

Implementation Of Information System for Shift Scheduling and Payroll Management at Mang Jana Rice Store

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Abstract

Shift planning and payroll management in small and medium-sized enterprises (SMEs) often face inefficiencies and inaccuracies due to manual processes. This research focuses on the implementation of an information system to overcome this challenge at Mang Jana Rice Shop, Bandung. The system aims to automate shift planning and payroll calculation, ensuring accuracy and operational efficiency. Using the case study method, this research involves the phases of needs analysis, design, development, testing, and implementation of the system. The resulting system integrates shift planning with payroll management, reducing payroll errors and optimizing employee scheduling. The system has been tested and evaluated, showing significant improvements in efficiency and user satisfaction. This research contributes to the digital transformation of SMEs by providing practical solutions for managing employee tasks. Further developments, such as mobile integration and advanced attendance tracking, are recommended to improve usability and functionality.

Keywords : Implementation, Information System, Scheduling, Shift, Payroll, Rational Unified Process, Unified Modelling Language

INTRODUCTION

Small and medium-sized enterprises (SMEs) play an important role in the economy and contribute significantly to employment and economic growth. However, many SMEs face operational challenges due to reliance on manual processes, including shift scheduling and payroll management. This manual method often leads to inefficiencies such as errors in employee shift management, inaccuracies in payroll calculations, and increased administrative workload. (Ariadin & Safitri, 2021; Dwi Agustina Cahyaningrum et al., 2023)

The implementation of information systems for shift scheduling and payroll management has garnered significant attention in recent years. (Wiradinata, 2023) As organizations strive for operational efficiency and accuracy, these systems offer solutions that enhance workforce management and streamline payroll processes.

Shift scheduling is a critical component of workforce management, particularly in

industries with variable working hours. Traditional manual scheduling methods often lead to inefficiencies, such as overstaffing or understaffing (Rindri et al., 2019). According to Zaman & Adhitya Pratama (2023), automated shift scheduling systems can significantly improve resource allocation, leading to enhanced productivity and employee satisfaction.

Payroll management involves intricate calculations and compliance with various regulations. (Giri et al., 2023) Research indicates that manual payroll processes are prone to errors, resulting in financial discrepancies and employee dissatisfaction (Ahmed et al., 2023). Implementing an information system can mitigate these challenges by automating calculations and ensuring compliance with labor laws (Boivin et al., 2022).

The landscape of shift scheduling and payroll management is evolving with advancements in technology. Emerging trends include the integration of artificial intelligence

and machine learning to optimize scheduling based on historical data and predictive analytics (Setiawan, 2019; Zafary, 2024).

Mang Jana Rice Store, a growing business in Bandung, faces similar challenges. The store's operations rely heavily on effective employee scheduling and accurate payroll processing to ensure that daily tasks run smoothly. While important, current manual systems have limitations, including errors in wage calculations and inefficiencies in employee shift assignment. These issues can impact employee satisfaction and the company's overall operational performance.

To overcome this challenge, the implementation of an information system is proposed. The system can automate and simplify shift planning and payroll processes, ensuring accuracy, reducing administrative burdens, and increasing operational efficiency. This research focuses on the development and implementation of an information system tailored to the needs of the Mang Jana Rice Store, highlighting its potential to transform traditional management practices into a more efficient and reliable system.

This article discusses the design, development, and implementation of the system, with the aim of providing a practical and scalable solution to SMEs facing similar operational challenges. The study also evaluated the effectiveness of the system and identified opportunities for future enhancements, including advanced features and potential integrations..

METHOD

This research involved the development of an information system for shift planning and payroll management using the Laravel framework, a widely used PHP-based web application development framework. The system is designed to operate as a web-based platform to ensure accessibility, scalability, and ease of integration with other tools or systems.

Methodology for System Development

The system development for Mang Jana Rice Shop adheres to a systematic methodology comprising multiple key phrases. The Requirements Analysis phase commences with identifying operational needs via interviews and observations. Functional needs like shift planning, salary computation, and user access administration are established at this stage. Furthermore, non-functional criteria, including performance, security, and usability, are recorded.

After the requirements study, the System Design phase ensues, during which the system architecture is formulated utilizing Laravel's Model-View-Controller (MVC) framework. This seeks to delineate the logic, display, and data layers. At this stage, a database schema for employee data, work hours, and payroll records is developed utilizing MySQL. Wireframes and user interface prototypes are created to guarantee user-friendly interactions.

The last step is System Development, during which back-end functionality is included in Laravel by utilizing preexisting frameworks and tools for authentication, database administration, and routing. The front end utilizes Blade templates to guarantee a responsive and fluid

design for web contexts. Additionally, third-party packages are incorporated as necessary to augment system capabilities, including reporting and data export.

Following development, the Testing step is executed to verify that each system component operates as designed. Unit testing is conducted for each component, and integration testing is used to validate the smooth interactions among the planning, payroll, and reporting modules. Usability testing is performed with end users to collect feedback and identify possible enhancements.

The Implementation step encompasses deploying the system on a web server, guaranteeing safe access exclusively for authorized users. Store personnel are trained to use the system proficiently in everyday operations. System performance is evaluated post-implementation, and technical faults are resolved.

Instruments and Technology

This project employs several tools and technologies, including the Laravel framework and programming languages such as PHP, HTML, CSS, and JavaScript. MySQL is the utilized database management system, and the development environment is configured in Visual Studio Code and Composer. Version control is administered using GitHub, and the web server employed is either Apache or Nginx.

Advantages of Web Templates

Selecting a web-based paradigm for this system presents numerous benefits. Accessibility enables users to use the system from any Internet-connected device. Moreover, centralized data management guarantees that all

data is consolidated on a single server, minimizing redundancy and enhancing data consistency. The system is engineered for scalability, facilitating future expansion, including supplementary features or heightened user demand. Ultimately, Ease of Maintenance facilitates upgrades and maintenance on the server without requiring local installation.

This methodology ensures the development of a robust, efficient and user-friendly system that meets the specific needs of Mang Jana Rice Store while providing scalability and adaptability for future use.

RESULTS AND DISCUSSION

This chapter presents the design and development of an information system for shift planning and payroll management at Mang Jana Rice Store. The system was developed following a structured process, from use case analysis to database design. Each component of the system architecture is detailed to provide a complete understanding of its functionality and implementation.

1. Use Case Diagram

Use case diagrams describe the interactions between users and systems. The main actors identified are **Administrators** and **Employees**. Key use cases include:

- Managing employee data.
- Creating and updating team schedules.
- Calculating and maintaining payroll.
- Viewing reports.

This diagram provides an overview of the system's functionality and highlights the basic

processes involved in payroll planning and management.

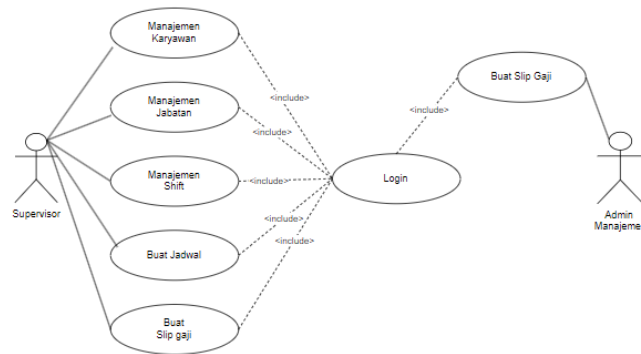


Figure 1. Use Case Diagram

2. Activity Diagram

Activity diagrams map the flow of actions for critical processes, ensuring a logical sequence of operations. The main activity diagram includes:

Shift Scheduling Process : Describes the steps from entering employee availability to finalizing the schedule.

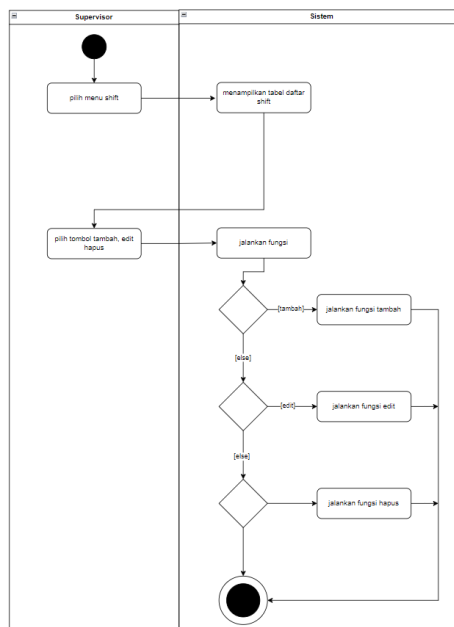


Figure 2. Supervisor Activity Diagram Shift

- a) **Payroll Calculation** : Detailed calculation of pay based on shift, overtime, and deduction data.
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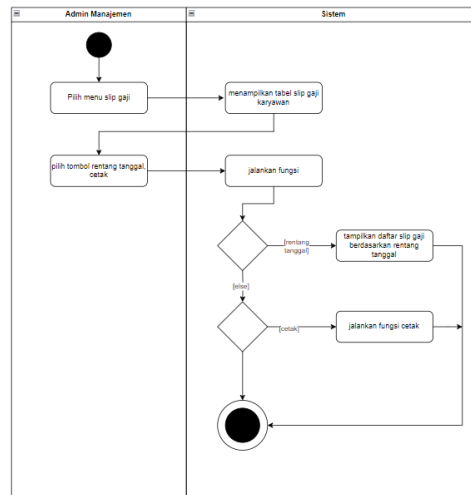


Figure 3. Salary Slip Management Admin Activity Diagram

Reporting : Shows the process of compiling shift and payroll data into actionable reports.

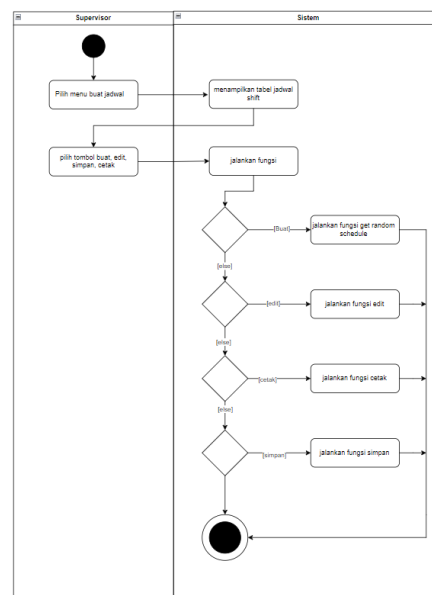


Figure 4. Supervisor Activity Diagram Create Schedule

This diagram ensures a clear understanding of the process flow and helps identify potential areas for optimization.

3. Sequence Diagram

Sequence diagrams describe the interactions between system components over time for key functions. Examples include:

- a) **Shift Schedule** : Shows how the administrator enters shift data and how

the system processes and stores the schedule.

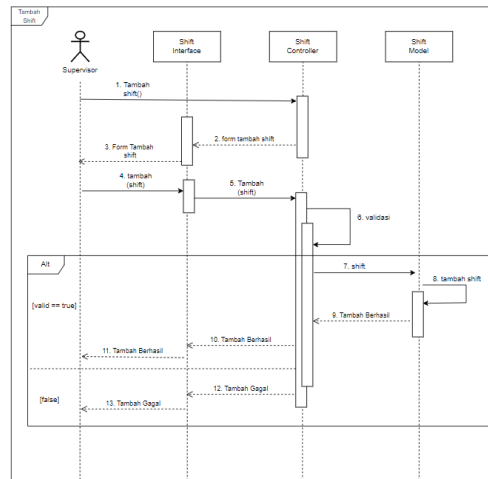


Figure 5. Sequence Diagram Add Shift

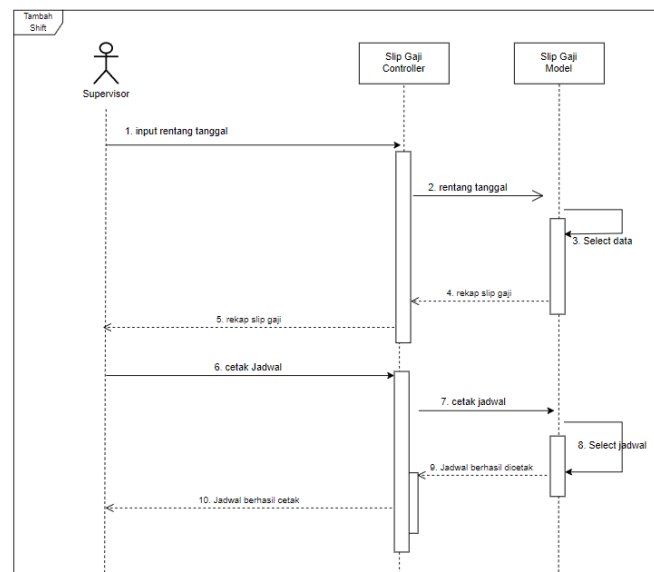


Figure 6. Sequence Diagram Create Shift

- a) **Payroll Processing** : Demonstrates the sequence of actions from retrieving shift data to calculating and saving payroll.

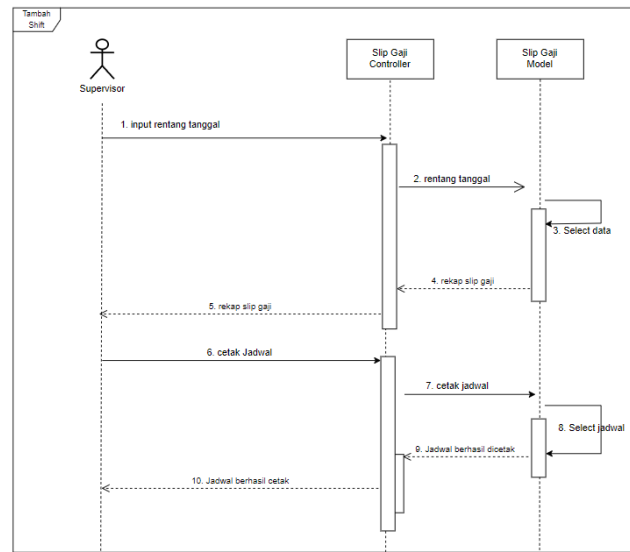


Figure 7. Sequence Diagram Payroll

These diagrams highlight the synchronization and interaction of system modules, ensuring data flow and smooth user interaction.

4. Class Diagram

A class diagram defines the structure of a system by illustrating the relationships between classes. Basic courses include:

- **Employee** : Contains attributes such as `ID`, `Name`, `Position`, and `Salary`.
- **Shift** : Contains attributes such as `Shift\_ID`, `Employee\_ID`, `Date`, and `Time`.

- **Payroll** : Manage attributes such as `Payroll\_ID`, `Employee\_ID`, `Total\_Hours`, `Salary`, and `Deductions`.

- **Reports** : Generate detailed work schedules, summaries, and payroll notes.

These diagrams ensure a robust and scalable data structure to support system functionality.

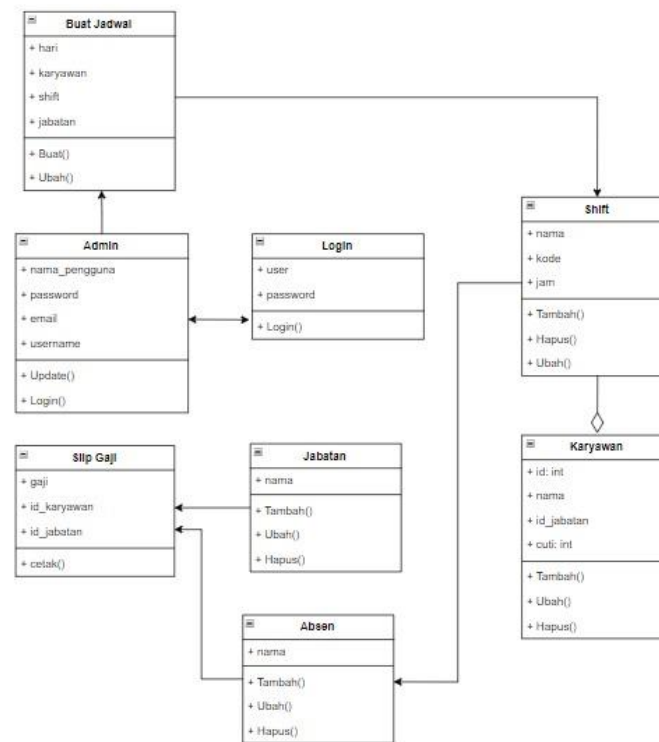


Figure 8. Class Diagram

5. Database Design

Databases are designed to efficiently support system operations. The main tables include:

- Employee Table** : Store employee details such as ID, name, and location.
- Shift Table** : Record shift times including employee assignments and time management.
- Payroll** : Capture payroll data including hours worked, pay items, and deductions.
- Report Table** : Save generated reports for future reference.

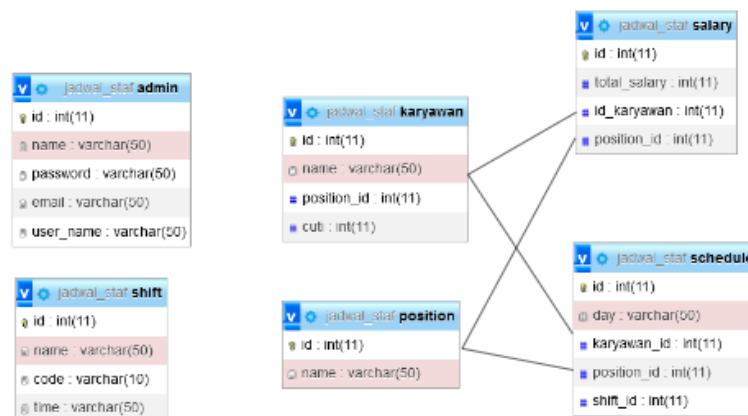


Figure 9. Database

Normalization techniques are applied to minimize redundancy and ensure data integrity.

6. System Workflow

The integration of all charts into a coherent workflow ensures that all processes from planning to payroll run smoothly. Workflows are aligned with user requirements, allowing administrators to manage operations efficiently and employees to easily access relevant data.

7. Discussion

The system design effectively addresses the challenges faced by Mang Jana Rice Store. The use of Laravel provides a modular and maintainable framework, while the web-based architecture ensures accessibility. The integration of diagrams and database design represents a structured approach that enables efficient planning and accurate payroll calculations. Possible future enhancements include adding mobile accessibility and integrating biometric attendance tracking.

8. User Interface Design

The user interface (UI) design aims to create a simple, intuitive, and easy-to-use experience for administrators and employees. The UI was developed using Laravel's Blade templating engine to ensure responsiveness and accessibility across all devices. An explanation of the main UI components is provided below:

a) Login Page

The login page provides secure access to the system for administrators and employees. This page includes input fields for username and password, as well

as a "Forgot Password" feature for account recovery.

b) Dashboard

The dashboard serves as a central hub for navigating the system. The dashboard displays an overview of key metrics such as total employees, upcoming shifts, and payroll summary. Interactive widgets and charts are used to visualize data and make it easier to interpret.

c) Team Management Page

This page allows administrators to create, edit, and view shift schedules. This page displays:

- Calendar view to view scheduled shifts.
- Form to assign employees to specific shifts, with drop-down menu to select date and time.

d) Payroll Management Page

The payroll page allows administrators to calculate and manage employee salaries. This page includes:

- Input form to adjust salary items such as overtime and deductions.
- Table view showing detailed salary information for each employee.
- Export functionality to create payroll reports in PDF or Excel format.

e) Reports Page

This page provides tools to create and view payroll teams and reports. Users can filter reports by date range, employee, or team type. The generated report is presented in table form with the ability to export.

f) Employee Self-Service Page

Employees can log in to view assigned shifts, payroll details, and attendance records. The interface is designed to be

simple and accessible, ensuring ease of use for non-technical users.

9. User Interface Illustrations

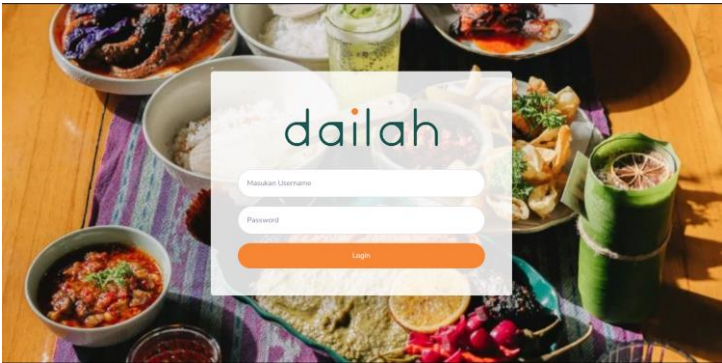


Figure 10. Login Page

The image shows a dashboard with a sidebar on the left containing menu items like Dashboard, Manajemen Karyawan, Shift, Buat Jadwal, Stop Gaji, and Pengaturan. The main content area is titled 'Jadwal Staf'. It contains a table with columns: No, Nama, Posisi, and Hari (with sub-columns for Senin, Selasa, Rabu, Kamis, Jumat, Sabtu, Minggu). The table lists 7 staff members. The 'OFF' status is highlighted in red for all staff on Wednesday (Rabu).

No	Nama	Posisi	Hari						
			Senin	Selasa	Rabu	Kamis	Jumat	Sabtu	Minggu
1	Haris	Supervisor	E	M1	OFF	PH	E	E	E
2	Juan	Kasir	E	M1	OFF	PH	E	E	E
3	Sinta	Kasir	E	M1	OFF	PH	E	E	E
4	Joko	Kasir	E	M1	OFF	PH	E	E	E
5	Mita	Bartender	E	M1	OFF	PH	E	E	E
6	Rian	Bartender	E	M1	OFF	PH	E	E	E
7	Risma	Bartender	E	M1	OFF	PH	E	E	E

Figure 11. Dashboard

The image shows a dashboard with a sidebar on the left containing menu items like Dashboard, Manajemen Karyawan, Shift, Buat Jadwal, Stop Gaji, and Pengaturan. The main content area is titled 'Daftar Karyawan'. It contains a table with columns: No, Nama, Posisi, and Aksi. The table lists 7 employees. The 'Aksi' column contains edit and delete icons for each employee.

No	Nama	Posisi	Aksi
1	Haris	FB Manager	[Edit] [Delete]
2	Juan	Supervisor	[Edit] [Delete]
3	Mita	Captain Service	[Edit] [Delete]
4	Joko	Cashier	[Edit] [Delete]
5	Sinta	GRO	[Edit] [Delete]
6	Rian	Waiter & Waitres	[Edit] [Delete]
7	Risma	Casual	[Edit] [Delete]

Figure 12. Employee

No	Shift	Kode	Jam	Aksi
1	Morning Shift	M1	10.00 - 18.00 WIB	
3	Morning Bar	MB	08.00 - 16.00 WIB	
3	Middle	M2	11.00 - 19.00 WIB	
4	Evening	E	14.00 - 22.00 WIB	

Figure 13. Shift Management Page

No	Nama	Posisi	Gaji yang diperoleh
1	Haris	M1	Rp 1.200.000
3	Mita	MB	Rp 1.400.000
3	Juan	M2	Rp 1.300.000
4	Sinta	E	Rp 2.000.000
4	Joko	E	Rp 3000.000
4	Rian	E	Rp 1.500.000
4	Risma	E	Rp 1.500.000

Figure 14. Payroll Management Page

Figure 14. Employee Self-Service Page

This user interface was designed with a focus on simplicity, functionality, and user satisfaction, ensuring that the system meets the operational needs of Mang Jana Rice Store while being accessible to all users.

CONCLUSION

This research successfully developed and implemented a web-based information system for shift scheduling and payroll management at Mang Jana Rice Store using the Laravel framework. The system addresses key challenges faced by stores, such as inefficient manual

scheduling, inaccuracies in payroll calculations, and increased administrative workload.

Several conclusions can be drawn from this study. First, the system enhances efficiency in crew planning by simplifying the shift scheduling process through an intuitive interface and automated functionalities, ensuring optimal workforce distribution while minimizing conflicts. Second, accuracy in payroll management is achieved through a payroll module integrated with crew data, which enables precise payroll calculations, including overtime adjustments and deductions, thereby reducing errors and saving time.

Moreover, the web-based model ensures user accessibility and scalability, allowing easy access for administrators and employees, with the potential for future integration of advanced features such as biometric attendance tracking and mobile compatibility. Lastly, better operational management is realized by consolidating data and automating processes, which improves overall operational efficiency, reduces reliance on manual methods, and enhances data consistency.

This research highlights the value of utilizing information systems for small and medium-sized enterprises (SMEs), providing practical and scalable solutions to operational challenges.

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