

Development Of A Web-Based E-Presence Application For Tracking Maps And Selfies Using Laravel

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ABSTRACT

Attendance is an activity aimed at assessing the level of employee presence and discipline within an organization or company. The E-Presence application is developed as a tool to enhance efficiency, accountability, and transparency in employee attendance, as well as to facilitate the processing of attendance data. The E-Presence application aims to reduce errors and improve the accuracy of employee attendance records, which are crucial for the decision-making process. The development of the E-Presence application uses the Laravel framework, MySQL database, and UML (Unified Modeling Language) tools to design Use Case Diagrams, Activity Diagrams, and Class Diagrams. The system development method follows the waterfall model, and Black Box Testing is employed as the testing method. The urgency of this research lies in the system's ability to perform real-time attendance tracking that can be conducted outside the office within a maximum distance of 20 meters. With the implementation of tracking maps, employees do not need to queue, thereby increasing work efficiency. Attendance recording can be done in real time, is flexible, easily accessible, improves efficiency in attendance recording, reduces the potential for errors, enhances human resource management, and provides attendance reports in Excel format. The novelty of this research is the development of a web-based application that incorporates Tracking Maps and Selfie features, ensuring that employees must be in a designated area to check in. Thus, the company/organization can easily analyze and evaluate employee discipline. The testing results indicate that the application functions well and meets user needs.

INTRODUCTION

Attendance is an activity aimed at assessing the level of presence and discipline of members within an institution or company. Attendance serves as a tool to calculate an individual's presence in an institution or company, making it essential (Gunawan R., Yusuf A.M., & Nopitasari L., 2021). Manual attendance systems can lead to various issues, such as employees manipulating their attendance or marking the attendance of friends (proxy attendance) who are actually not present, resulting in their names appearing on the attendance list. According to Gunawan R., Habib Putra Wahyudi H. P., & R. M. Yulianto (2023), the manual attendance process requires considerable time and effort. Additionally, administrators must manually compile attendance records, making this system less effective and accurate (N. Hermanto, N., & N. R. D. R. Riyanto, 2019). This has prompted the implementation of web-based attendance applications (Fauziah, Z., Latifah, H., Rahardja, U., Lutfiani, N., & Mardiansyah, A., 2021) in line with technological advancements and the need for an improved system.

In the research by Tri Wahyunia, Puji Handayani Putrib, & Setia Wardanic (2023), the attendance system still uses fingerprint technology, which has many shortcomings. When a large number of users attempt to clock in, it can lead to long queues. The shift from a fingerprint system to a selfie verification system and Android-based IP server has been implemented, but this system lacks a Tracking Maps feature for location tracking. In the study by Berlian Fajar Prayogo and Rangga Sanjaya (2021), an application for selfie attendance and geotagging was developed using the waterfall method for system development. This application simplifies attendance for employees by allowing them to take a selfie at their work location, eliminating the need to commute to the office, which saves time and distance. Companies/institutions can monitor employees working outside the office, although this research did not define a specific distance for attendance since it was intended for employees on external assignments.

Attendance data can be more accurately recorded by utilizing photos and location-based services. According to Dian Nurdiana and Andri Suryadi (2022), photos can be used for facial recognition, allowing attendance to be verified through employee identification. Meanwhile, the Global Positioning System (GPS) provides geographic information services that can track users' positions via longitude and latitude coordinates (M. A. R. Sikumbang, R. Habibi, and S. F. Pane, 2020).

A web-based attendance system enables employees to clock in in real-time without needing to queue, thus optimizing working hours (Khaerudin, M., Sumantri, A., Supriatna, E., and Ritzkal, R., 2022). Administrators can



monitor and record employee attendance (Wulandari, R., and Dwipangga, 2023). Photos are used to verify employee identity during attendance, while Location-Based Services are essential for ensuring employees are at the correct location when fulfilling their duties. Additional features, such as report generation by the admin, can ease the process of compiling monthly attendance reports for companies/institutions.

The novelty of this research lies in the development of a web-based application that incorporates Tracking Maps and Selfie features, requiring employees to be within designated areas to clock in. This allows companies/institutions to easily analyze and evaluate employee discipline. The urgency of this research is that it will enable real-time attendance recording outside the office within a maximum distance of 20 meters. With Tracking Maps, employees do not have to queue, thereby optimizing working hours; attendance can be recorded in real-time, flexibly, and accessed easily, along with attendance reports formatted in Excel.

The attendance application will include features for employee data management (inputting employee data, attendance records such as present, leave, sick, or late, and generating attendance reports). Employee attendance data aims to capture entry and exit times and to facilitate report creation/printing. The employee attendance application plays a role in enhancing employee performance within a company (Soelistijadi, R., Sugiyanta, S., Sunardi, S., and Winarti, W., 2021). In light of the above, there is a need for an effective and efficient new system for managing employee attendance, which will take the form of a web-based attendance application with Tracking Maps and Selfie features that is user-friendly to facilitate the processing of employee attendance data.

LITERATURE REVIEW

Previous research conducted by various researchers has shown different approaches and technologies in the development of attendance information systems, ranging from the use of QR codes, geotagging, facial recognition, to the utilization of IoT technology and web-based platforms. The following is a review of several studies related to attendance information systems using modern technology: Research by Berlian Fajar Prayogo and Rangga Sanjaya (2021) developed an Attendance Information System using selfie photos and geotagging. This approach utilizes facial recognition and geolocation technology to ensure participants' presence at the specified location. Dian Nurdiana and Andri Suryadi (2022) also developed an employee attendance application that uses selfies and Location-Based Service (LBS) at the Faculty of Science and Technology, Universitas Terbuka. Fauziah et al. (2021) designed a web-based attendance information system for students, published in the APTISI Transactions on Technopreneurship (ATT). This system was designed to facilitate online monitoring of student attendance. Gunawan, Yusuf, and Nopitasari (2021) developed a student attendance system based on Android using QR codes, published in *Elkom J. Electron. and Comput.* Further research by Gunawan et al. (2023) focused on the development of a web-based e-presence application using QR codes, published in the *Journal of Scientific Publications in Information and Communication Technology*. Herlina (2023) developed a web-based academic information system using Node JS, Express JS, and MongoDB, published in the *Journal ICT: Information Communication & Technology*. This research demonstrates the integration of various web technologies for academic data management. In another study, Herlina et al. (2022) designed and implemented a web-based document management system for letters and inventory of SARPRAS, published in *Media Journal of Informatics*. Fahrurrozi and S. N (2016) compared the software modeling processes using the Waterfall and Extreme Programming methods in the *Informatic journal*. Khaerudin et al. (2022) developed an employee attendance information system using QR codes at the Bekasi City Education Office, published in the *Innovative Journal*. Sikumbang, Habibi, and Pane (2020) developed an employee attendance information system using the RAD method and LBS based on attendance coordinates, published in the *Journal of Media Inform. Budidarma*. Hermanto et al. (2019) developed an Android-based student attendance application published in *Simetris J. Tech. Machinery, Electrical and Computer Science*. Lestari et al. (2021) developed a motorcycle monitoring application based on the Internet of Things, published in *J. Phys. Conf. Ser.* Soelistijadi et al. (2021) developed a web-based employee attendance system using QR codes to mitigate the spread of COVID-19, published in *Dinamik*. Nidhra and Dondeti (2012) conducted a literature review on Black Box and White Box testing techniques, published in the *Int. J. Embed. Syst. Appl.* Tri Wahyunia et al. (2023) developed an online attendance application using selfie photo verification and server IP based on Android, published in *JIFKOM*. Wulandari and Dwipangga (2023) developed a mobile web-based employee attendance application, published in the *Asian Journal of Natural Sciences*.

METHOD

The data collection method is conducted to understand the reasoning behind the research problem by gathering data related to the issue.

Data Collection Methods

Data collection methods are conducted to understand the underlying reasoning behind the issues being studied by gathering data related to the problem (Herlina, 2023). The data collection techniques used in this research include:

1. Literature Study

This method involves studying, researching, and reviewing various literature from libraries, including books, scientific journals, internet sources, and other readings related to the research on the application system to be developed.

2. Field Study is conducted in the following ways:

a. Interview Method

The interview method is a step in scientific research that involves verbal communication to gather information from a source. Interviews are conducted with employees who will use the system. In this section, the author interviews them about the current system workflow.

b. Observation Method

Observation is a data collection method involving the observation of the behavior and environment (social/material) of the individuals being studied. In this research, the researcher conducts observations by examining the system workflow, as well as the input and output processes. Through these observations, the researcher collects data in the form of employee attendance records.

System Development Method

Each paradigm consists of activities formed from methods, procedures, and tools to achieve goals. In the development of the Presence Tracking Maps and Selfie web application, the waterfall method is utilized (N. S. Lestari et al., 2021).

The initial stage involves analyzing the presence system and data processing reports of a relevant institution to understand how the existing system will be developed. Next, the system design is created using use cases, interactions between tables, and interface design. This is followed by coding using PHP programming language with a MySQL database. Afterward, the program undergoes testing to identify any errors or issues within the application. The final stage is the implementation of the Presence Tracking Maps and Selfie web application in the institution. In the waterfall method, the system is developed in a sequential or linear manner. If the first step is not completed, the second, third, and subsequent steps cannot be undertaken (Fahrurrozi and A. S. N, 2016). The testing method for the application uses black-box testing (S. Nidhra and J. Dondeti, 2012). The waterfall method to be used in the development of the application is illustrated in the figure below.

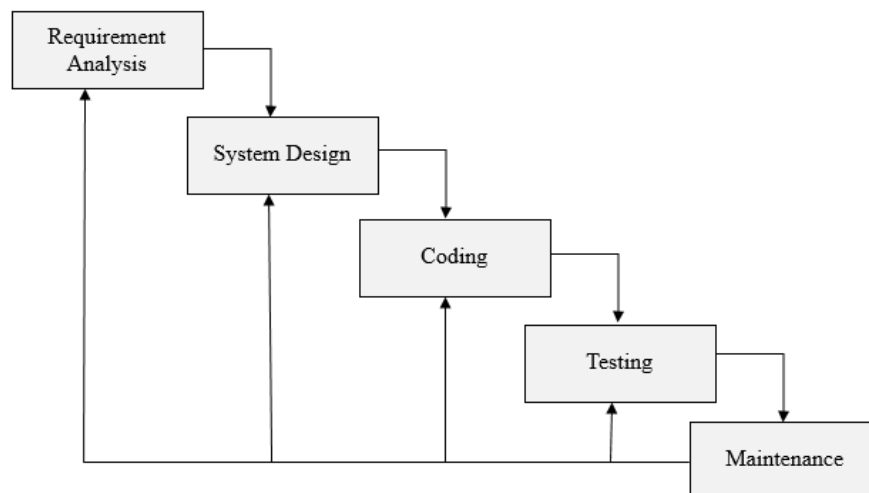


Figure 1. Waterfall Model
(Pressman, 2010:39 in Herlina, 2023:53)

RESULT

System Needs Analysis

The purpose of system analysis is to understand the system, identify its shortcomings, and determine the system's needs. Data flow analysis aims to understand the flow of information processes (Herlina, N. S. Lestari, A. Suherman, & D. Jalaludin, 2022). The object-oriented development used is Use Case.

Table 1. Functional Requirements of Employees

Actor: Employee		
Code	Use Case Name	Description
KF-01	Login	Enter registered NIK and password
KF-02	Check – in	The system will read the location radius and take a photo
KF-03	Check - out	The system will read the location radius and take a photo
KF-04	Leave / Permission	1. Business Trip
		2. Sick
		3. Other Purposes

Table 2. Functional Requirements for Admin

Actor : Admin		
Code	Use Case Name	Description
KF-01	Login	Enter registered NIK and password
KF-02	Manage Attendance	Add, edit, delete, and export data to Excel
KF-03	Manage Employees	Add, delete, and edit data
KF-04	Manage Leave / Permission	Approve or reject leave/permission requests

System Design

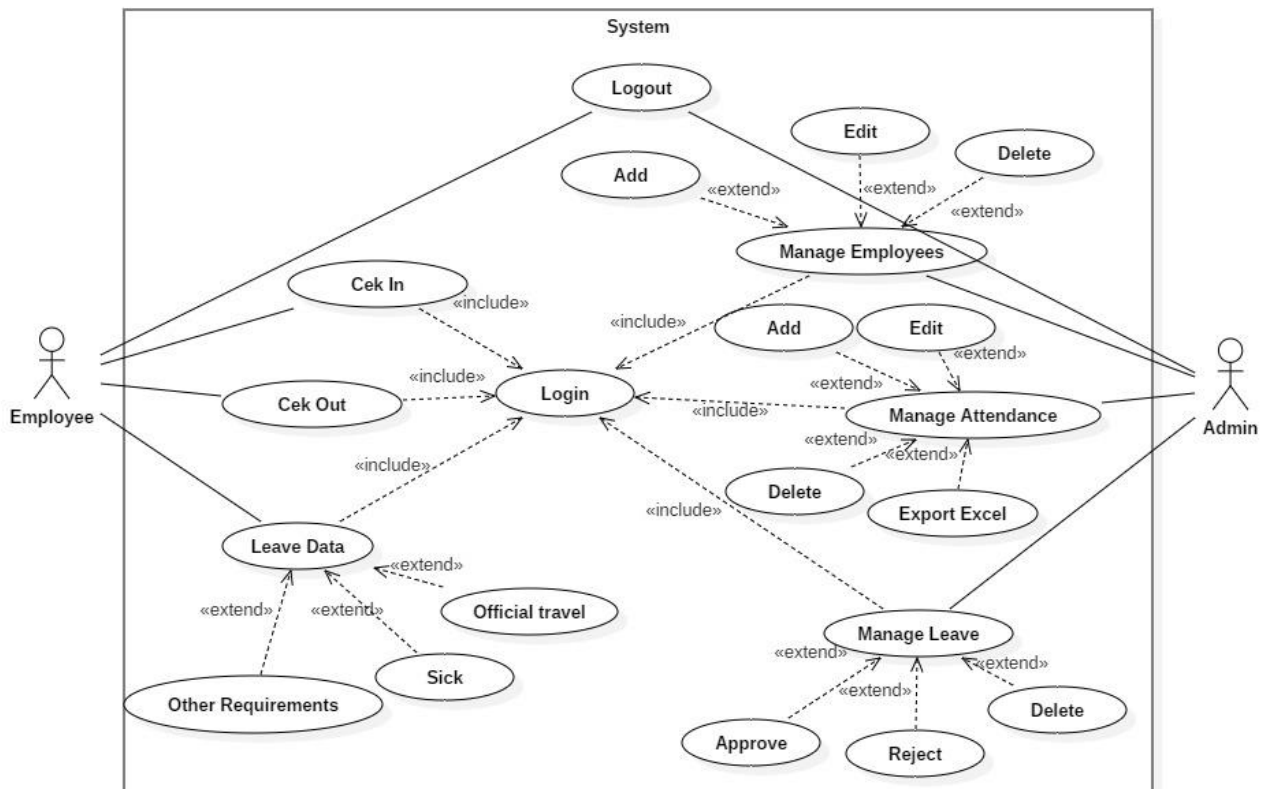


Figure 2. E-Presence Use Case

Interface Design



Figure 3. Design of the Login Page Interface

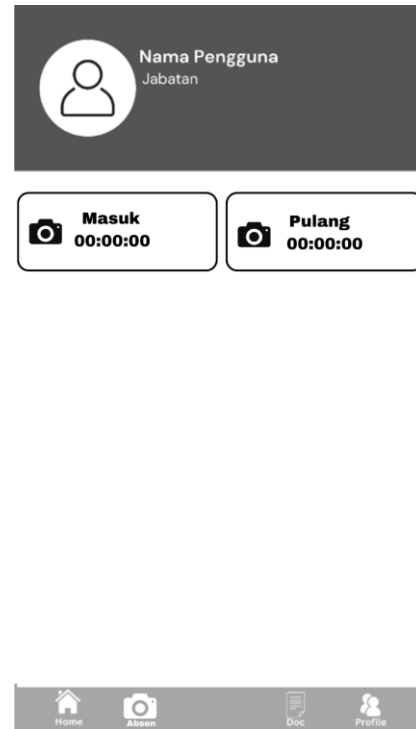


Figure 4. Design of the User Dashboard Interface



Figure 5. Design of the Attendance Check-In/Check-Out Interface

Implementation



Figure 6. Login Page Display

To log in, users must follow these steps: First, enter the Employee Identification Number (NIK) in the provided field. Second, input the password. After that, click the 'Log In' button. If the NIK and password are correct, the user will be directed to the main page corresponding to their access rights, whether as an employee or an admin.

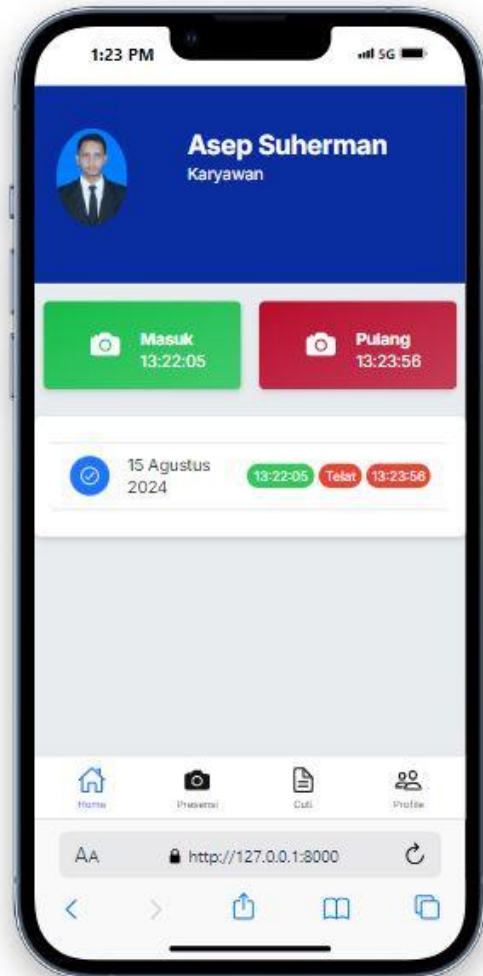


Figure 7. User Dashboard Page

The main page of the application displays the employee profile of Rifan Seftiansyah, featuring a photo, name, and job title at the top. Below this, there is attendance information showing the "Check In" and "Check Out" times, indicating the check-in time (13:22:05) and check-out time (13:23:56). There is also a presence status that indicates whether the employee is on time or late. At the bottom of the screen, there is a navigation menu that includes Home, Attendance, Leave, and Profile, making it easy for employees to access various features of the application.

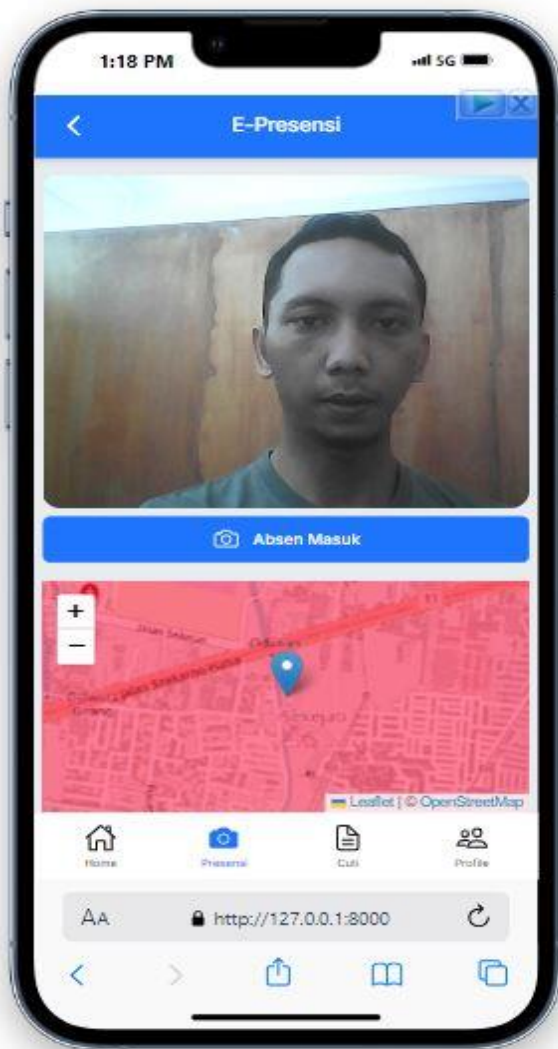


Figure 8. Check-In Page

On this page, employees can check in and out by clicking the 'Check In' button. When the button is clicked, the system will automatically check the radius on the map and take a photo. If the distance from the specified location is more than 20 meters, the check-in will not be successful.

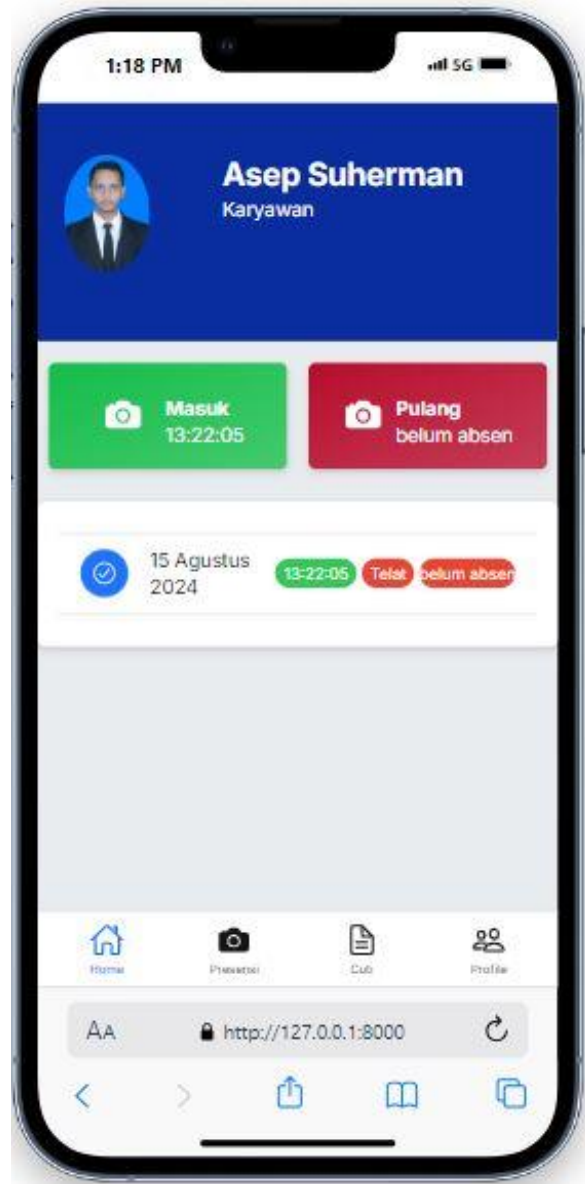


Figure 9. Check-In Dashboard Page

This page displays the profile of an employee named Asep Suherman with check-in information showing a check-in time of 13:22:05. There is also an attendance status indicating whether the employee is on time or late.

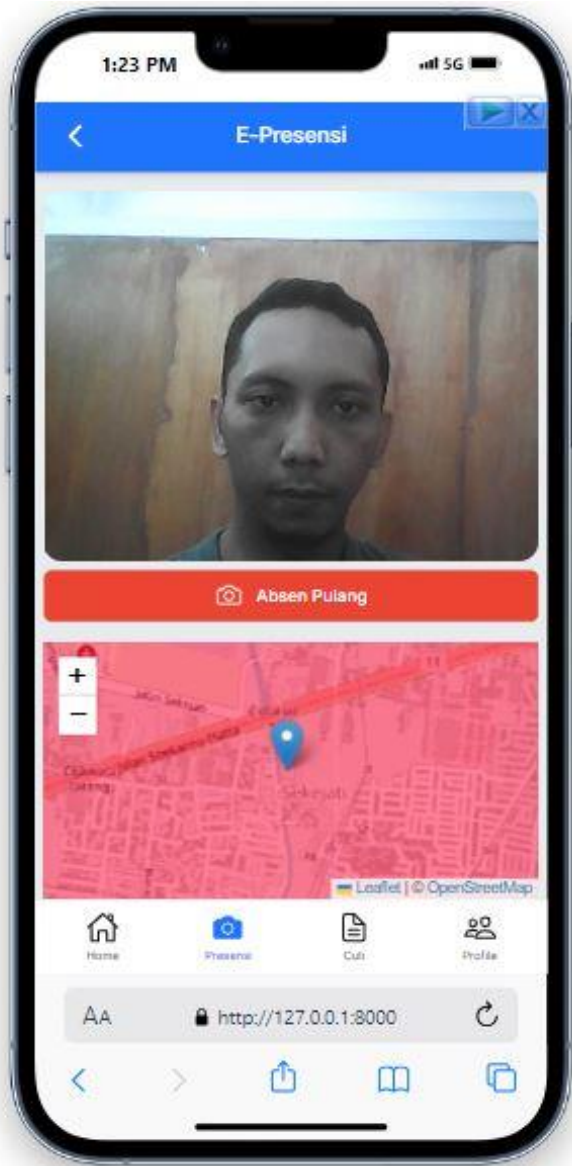


Figure 10. Check-Out Page.

On this page, employees can check out by clicking the 'Check Out' button. When the button is clicked, the system will automatically check the radius on the map and take a photo. If the distance from the specified location is more than 20 meters, the check-out will not be successful.

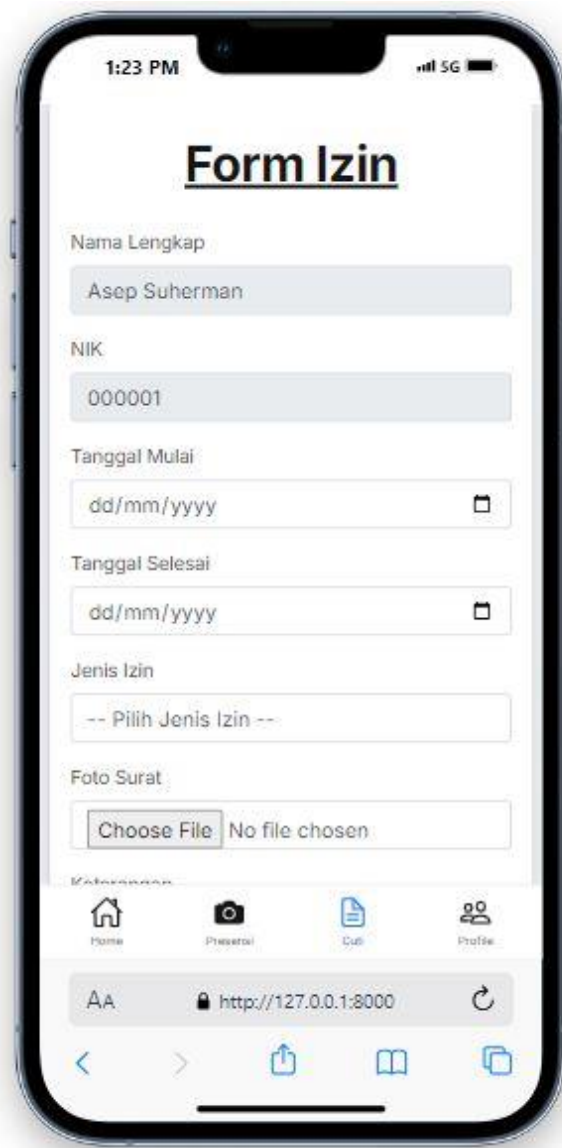


Figure 11. Leave/Permission Page

On the Leave/Permission Page, employees can request leave or permission by filling out the required information. The full name and employee ID will be automatically filled in based on the logged-in account and cannot be changed. Employees need to enter the start and end dates of the leave, select the type of permission such as business trip, sick leave, or other reasons, and upload a photo of the permission letter or medical certificate. An additional description of up to 10 words must also be provided. After the form is completed, employees only need to wait for approval from the admin.

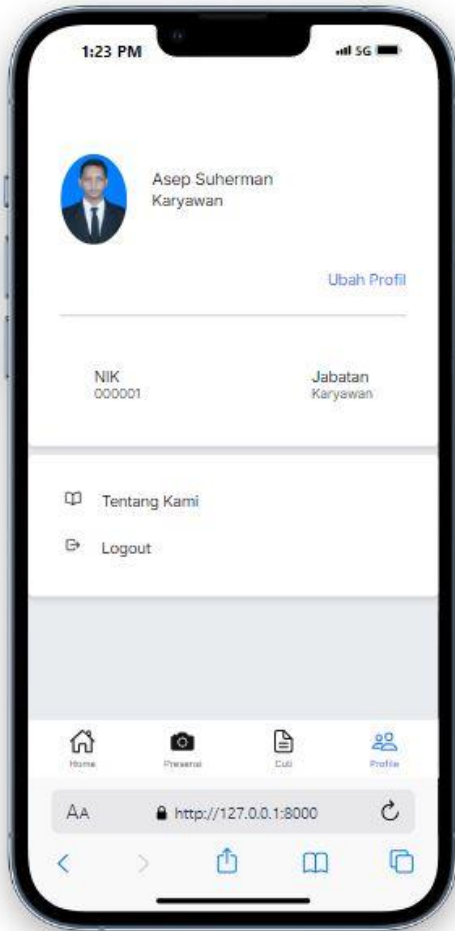


Figure 12. Profile Page

On this page, admins and employees can edit their profiles by changing their name, phone number, and updating their profile picture.

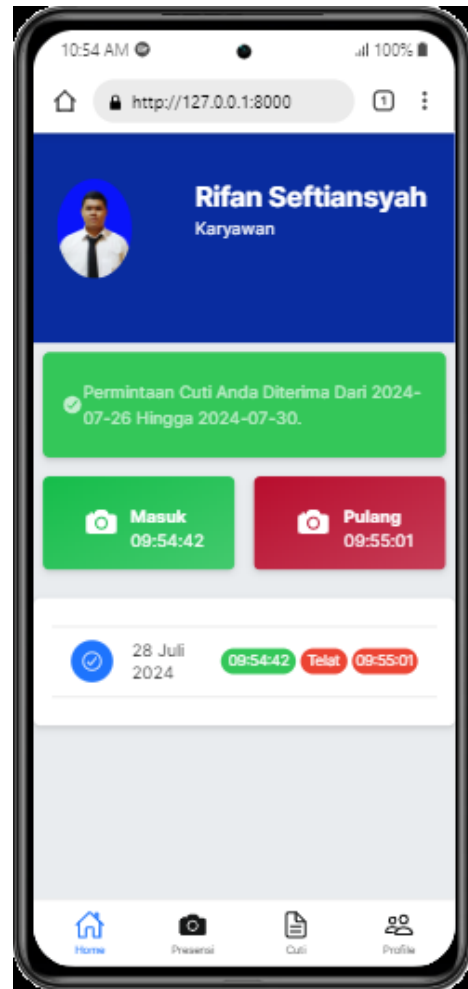


Figure 13. Leave Approval/Reject Notification

On the 'Manage Leave' page, the admin can manage employee leave requests. The admin views a complete list of requests, including Employee ID, start date, end date, type of leave, remarks, status, and attachment of proof. By selecting 'Approve,' the leave request is approved, and the employee cannot take leave again until the leave period ends. If rejected with 'Reject,' the employee can submit a new leave request. Notification of approval or rejection will appear on the employee's dashboard.

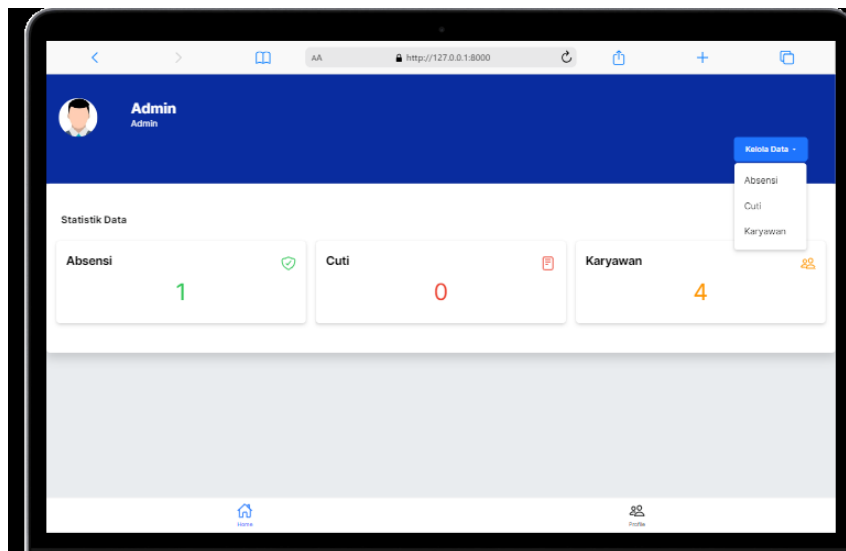


Figure 14. Admin Dashboard Page

The main page of the application for the admin displays the admin's profile with a photo, name, and the title 'Admin' at the top. In the upper right corner, there is a 'Manage Data' menu that allows the admin to manage attendance, leave, and employee data. The bottom of the screen features a navigation menu that includes 'Home' and 'Profile,' making it easy for the admin to switch between the main page and their profile page.

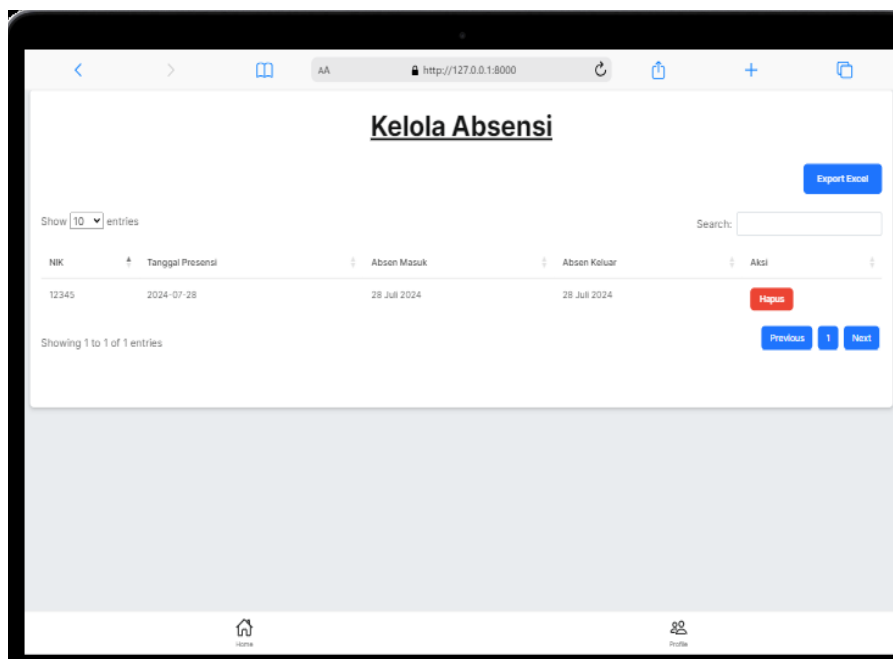


Figure 15. Attendance Management Page

On the 'Manage Employee' page, the admin can view a list of attendance records that include the employee ID, attendance date, check-in time, and check-out time. The admin can also perform actions such as deleting attendance data by clicking the 'Delete' button in the action column. In the upper right corner, there is an 'Export Excel' button that allows the admin to download attendance data in Excel format. Additionally, there is a search feature to help the admin easily find specific attendance records.

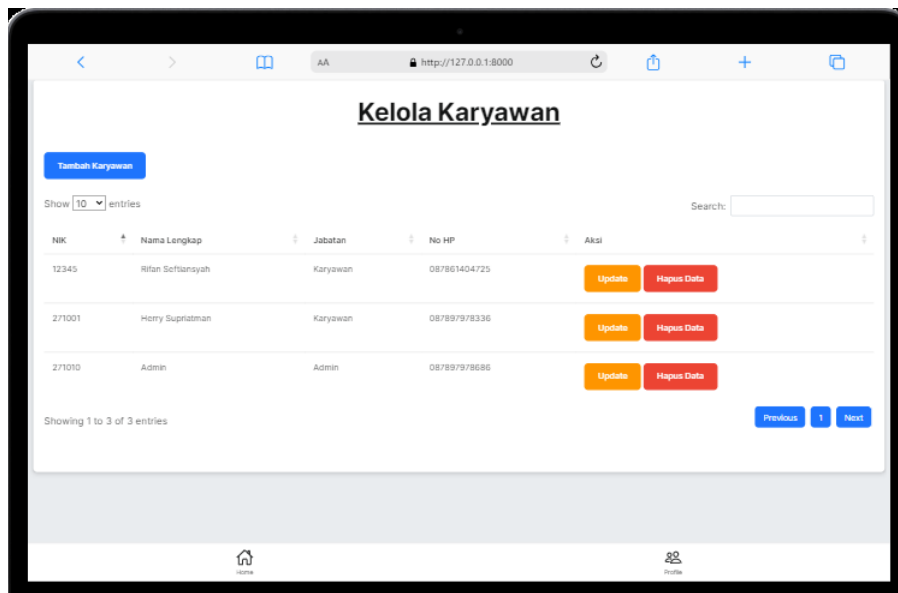


Figure 16. Employee Management Page

On the 'Manage Employee' page, the admin can view a list of employees that includes the employee ID, full name, position, and phone number. The admin has the option to add a new employee by clicking the 'Add Employee' button in the upper left corner. Additionally, the admin can update existing employee data by clicking the 'Update' button or delete employee data by clicking the 'Delete Data' button in the action column. The search feature in the upper right corner makes it easy for the admin to find a specific employee.

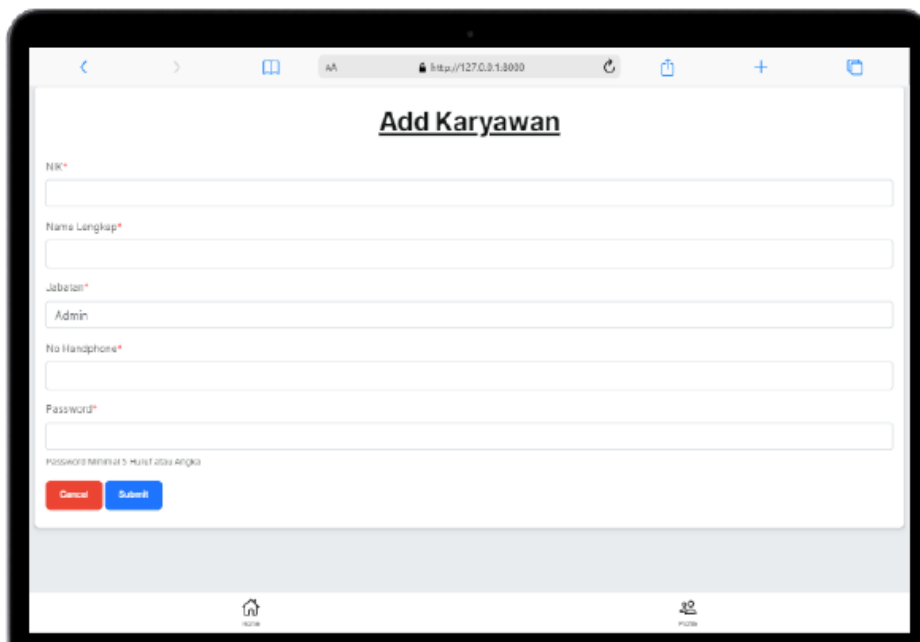


Figure 17. Add Employee Page

On the 'Add Employee' page, the admin must fill in several important pieces of information, such as employee ID, full name, position, phone number, and password. All required fields are marked with a red asterisk (*), indicating that they must be completed. The position is set to 'Admin' by default but can be changed according to the position of the employee being added. After all information is filled in, the admin can click the 'Submit' button to save the new employee's data, or 'Cancel' to abort the addition process. This page also displays a message below the password field stating that the password must consist of at least 5 characters or digits.

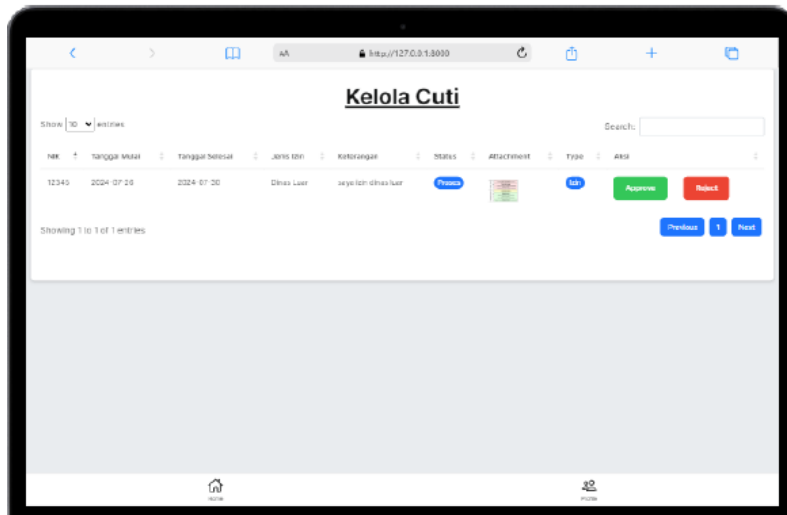


Figure 18. Leave/Permit Management Page

On the 'Manage Leave' page, the admin can view a list of leave requests with details such as employee ID, start date, end date, type of leave, remarks, status, and proof of leave attachment. The admin can use the 'Approve' option to approve the leave request or 'Reject' to deny it. The 'Status' column indicates the current status of the leave request, while the 'Attachment' column contains the proof of leave files uploaded by the employee. The admin can also search for specific leave requests using the search feature at the top of the page. This leave request data table can be configured to display a certain number of entries per page, and the admin can navigate between pages using the 'Previous' and 'Next' buttons at the bottom of the table.

System Testing

Table 3. Black Box Testing for Employees

No	Test	Expected Result	Test Result
1	Login	Successfully logged in with a registered account	Success
2	Check – in	Successfully checked in	Success
3	Check – out	Successfully checked out	Success
4	Leave / Permit	Successfully submitted leave/permit request	Success

Tabel 4. Pengujian Blackbox Testing Admin

No	Test	Expected Result	Test Result
1	Login	Successfully logged in with a registered account	Success
2	Manage Attendance	Successfully added, deleted, and updated attendance data	Success
3	Manage Employees	Successfully added, deleted, and updated employee data	Success
4	Manage Leave / Permit	Successfully approved or rejected leave/permit requests	Success

CONCLUSION

This application was developed to improve efficiency and accuracy in employee attendance records, facilitate access to attendance data by authorized personnel, and enhance transparency and accountability in attendance management. The system can perform real-time attendance tracking and can be used outside the office within a maximum distance of 20 meters. With tracking maps, employees do not need to queue, thereby optimizing working hours; attendance can be recorded in real-time, is flexible, easily accessible, and capable of increasing efficiency in attendance recording, reducing potential errors, and improving human resource management. Testing results indicate that the application functions well and meets user needs.

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