Design and Creation of Web-Based Online Attendance Systems in Higher Education Institutions

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Abstract

Discipline and performance are important factors in educational institutions. Discipline assessment and employee performance can be assessed through attendance. The initial process of recording employee attendance is done by coming directly to the campus environment using a fingerprinting tool. The use of fingerprint tools as a medium for recording attendance can no longer be used considering that it can increase the spread of COVID-19 due to the changing contacts of the device by employees. During the pandemic, employees are required to work from home, but attendance data must still be recorded properly without having to physically come to campus. Employees were instructed to prevent the spread of the virus by not using the fingerprint machine, reducing all forms of physical work in the campus environment, and starting to work from home to prevent direct physical contact. The use of computer and internet technology in the form of an online presence system needs to be developed to prevent the spread of COVID-19 from spreading. This study designs and makes a prototype of a web-based online attendance system for employees of educational institutions to provide solutions to problems faced by helping record attendance from anywhere. The development of a web-based online presence system in this study uses the PHP programming language and MySQL database. The system development stage uses the prototyping method. Based on the testing using the Blackbox method the online attendance system can help campus management manage employee attendance data better in minimizing the risk of COVID-19 transmission.

Keywords: online attendance system, web-based, covid-19 pandemic, work from home

1. Introduction

Attendance is one of the assessments of employee discipline and performance. Attendance data is important information in staffing rules so this data must be recorded properly. Attendance recording is carried out by all employees every day and within applicable working hours. Research on the use of web-based online attendance system technology has been carried out at government agencies in the Batuceper Tangerang sub-district office. System development research is carried out as a solution to the problems faced because the application of employee attendance recording is still manual. The manual recording is ineffective and efficient in the form of handwriting which makes it difficult to find information and present employee attendance reports. The computerized online attendance system reduces errors in recording attendance. The attendance process is enough to input the employee's parent number. This study used UML object-oriented system design tools (Unified Modelling Language) [1].

In addition to government agencies, the development of a web-based attendance information system is also carried out for scientific conference activities. This research was conducted to overcome the difficulty of recording the attendance of conference participants who were still manual. These difficulties include making reports of participants who presented at the conference still takes a long time. This study used a systematic and iterative spiral system development method on the features of the web-based online attendance system developed [2].

Employee attendance is participation of employee attendance is an important factor for an agency, company, or organization to achieve a goal, attendance is closely related to discipline and is an assessment of employee performance. Attendance data collection includes the calculation of attendance hours, exit hours, non-entry information, and the attendance recapitulation calculation process [3]. Before the COVID-19

pandemic occurred, the process of recording the attendance of employees, both lecturers, and educational staff, was carried out by coming directly to the campus environment using a fingerprinting tool. During the COVID-19 pandemic, all employees were given directions to prevent the spread of the virus by not using fingerprint machines, as well as reducing all forms of physical work in the campus environment and starting to work from home. This is to maintain the health and safety of all employees. However, this attendance recording must still be implemented as a form of staffing rule. The obstacle encountered is that there are restrictions on not being allowed to physically come to the campus environment where attendance recording activities can no longer use fingerprints until conditions are declared safe. This research of the web-based online attendance system is a computer technology that utilizes internet access that allows all employees to continue to be able to carry out attendance recordings from anywhere. Using this web-based online attendance system, that supports work-from-home activities.

2. Research Methods

The development of a web-based online attendance system in this study uses PHP programming language and MySQL databases. PHP is a programming language used to develop the web where the source code is on the server side [4], while MySQL is a database management system that uses structured query language SQL commands [5]. The system development method utilizes the prototyping method, namely problem identification, the system needs analysis, designing and prototyping, trials, and system implementation [6].

The initial stage of identifying problems in the system is carried out in the process of collecting data. The data sources in this study are primary and secondary data. The source of the research data is the subject of data obtained [7]. Primary data sources through field observation data collection techniques and procedures for recording attendance have been carried out. Question and answer interviews directly to campus management. Secondary data are obtained from form documents and employee attendance recapitulation reports. Literature studies collect data from literature books, research journals, laws and regulations, seminar results, and other sources related to research on the design and development of web-based online attendance [8].

The system needs analysis stage is in the form of needs analysis that is functional and non-functional. Analysis of functional system needs is related to stakeholders who use the online attendance system, including employees, staff, and campus leaders. Analysis of non-functional system needs related to hardware and software, as well as supporting networks for system development [9].

The stage of designing and making prototypes utilizes Data Flow Diagrams (DFD) in the form of context diagrams followed by interface design and program coding following the features specified at the problem identification stage in the web-based online attendance system [10]. This system processes employee attendance data, for both lecturers and education staff. Attendance data includes the arrival and return times over the internet network to support working from home. This system can be seen in the context of the diagram as follows:
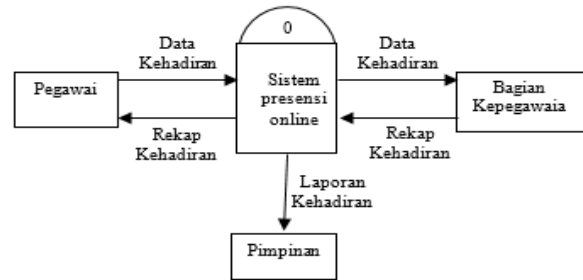

Figure 1 Diagram Context

In the online attendance system, employees record attendance coming and going home. The staffing department automatically creates attendance reports based on employee attendance recapitulation data for campus leaders.

The trial and implementation stage of the system aims to determine the ability of the web-based online attendance system developed to present the system flow according to the design. The system's ability to process data is tested using the BlackBox testing method. Blackbox testing software is used to test software without knowing the program code in it. Testing uses a list of features to make testing easier and more purposeful to reference whether the system is feasible to implement and use [11].

3. Results and Discussion

The proposed web-based online attendance system is a system for recording employee attendance at higher education institutions. Visual display bridges the system with the user, web-based system interface as follows:

3.1. Login Interface

The system user is required to log in to know whether the user has access rights or not. This is one of the security features of the feature. Login is a security feature for system users to find out if a user has access rights or not. The process of logging into the system requires a username and password according to the access rights of each user. The system will validate the username and password entered by the user. The system login display can be seen in Figure 2.
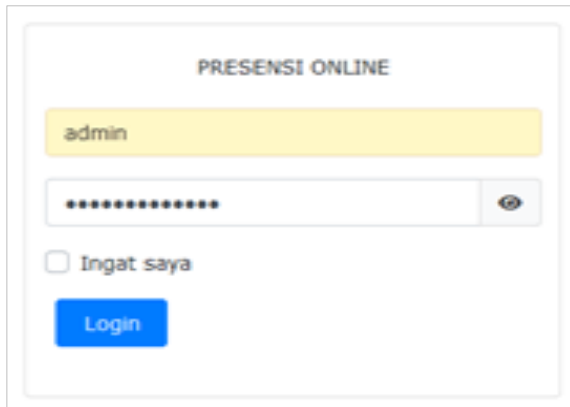
Figure 2 Login Interface

The process of logging into the system is by entering the username and password that have been determined and owned by each employee.

3.2. Attendance Confirmation Interface

This login process is also a process of recording the attendance time, where the time of the first login on a certain day will be recorded as the time of arrival. The system will display a notification message that the attendance has been successfully performed
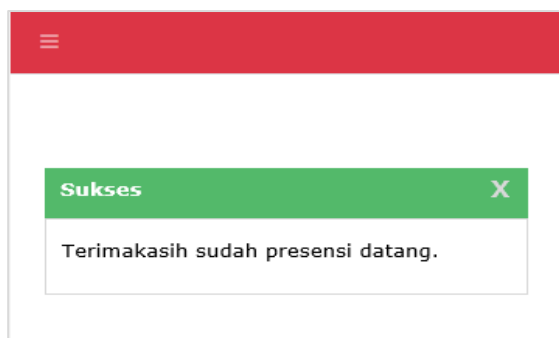

Figure 3 Confirmation of Attendance

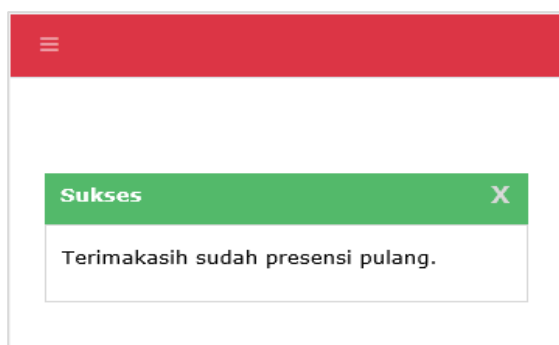The second login time on the same day will be recorded as the return attendance time.

Figure 4 Confirmation of Return Attendance

The system will display a confirmation message for successfully recording the return attendance time.

3.3. Employee Data Interface

The addition of employee data is carried out by recording information related to employees who have access to the attendance system.
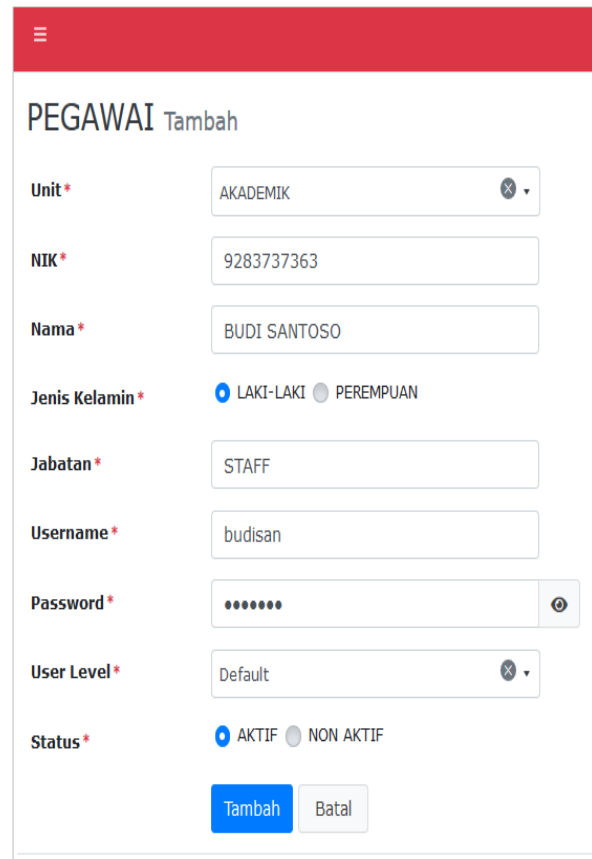

Figure 5 Employee Data Interface

Employees can log in to the attendance online if they have been registered in the database through the employee data feature.

3.4. Attendance Report

Employees can view attendance reports containing a recapitulation of the attendance data of the employee concerned. The report includes data in the form of employee names, the date when the attendance was carried out, the time the attendance came, and the time of the attendance to go home. The staffing division acts as a system admin that can perform searches and filter data. This attendance disclosure is used to determine the activeness of employees in carrying out attendance

Figure 6 Attendance Report

3.5. Online Attendance System Testing

Online attendance system testing to determine the system's ability to limit the attendance time that can be carried out by employees. The test method uses Blackbox Testing.
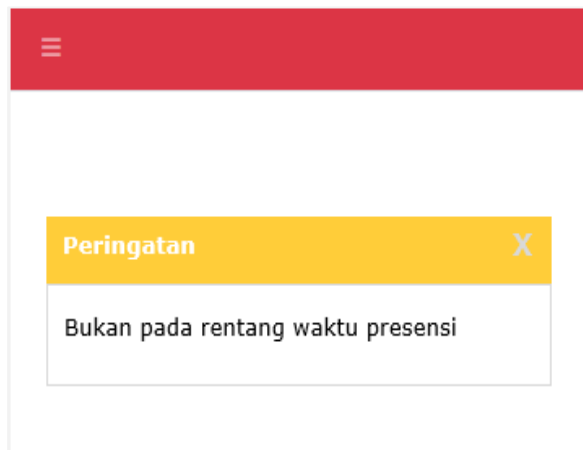

Figure 7 Warnings Outside the Attendance Time

The system warns if the login process is carried out outside the specified time frame. Restrictions are placed on logins that are carried out ahead of the allowed arrival time. Likewise, restrictions are made on the login process that is later than the time allowed in recording the return attendance.

Figure 8 Commemoration of Attendance Time outside of Working Day

The system warns that the login process is carried out outside of working days. Restrictions are carried out if the login process is carried out on Saturdays and Sundays, but the system still cannot limit logins on national holidays that coincide with Monday to Friday so the login process can still be carried out. This is because a database has not been provided that contains data on national holidays. Testing is done using the Blackbox testing method. Table 1 presents the results of functional testing of the developed application:

Function tested	Expected results	Testing results
Windows PC access via dektop browser	Proportional interface	Valid
Android device access via mobile browser	Responsive Interface	Valid
Login-Enter the correct username and password	Users can perform the presence process	Valid
Login-Enter the incorrect username and password	incorrect username and password warning - The system prevents recording the presence process	Valid
Login outside the	outside the allowed time warning - The system	Valid

allowed time	prevents recording the presence process	
Login on Saturday and Sunday	not weekdays warning - The system prevents recording the presence process	Valid
Login on working days that coincide with national holidays	national holidays warning - The system prevents recording the presence process	Invalid - The system still records the attendance process

4. Conclusion

A web-based online attendance system can be developed by prototyping methods using the PHP programming language and MySQL databases. An online attendance system can help campus management manage employee attendance data. This web-based online attendance system still needs to be developed so that the attendance login process on national holidays can be limited. The development of the system also needs to display other important information such as data on the calculation of honors and meal allowances for campus employees. This system can be developed not only to process employee attendance data but also to process student attendance data when conducting online lectures.

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