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Design and Development of a Location-Based Attendance Application (Geo-attendance) Using CodeIgniter at the Pontianak District Court Class 1A

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Abstract
The Class 1A District Court of Pontianak (Pengadilan Negeri Pontianak Kelas 1A), as a government institution, demands high discipline from all employees. Currently, the existing attendance management system faces technical constraints such as location validation inefficiencies and system errors, making it difficult to monitor employee positions accurately and in real-time. This situation potentially leads to discrepancies between attendance data and actual facts on the ground. This research aims to design and build a location-based attendance application (Geoattendance) that utilizes Global Positioning System (GPS) technology and the Google Maps API to validate employee positions during attendance recording. This application is web-based, built using the CodeIgniter framework and the Waterfall system development method. The result of this research is an attendance information system capable of verifying employee locations both visually and via coordinates, thereby increasing discipline and data transparency at the Class 1A District Court of Pontianak.

1. Introduction

Employee attendance plays an important role in measuring discipline and improving organizational performance. The Class 1A District Court of Pontianak requires an accurate attendance management system to ensure transparency and accountability. However, the existing attendance system still encounters problems in validating employees' physical locations due to GPS errors and limited location visualization. As a result, attendance records cannot always confirm whether employees are actually present at the designated workplace. Several previous studies have developed web-based and mobile attendance systems using geolocation technology. However, most systems only validate GPS coordinates without providing accurate visual verification of employee locations, while others use frameworks such as Laravel or Android applications that require greater server resources. Therefore, there is still a need for a lightweight web-based solution capable of providing accurate location validation and visual monitoring.

This research proposes the development of a Geoattendance application using the CodeIgniter framework integrated with the Google Maps API. The system enables employees to record attendance through smartphones while allowing administrators to verify attendance locations visually using Google Maps and Street View. The novelty of this research lies in the integration of CodeIgniter, GPS-based geolocation, and Google Maps visualization to improve attendance validation and reduce attendance fraud.

The objective of this research is to design and develop a web-based attendance application capable of validating employee locations accurately and providing transparent attendance management for the Class 1A District Court of Pontianak.

2. Research Method

This research employed the Waterfall software development model consisting of five stages: requirement analysis, system design, implementation, testing, and maintenance.

2.1 Respondent Characteristics

The respondents involved in this study were employees and administrative staff of the Class 1A District Court of Pontianak. Administrative staff acted as system administrators, while employees served as end users of the attendance application.

2.2 Data Collection

Data were collected through:

- Observation of the existing attendance system.
- Interviews with administrative staff.
- Literature review from journals, books, and related studies.

2.3 System Development

The application was developed using:

- PHP with CodeIgniter Framework
- MySQL Database
- Google Maps API
- HTML, CSS, Bootstrap, and JavaScript

2.4 System Testing

The system functionality was evaluated using the Black Box Testing method to verify whether each feature operated according to the functional requirements.

3. Results and Discussion

The developed Geoattendance application successfully implements location-based attendance recording integrated with Google Maps API.

The system provides several main features including:

- User authentication
- GPS-based attendance
- Employee attendance history
- Daily attendance reports
- Employee attendance summary
- Holiday management
- Employee management
- Department management

GPS validation ensures that attendance can only be submitted within the predefined office radius. Google Maps visualization enables administrators to verify attendance locations directly through map and satellite views.

Black Box testing results indicate that all system functions performed successfully. Login authentication, attendance recording, GPS validation, report generation, employee management, and holiday management operated according to the expected results without functional errors.

Compared with previous studies, this research provides better location visualization through Google Maps integration while maintaining lightweight performance using the CodeIgniter framework. These improvements increase transparency and reduce the possibility of attendance manipulation.

4. Conclusions and Future Works

This research successfully designed and implemented a web-based Geoattendance application using CodeIgniter and Google Maps API for the Class 1A District Court of Pontianak. The application accurately validates employee attendance based on GPS coordinates and provides visual location verification for administrators. Black Box Testing demonstrated that all major system functions operated correctly.

Future research may enhance the system by integrating facial recognition, fake GPS detection, mobile applications for Android and iOS, and automatic attendance notifications to further improve security and usability.

5. References

The references should follow the IEEE citation format and primarily include recent publications from the last five years. The references used in this study include literature related to CodeIgniter, attendance systems, Google Maps API, geolocation technology, and software engineering.

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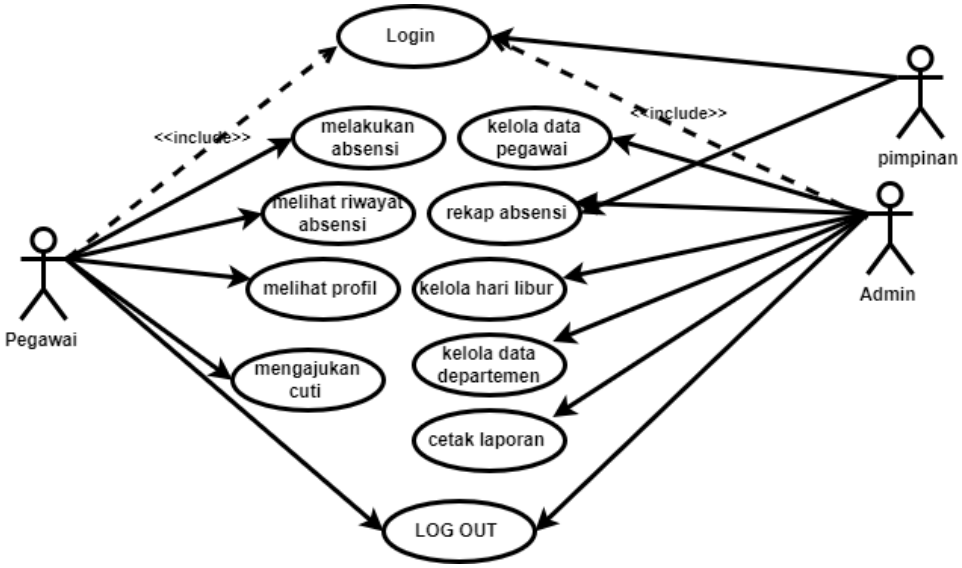
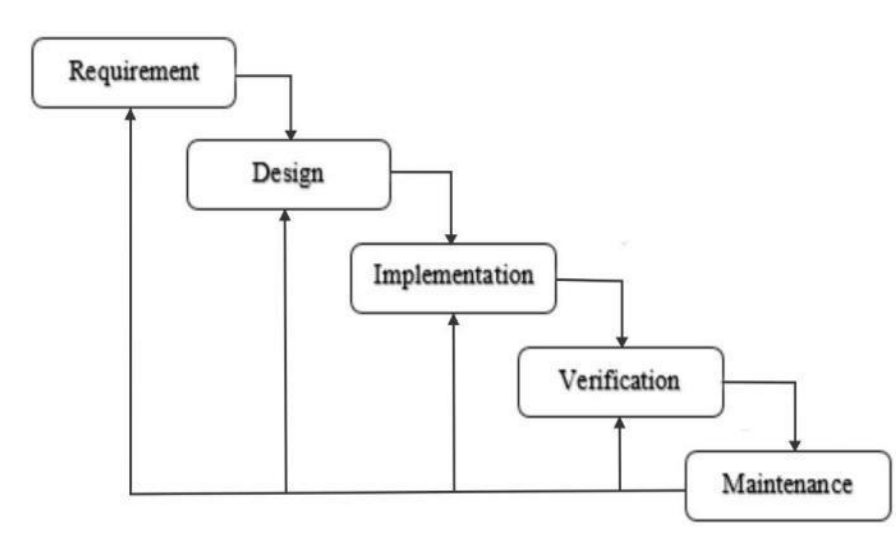
Figure and Table



Gambar 1. 1 *Use Case Diagram*



Gambar 1. 2 Metode Waterfall