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Employee Attendance Application at Universitas Muhammadiyah Sidoarjo Based on WhatsApp

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ABSTRACT

Objective: *Effective employee attendance management is crucial for optimizing operational efficiency in higher education institutions. This study aims to develop a WhatsApp-based attendance system to enhance accuracy, efficiency, and accessibility at Muhammadiyah University of Sidoarjo.* ***Method:*** *A web-based application was designed and integrated with the WhatsApp API, enabling employees to record attendance by sending messages via WhatsApp. The system includes automated data processing features for administrative monitoring. The research follows a system development life cycle (SDLC) approach, incorporating requirements analysis, design, implementation, and evaluation phases.* ***Results:*** *The implementation of the system demonstrated improved attendance efficiency, minimized human error in data recording, and reduced reliance on additional applications. The administrative panel facilitated real-time monitoring, enhancing managerial oversight.* ***Novelty:*** *This study presents an innovative approach by leveraging WhatsApp—a widely used communication platform—as a cost-effective alternative to conventional attendance systems. The integration of WhatsApp API eliminates the need for dedicated mobile applications, reducing maintenance costs and improving user adoption. This solution offers a practical model for universities seeking to modernize attendance management while maintaining ease of use for employees.*

INTRODUCTION

Employee attendance is a crucial aspect of human resource management in an organization, including within higher education institutions. An accurate and efficient attendance recording process supports workforce management and enhances employee discipline and productivity. Muhammadiyah University of Sidoarjo (UMSIDA), as a continuously developing educational institution, requires a more modern and effective attendance system to replace conventional methods that are still widely used [1].

Generally, attendance systems implemented in various institutions use manual methods such as recording in attendance books or fingerprint scanning. However, these methods pose several challenges, including long queues during the attendance process, potential fraud, and difficulties in summarizing attendance data. To address these issues, a more flexible, efficient, and accessible attendance system for all employees is needed [2].

One potential solution is the development of a WhatsApp-based attendance website application. WhatsApp is a widely used instant messaging application, including among employees at Muhammadiyah University of Sidoarjo. By leveraging this technology, employees can mark their attendance simply by sending a message via WhatsApp, which is then processed and recorded in a web-based system [3].

This research aims to design and develop a WhatsApp-based employee attendance website application to improve the efficiency of the attendance process. This system is expected to facilitate employees in recording their attendance without relying on specific devices while also simplifying administrative management of attendance data. Additionally, implementing this technology is anticipated to reduce fraud potential and enhance the accuracy of attendance records within Muhammadiyah University of Sidoarjo [4].

An application is software designed to assist users in completing specific tasks. Applications can take the form of mobile, desktop, or web-based software, allowing users to access them through various devices. Applications facilitate the completion of tasks, including mathematical problems, ensuring the reliability and accuracy of results [5].

A website is a collection of interconnected web pages accessible via the World Wide Web (WWW) on the internet. These interconnected pages can be accessed through internet browsers using a communication protocol known as Hypertext Transfer Protocol (HTTP). Websites serve various functions, including information dissemination, communication, transactions, and management systems that assist organizations in their operations [6].

PHP (Hypertext Preprocessor) is a server-side programming language widely used in developing dynamic websites. PHP enables the creation of interactive web-based applications by integrating database access and efficient data processing [7].

MySQL is a relational database management system (RDBMS) commonly used to store and manage data for web-based applications. MySQL is known for its speed, security, and compatibility with various programming languages, such as PHP [8].

WhatsApp is a widely used instant messaging application with millions of users worldwide. Through the WhatsApp API, the application can be integrated with other systems, allowing automation in communication, including the implementation of a WhatsApp-based attendance system [9].

With the advancement of digital technology, an efficient attendance system has become an urgent necessity for educational institutions to enhance human resource management. The development of the **Employee Attendance Application at Universitas Muhammadiyah Sidoarjo Based on WhatsApp, it** holds significant importance in providing a modern and adaptive solution to the challenges faced in employee attendance recording. This study not only helps UMSIDA run more smoothly, but it also gives other schools ideas on how to use similar technologies to improve the accuracy of attendance records, openness in administration, and overall efficiency in managing workers in the digital age.

RESEARCH METHOD

This section explains the research stages, including the software development method and data collection techniques used in the study.

3.1 Software Development Method

This study adopts the Waterfall model for software development. According to Ladjamudin, the Waterfall model consists of five main stages:

1. **Specification and Analysis**
   This stage involves analyzing the system requirements, particularly for the leave request system. Additionally, data management plans, application specifications, and the required hardware are determined.
2. **System and Software Design**
   At this stage, an initial system design is created based on the collected data before proceeding to the implementation phase.
3. **Implementation and Unit Testing**
   This is the core phase of system development. After the design is completed, the system is developed and tested on a unit level to ensure each component functions properly.
4. **Integration and System Testing**
   Once the coding process is completed, the system undergoes comprehensive testing to verify compliance with predefined specifications. At this stage, the system is introduced to users to identify potential issues before full implementation.
5. **Operation and Maintenance**
   After deployment, maintenance is carried out to resolve potential errors and adjust the software to accommodate new requirements that may arise [10].

3.2 Data Collection Method

The data collection methods in this study include three main techniques:

1. **Observation**
   Direct observations were conducted at Muhammadiyah University of Sidoarjo to ensure that the designed system aligns with real-world conditions and institutional needs.
2. **Interviews**
   Interviews were conducted with personnel involved in attendance management, such as the Human Resources (HR) department and the Campus Management Information System (MIS) team, to strengthen the system requirements analysis.
3. **Literature Study**
   To support system development and reinforce the theoretical foundation, a literature review was conducted by referring to scientific journals, books, and reliable online sources [11].

RESULTS AND DISCUSSION

4. Results and Discussion

The online attendance system is implemented through WhatsApp chat, where UMSIDA employees send messages to the UMSIDA WhatsApp bot, which recognizes the employee's registered phone number. The users directly involved in this system

include employees and supervisors. Each employee records their attendance by sending their live location to the UMSIDA WhatsApp bot. The system identifies the employee's phone number and verifies their location. If the employee is not on campus, the attendance request is rejected; however, if the attendance is recorded within the campus premises, it is accepted.

4.1 Use Case Diagram

The Use Case Diagram serves as the starting point for understanding and analyzing system requirements during the design phase. It helps define the necessary functionalities of the system. Figure 1 below illustrates the use case diagram involving employees and the WhatsApp bot.

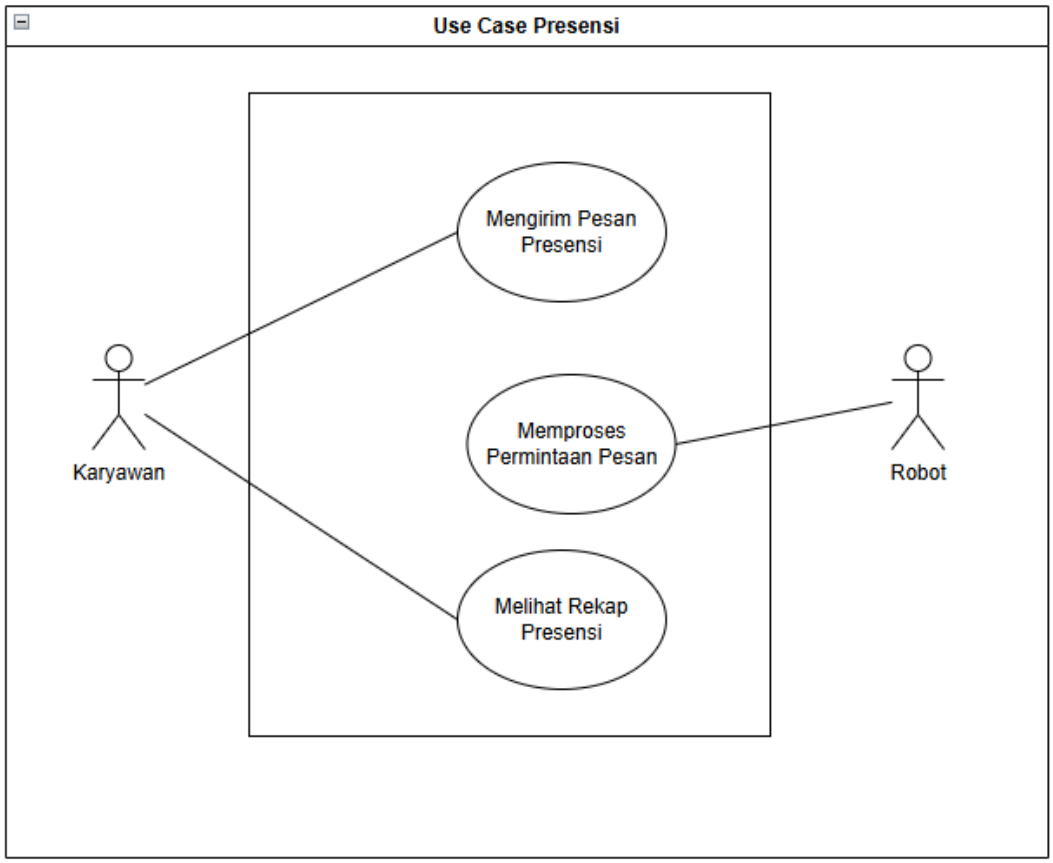

Figure 1. Use Case Diagram of Employees and WhatsApp Bot

Employees can easily record their attendance via WhatsApp by sending a live location to the designated WhatsApp bot number. When an employee shares their real-time location, the system automatically records the timestamp and geographic coordinates. This ensures that attendance is conducted within the specified location, minimizing the potential for fraudulent check-ins. Additionally, this method simplifies the attendance process as employees do not need to install additional applications; they can use WhatsApp, which is already widely used for daily communication.

4.2 User Interface

The WhatsApp-based attendance system is designed to facilitate employees in recording their attendance efficiently. In this system, employees only need to send a live location to the designated WhatsApp number. Once received, the system processes and displays attendance details, including the employee's name, timestamp, and location coordinates. If the recorded location matches the designated work area, the system marks the attendance as valid [12], [13].

Additionally, the user interface includes a confirmation notification informing employees that their attendance has been successfully recorded. The response message is designed to be simple and easy to understand, ensuring that users can complete the attendance process quickly and without any complications.

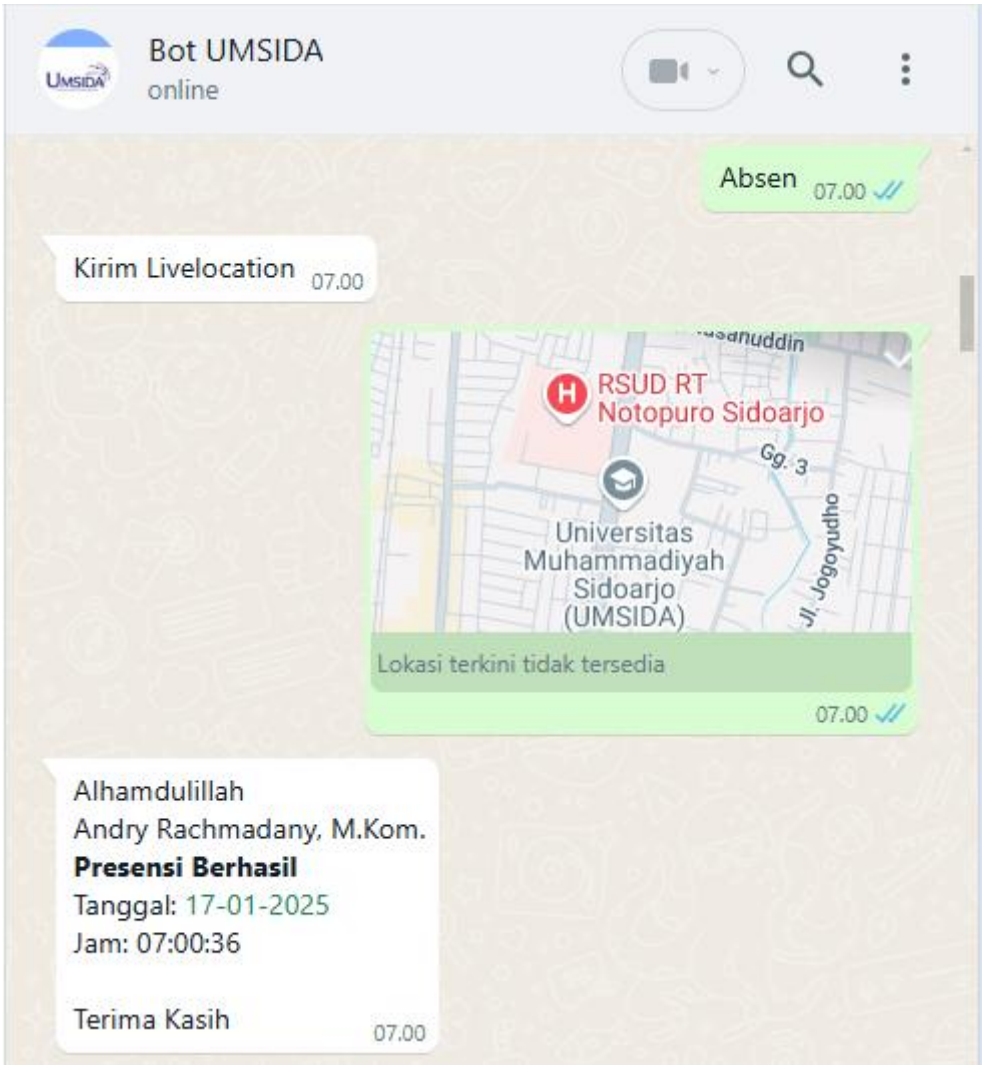

Figure 2. Attendance via WhatsApp

If the attendance process is successful, the system will automatically send a confirmation message displaying "Attendance Successful" as an indication that the location and timestamp have been recorded. This notification is sent directly via WhatsApp, allowing employees to verify that their attendance has been successfully recorded without needing to check manually [14], [15].

Additionally, the system can include extra details such as the attendance timestamp and the recorded location to ensure transparency. This feature minimizes concerns about system failures or recording errors, as every attendance process is confirmed in real time.

CONCLUSION

Fundamental Finding: Employee attendance is a critical aspect of institutional workforce management. The WhatsApp-based Employee Attendance Application at Muhammadiyah University of Sidoarjo provides a practical, efficient, and user-friendly solution by utilizing WhatsApp's live location feature. This system enables employees to record their attendance without additional applications, simplifying the process while ensuring accuracy through real-time timestamp and location verification. **Implication:** The implementation of this system enhances transparency, reduces fraudulent attendance practices, and streamlines administrative workload, ultimately improving efficiency in employee management. Additionally, the system leverages widely used technology, promoting ease of adoption without requiring extensive training or infrastructure changes. **Limitation:** Despite its advantages, this system relies on internet connectivity and the accuracy of GPS data, which may affect attendance verification in cases of unstable network conditions or location inaccuracies. Furthermore, the system is limited to employees with WhatsApp access, potentially excluding those without compatible devices. **Future Research:** Further studies should explore the integration of advanced authentication mechanisms, such as biometric verification or AI-based location validation, to enhance security and reliability. Additionally, expanding the system to accommodate multi-location attendance tracking and integrating it with payroll or performance evaluation systems could provide a more comprehensive workforce management solution.

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