



Employee Attendance System Using Rapid Application Development Method Based on Location Based Service

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Abstract

Employee attendance is the main benchmark in assessing employee performance and discipline, as well as providing important data for company management. The use of information technology, such as computers, has helped companies make decisions effectively. However, some companies face obstacles in the employee attendance process, especially in manual or finger print situations, and absence management. By utilizing GPS technology or similar LBS technology to detect employee presence. In this context, mobile technology, especially smartphones, has an important role in providing fast and accurate access to information. The RAD method is used in making application prototypes with repeated iterations, enabling fast development and efficient improvements. The aim of this research is to apply the LBS method to support absenteeism. This application allows employees to take attendance on time via their smartphones, with attendance data directly stored in the company's servers and databases. In addition, the Global Positioning System (GPS) feature allows tracking the location of employees who are on external service. It is hoped that the results of this research can help companies minimize the problem of employee absenteeism, increase the efficiency of work processes, and provide faster and more accurate access to information. The RAD and LBS methods have proven their effectiveness in overcoming absenteeism problems and speeding up work flow. Apart from that, this research also underlines the importance of employee discipline in achieving company goals.

Keywords: Attendance, Employees, LBS, Android, RAD

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1.0 INTRODUCTION

Computers have brought the world into a new era/information age. Of the many sectors of human life that are influenced by the presence of information technology, business-oriented organizations or institutions (companies) are the entities that benefit the most. In the current era of globalization, the need for fast, precise and accurate information is very important. A computer is a tool for processing data according to commands that have been formulated quickly and precisely, and is organized so that it automatically receives and stores data based on instructions that have been stored in memory. (Hanafri, 2019). [4]

The development of information and communication technology in Indonesia is very rapid, fast and accurate communication and information is really needed among the public to provide correct or original information in a company or agency. This fast and precise access can be accessed via mobile technology that is connected to the internet. Mobile Technology is Smartphone or Cellular Cell Phone Technology that we use in everyday life.

PT in collecting unstructured data, especially for employees in carrying out attendance which is carried out by employees manually or finger attendance, so that most employees have a lot of time constraints, so that most employees don't have time to finger, or queue too long to fill out the attendance list. So the data received by HRD in collecting employee attendance results is less valid or does not match and many employee absences have holes or blanks.

Attendance is one of the obligations that must be carried out because it has an important role for the company, where attendance is one of the supports that can support or motivate every activity within it. Apart from that, this absence can also provide information about how disciplined the employee concerned is. The presence of mobile Android-based employees can speed up and make it easier for employees to take attendance without having to queue in front of the attendance machine (Harumy 2018). [8] absenteeism can also be

interpreted as absenteeism and employee attendance is an important factor for an agency or company to achieve its goals, this is related to discipline and has an impact on the performance of each employee (Subiantoro & Sardiarinto, 2018). [10]

The Rapid Application Development (RAD) method based on location based service says that applying the Rapid Application Development (RAD) method is a software development method with an object-oriented approach to system development. This method aims to shorten the time in planning, designing and implementing a system when compared to traditional methods. Then the Location Based Service (LBS) method is used to access geographic information services used by users with cellular telephone devices via a cellular network connection to map locations to determine where they are (Sikumbang, 2020).

2.0 METHODOLOGY

Research methods

The system development method used is the Rapid Application Development (RAD) method which describes use case diagrams and uses UML tools. As previously explained, the Rapid Application Development (RAD) method is an application creation process based on making prototypes. Iteration, and repeated feedback. while the RAD model is very suitable for large scale projects because it uses an iterative method and can save costs (Deni Murdiani & Muhamad Sobirin, 2022) The steps that must be carried out when using the RAD method are:

- a. Requirements Planning
Requirement Planning is the initial stage that is carried out to analyze the needs of a Web-based attendance system, namely how the system works and interface design with the attendance system.
- b. In this stage of system design, the activeness of the users involved determines whether to achieve the goal because in this process the design process is carried out and improvements are made if there are still design discrepancies between the user and the analyst. A user can immediately provide comments if there are discrepancies in the design, design the system by referring to the user requirements documentation that was created in the previous stage.
- c. Rapid construction and feedback application coding, unit integration, system testing and converting prototype and beta systems into working models. In this phase the software and applications are thoroughly tested to meet the client's wishes. Developers will also work closely with clients and end users to determine feedback on functionality and interfaces to improve all aspects of the product.
- d. Implementation at this stage is the programmer who develops a program design that has been approved by users and analysts. Before being applied to an organization, a testing process is first carried out on the program to see whether there are errors or not. At this stage, users usually provide feedback on the system that has been created and obtain approval regarding the system.

Data Collection

In this research, the data collection stages were carried out, namely:

- a. Data collection is collecting all the desired data at Pt Xie Ying Konveksi Indonesia.
- b. Observations at Pt Xie Ying Konveksi Indonesia, from the results of the observations carried out obtained information
- c. Interview at PT. Xie Ying Konveksi Indonesia with several questions for the author's needs in designing an employee attendance system
- d. Literature study by studying theories, books, articles and internet sites related to proposed material related to attendance systems, system analysis and design, research methodology, and programming.

3.0 RESULTS AND DISCUSSION

3.1 Needs Analysis

To create an employee attendance application, there are several hardware and software used, namely:

3.1.1 Hardware

The hardware used is a laptop or computer with the following specifications:

- a. Processor Intel(R) Core (TM) i5-7020U CPU
- b. 8GB RAM
- c. Standard Keyboard and Mouse.

3.1.2 Software

The software required to create this system is as follows:

- a. Microsoft Windows 10 / 11 Operating System
- b. PHP Programming Language
- c. Android Studio

- d. MySQL
- e. XAMPP

3.2 New System Design

3.2.1 Flowchart

is a diagram that shows the workflow or actions carried out throughout the system and describes the sequence of procedures that exist in a system.

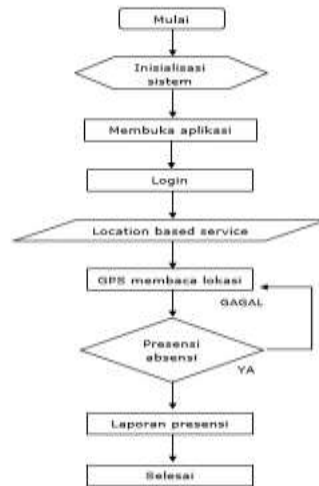


Figure 1. flowchart system workflow diagram

3.2.2 Use Cases

The Use Case Diagram below describes the activities of the system

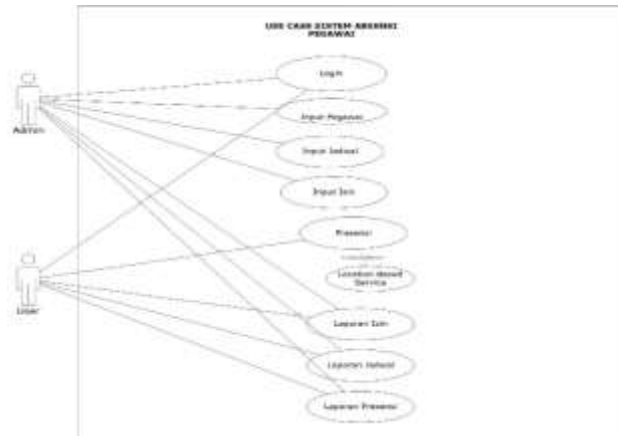


Figure 2. use case activity from the system

3.2.3 Activity Diagrams

The new activity diagram will depict the flow of activities in the system being designed, how each flow begins, the decisions that may occur, and how they end.

a. Admin Activity Diagram

The admin activity diagram below describes the activities of how the admin process adds or deletes data.

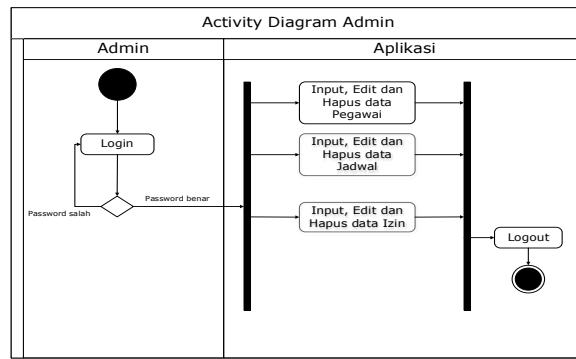


Figure 3. admin activity diagram

b. Activity Diagram User

The following user activity diagram will show activities from starting application access and being able to take attendance.

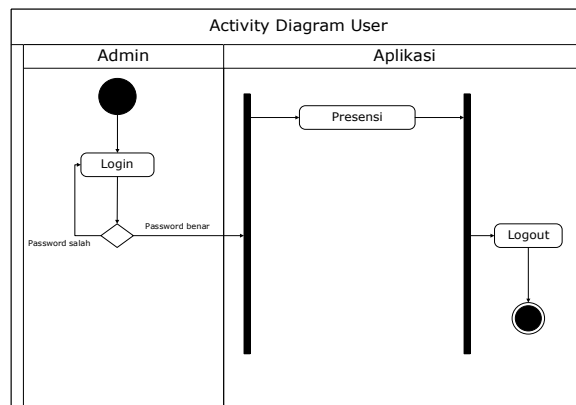


Figure 4. User Activity Diagram

3.2.4 Sequence Diagrams

Sequence diagrams explain the sequence of a process that is carried out to achieve a desired goal, starting from logging in to the program to producing a report or required output.

a. Sequence Diagram Admin

The admin sequence diagram describes an activity that an admin can carry out in the attendance application.

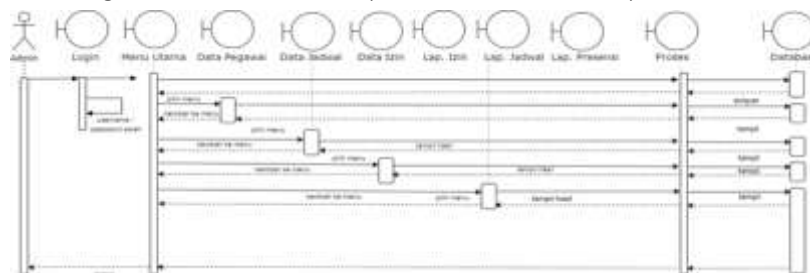


Figure 5. Sequence Diagram

b. Sequence Diagram User

The user sequence diagram describes an activity that a user can carry out in the attendance application.

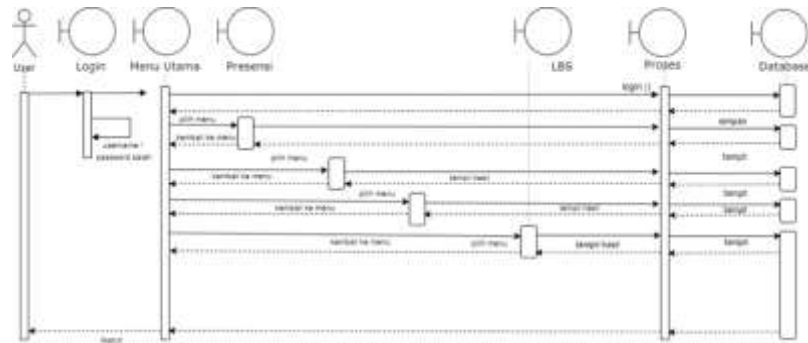


Figure 6. User Sequence Diagram

3.2.5 SWOT Analysis

SWOT analysis is an analysis method for identifying internal factors such as strength, weakness and external factors such as opportunity and threat systematically to determine the company's current position.

1. Strength (Strength)

The strength of the running system is the recorded attendance data, making it easier to check.

2. Weakness (Weakness)

This attendance system is only built based on a website and builds the web into an Android APK.

3. Opportunity (Opportunity)

Because there is no attendance application system, there is an opportunity to create an attendance application to make it easier for users to take attendance and companies to handle attendance.

4. Threat (Threat)

The time needed to take attendance requires sufficient time because you have to record it.

3.4 System Implementation

After designing the interface, the researcher will carry out the implementation stage of the system that has been designed.

3.4.1 Login Form Page

The login form page is the initial place where you will enter the application

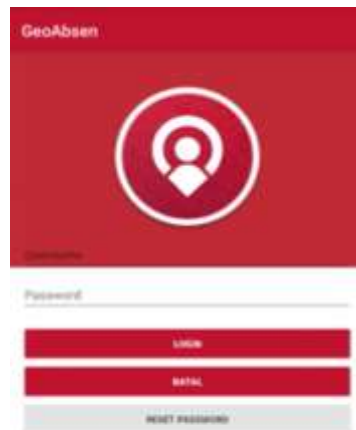


Figure 7. Login Form Page

3.4.2 Presence Page

The Presence page is a place for users to register for entry and return or attendance



Figure 8. Presence Page

3.4.3 Employee Data Page

The Employee Data page is a place to display employee data that has been input

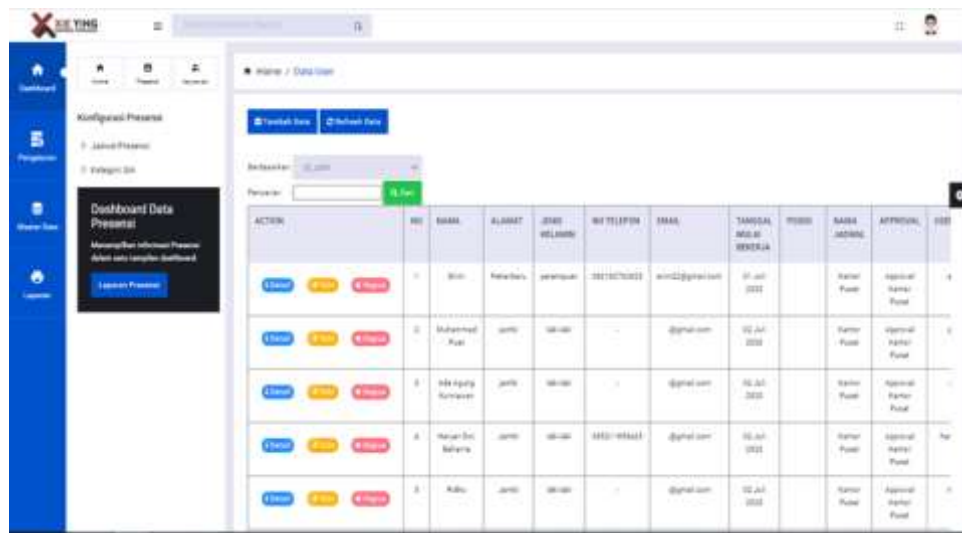


Figure 9. employee data page

3.4.4 Schedule Data Page

The Schedule Data page is a place to display the schedule data that has been input

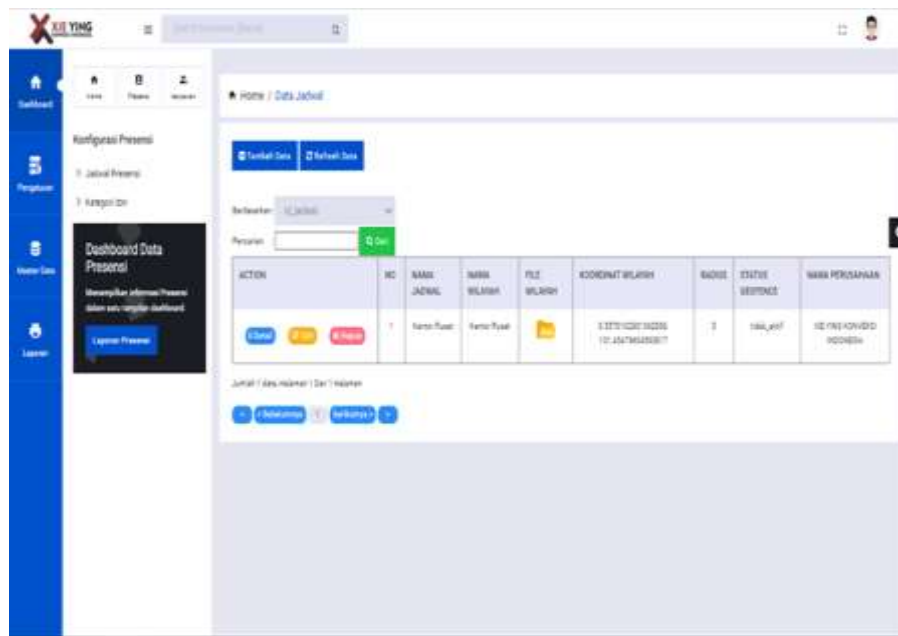


Figure 10. Schedule Data Page

3.4.5 Presence Data Page

The Presence Data page is a place to display employee attendance data

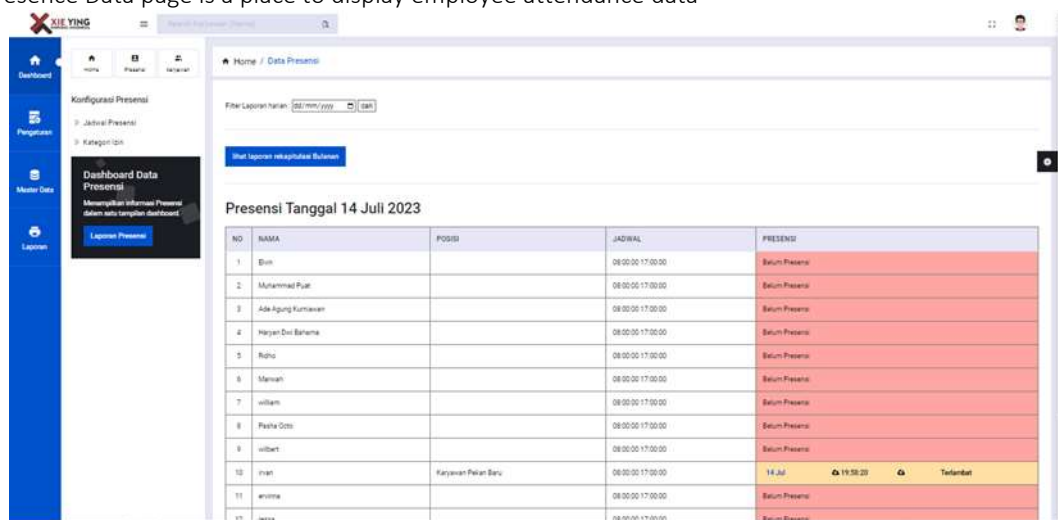


Figure 11. page of attendance data for employees who have been absent

3.4.6. Black box testing

Is a method of testing software based on input and output. The focus is on the functions and specifications expected from the application.

Table 1. testing the application that will be used by the user

Test Scenarios	Testing Actions	System Functions	Expected Results	Test result
Login	Testing the login menu	To ensure admin access rights	Displays the admin Dashboard page menu	Succeed
Add employees	Add employee data	To add employee data	Employee data added successfully	Succeed
Updating employees	Updating employee data	To update employee data	employee data has been successfully updated	Succeed
Deleting employee data	Deleting employee data	To delete employee data	employee data has been successfully deleted	Succeed

Test Scenarios	Testing Actions	System Functions	Expected Results	Test result
Add a schedule	Add a schedule	To add to the schedule	New schedule added successfully	Succeed
Update schedule	Update schedule	To Update the schedule	schedule updated successfully	Succeed
Delete a schedule	Delete a schedule	To delete a schedule	The schedule has been successfully deleted	Succeed
Add permissions	Add permissions	To add permissions	permission added successfully	Succeed
Update permissions	Update permissions	To Renew permissions	permissions updated successfully	Succeed
Remove permissions	Remove permissions	To remove permissions	permission removed successfully	Succeed

Table 2. user/system user testing

Test Scenarios	Testing Actions	System Functions	Expected Results	Test result
Users access the attendance application page	Testing the attendance dashboard page	To access the attendance application	Displays the attendance application page menu	Succeed
Users perform attendance	Choose attendance, absence, entry or return	To do attendance	Displays attendance results	Succeed

3.4.7 Comparison of distance trials

This is the distance between the user and the closest location point and the location that has been determined, provided that the distance between the location of the absent point and the presence of the user is within a radius of 800M (depending on company provisions).

Table 3. Comparison of Location Distance Tests, Between Users and Location Points

No	Attendance Point	User Position	Distance (M)	Expected results	Test result
1	Jl. Sultan sharif Qasim (0.5368801934487487, 101.45381164669318)	Gg. Aman (0.5369539509561735, 101.45479467629353)	109	Can attend attendance over a distance (500 M)	Succeed
2	Irna's sewing house (0.5368801636192423, 101.454800840313)	Gg. Taspen (0.5371161876414164, 101.45389593004843)	105	Can attend attendance over a distance (500 M)	Succeed
3	Gg. Aman (0.536874799438638, 101.45386508464016)	Shopee Express HUB fifty (0.5377706178471263, 101.45647085068501)	308	Can attend attendance over a distance (500 M)	Succeed
4	Gg. Aman (0.5369539509561735, 101.45479467629353)	RM Abang Adek (0.5387984615752347, 101.4583185432559)	543	Can attend attendance over a distance (700 M)	Succeed
5	Gg. Selamat (0.5368673561849963, 101.4538727818263)	Cahaya Bunda School (0.540308478275377, 101.45956308823654)	740	Can attend attendance over a distance (700 M)	Succeed

5.0 CONCLUSION

Conclusion

Based on the results of research and discussions that have been detailed in the Employee Attendance system, it can be concluded that by implementing the location-based service method in the attendance application, this location-based service feature utilizes GPS technology where employees make attendance according to predetermined locations and coordinates. So, every time an employee makes a presence, the data will be recorded accurately at a specific coordinate point. This application also provides various company management features

that can help in managing employee absences holistically. For example, managers can easily view employee attendance reports in tabular form, monitor employee attendance in real-time, and access attendance history for further analysis.

Recommendation

By designing this location-based service application, it is hoped that the company can increase efficiency in employee attendance management, reduce administrative costs associated with manual attendance, and provide a better work experience for employees. As a modern solution, we believe this application will become a trusted partner for companies in managing human resources more effectively and intelligently.

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