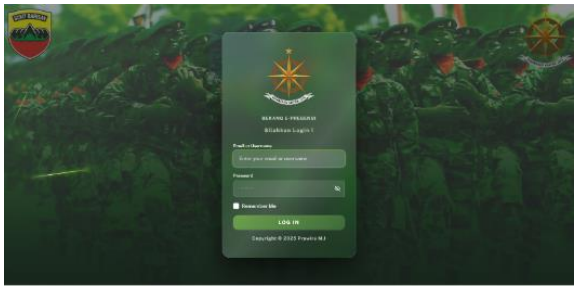
Implementation of a website-based employee attendance information system at the Bekangdam I/Bukit Barisan work unit

The rapid development of information technology requires organizations to adopt information systems that can improve operational efficiency and data management. In this research, a website-based employee attendance information system was successfully developed and implemented in the Bekangdam I/Bukit Barisan Task Force to replace the previously used manual attendance recording process. The manual system had several limitations, including vulnerability to recording errors, potential data manipulation, difficulties in preparing attendance reports, and time inefficiency in administrative processes. To address these problems, the developed system utilizes web technology integrated with a centralized database to support real-time attendance recording and monitoring. Through the implementation of this system, employee attendance can be recorded digitally using location-based validation, enabling administrators to manage attendance data more accurately and efficiently. As stated by (Sitorus et al., 2024) web-based attendance systems enable centralized data management and improve the transparency and efficiency of attendance administration.

The implementation results show that the developed system is able to support the research objective of improving the effectiveness and accuracy of employee attendance management. Performance testing using WAPT Pro with a simulation of 20 concurrent users for 10 minutes showed that the system successfully handled 20 user sessions with 646 pages accessed and 3,039 server request hits, with an average page response time of 0.61 seconds. These results indicate that the system can operate reliably and provide fast responses when accessed simultaneously by multiple users, thereby supporting efficient attendance recording activities. In addition, security testing using OWASP ZAP indicated that no high-risk vulnerabilities were found in the system, demonstrating that the developed system is sufficiently secure for managing sensitive attendance data. Furthermore, the results of User Acceptance Testing (UAT) involving 20 respondents showed that the majority of users provided positive responses regarding system usability and functionality. These findings indicate that the developed system is able to address the initial problems identified in the manual attendance process by reducing recording errors, improving data transparency, and accelerating the generation of attendance reports, thereby supporting more effective and efficient attendance management at Bekangdam I/Bukit Barisan.

Interface and Authentication System

The resulting attendance information system has two levels of user access, namely admin and employee. Each user has a different interface and function according to his or her roles and responsibilities. This separation of access rights aims to maintain data security and ensure that each user can only access features relevant to their tasks. The implementation of role-based access control in information systems is widely used to restrict system access according to user roles and to prevent unauthorized access to sensitive (Samsudin & Rahman, 2024). The login interface used as the initial authentication gateway of the system is shown in Figure 4.



Source: (Research Result, 2026)

Figure 4. System Login Interface

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The figure shows the system login interface with username and password fields as the user's initial authentication mechanism. The login page serves as the primary gateway to access the system, where users are required to enter a username and password configured by the administrator. This authentication process functions to verify user identity before granting access to system resources. Authentication mechanisms are an essential component in information system security because they protect user data and prevent unauthorized access to digital applications (Riadi et al., 2021)

Employee User Interface

The employee dashboard provides a responsive interface that can be accessed through desktop and mobile devices, enabling military and civil servant employees to perform attendance activities from various platforms. This responsive design improves system usability and ensures that users can access the application regardless of device screen size. Responsive web design and mobile-first approaches are widely used to enhance user experience, flexibility, and accessibility across multiple devices (Nurhikmat et al., 2024). The mobile dashboard interface for employees is presented in Figure 5.

Source: (Research Result, 2026)

Figure 5. Mobile Employee Dashboard Interface

The mobile interface displayed on the employee dashboard allows system access from various locations as long as it is connected to the internet network. The main features available on the employee dashboard include incoming and outgoing attendance, permit application, daily work report creation, and access to personal attendance history. Research (Christyanto et al., 2022) It shows that information systems with mobile interfaces can increase user adoption rates by up to 65% compared to systems that can only be accessed through desktops.

Attendance feature with Time and Location Validation and face detection

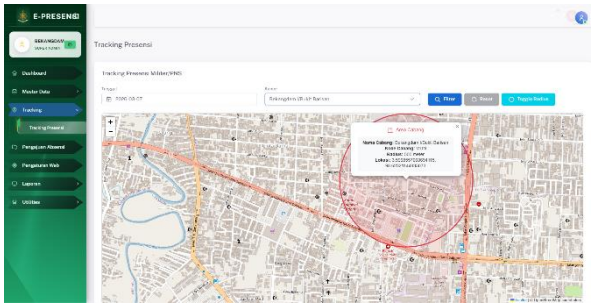
The inbound and outbound attendance feature is equipped with a time, location, and facial verification validation system. The system automatically records the attendance time and compares it with predetermined working hours. If an employee performs attendance outside the specified working hours, the system will automatically categorize the attendance as late. In addition, the system integrates Global Positioning System (GPS) technology to ensure that attendance is carried out within the configured radius of the office location.

To enhance system security and prevent attendance fraud, the system also implements face recognition technology to verify the identity of employees during the attendance process. The captured facial image is compared with the facial data stored in the system database to confirm that the attendance is performed by the registered employee. The integration of GPS-based location validation and facial recognition technology can improve the accuracy, transparency, and reliability of employee attendance records (Sinaga et al., 2024). An example of the mobile interface used for the e-attendance process is shown in Figure 6.

Source: (Research Result, 2026)

Figure 6. Mobile Interface for E-Attendance

The implementation of GPS technology in the attendance system makes a significant contribution to improving the accuracy of attendance data. Research by (Nawir et al., 2024) shows that the use of GPS technology in attendance systems can increase attendance recording accuracy by up to 95% and reduce attendance fraud practices. Location validation is performed in real time by comparing the GPS coordinates of the user's device with the office coordinates configured in the system. If the employee is outside the specified radius, the system will reject the attendance recording and provide a notification to the user. The GPS-based attendance tracking interface is presented in Figure 7.



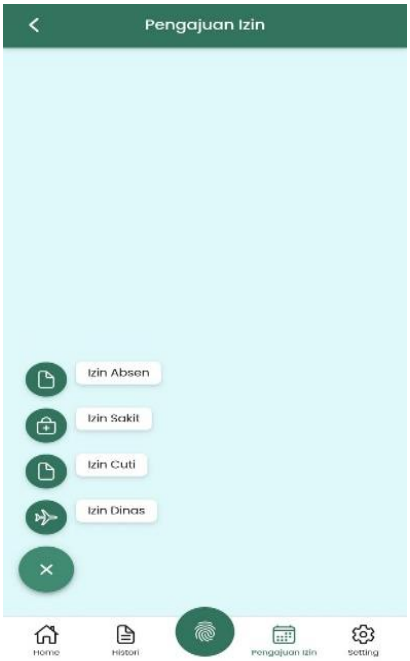
Source: (Research Result, 2026)
Figure *7. GPS-Based Attendance Tracking Interface*

In addition to GPS-based validation, the system also integrates face recognition technology to verify the identity of employees during the attendance process. The system captures the user's facial image and compares it with the facial data stored in the database to ensure that attendance is carried out by the registered employee. This additional verification mechanism helps prevent fraudulent practices such as proxy attendance or unauthorized use of another employee's account.

Compared to several previous attendance systems that only rely on web-based login authentication without location verification, the proposed system provides stronger validation in ensuring the authenticity of attendance data. Some web-based attendance applications allow users to record attendance from any location as long as they can access the system, which may increase the risk of attendance manipulation. Meanwhile, studies that implement GPS-based attendance systems improve location accuracy but may still be vulnerable to identity misuse if user authentication relies only on username and password. Therefore, the integration of GPS-based location validation and face recognition in this study provides a more comprehensive approach to improving attendance accuracy, operational efficiency, and employee discipline compared to previous web-based attendance systems.

Permit Application and Work Report Features

This system also provides a permit application feature that allows employees to apply for sick leave, annual leave, or official duty permits digitally. Employees can attach supporting documents in the form of photos or files as proof of submission. The submitted request will be stored in the system and will wait for approval from the administrator. The implementation of a digital leave management system enables employees to submit requests online while allowing administrators to review and approve applications more efficiently. Previous studies indicate that web-based leave management systems significantly improve administrative efficiency, reduce paperwork, and accelerate the approval process compared to conventional manual procedures (Azizah & Utami, 2024). The mobile interface for submitting permit applications is presented in Figure 8.



Source: (Research Result, 2026)
Figure 8. Mobile Interface for Permit Application

The daily work report feature is designed as an innovation that supports employee performance monitoring and evaluation. After completing the attendance process, each employee is required to input a report describing the activities carried out during the day. The submitted reports are stored in the system database and can be accessed by administrators or management for monitoring and evaluation purposes. The integration between attendance data and daily activity reports enables organizations to obtain more comprehensive information regarding employee discipline and productivity.

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Through this mechanism, management can analyze the relationship between attendance patterns and work activities, allowing more objective and data-driven performance evaluation. Previous studies have shown that digital employee monitoring systems that integrate attendance records with activity reporting can improve transparency, facilitate performance assessment, and support managerial decision-making based on accurate organizational data (Pratiwi et al., 2025) Therefore, the integration of attendance features with daily work reporting in this system provides additional value compared to conventional attendance systems that only record employee presence without documenting daily work activities. An example of the mobile interface used to submit daily work reports is shown in Figure 9.

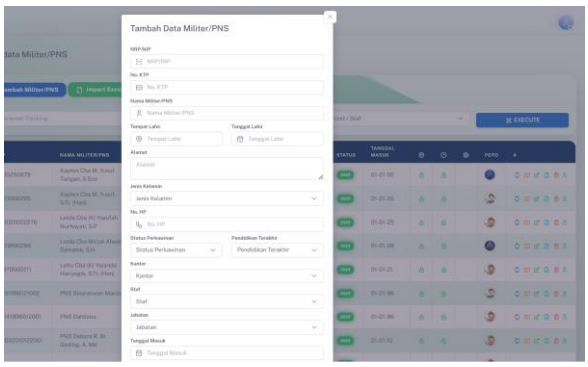
Source: (Research Result, 2026)
Figure 9. Mobile Interface for Daily Work Report Submission

The attendance history feature allows employees to view their own attendance track record in a given period. Employees can filter based on the date range to see incoming attendance data, outbound attendance status, attendance status, and late information if any. This data transparency provides an opportunity for employees to conduct an independent evaluation of their attendance discipline. The mobile interface displaying the attendance history feature is presented in Figure 10.

Source: (Research Result, 2026)
Figure 10. Mobile Interface for Attendance History

Administrative Functions and Data Management

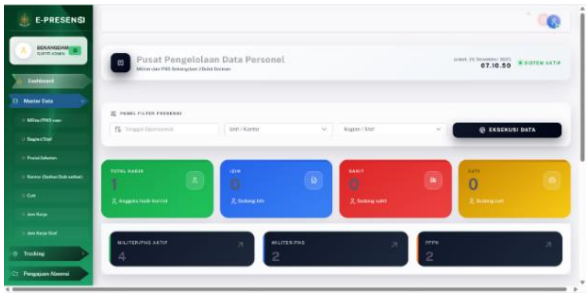
On the administrator side, the system provides a comprehensive dashboard to manage all employee data and system configuration. The administrator has full authority to add new employees, set working hours, manage job and office data, and approve permit applications from employees. The process of managing employee data begins with the input of identity data such as name, NIK/NRP, position, and office. After the data is saved, the administrator will create an account with a username and password that will be used by employees to access the system. The interface for adding employee data on the administrator side is shown in Figure 11.



Source: (Research Result, 2026)
Figure 11. Interface for Adding Employee Data (Admin Panel)

Administrative functions include master data management which includes employee data, office

data, position data, and working hours settings. Administrators can perform addition, change, and delete operations against all of those data entities. This flexibility in data management allows the system to adapt to changes in organizational structure without requiring modification of program code. According to Stair and (Prakoso & Silfianti, 2024), the ability of the system to adapt to changing organizational needs is an important indicator of the quality of the information system. The main administrator menu interface that provides access to these management functions is presented in Figure 12.

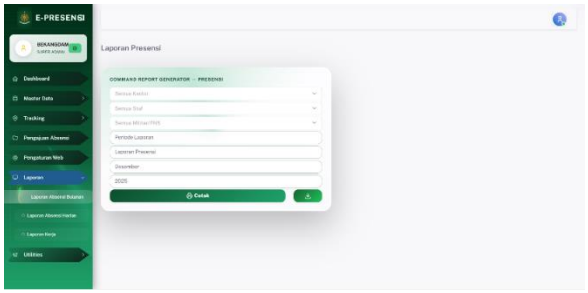


Source: (Research Result, 2026)
Figure 12. Administrator Menu Interface

The administrator also has the function to approve or reject the application for permission from the employee. Each incoming permission application will be displayed on the admin interface with complete information including employee identity, permission type, permission period, and supporting documents. Administrators can verify the completeness of documents and provide approval decisions. The system will automatically send a notification to employees regarding the status of their permit application.

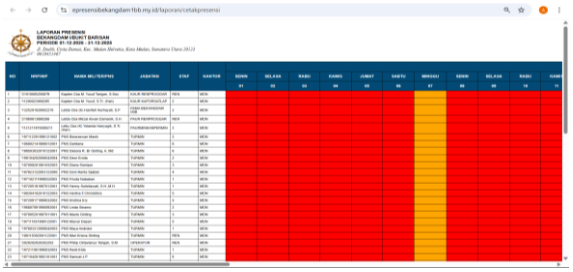
Data Reporting and Analysis System

The reporting feature is a crucial component of this system. Administrators can generate attendance reports in various formats, both per individual and for all employees within a certain period. Reports can be filtered by specific month, office, staff, and employee. The system also provides the option to print or download reports in a further processing format. The interface of the attendance report menu is presented in Figure 13.



Source: (Research Result, 2026)
Figure 13. Attendance Report Menu Interface

The system also provides a print preview feature that allows administrators to review the attendance report before printing or exporting it. An example of the print display of employee attendance reports is shown in Figure 14.



Source: (Research Result, 2026)
Figure 14. Print Preview of Employee Attendance Report

This ability of the system to automatically generate reports significantly reduces the administrative workload. Automated reporting mechanisms allow the system to process attendance data and generate structured reports without requiring manual calculations. Previous studies indicate that automated attendance and reporting systems can reduce administrative tasks, accelerate data processing, and improve the accuracy of organizational data management compared to manual reporting procedures (Sawant et al., 2024).

The resulting report includes complete information such as employee name, number of working days, number of attendances, number of delays, number of permits, and percentage of attendance. The report format is designed to facilitate the analysis and evaluation process, where data is presented in a structured table with automatic statistical calculations. Administrators can easily identify employees with low attendance rates or frequent delays for corrective action. In addition, the generated reports can also be used as a reference for calculating the attendance component in the payroll system.

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System Functions and Uses

Overall, the website-based employee attendance information system has various integrated functions to support the effective management of employee attendance. The main functions and features available in the system are summarized in Table 2.

Table 2. Main Functions of the Website-Based Employee Attendance Information System

Menu	Sub Menu	Uses
Login Menu	*Employee login*	The User Login *submenu* functions to verify *usernames* and *passwords* so that users can access the system according to their access rights.
Attendance Menu	Attendance	The Attendance Submenu functions to record employee attendance time when starting work in *real-time.*
	Outgoing Attendance	The Outgoing Attendance submenu functions to record the employee's return time after working hours are over.
History Menu	Attendance History	The attendance history submenu functions to display employee attendance data based on dates, entry times, and exit times.
Permissions menu	Permit Application	The Permit/Sick Submission Submenu functions to manage employee absence data with information on leave or illness as well as leave or foreign service.
Employee Data Menu (Admin)	Master Data	The Employee Data Submenu functions to manage employee data which includes adding, changing, and deleting employee data.
Report Menu	Attendance Report	The Attendance Report submenu functions to display, print, and download employee attendance reports within a certain period.

Source: (Research Result, 2026)

Based on the functions that have been described, this system is designed using a user-centered design approach that prioritizes ease of use and process efficiency. Each feature is developed to accomplish specific tasks with minimal steps while maintaining data security and accuracy. The user-centered design approach emphasizes understanding user needs, behaviors, and system usability to ensure that the developed system is easy to use and supports organizational workflows effectively. Previous studies indicate that systems designed using UCD principles tend to achieve higher usability, better user satisfaction, and improved operational efficiency because the design process focuses on real user requirements (Rante & Suardi, 2025)

Implementation Benefits and Impact Analysis

The implementation of a website-based attendance information system improves the accuracy of attendance data by eliminating errors that commonly occur in manual recording processes. Attendance data is stored digitally in a structured database and can be accessed at any time for monitoring, evaluation, or auditing purposes. Previous studies show that online attendance systems provide more accurate and reliable attendance records and allow management to monitor employee discipline more effectively compared to manual attendance methods (Putra et al., 2024).

Second, the system increases transparency because each employee can access their own attendance history through the attendance history feature. This transparency allows employees to verify attendance records independently and reduces potential disputes related to attendance data. Similar findings were reported in studies on web-based attendance systems, which show that implementing web-based systems improves the accuracy, real-time monitoring, and transparency of attendance management in organizations (Kelvin & Yuliawan, 2025)

Third, administrative efficiency is significantly improved because the processes of data processing and report generation are performed automatically by the system. Administrators no longer need to perform time-consuming manual recapitulations, thereby reducing administrative workload and increasing operational efficiency. Similar findings were reported in studies on web-based and automated attendance systems, which found that such systems reduce manual data processing, accelerate report generation, and enhance administrative efficiency in attendance data management (Panjaitan, 2025).

Fourth, employee discipline is enhanced through the implementation of strict time and location validation mechanisms integrated with GPS technology and facial verification. These mechanisms ensure that employees perform attendance within the designated office location and verify their identity during the attendance process. Compared to conventional attendance systems that rely only on manual signatures or basic login

authentication, systems that implement GPS-based validation and facial recognition provide stronger control mechanisms and reduce the possibility of attendance fraud such as proxy attendance or manipulation of attendance time (Anggraini & Alda, 2025)

In addition to operational improvements, the system also supports better management decision-making. Accurate and real-time attendance data enables management to identify attendance patterns, evaluate work unit productivity, and formulate more targeted policies. The availability of comprehensive historical data also enables long-term trend analysis. Similar findings were reported in recent studies showing that attendance information systems with real-time data accessibility and decision support capabilities can enhance managerial decision-making by providing timely and accurate operational data for analysis and strategic planning (Teguh Santoso et al., 2025).

From a data security perspective, digital attendance systems reduce the risk of data loss caused by physical damage to documents or administrative errors. The system stores data on a server with periodic backup mechanisms to ensure data availability and integrity. Furthermore, the system records audit trails for each user activity, allowing administrators to track changes to attendance data and maintain accountability in organizational data management. Similar security mechanisms are commonly implemented in modern information systems to ensure data integrity and traceability (Nugroho et al., 2025).

To provide a clearer understanding of the advantages offered by the developed system, a comparison between the conventional attendance system and the proposed system is presented in Table 3.

Table 3. Comparison between the Conventional Attendance System and the Proposed System

Feature	Conventional Attendance	Proposed System
Location Validation	No	GPS-based
Identity Verification	Login only	Face recognition
Attendance Record	Manual	Automated database
Reporting	Manual recap	Automatic report
Work Monitoring	Not available	Daily work report

Source: (Research Result, 2026)

Potential for further development

The attendance information system that has been developed has the potential to be further developed by integrating various supporting technologies. Development can include integration with employee performance appraisal systems, so attendance data can automatically influence performance evaluations. In addition, the system can be developed by adding an automatic notification feature via email or messaging app to remind employees of their attendance hours or the status of their permit application.

Integration with biometric technologies such as facial recognition or fingerprinting can also be considered to improve system security and prevent absenteeism practices. Research (Apriadi & Sutrisna, 2023) It shows that the integration of the attendance system with biometric technology can increase system security by up to 99.7% and practically eliminate the possibility of attendance fraud. Facial recognition technology can be integrated with smartphone cameras for identity verification at the time of attendance.

The development of native mobile applications for Android and iOS platforms can also be a priority to provide a more optimal user experience compared to access through a web browser. Mobile apps can make more effective use of device features such as cameras, GPS, and push notifications. According to research (Mulyadi et al., 2020), mobile apps provide higher user satisfaction rates with an increase of up to 35% compared to responsive web interfaces.

The system also has the opportunity to be integrated with a broader human resource management information system, including personnel data management, payroll, and career development. This kind of integration will create a comprehensive digital ecosystem for human resource management within the Bekangdam I/Bukit Barisan Task Force. Research (Aeni & Hidayat, 2024) emphasizing that an integrated HR information system can increase the effectiveness of HR management by up to 50% and provide a significant return on investment in the long term.

Analytics features and executive dashboards can also be added to provide more interactive data visualizations. The dashboard can display a graph of attendance trends, a comparison of attendance rates between work units, and other key performance indicators. Good data visualization can help management in understanding patterns and making faster and more informed decisions.

The success of the implementation of this system is supported by the availability of adequate information technology infrastructure in the Bekangdam I/Bukit Barisan Task Force, including a stable internet network and adequate computer devices. The support of the leadership and the commitment of all employees are also key factors in the successful implementation of this system. Thus, this website-based employee attendance

information system has excellent prospects to continue to be developed and make a real contribution to improving the effectiveness of human resource management in the military environment.

CONCLUSION

This research successfully developed a website-based employee attendance information system at the Bekangdam I/Bukit Barisan Task Force that replaces the previous manual recording process with an integrated digital system. The system, built using the Laravel framework, is equipped with user authentication, GPS-based check-in and check-out with time and location validation, digital leave application, and automated attendance reports. Performance testing with 20 concurrent users showed that the system can handle simultaneous access with an average page response time of 0.61 seconds and 3.29 seconds including all page elements, without any failed sessions or critical errors. Security testing using OWASP ZAP found no high-risk vulnerabilities, while User Acceptance Testing (UAT) involving 20 respondents confirmed that the system meets user needs and is easy to use. The implementation of the system improves attendance data accuracy, transparency, administrative efficiency, and employee discipline. Furthermore, the system has strong potential for future development through integration with biometric technology and comprehensive human resource management systems to support a fully digital ecosystem in the military environment.

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