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Website-Based Employee Attendance System with QR Code at PT Sigap Jaya Sampoerna

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ABSTRACT

The development of information technology encourages companies to adopt digital systems to improve employee attendance management. PT Sigap Jaya Sampoerna previously relied on a manual attendance process that caused data inaccuracies, slow recapitulation, and limited supervision. This study aims to design and implement a web-based employee attendance system integrated with QR Code technology to improve efficiency and accuracy. The system was developed using the Waterfall method, consisting of requirements analysis, system design, implementation, and testing stages. The system enables QR Code-based attendance recording and real-time monitoring of employee presence. The results show that the proposed system simplifies attendance processes, reduces recording errors, and improves transparency in attendance data management. This study proves that a web-based QR Code attendance system can effectively support digital transformation in employee attendance management in private companies.

Perkembangan teknologi informasi mendorong perusahaan untuk mengadopsi sistem digital dalam pengelolaan absensi karyawan. PT Sigap Jaya Sampoerna sebelumnya menggunakan sistem absensi manual yang menyebabkan ketidak akuratan data, proses rekapitulasi yang lambat, serta keterbatasan pengawasan. Penelitian ini bertujuan untuk merancang dan mengimplementasikan sistem absensi karyawan berbasis website yang terintegrasi dengan teknologi QR Code guna meningkatkan efisiensi dan akurasi. Sistem dikembangkan menggunakan metode Waterfall yang meliputi tahapan analisis kebutuhan, perancangan sistem, implementasi, dan pengujian. Sistem memungkinkan pencatatan absensi berbasis QR Code serta pemantauan kehadiran secara real time. Hasil penelitian menunjukkan bahwa sistem mampu menyederhanakan proses absensi, mengurangi kesalahan pencatatan, serta meningkatkan transparansi pengelolaan data kehadiran karyawan.

A. INTRODUCTION

Employee attendance management is an essential component of human resource management in companies, as it directly influences work discipline, productivity, and organizational performance. Along with the rapid development of information technology, companies are increasingly required to adopt digital systems to support operational activities more efficiently, including attendance recording and monitoring.

PT Sigap Jaya Sampoerna is a private company that manages employee attendance as part of its daily operational activities. Prior to this study, the attendance process was conducted manually using handwritten signatures on paper-based attendance sheets. This method limited accuracy and efficiency, increased the risk of data loss and manipulation, and required additional time for data recapitulation by administrative staff. Similar challenges related to manual attendance systems have been identified in previous studies, highlighting issues such as data inaccuracies, inefficiency, and limited transparency in attendance management (Satria, 2022; Gunawan et al., 2024).

The development of web-based attendance systems has been widely recognized as an effective solution to overcome these limitations. Web-based systems enable digital data storage, real-time access, and improved monitoring capabilities. Furthermore, the integration of QR Code technology allows faster attendance recording while reducing input errors and attendance fraud. Several studies have shown that QR Code-based attendance systems can improve efficiency, accuracy, and transparency in employee attendance management (Ayuliana et al., 2025; Nasution & Hanum, 2023; Karim et al., 2025).

Although previous studies have discussed the implementation of QR Code-based attendance systems, most of them focus on system design or implementation in educational institutions or general organizational environments (Nasution & Hanum, 2023; Tjahyaningtijas, 2023). Research that specifically examines the implementation of web-based QR Code attendance systems in private companies and their role in improving real-time attendance monitoring and administrative efficiency is still limited. Therefore, this study aims to design and implement a web-based employee attendance system integrated with QR Code technology at PT Sigap Jaya Sampoerna.

B. METHODS

This community service activity employed an applied system implementation approach to address employee attendance management issues at PT Sigap Jaya Sampoerna. The activity was conducted over a six-month internship period using a direct on-site working method within the company environment. The focus of this activity was the implementation of a web-based employee attendance system integrated with QR Code technology to replace the existing manual attendance system.

The first stage was a needs analysis, carried out through direct observation of the employee attendance process and discussions with administrative staff responsible for attendance management. This stage aimed to identify attendance workflows, user roles, and system requirements to ensure that the developed solution aligned with the company's actual conditions and needs.

The second stage was system design, which included designing the database structure, application workflow, and user interface layout. The design emphasized ease of use, clarity of system flow, and accessibility for both administrators and employees.

The third stage was system development, involving the construction of a web-based attendance application. On the frontend side, the system was developed using TypeScript with TSX format for React components, JavaScript for application logic, and Tailwind CSS for interface styling. On the backend side, the system was built using TypeScript on Next.js API routes running in a Node.js environment. Attendance data management and storage were handled using a MongoDB database. Core features implemented included user authentication, QR Code–based attendance recording, and employee attendance data recapitulation.

The fourth stage was system testing, conducted to ensure that all system functions operated properly and met user requirements. Testing focused on system functionality, attendance data accuracy, and usability. Feedback from the company was used as a basis for system refinement.

The final stage was system deployment, where the attendance system was implemented for operational use at PT Sigap Jaya Sampoerna. The success of this community service activity was evaluated qualitatively based on improvements in attendance recording accuracy, efficiency of the attendance process, and reduction of administrative workload.

C. RESULTS AND DISCUSSION

This section presents the results of the implementation of the web-based employee attendance system integrated with QR Code technology at PT Sigap Jaya Sampoerna. The results focus on the effectiveness of the system in improving the attendance recording process, reducing administrative workload, and enhancing the accuracy of employee attendance data. The implementation of the system also enabled real-time monitoring of employee attendance, which contributed to more efficient attendance management compared to the previous manual system.

Implementation of the Web-Based Employee Attendance System The main outcome of this community service activity was the successful development and implementation of a web-based employee attendance system integrated with QR Code technology at PT Sigap Jaya Sampoerna. The system was designed to replace the previous manual attendance process that relied on handwritten signatures on paper-based attendance sheets and to support digital and real-time monitoring of employee attendance.

The developed system provides two main user roles, namely employees and administrators. Employees can log into the system and record their attendance by scanning the available QR Code, allowing attendance time to be automatically recorded by the system. Administrators have access to monitor employee attendance data, view attendance recapitulation, and manage employee records through a dedicated dashboard.

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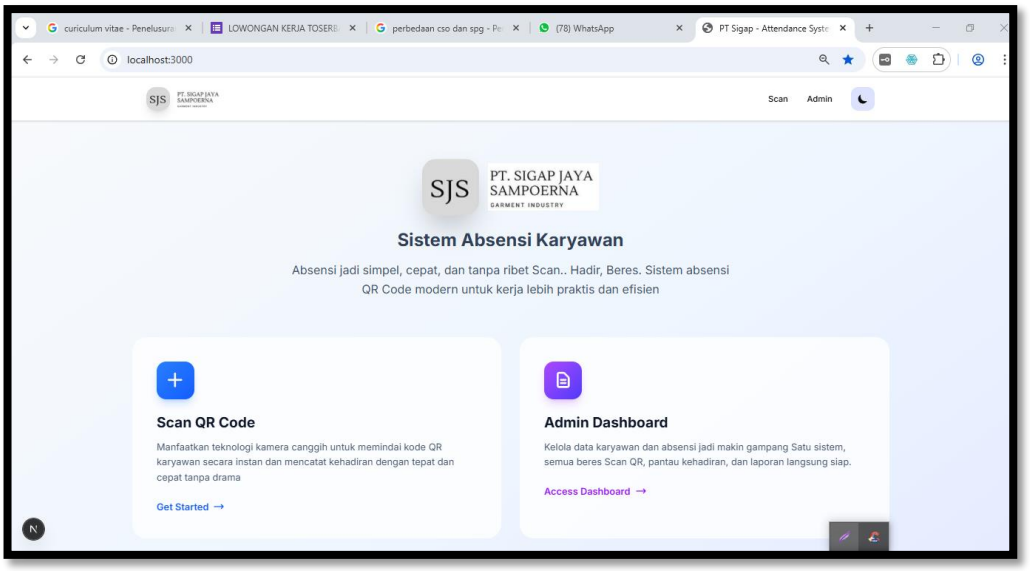

Figure 1. Main Page for Admin and Employee Role Selection

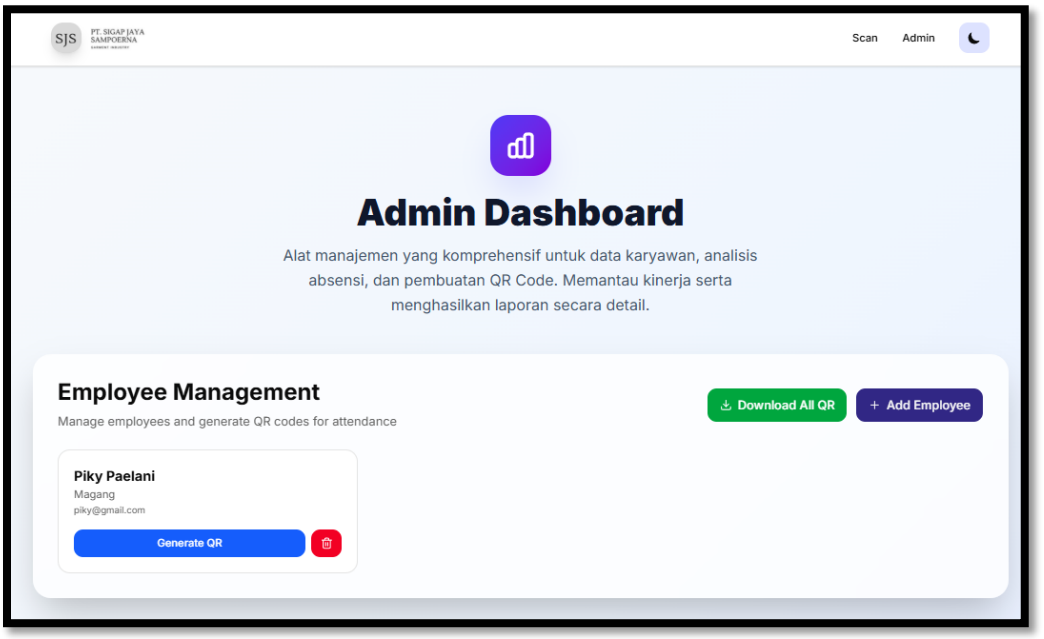

Figure 2. Admin Dashboard for Adding Employee Data

On this page, the administrator can add new employee data and view the list of employees registered in the attendance system. The administrator can also delete employee data that is no longer active. All data is stored centrally, supporting more structured and efficient employee attendance management.

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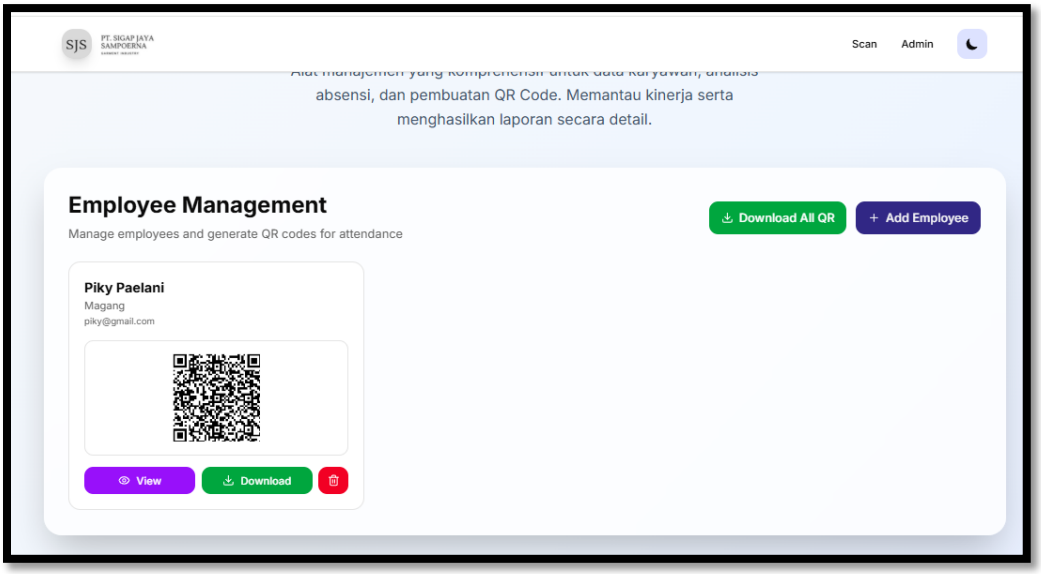

Figure 3. Admin Page for Viewing and Downloading Employee QR Code

This page allows administrators to view and download employee QR codes used in the system. QR codes serve as unique identifiers; each employee has a unique QR code to record their attendance.

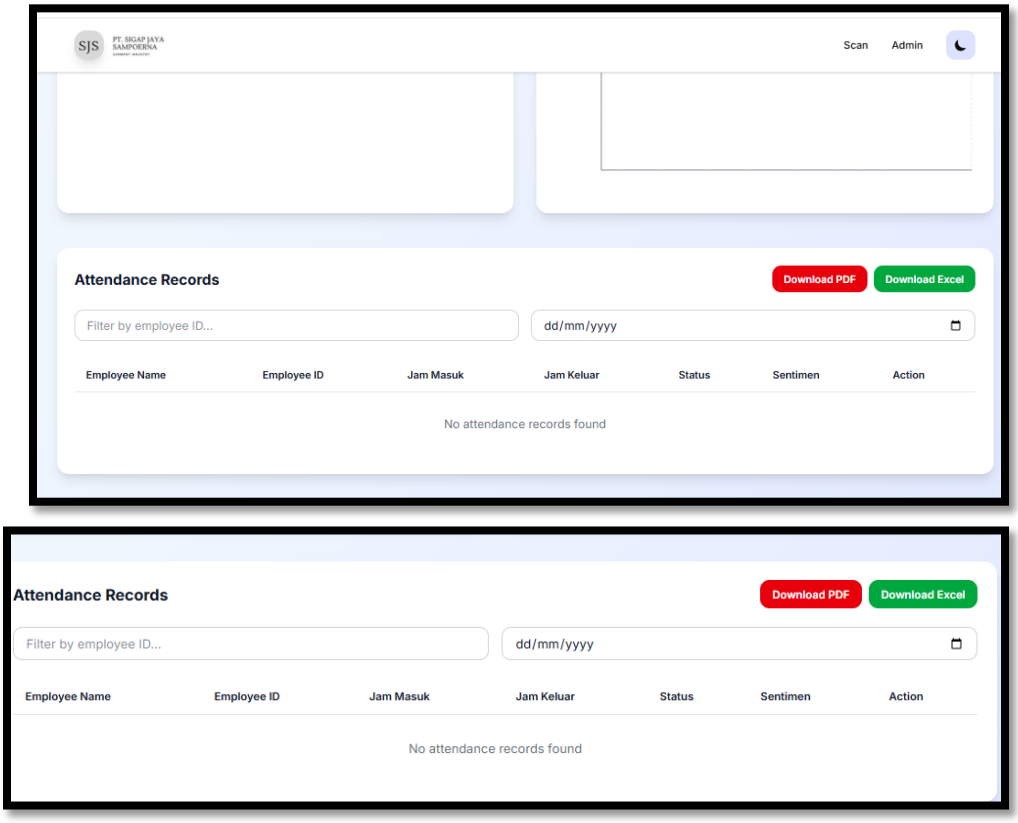

Figure 4. Employee Attendance Monitoring Page

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This employee attendance monitoring page is designed to provide the admin with full control over employee attendance activities. On this page, the admin can monitor each employee's check-in and check-out times along with the corresponding dates. Additionally, the page offers a report download feature in both Excel and PDF formats, facilitating the storage and distribution of attendance data. Furthermore, the admin can access daily attendance summaries, allowing for quick and accurate evaluation of employee presence. Thus, this page enhances the efficiency of attendance management and minimizes manual recording errors.

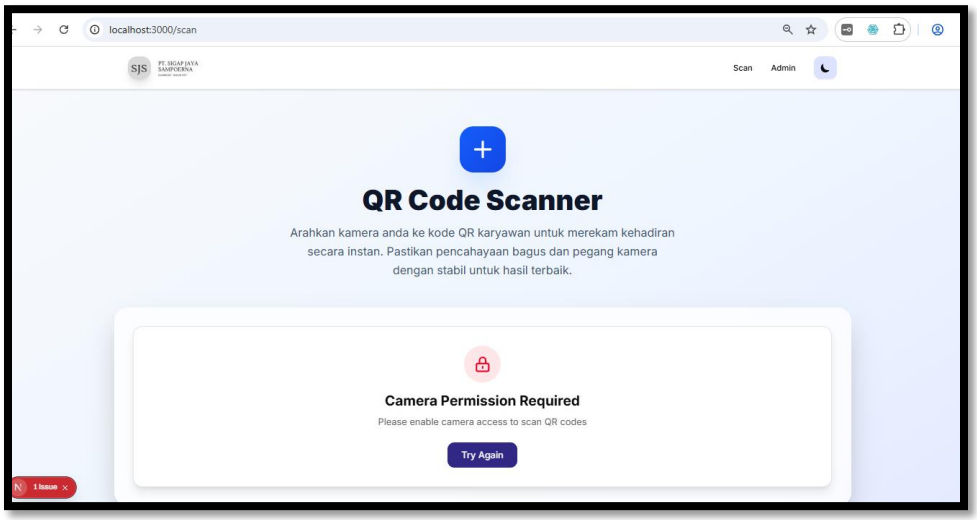

Figure 5. Employee QR Code Scanning Page

This page allows employees to perform self-attendance by scanning a QR Code. With this feature, employees can record their check-in and check-out times directly and accurately, reducing reliance on manual recording. The system automatically stores the data in the database, enabling administrators to access attendance information in real-time. The scanning feature also ensures that attendance can only be submitted by the respective employee, enhancing data reliability and minimizing the risk of errors or manipulation. Therefore, this scan page simplifies the attendance process and improves both efficiency and transparency in employee attendance management.

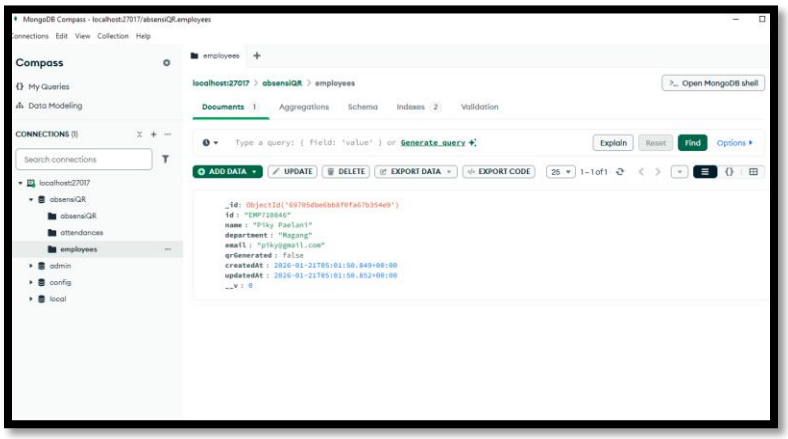

Figure 6. Admin Data Access Page MongoDB

This page displays employee attendance data stored in the MongoDB database and can only be accessed through the application by users with an admin role. The application-side system ensures that only admins can view, manage, and analyze the data. The page presents complete attendance information, including attendance history, daily reports, and attendance statistics, facilitating admins in monitoring and evaluating employees. Thus, this page enhances data management efficiency and ensures the security and privacy of employee information through application-level control mechanism Discussion

The results indicate that the web-based attendance system using QR Code effectively addresses the issues of manual attendance identified in the introduction section. By digitizing attendance records, the company gains better transparency, improved monitoring capabilities, and more efficient data management. Administrators can monitor employees' check-in and check-out times along with the corresponding dates, download daily reports or summaries in Excel and PDF formats, and access attendance data in real-time through the MongoDB application. The system also supports accountability by requiring participants to record daily activities alongside attendance submission, while employees can perform self-attendance through QR Code scanning.

Although the system successfully achieves its initial objectives, its implementation is currently limited to a local server environment, and admin access control is managed on the application side without specific validation in the MongoDB database. Future development could include system scalability, cloud-based deployment, or integration with performance evaluation modules to further enhance its benefits.

Overall, the implementation of this system demonstrates that a properly applied web-based information system can play a significant role in supporting digital transformation.

D. CONCLUSION

The implementation of a web-based employee attendance system using QR Code at PT Sigap Jaya Sampoerna successfully addressed the challenges associated with manual attendance recording. The system improves accuracy, efficiency, and transparency in attendance data management, while also facilitating real-time monitoring by administrators and reducing administrative workload.

Through digital attendance recording and QR Code scanning, administrators can monitor employees' check-in and check-out times along with the corresponding dates, download daily reports or summaries in Excel or PDF formats, and manage data more effectively. Meanwhile, employees can perform self-attendance easily, making the attendance process more simple, structured, and reliable.

Although the system has been successfully implemented, it is currently limited to a local server environment, and admin access control is managed on the application side without specific validation in the MongoDB database. Future development may include system scalability, cloud-based deployment, and integration with performance evaluation modules to further enhance the system's usability and sustainability.

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F. AUTHOR CONTRIBUTIONS

System design and implementation: PikyPaelani;
Data analysisandsystem evaluation: PikyPaelani;
Article writing and revision: PikyPaelani.

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