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Design of A Web-Based Employee Attendance Monitoring Information System

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Abstract
PT. Golden Riau Jaya is a company engaged in the sale of electrical and lighting products, with various employee divisions, including those working outside the company's reach. The current fingerprint-based attendance system is deemed ineffective as it often causes long queues and unfairness for employees who arrive on time. Additionally, the company faces challenges in monitoring employee tasks, particularly for those working outside the company, such as sales and debt collectors. This study aims to improve employee performance through the development of a web-based information system designed to support selfie-based attendance with location-based services to record attendance time and location in real-time, minimizing fraud. The system also allows employees to report daily tasks and work durations, with all employee data stored using a MySQL database to ensure organized and efficient data management. The results indicate that this system helps monitor employee attendance, enhances transparency, and provides relevant data for performance evaluation, ultimately improving operational efficiency and supporting more effective management decision-making.
Keywords: Information System, Attendance, Location-Based Service

1.0 INTRODUCTION

In this digital era, technology has advanced significantly, especially in the field of information systems. Information systems and computer technology are rapidly evolving in line with the growing demand for information (Rio et al., 2019). An information system is a system designed to collect, input, and process data, manage data, and generate information, combining human tasks with the use of technology in an effort to support management and operational activities (Ariana, 2019). The information produced can be used as a consideration in decision-making (K. A. Ramadhan & Utami, 2019). Information systems are highly useful for helping to process company data, reduce costs or resources needed within the company, and improve employee performance quality. One important factor in enhancing employee performance is paying attention to work discipline. A company's work discipline can be observed through its employee attendance records—whether employees consistently arrive on time, frequently request leave, or are absent from work (Pertiwi et al., 2023). The recapitulated employee attendance records can have an impact on determining the amount of salary an employee will receive. In addition, the company needs to monitor the tasks completed by employees and how long they take to finish them.

PT. Golden Riau Jaya is a company engaged in the sale of electrical products and lighting, located at Jalan Tuanku Tambusai, Puri Nangka Sari Complex, Block A No. 10–11, Pekanbaru City, Riau Province. The company consists of many employees working in various divisions. Although most employees work within the company premises, there are some who operate outside the company's direct reach.

Based on interview data, it was found that the attendance system currently used by the company is a fingerprint system. However, this system is considered ineffective because only one or two employees hold the key to open the company doors in the morning. As a result, when the doors are opened, all employees must queue in a long line to record their attendance using the fingerprint system.

In addition, this system creates a sense of unfairness among other employees if the keyholder arrives late to the office. In such situations, the keyholder's delay causes all punctual employees to wait for the doors to be opened before they can clock in. This indirectly benefits employees who arrive late on that particular day, as attendance cannot be recorded until the keyholder is present. As a result, employees who arrive on time feel disadvantaged, especially since the salary deduction policy for lateness is not consistently enforced under these circumstances.

Employees at PT. Golden Riau Jaya are divided into various divisions, with some focusing on direct sales to consumers. Among them, some work as cashiers within the company, while others serve as sales representatives offering products outside the company. In addition, there are employees working in accounting or tax calculation, debt collection, and inventory management. With the large number of divisions and employees, it becomes very difficult for the company owner to monitor the work of all employees—especially those who operate beyond the company's direct reach, such as sales representatives and debt collectors.

This research aims to improve employee performance at PT. Golden Riau Jaya. As employee performance increases, the company will continue to grow and improve. Therefore, an effective information system is needed to address the existing problems faced by PT. Golden Riau Jaya.

The information system required includes an attendance tracking system and a system for collecting daily reports. This designed information system will assist employees in performing attendance by taking a selfie photo within the company premises. Additionally, employees can report in the system if they need to request leave or are unable to work due to illness. The use of selfie photos for attendance can reduce the possibility of employees committing fraud (Berlian & Sanjaya, 2021). Attendance can only be performed within a certain distance inside the company premises, and the system will also record the attendance location in real-time using location-based services (LBS) that can convert coordinates into an address (Qois & Jumaryadi, 2021).

This system is also useful for monitoring employee performance, assisting the company leadership in tracking employees who are frequently late or absent, and can serve as a basis for employee evaluations. Additionally, this system makes it easier for employees, eliminating the need to queue for attendance and addressing common issues in fingerprint-based attendance systems, such as unreadable fingerprints. Each employee is required to describe the tasks they performed on that day and how much time was spent, making this system also capable of enhancing transparency and work effectiveness.

Based on the background explained above, a web-based information system has been developed using MySQL database for data storage.

2.0 LITERATURE REVIEW

2.1. *Information System*

An information system is a structured system that is used to process useful information with a specific purpose. The information that is conveyed can be effectively received by the recipient so that the intended goal can be achieved (Sallaby & Kanedi, 2020).

2.1.1. *System*

A system is a collection of several components that form a unified whole. A system can also be defined as elements or components that come together to facilitate the flow of materials, energy, or information to achieve a desired goal (Setiyanto et al., 2019).

2.1.2. *Information*

Information is data that has been processed into something meaningful for the recipient and becomes valuable in terms of decision-making (Setiyanto et al., 2019).

2.2. *Attendance*

According to the Indonesian Dictionary (Kamus Besar Bahasa Indonesia), "absen" refers to a person's absence from an institution. Meanwhile, "absensi" refers to the process of recording or marking the time of someone's attendance in a document that is created according to regulations, serving as a reference for decision-making in the context of research (Febriandirza, 2020).

2.3. *Location Based Service*

Location-Based Service (LBS) is an information service that allows users to access data through mobile devices connected to a network. This service can accurately display the geographic position of the device, allowing users

to know the current location of the device being used. LBS works by utilizing a combination of technologies, such as the Global Positioning System (GPS) and cell-based location provided by Google (Hasian et al., 2023).

2.4. Geolocation

Geolocation is a specific API supported by some browsers, but not all browsers support it. Therefore, geolocation may not always be usable in web applications (Hajar et al., 2021). The basic concept of geolocation involves the role of Internet Service Providers (ISPs) or GSM networks in transmitting internet signals connected to GPS satellites and telecommunication systems. The location data obtained are stored on a server and can then be accessed by users via smartphones connected to GPS. GPS functions to determine the geographic coordinates of a location—latitude and longitude—in order to provide precise positioning information (Ardianto et al., 2022).

2.5. Daily Reports

Daily reports generally contain information regarding the placement of workforce for the tasks they are performing (Dameria & Nursyanti, 2022). A daily report is a representation of data that shows proof of work carried out in a single day. In general, this daily report is very important for an organization or company (Saputra & Zakaria, 2023).

2.6. Web

The web is a series of pages that display information, text, images, animations, and sound either statically or dynamically. These pages are connected within a hyperlink network {Merging Citations}. Web features generally include data resilience, support for transactions, and the composition of dynamic web pages, which can be considered a hybridization between hypermedia and information systems (Melanda et al., 2023).

2.7. Database

A database is a system used to store, organize, and easily access data. A database consists of structured data in a digital format. Some examples of databases currently in use are: MySQL, SQL Server, MS Access, Oracle, and PostgreSQL (R. F. Ramadhan & Mukhaiyar, 2020).

2.8. XAMPP

XAMPP stands for X (cross-platform), Apache, MySQL, Perl, and PHP. This program is available under the General Public License (GNU) and is an easy-to-use web server that can be implemented to create dynamic web pages (Junior et al., 2022).

2.9. System Development Method

The system development method in this research uses the System Development Life Cycle with the Agile model.
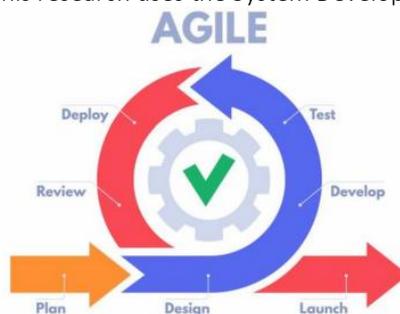

Figure 1. Agile Method

2.10. UML (Unified Modelling Language)

UML is a technique and a set of structures used to model the design of object-oriented programming (OOP) and its applications (Helsalia et al., 2021). UML is used to assist in describing and designing software systems, especially systems built with object-oriented programming. UML was developed through the merging of various rapidly growing object-oriented graphical modeling languages in the late 1980s and early 1990s. Although its use is not

limited to any particular methodology, UML is most commonly used in object-oriented methodologies (Nistrina & Sahidah, 2022).

2.11. Black Box Testing

Black box testing is a testing method that focuses on the functionality of the application system. This testing is carried out by providing random input data to obtain clear results. Clear results mean that if there is an error in the input data, the system will reject the input, or the data cannot be saved in the database. Conversely, if the input data is correct, the data will be accepted and stored in the information database (Arofiq et al., 2023).

3.0 METHODOLOGY

This research method uses the Agile method. The research framework is as follows:
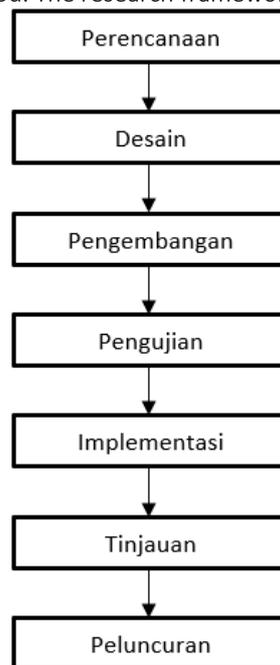
Figure 2. Research Framework

The description of the research method mentioned above is as follows:
1. Planning

   This process involves gathering information from users through direct interviews or observations to identify the specific needs of the system. This stage is crucial to ensure that the system development aligns with the expectations and needs of the users.
2. Design

   In this stage, the physical design of the system is created, including processes, architecture, interfaces, databases, files, and programs. This design is based on the data obtained during the planning stage and serves as a guide for the next steps in system development.
3. Development

   System development is carried out collaboratively and iteratively. The development team works together to implement the designed features. A flexible and continuous approach allows the system to be adjusted to the user needs, which may change during the development process.
4. Testing

   After the system is completed, various types of testing are performed, such as unit testing, integration testing, and functional testing, to ensure the system's reliability. This stage is designed to identify and fix any issues that may affect the system's efficiency and fairness before it is used.
5. Implementation

The new system is implemented gradually. Each new feature or change is introduced after passing the tests and receiving approval. This step aims to reduce operational disruption and ensure that the new system functions optimally.

6.   Review

At this stage, the results of the system development are evaluated retrospectively. The team assesses how well the new system has met its main objectives, such as improving efficiency and fairness. Feedback from stakeholders and users is also analyzed to ensure the system meets their expectations and needs.

7.   Launch

The launch stage is the final step that ensures the successful implementation of the new system. A thorough evaluation is conducted to assess the system's effectiveness, identify strengths, and address potential weaknesses. This also includes gathering input from users to improve the system's quality in the future.

4.0 RESULTS AND DISCUSSION

4.1. System Requirements Analysis

In the design of the Employee Attendance Monitoring Information System for PT. Golden Riau Jaya in Pekanbaru, using the Agile Method, several plans or requirements analysis were made based on interviews with the staff of PT. Golden Riau Jaya, as follows:

1.   User Requirements

There are 3 types of users who will use the system: the admin or leader and employees as active users, as well as the leader or admin as a passive user or someone who uses the system when needed. The detailed requirements are as follows:

a.   The leader can view the attendance report and activity report sections.

b.   The admin can access all parts of the system without exception.

c.   Employees can only access the attendance page and fill in the activity report.

2.   System Requirements

The system requirements for the design of the attendance and daily report system using the Agile method are:

a.   The system must differentiate access rights based on user needs.

b.   The system must be able to record attendance and daily reports.

c.   The system must be able to read the location of employees when they check in.

d.   The system must be able to calculate the radius of the employee's location when they check in.

e.   The system must be able to group data for each employee.

f.   The system must be able to calculate the total attendance of employees each month.

g.   The system must be able to display the report results in file formats such as PDF.

4.2. System Design (Design)

4.3.1. Use Case Diagram

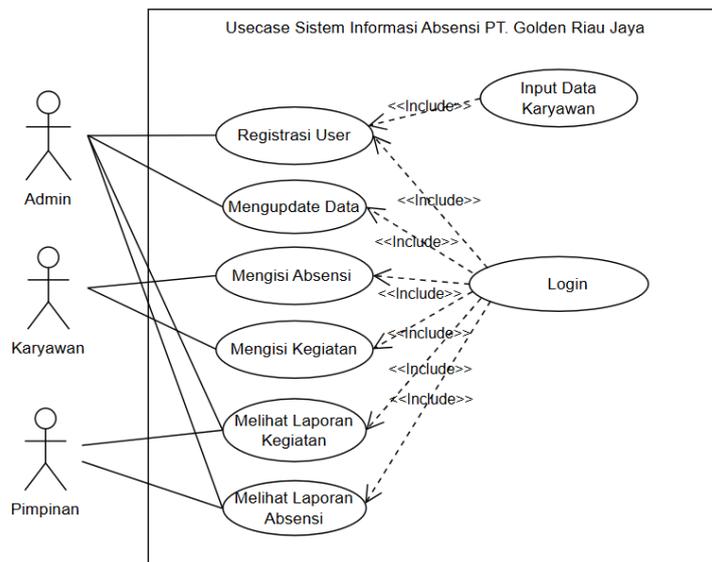The use case diagram for this research is as follows:

Figure 3. *Use Case Diagram*

4.3.2. Class Diagram

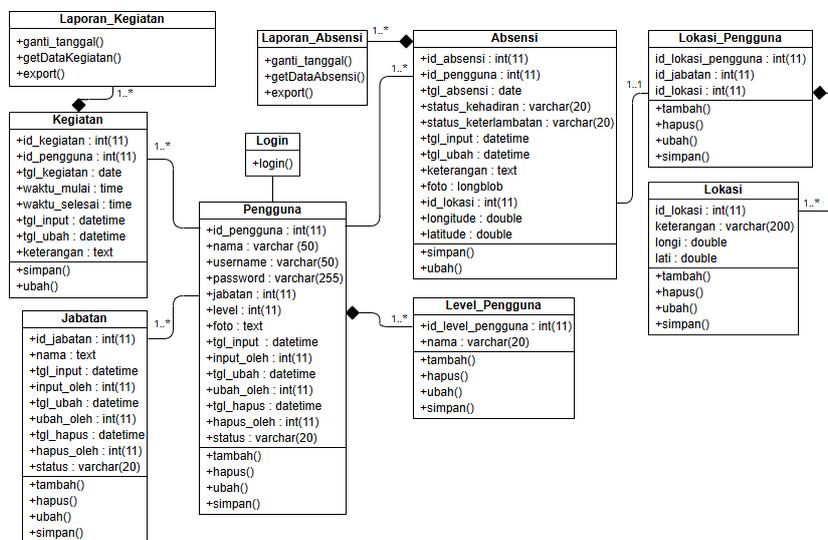The class diagram for the system that is designed and developed is as follows:

Figure 4. *Class Diagram*

4.3. Implementation

4.3.1. Login Page

The login page contains 3 types of users: Admin, Leader, and Employee. All users can log in if the Admin has registered the user account that will perform the login.

Figure 5. Login Page

4.3.2.   User Page

On the user page, only the Admin can access this page. On this page, the Admin can view the list of users, add new user data, modify user data, and delete user data.
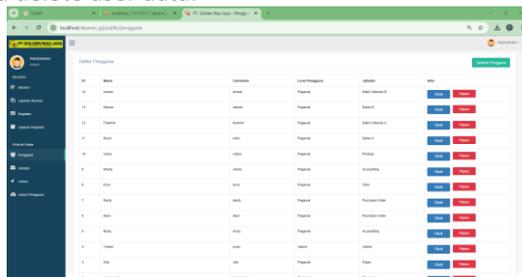
Figure 6. User Page

4.3.3.   Position Page

On the position page, only the Admin can access this page. On this page, the Admin can view the list of positions, add new position data, modify position data, and delete position data.

Figure 7. Position Page

4.3.4.   Location Page

On the location page, only the Admin can access this page. On this page, the Admin can view the list of locations, add new location data, modify location data, and delete location data.
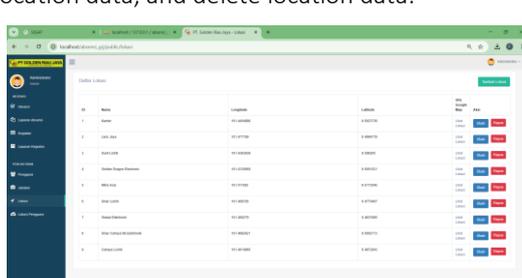
Figure 8. Location Page

4.3.5.   User Location Page

On the user location page, only the Admin can access this page. On this page, the Admin can view the list of user locations, add new user location data, modify user location data, and delete user location data.
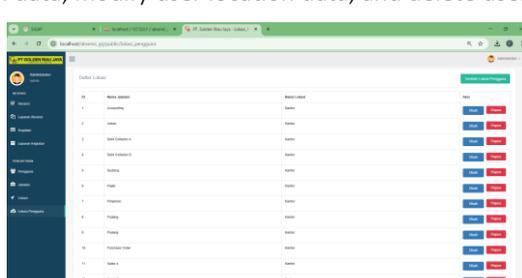
Figure 9. User Location Page

4.3.6.   Attendance Page

On the attendance page, only the Admin and Employees can access this page. On this page, both the Admin and Employees can view their own attendance data and perform attendance.
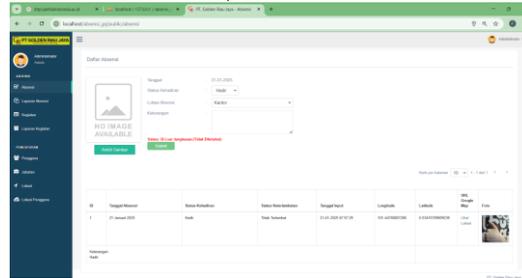
Figure 10. Attendance Page
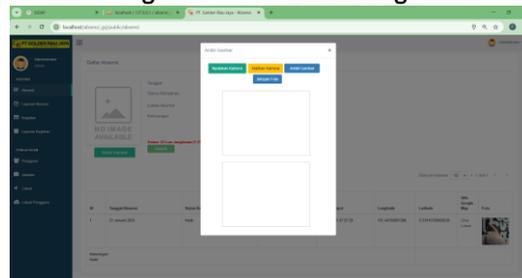
Figure 11. Capture Image Page

4.3.7.   Activity Page

On the activity page, only the Admin and Employees can access this page. On this page, both the Admin and Employees can view their own activity data and fill in the activity details.
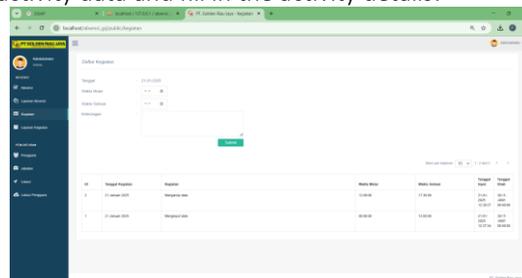
Page 12. Activity Page

4.3.8.   Attendance Report Page

On the attendance report page, only the Admin and Leader can access this page. On this page, both the Admin and Leader can view the attendance report of all users, which can be filtered by date and exported into a PDF file.
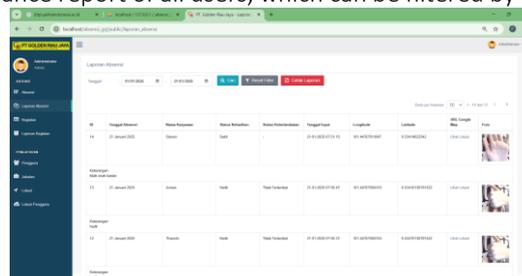
Figure 13. Attendance Report Page

4.3.9.   Attendance Report Print Page

On the attendance report print page, only the Admin and Leader can access this page. On this page, both the Admin and Leader can view the attendance report that is already in PDF format.

Figure 14. Attendance Report Print Page

4.3.10.   Activity Report Page

On the activity report page, only the Admin and Leader can access this page. On this page, both the Admin and Leader can view the activity report of all users, which can be filtered by date and exported into a PDF file.

Figure 15. Activity Report Page

4.3.11.   Activity Report Print Page

On the activity report print page, only the Admin and Leader can access this page. On this page, both the Admin and Leader can view the activity report that is already in PDF format.
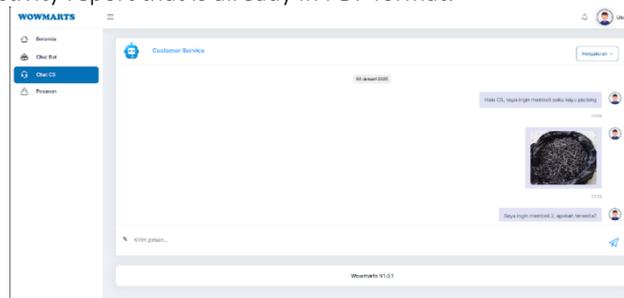
Figure 16. Activity Report Print Page

4.4.   System Testing and Research Analysis

Black box testing aims to ensure that each function within the system operates as intended. Based on the test results presented in Table 4.8, all 42 buttons in the system performed as expected, with each test showing a successful outcome. These results indicate that all components of the employee attendance monitoring system are functioning correctly. This testing confirms that the system developed in this study is capable of executing all its functions with a 100% success rate. Therefore, the employee attendance monitoring system at PT. Golden Riau Jaya has been successfully designed and implemented optimally, and is deemed suitable for use in accordance with the company's operational needs.

5.0 CONCLUSION

5.1.   Conclusion

Based on the results of the research conducted on the design of a web-based employee attendance monitoring system, the following conclusions can be drawn:

1. Delays in attendance have been identified as a common issue, often caused by the employee responsible for holding the office key arriving late. This situation prevents other employees from recording their attendance on time and has the potential to disrupt overall work productivity. The implementation of this system is expected to minimize attendance delays, thereby making the attendance process more orderly and efficient.
2. In addition, the system is designed to facilitate supervisors or managers in monitoring employee activities. This monitoring covers both employees working within the office and those assigned to tasks outside the office, resulting in more effective and structured oversight.

5.2. Suggestions

The following suggestions are provided by the researcher based on the results of the web-based employee attendance monitoring system development:

1. The current system is web-based; therefore, it is recommended that future development includes the creation of a mobile application for Android or iOS platforms to enable easier and more accessible use for employees.
2. In future development, the features of the attendance platform hold significant potential for further enhancement and refinement to achieve greater optimization. These improvements may include adaptation to emerging technological trends—such as Face Recognition technology—evolving user needs, and new challenges that arise over time. By continuously embracing innovation and ensuring that the system meets user expectations, it is hoped that the enhanced features will provide a more efficient, relevant, and improved user experience in the future.

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