



Web-Based Internship Absence and Activity Information System Using GPS (Case Study: BMKG Region I, Medan City)

M. Arif Panji Wibowo^{1*}, Samsudin²

*^{1,2}Program Studi Sistem Informasi, Fakultas Sains dan Teknologi, Universitas Islam Negeri Sumatera Utara
dimasarief001@gmail.com^{1*}, samsudin@uinsu.ac.id²*

Abstract

Internship attendance and activity recording are crucial components of the human resource evaluation and development process. At the BMKG Region I, Medan City, the attendance and internship activity reporting process was previously carried out manually, potentially leading to recording errors, reporting delays, and difficulties in evaluating intern performance. This study aims to implement a web-based Internship Attendance and Activity Information System utilizing Global Positioning System (GPS) technology. The research method used was the System Development Life Cycle (SDLC) with a case study approach. The system was developed using the native PHP programming language with JSON-based data storage. The results showed that the system is capable of supporting location-based attendance, daily activity recording, activity verification by supervisors, and systematic intern performance assessment. The implementation of this system has been proven to increase the effectiveness and efficiency of internship management within BMKG Region I, Medan City.

Keywords: *Information System, Attendance, GPS, Internship, Performance Evaluation.*

1. Introduction

Developments in information technology are encouraging government and educational institutions to adopt information systems to support operational activities, including internship management. Internships require a system capable of recording attendance, daily activities, and evaluating participant performance accurately and in a structured manner [4], [5].

In practice, the manual process of recording and recording internship activities has the potential to cause problems, such as data recording errors, late reporting, and difficulties in monitoring and evaluating intern performance [6], [8]. Therefore, a web-based information system capable of managing internship data in an integrated manner is needed.

The use of Global Positioning System (GPS) technology in attendance systems is considered capable of improving participant attendance accuracy by directly verifying location [2], [7]. Several studies have shown that GPS-based attendance systems are more effective in improving discipline than conventional attendance methods [3].

Based on these issues, this study focuses on the implementation of a web-based attendance and internship activity information system utilizing GPS technology and an intern performance evaluation feature at the BMKG Office, Region I, Medan City.

2. Research Method

2.1 System Development Method

The system development method used in this research is the System Development Life Cycle (SDLC) with the Waterfall model. The SDLC method was chosen because it has systematic stages and is suitable for developing information systems with clear functional requirements [1], [9].

The SDLC stages applied include system requirements analysis, system design, implementation, and testing. This approach is widely used in web-based information systems research because it facilitates the documentation and evaluation process at each development stage [3].

2.2 Data Collection Techniques

Data collection techniques used in this research included direct observation of the attendance process and internship activity recording, interviews with field supervisors and internship managers, and literature review from journals and books relevant to attendance information systems and performance evaluation [5], [8].

2.3 System Design

The system is designed to be web-based, with access rights divided based on user roles: Admin, Field Supervisor, and Intern. Each role has different functions and access restrictions to maintain data security and integrity [4], [10].

2.4 System Testing Scenarios

System testing was conducted to ensure that all functions of the attendance and internship activity information system functioned according to user requirements. The testing method used was functional testing (black-box testing), which involves testing each system feature based on its intended function without reviewing the program code structure.

The testing scenarios focused on several key system functions, including the user login process, GPS-based attendance, daily activity recording, activity verification by supervisors, and the internship performance assessment process. Each scenario was tested based on user input and system output. Testing was conducted for each user role—Admin, Field Supervisor, and Intern—to ensure proper access restrictions were in place.

The test results showed that all system functions functioned according to the requirements defined in the analysis phase. No functional errors were found that hindered the overall use of the system. This functional testing approach aligns with previous research that found black-box testing to be effective in testing web-based information systems [9].

3. Result and Discussion

3.1 System Implementation

The GPS-based attendance module allows interns to record attendance with real-time location validation. The system also records attendance times to determine the intern's level of discipline. This approach aligns with previous research that suggests the use of GPS in an attendance system can improve the accuracy of attendance data [2], [7].

The information system developed consists of several main modules, including:

1. User login and authentication module
2. GPS-based attendance module
3. Daily activity recording module
4. Activity verification module by supervisor
5. Internship performance assessment module

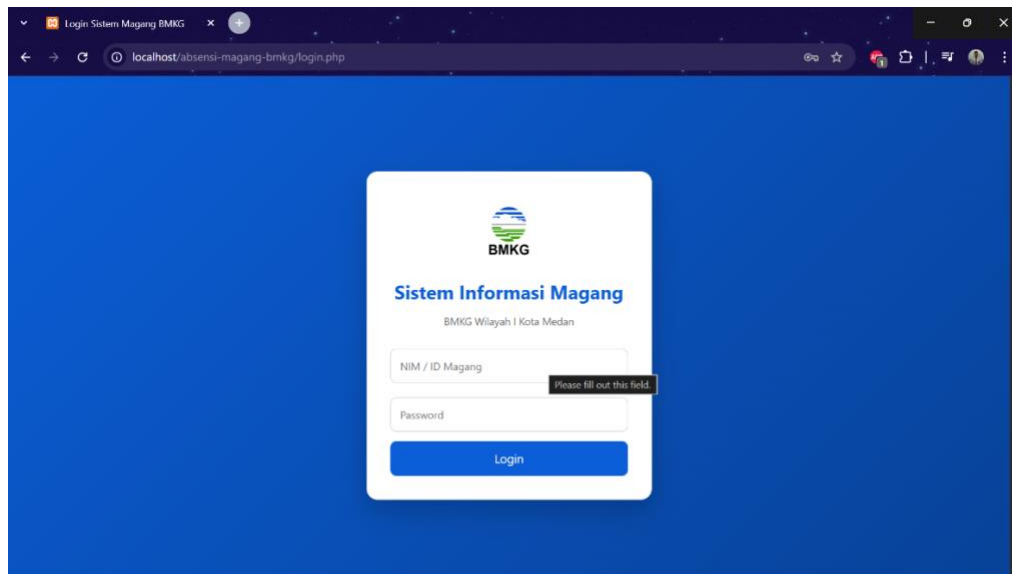


Figure 1. assessment module System Login Page Appearance

3.2 GPS-Based Attendance Implementation

The Global Positioning System (GPS)-based attendance module is designed to enable interns to record attendance using **real-time** location information. When an intern records their attendance, the system automatically captures the user's location coordinates through their device and stores them as part of the attendance data. This mechanism ensures that attendance can only be recorded when the intern is at the designated location.

In addition to location validation, the system also automatically records the time of attendance, which can be used to measure the intern's discipline. This time-of-attendance data is then analyzed to determine whether the intern is on time or late. By simultaneously recording location and time, the system provides more accurate, objective, and accountable attendance data.

This GPS-based attendance approach aligns with previous research, which suggests that utilizing GPS technology in an attendance system can improve the accuracy of attendance data and minimize the potential for fraud that often occurs with conventional attendance methods [2], [7].

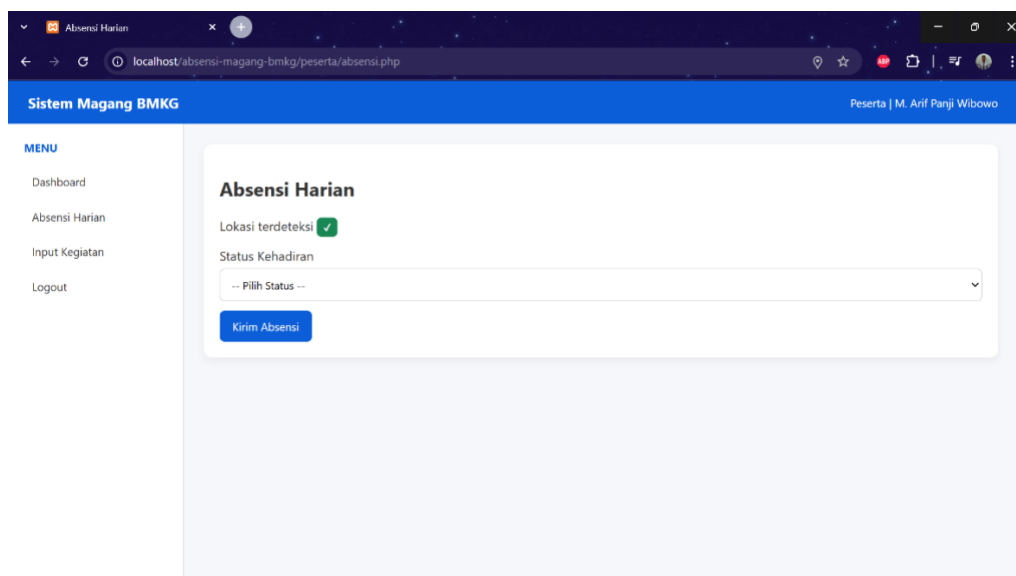


Figure 2. Tampilan Halaman Absensi Berbasis GPS

3.3 Implementation of Participant Activity Recording

Interns can record daily activities through the system by completing activity descriptions and uploading supporting files. The inputted activity data will be forwarded to the field supervisor for verification [4], [5].

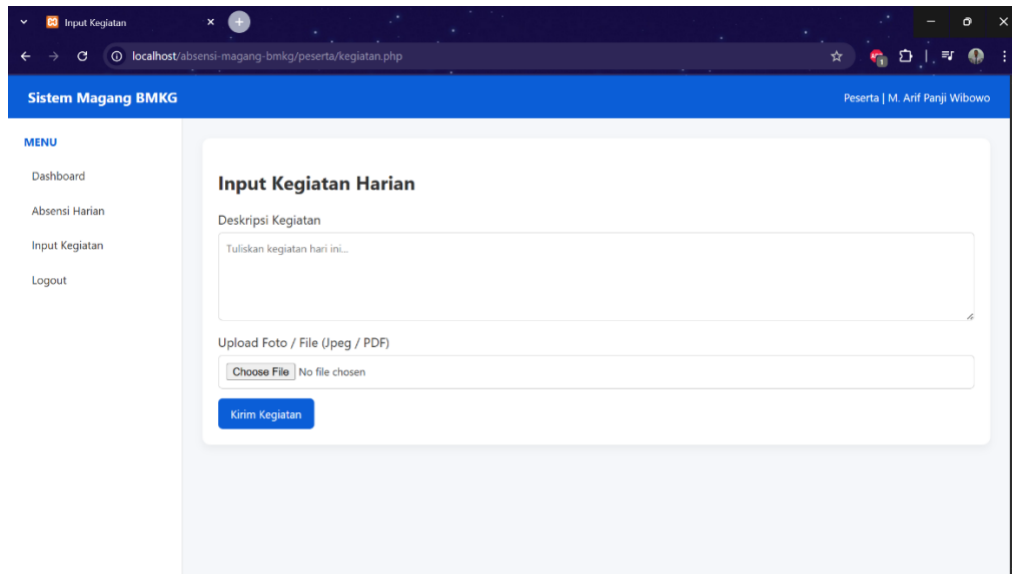


Figure 3. Tampilan Input Kegiatan Harian Peserta

3.4 Activity Verification by Supervisors

Field supervisors play a crucial role in ensuring the suitability and quality of activities carried out by interns. Through the developed system, supervisors are granted special access to verify activity reports submitted by interns. This verification process is carried out by reviewing activity descriptions and supporting documents uploaded to the system.

During the verification stage, field supervisors can assign an approved status if the reported activities align with the internship plan and objectives, or a revised status if discrepancies or deficiencies are found in the activity report. In addition to determining the status, supervisors can also add comments or evaluative notes as feedback to interns. This feature enables structured two-way communication between supervisors and interns, allowing for more effective and well-documented guidance and activity evaluation [6], [10].

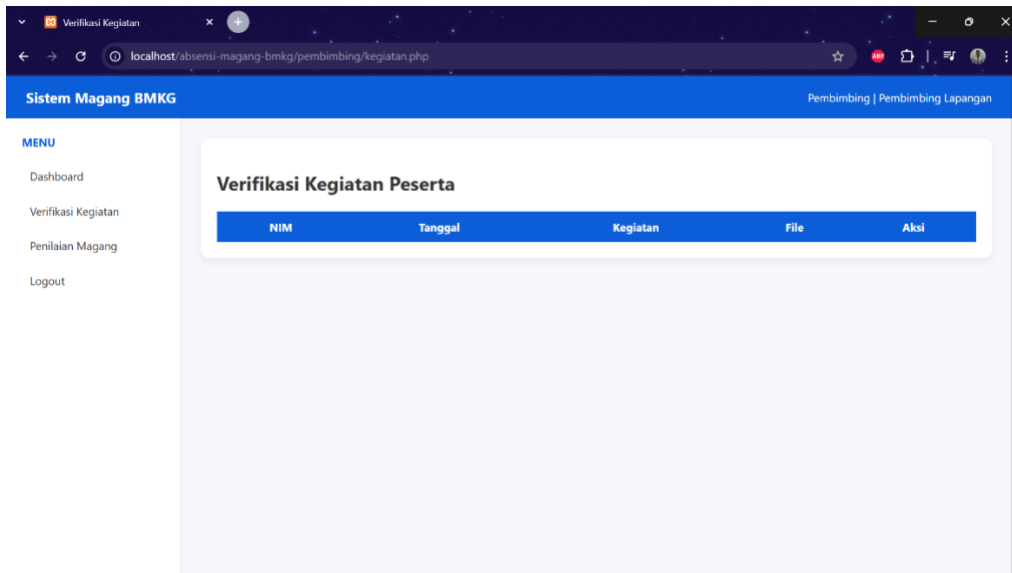


Figure 4. Tampilan Verifikasi Kegiatan oleh Pembimbing

3.5 Evaluation and Assessment of Internship Performance

Internship performance is assessed based on several criteria, including discipline, attendance, performance, and attitude. The system automatically calculates the final grade based on predetermined weighting [6], [10].

Figure 5. Tampilan Penilaian Kinerja Peserta Magang

3.6 Discussion

Based on the results of system implementation and testing, the developed information system is able to overcome the problems of manual recording that previously occurred. The system facilitates the attendance process, activity monitoring, and performance evaluation of intern participants. Furthermore, the use of GPS improves the accuracy of intern attendance data [8], [9].

3.7 Analysis of Access Rights and System Security

The developed information system implements a mechanism for dividing access rights based on user roles to maintain data security and integrity. Each user is required to authenticate through the login page before accessing the system. After successful authentication, the system directs the user to the dashboard page appropriate to their role.

Admins have access to monitor attendance data, activities, and final grades for intern participants. Field Supervisors have limited access to verify activities and assess intern performance. Meanwhile, interns can only record attendance, input activities, and view performance evaluation results without the right to change assessment data.

This implementation of divided access rights aims to prevent system misuse and maintain the validity of stored data. This approach is in line with the principles of information system security which emphasize the importance of role-based access control in data management [4], [10].

3.8 Analysis of System Benefits for the Internship Process

The implementation of an intern attendance and activity information system provides several benefits for related parties. For interns, the system simplifies the attendance process and daily activity reporting, as it can be done independently through a web-based system. In addition, interns can monitor the activity verification status and performance scores assigned by their supervisors.

For Field Supervisors, the system facilitates a more structured monitoring of intern activities. Supervisors no longer need to manually review activity reports, as all data is stored and documented within the system. The performance assessment process also becomes more objective because it is based on recorded attendance and activity data.

Meanwhile, for Admins, the system simplifies the management and reporting of internship data. Attendance data and final intern grades can be exported as PDF reports, supporting administrative needs. These benefits align with previous research that found web-based information systems can improve efficiency and transparency in internship management [8].

3.9 Evaluation of System Test Results

Evaluation of system test results was conducted to assess the success of the implementation of the developed intern attendance and activity information system. The evaluation focused on system functionality, feature suitability to user needs, and ease of use for each user role.

Based on the results of functional testing using the black-box testing method, all key system features functioned well according to the requirements defined in the analysis phase. The login process successfully differentiated user access rights based on the roles of Admin, Field Supervisor, and Intern. The GPS-based attendance module accurately recorded location and time data, while the activity recording and verification modules ran smoothly.

In addition to functional testing, a qualitative system evaluation was also conducted through direct observation of system usage. The evaluation results indicated that the system was easier to use than the previous manual process. Users could quickly access attendance, activity, and assessment data without having to re-register. This resulted in improved time efficiency and data consistency.

In terms of system reliability, JSON-based data storage was deemed quite effective for the needs of an internship system with a relatively limited number of users. However, for larger-scale use, the system still has potential for development using a relational database to further enhance performance and data security.

The results of this evaluation indicate that the developed information system meets the functional and operational needs of users and is suitable for use as a support tool for internship management. This finding aligns with previous research indicating that implementing a web-based information system can improve the effectiveness of data management and the quality of performance evaluations [6], [8], [9].

4. Conclusion

Based on the research results and discussion, it can be concluded that the implementation of a web-based Internship Attendance and Activity Information System with GPS at the BMKG Region I Office in Medan City has successfully increased the effectiveness and efficiency of internship management. This system is able to provide data on attendance, activities, and performance assessments in an integrated and structured manner.

In addition to improving the effectiveness of internship data management, this system also contributes to increased transparency and accountability in the internship evaluation process. All attendance, activity, and assessment data are well-documented and can be used as a basis for decision-making by relevant parties.

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