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Web-Based Worship Schedule Information System for Gereja Jemaat Pamalar

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Abstract

The scheduling of worship activities is a crucial aspect of church management, particularly for GKS Jemaat Pamalar, which conducts routine weekly and monthly activities. Manual scheduling often leads to various problems, such as time inaccuracies, data errors, and delays in delivering information to the congregation. Therefore, this study aims to design and develop a web-based worship scheduling system to assist church administrators in managing and disseminating worship schedules in a more organized and efficient manner. The system was developed using the Waterfall method, which consists of requirements analysis, system design, implementation, and testing stages. The main features of the system include worship schedule input, management of worship officers' data, and direct publication of schedules through a responsive and user-friendly web interface that can be accessed on various devices. The implementation of this system is expected to improve the organization of worship activity management, reduce scheduling errors, and accelerate the dissemination of information to the congregation. The developed system functions as intended in supporting administrators in managing worship schedule data in a structured manner and presenting worship schedules clearly to the GKS Jemaat Pamalar congregation. Based on Black Box Testing, all system features were successfully tested with a 100% success rate.

Keywords: *Information System, Worship Schedule, Waterfall Model, GKS Jemaat Pamalar, Web-Based System*

1. Introduction

Religious worship activities are one of the essential aspects of religious life and serve as the center of church activities. At Gereja Jemaat Pamalar, various routine worship activities such as weekly services, joint prayers, and special ministries are conducted according to a schedule. However, this often leads to several issues, including overlapping worship schedules due to a lack of synchronization among church administrators, incomplete dissemination of schedule information to all congregants because of limited communication media, and delays in updating information resulting from the absence of a centralized system that can be accessed directly by all relevant parties. In addition, the management of schedules that are scattered across various formats and storage locations—such as handwritten notes, spreadsheet files, or personal messages—often creates difficulties in maintaining data consistency and accuracy.

Moreover, the manual scheduling of worship activities frequently causes problems such as scheduling errors, mismatches in implementation time, and delays in delivering information to congregants and worship officers. These issues result in suboptimal congregational participation and hinder the smooth conduct of worship services. In the current digital era, the utilization of information technology has become an important solution to improve efficiency and accuracy in schedule management. The use of a web-based worship scheduling system offers ease of access and real-time data management, enabling church administrators to update schedules quickly and disseminate information directly to the entire congregation. Therefore, this system is expected to reduce errors and enhance orderliness in the implementation of worship activities.

Based on these issues, this study aims to design and develop a web-based worship scheduling system that can assist church administrators in managing worship schedules in a more structured and transparent manner. The system is also expected to improve communication between administrators and congregants and support the smooth execution of various worship activities at Gereja Jemaat Pamalar.

2. Previous Research

2.1. Church

The Church is a community of people who believe in Jesus Christ. Therefore, the essence of the Church lies in fellowship with Christ and fellowship with one another. The Church itself is not merely a building or a place of worship; rather, its most essential aspect is the people who believe in Christ, who are called and sanctified by God. In the development of contemporary church reform, human involvement

cannot be separated from this process, because the Church experiences reform and growth through the participation and contribution of its members [1].

2.2. Worship

Worship refers to the experience of encountering God. Fellowship, meetings, and a conscious encounter with God through His Son, Jesus Christ, deeply move the heart and are able to transform a person from within. Another meaning of worship is restoring worthiness to God. Humans worship not merely because of their own needs, but because God is worthy to receive praise and adoration from humanity [1].

2.3. Information System

An information system is one form of implementation of information technology. The development of an information system is the process of creating a computer-based information system to solve organizational problems or to take advantage of existing opportunities [2].

An information system is a set of interrelated components that interact with one another to collect, process, store, and distribute information in order to support decision making, operations, and management functions within an organization. This system plays an important role in providing relevant and useful information for organizational managers, whether for planning, control, or performance evaluation purposes. In a broader context, information systems are not only beneficial for managers but also for other users who require accurate and timely data to carry out their tasks or responsibilities effectively [3].

2.4. Waterfall

The Waterfall method is one of the software development methods that is carried out in a structured and sequential manner, where a phase cannot be executed until the previous phase has been completed. According to Riyadi [4], the phases in the Waterfall method include communication, planning, modeling, construction, and implementation.

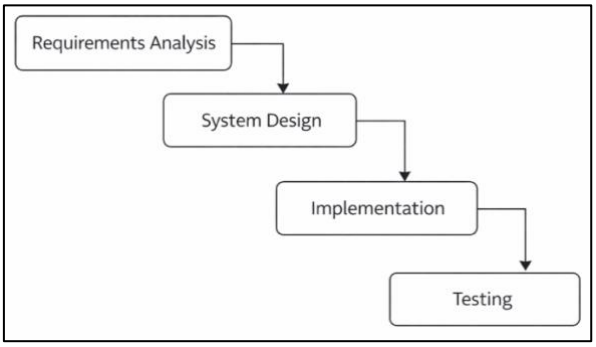

Fig. 1: Waterfall

Description:

1. Requirements Analysis
   Requirements analysis is a method of collecting data through interviews with relevant stakeholders and is an essential step in obtaining the information needed for the development of a web-based worship schedule service information system for Gereja Jemaat Pamalar. At this stage, the main focus is on gathering data that meet the requirements and functions of the system to be developed. It was found that the worship schedule service at Gereja Jemaat Pamalar was less effective, which prompted the need for system development to address these issues through the creation of a web-based worship schedule service information system.
2. System Design
   The design stage in system development consists of a series of steps focused on detailed program planning. This process includes determining efficient data structures, a robust system architecture, intuitive user interface representations, and well-structured coding procedures. In short, the design stage bridges the gap between requirements analysis and program implementation. It translates the system requirements identified during the analysis stage into concrete design representations that can be realized as a functional program in the subsequent stage.
3. Implementation
   This stage is the programming phase. The system is initially developed as small programs called units, which are then integrated in the next stage. Each unit is developed and tested to ensure that its functionality meets user requirements and expectations.
4. Testing
   The testing stage focuses on evaluating the system from both logical and functional perspectives, with the primary objective of ensuring that all system components have been thoroughly tested. This process is crucial for minimizing potential errors and ensuring that the output produced conforms to the expected specifications. In other words, testing is conducted to validate that the system operates as intended, both in terms of internal logic flow and the functions it provides [5].

2.5. PHP (Hypertext Preprocessor)

There are several definitions of PHP from its initial development to the present day. PHP, or Hypertext Preprocessor, is a server-side scripting language that is integrated with HTML to create dynamic web pages. Server-side scripting means that the syntax and commands provided are executed entirely on the server, although they are embedded within HTML documents. Web development using PHP is a combination of PHP as the programming language and HTML as the structure for building web pages [6].

2.6. Blackbox Testing

Black Box Testing focuses on evaluating whether the developed software meets the user requirements that were defined at the initial design stage. This testing is intended to determine whether the software's functions, inputs, and outputs operate in accordance with the required specifications. Black Box Testing is conducted based on the predefined test items that have been designed [7].

3. Results And Discussion

The data collection method is a procedure used to obtain the information or data required for the development of a web-based Worship Schedule Information System for Gereja Jemaat Pamalar, which requires accurate and up-to-date data. Therefore, data were collected using several methods, as follows:

1. Observation
   The research conducted direct observation at GKS Jemaat Pamalar. The subject of observation in this study was the head of BPMJ GKS Jemaat Pamalar in order to obtain precise and accurate information. The data and information observed were related to the absence of an existing system for managing the congregation's worship schedule, as well as the fact that financial data were still managed manually, resulting in inefficiency and ineffectiveness in the management of the worship schedule at Jemaat Pamalar.

2. Interview
   The interview process was conducted to obtain in-depth information and served as a technique for collecting data or information that would be used to draw conclusions regarding the problems under study. Interviews were conducted either face-to-face or via telephone. The informant in this study was the pastor, who also serves as a member of BPMJ Jemaat Pamalar. The interviews were conducted in May 2025 at GKS Jemaat Pamalar, Umbu Ratu Nggay District, Central Sumba Regency.

4. Implementation and Testing

4.1. WhatsApp Notification

The research results are findings obtained from the implementation of the study in accordance with the planned steps and stages, producing outputs in the form of a system and the results of system testing. The Web-Based Worship Schedule Information System for Pamalar Church was developed to provide a solution to problems in data management and the delivery of worship schedule information to the congregation in a structured and easily accessible manner. After the system was fully developed, testing was conducted using the black-box testing method to ensure that all system functions operated as expected and were able to optimally meet user requirements.

1. Main Page Interface

Fig. 2: Main Page Interface

Figure 2 shows the main page interface of the worship schedule information system for Gereja Kristen Sumba Jemaat Pamalar. This page contains a navigation menu at the top consisting of Home, Worship Schedule, and Login. The main interface displays a welcome message reading "Welcome to the GKS Jemaat Pamalar Worship Schedule", which serves as the opening page before users access other system features.

2. Worship Schedule Menu Interface

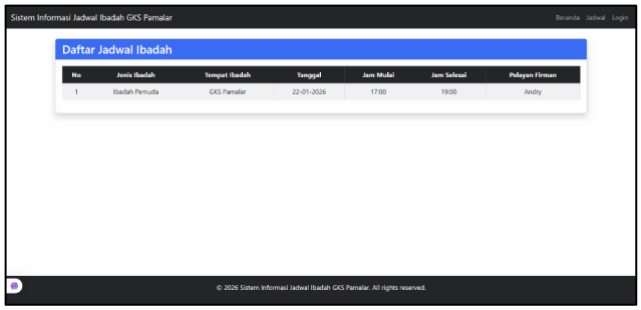

Fig. 3: Worship Schedule Menu Interface

Figure 3 presents the Worship Schedule menu interface, which can be accessed by both administrators and users without logging in. This page displays a table containing complete information about worship schedules at Gereja Kristen Sumba Jemaat Pamalar. The table columns include No, Type of Worship, Date, Time, and Minister. This interface is intended to make it easier for the congregation to view worship schedules in a transparent and well-structured manner.

3. Admin Login Interface

Fig. 4: Admin Login Interface

Figure 4 shows the Admin Login page of the GKS Jemaat Pamalar Worship Schedule Information System. This page serves as the gateway for administrators to access and manage worship schedule data. Administrators must enter a username and password in the provided fields to log in to the system. If the login process is successful, the administrator is automatically redirected to the admin dashboard page, where all worship schedule data can be viewed and managed. If the login fails, the system displays a warning message indicating an incorrect username or password, and the user is prompted to retry the login process.

4. Admin Dashboard Interface

Fig. 5: Admin Dashboard Interface

Figure 5 displays the admin dashboard interface after a successful login. On the left side of the page, there is a navigation menu consisting of Dashboard, Schedule Data, and Logout. The Dashboard menu returns the user to the main admin page, the Schedule Data menu is used to manage worship schedules, and the Logout menu functions to exit the system. The center of the page displays the total number of worship schedule records.

5. Worship Schedule Data Interface

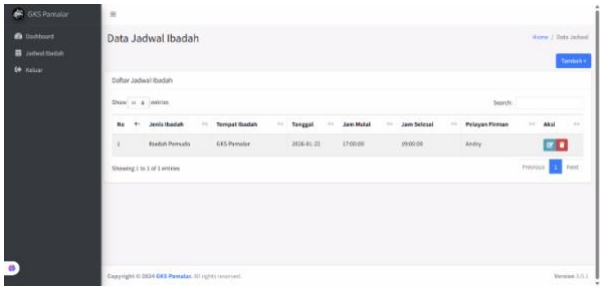

Fig. 6: Worship Schedule Data Interface

Figure 6 shows the worship schedule data page, which displays all worship schedule records stored in the system. The page contains a table with columns for Type of Worship, Date, Start Time, End Time, and Minister. In the Action column, two buttons are available—Edit and Delete—allowing administrators to update or remove worship schedule data as needed. There is also an Add button located at the top right of the page, which is used to add new worship schedule data to the system.

6. Schedule Data Addition Interface

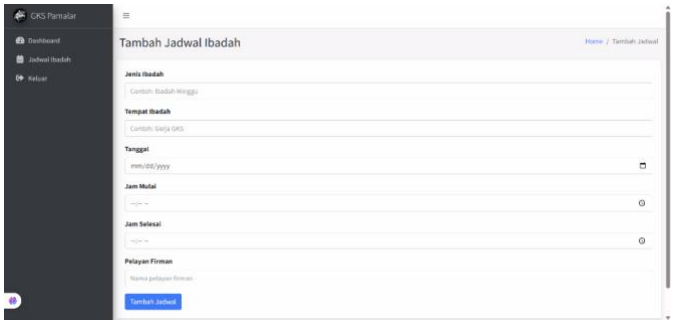

Fig. 7: Schedule Data Addition Interface

Figure 7 shows the schedule data addition page, which is used by the administrator to add new worship schedule information into the system. The available form consists of several input fields, namely Worship Type, Date, Start Time, End Time, and Minister. Each field must be filled in completely to ensure that the schedule data is saved correctly. After all data has been entered, the administrator can click the Add button at the bottom to save the data into the database, and it will then be displayed on the schedule data page.

7. Schedule Data Edit Interface

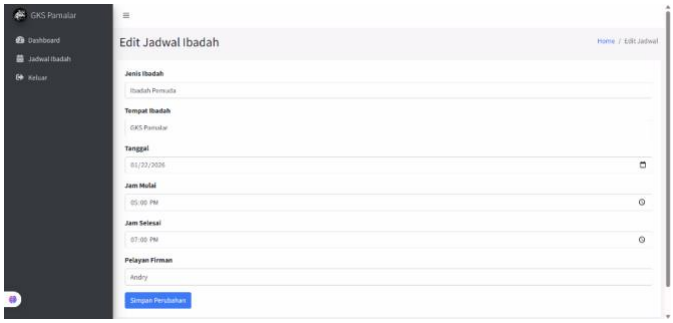

Fig. 8: Schedule Data Edit Interface

Figure 8 shows the schedule data edit page, which is used by the administrator to modify incorrect worship schedule information. The available form consists of several input fields, namely Worship Type, Date, Start Time, End Time, and Minister. Each field must be filled in completely to ensure that the schedule data is saved correctly. After all data has been entered, the administrator can click the Edit button at the bottom to update the data in the database, and it will then be displayed on the schedule data page.

8. Schedule Data Deletion Interface

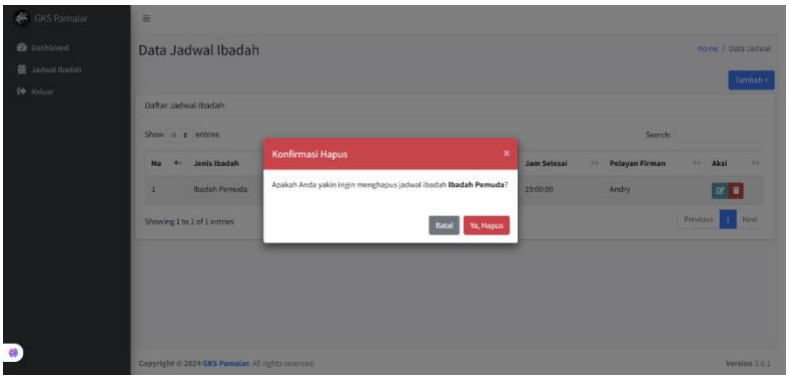

Fig. 9: Schedule Data Deletion Interface

Figure 9 shows the schedule data deletion process, which is used by the administrator to delete worship schedule data that is no longer needed. Before the deletion process is carried out, the system displays a confirmation dialog containing the message “Are you sure you want to delete?” to confirm the administrator’s action. If the administrator selects the “Yes” button, the schedule data will be removed from the system. Conversely, if “No” is selected, the deletion process is canceled and the data remains stored. This confirmation feature functions to prevent accidental data deletion, thereby maintaining the security and accuracy of worship schedule data.

9. WhatsApp Notification

Fig. 10: WhatsApp Notification

Figure 7 shows a WhatsApp notification containing worship schedule information that is automatically sent to users. The notification includes a greeting message and essential information such as the type of worship, date and time, place of worship, and minister.

Notifications are sent in two stages: H-1 (one day before the scheduled worship) as an initial reminder, and on the day of the event a few hours before it begins as a follow-up reminder, ensuring that congregation members do not forget and can prepare themselves accordingly.

4.2. Testing

Testing of the Web-Based Worship Schedule Information System for Pamalar Church was conducted using the black-box testing method. The results of the black-box testing of the Web-Based Worship Schedule Information System for Pamalar Church are presented in Table 1.

Table. 1: Testing Black Box

Tested Function	Testing Method	Expected Result	Test Result
Login	Enter a valid username and password	The system successfully logs in and displays the admin dashboard	[✓] Successful
Login	Enter an valid username and password	The system displays an error message “Incorrect username or password”	[✓] Successful
Display Schedule Data	Admin opens the schedule list page	The system displays the list of schedule data	[✓] Successful
Add Schedule Data	Admin fills in all fields and clicks save	The data is successfully added	[✓] Successful
Add Schedule Data	Admin leaves the add schedule form empty	The system displays an error message “This field is required”	[✓] Successful
Edit Schedule Data	Admin modifies existing schedule data	The schedule data is successfully updated	[✓] Successful
Delete Schedule Data	Admin deletes existing schedule data	The system successfully deletes the selected data	[✓] Successful
Logout	Admin clicks the logout button	The system logs out of the admin account and returns to the login page	[✓] Successful
Display WhatsApp Notification	Notification is received on WhatsApp	Worship schedule information is displayed	[✓] Successful

Based on Table 1, the results of black-box testing of the Web-Based Worship Schedule Information System for Pamalar Church show that all tested functions were successfully executed as expected, achieving a success rate of 100%. Based on these results, it can be c.

5. Conclusion

Based on the results of analysis and testing of the Web-Based Worship Schedule Information System for Pamalar Church, it can be concluded that the developed system is able to facilitate worship officers in managing worship schedules in a structured manner and in providing clear and accurate worship schedule information to the congregation. The system also helps improve the effectiveness of information delivery, allowing worship schedules to be accessed easily and in a timely manner. Based on the results of testing using the Black-Box Testing method, all features of the Web-Based Worship Schedule Information System for Pamalar Church were successfully tested with a success rate of 100%. This indicates that all main system functions—including data display, data addition, editing, deletion, WhatsApp notification of worship schedules, as well as login and logout features—have operated as expected. Therefore, the system is considered to have met functional requirements, is suitable for use, and is capable of optimally supporting worship services and the management of worship schedules at GKS Jemaat Pamalar Church.

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