

Development of Web-Based Leave Management System for Telkom Delivery Department Crowdsource Employees in PT Sigma Cipta Caraka

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Abstract— Technology is one of the solutions that can bring automation to a process, with technology all processes can be more time efficient. This is necessary for some processes that were previously done manually. One of them is in Telkom Delivery's division at PT Sigma Cipta Caraka, a company that has some crowdsource employees, who have the right to take leave every year. The current system can still be used because it still sends leave application messages using e-mail, this also indicates that it is not integrated properly. The purpose of designing this leave application information system is to provide a solution to the problem of managing employee leave so that it can run more efficiently. The methods used in the data collection process to obtain user requirements are observation, interviews, and literature study. To support the development of this information system, the author uses several technologies, namely the Laravel framework and MySQL database using certain software development lifecycle (SDLC). This research results in a leave management web application for crowdsource employees in PT Sigma Cipta Caraka. The web application is bringing efficiency in leave requests and processing.

Keywords— **Terms**—*leave management, attendance, leave monitoring system*

I. INTRODUCTION

Telkomsigma (PT Sigma Cipta Caraka) is a subsidiary of PT Telkom Indonesia (Persero) Tbk. Telkomsigma needs a qualified employee management system, because of the many employees in the company. The number of employees in Telkomsigma reached 1.756 employees, as registered

in 2018. Telkom Delivery is a unit within Telkomsigma, and most of the employees are registered as Crowdsource which is also recorded as permanent employees.

Amongst systems that are critical for employee management, there is one system that is known as the leave application system. For crowdsource employees, the leave application system is still done manually, namely by sending an email to each Team Leader and Project Manager, then the application will be validated and written in an online spreadsheet. The current system has drawbacks, for example, the lack of integration between leave application platforms, so it takes a lot of time to validate and send it back to each employee and tends to be a lot of miscommunications. Based on this situation, a solution is created through research to improve the system.

The methodology used to build the system is the agile development model that applied Scrum as the system development framework. Several sprints need to be done to fulfill the requirements of the system, which are scheduled in a sprint backlog.

This research was conducted with the purpose of optimizing the existing leave application process in Telkomsigma by building a website-based leave application system, to provide benefits and convenience for crowdsource employees to apply for leave and access leave information online and to

provide an integrated system. The following is the scope of this research:

- The research was conducted on employees of the Telkom Delivery unit PT Sigma Cipta Caraka.
- The system is limited to the process of leave application and providing information on employees' leave.
- The system is a web-based application.

Current technological development nowadays is a challenge for organizations to utilize business interventions as well as HR professionals in the future to help achieve the expected levels [3].

The process of leave application will be very effective and efficient if it is computerized. The intention of effectiveness is in terms of time, where if the process is computerized, employees can carry out the leave request process from anywhere and anytime, which makes the process more effective. Then efficient means, that not really a lot of energy is wasted when the process of leave application has proceeded in a computerized where employees can apply from an electronic device, and more, it can reduce the usage of paper due to the application system [6].

This research presents the development of a leave management system for employees which functions as a more accurate and efficient system.

II. METHOD

In developing a Leave Management System, the methodology used to manage the processes is System Development Life Cycle (SDLC), which can be seen in Fig. 1. This methodology is a software system development concept with steps to identify each work process which is divided into certain phases which are carried out in stages starting from planning, analysis, design, to implementation [9].

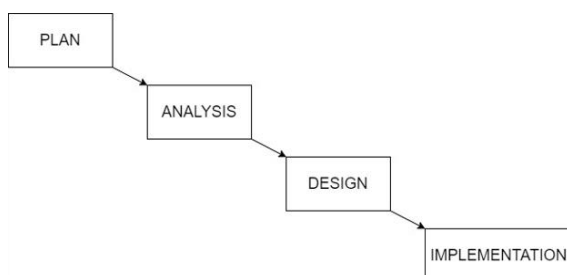


Fig. 1. System development life cycle.

The development model used is Agile, as can be seen in Fig. 2. This model is known to be adaptive to changes that may occur during the development

process and can support the development of application systems quickly and effectively [9].

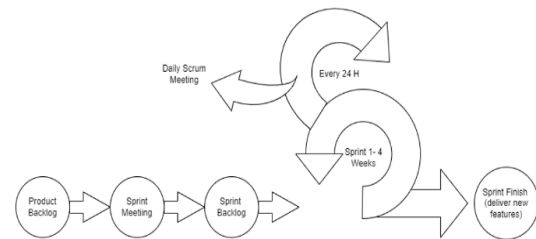


Fig. 2. Agile methodology.

In implementing Agile, the Scrum technique is applied as a system development framework. The Scrum flow is known to be quite complicated, when the sprint starts, you are not allowed to add new requirements. If there is a new requirement it will be placed in the backlog of the upcoming sprint.

Before starting the sprint, an estimation of the user stories development is conducted using poker planning in determining story points, the author uses the Fibonacci sequence. This is done to be able to estimate the effort and processing time on product backlog items [14]. And, when the sprint starts, a burndown chart is needed to see the progress of each sprint that has been running [15].

During the sprint, you must hold a meeting with the team to report what was done yesterday, what will be done today, and what problems occurred. This is done every day to be able to find out the progress that has been made by each team member. When the sprint period is over, the team will release the features/systems that have been made to the user [9].

Based on the description above, the framework for designing a web-based leave management system for crowdsourcing employees at PT Sigma Cipta Caraka is described as follows (Fig. 3):

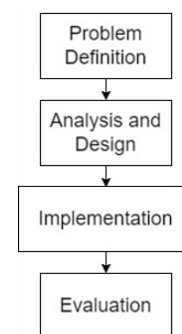


Fig. 3. Leave management system development framework.

In the first step, a problem definition is conducted by gathering data on the existing system and its usage. From data gathering activities, users' pain points are

collected and then concluded with a summary of the problem statement.

After the problem is clearly defined, then before starting the analysis and design stage, a planning activity is conducted. At this planning event, it is proposed to describe a business system in the form of system planning as the first step that needs to be taken to begin the development of an information system. Referring to the running system problems that are still manual, the following is a proposed solution plan:

1. Application and approval process of leave can be done in real-time in one leave application.
2. Managers and leaders can view information and monitor the list of employees on leave through the application.
3. Managers and leaders will get notification of employee leave information via Telegram.

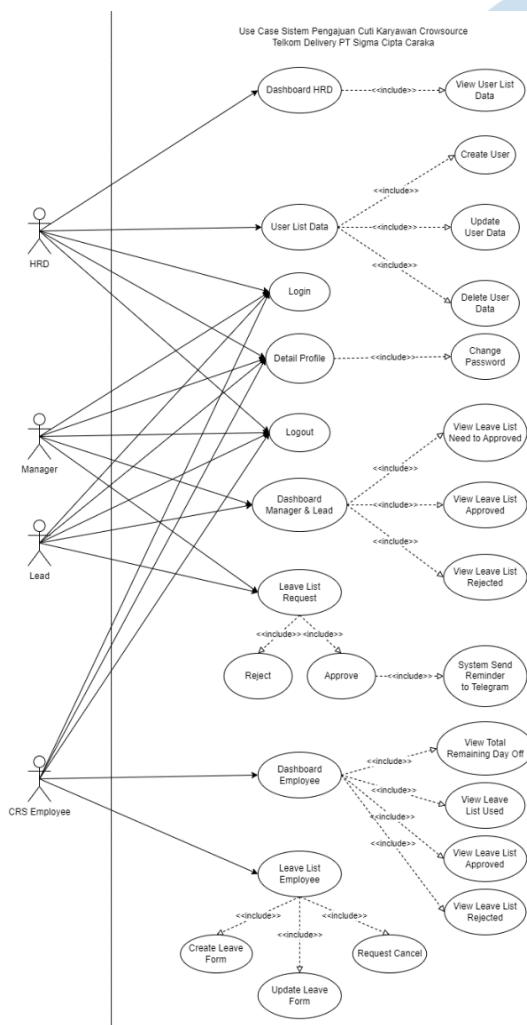


Fig. 4. Leave management use case diagram at PT Sigma Cipta Caraka.

The second step is analysis and design to analyze the root cause of the problems. After the root causes are found, a solution option could be picked to solve all those root causes all at once. Then the next step is to move to the detail of the solution design.

In Fig. 4, a systematic analysis of the Leave Management system using the Use Case Diagram is presented, where there are four actors who have different roles. The first actor is HRD which has the role of registering all employees into the system, this role should be done because of system needs. Then, the second actor is the Manager who has the role to approve or reject requests from crowdsourcing employees. And for the leader, the role is the same as Manager but has another role to assign “delegate to” for crowdsourcing employees that requested leave. And for the last one is crowdsourcing employees that have the main role to request leave from the Manager and the Leader.

In the third step, the solution implementation is done with the design that is already finalized. Conduct some necessary testing on it, then deliver the solution to the users.

After done with the user acceptance testing and the users have approved the result, the solution can then be promoted into the production environment and used in daily operations. After some period of agreed time of monitoring, a performance evaluation is conducted to review the usage of the new system.

III. RESULT AND DISCUSSION

A. Design

The following is the design of the Web-based Leave Management System at PT Sigma Cipta Caraka:

1) Dashboard Page

There are 3 kinds of dashboard pages, depending on the user that logged in:

- a. Dashboard page for employees.

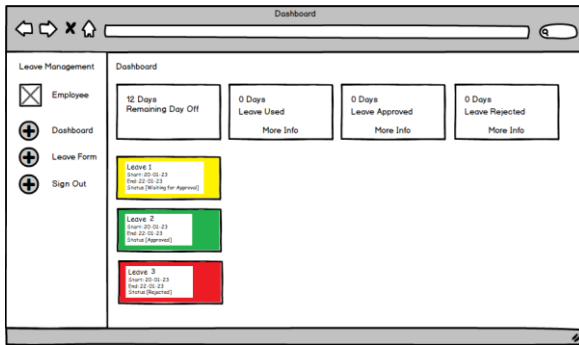


Fig. 5. Dashboard page for employees.

This dashboard in Fig. 5, gives employees information about remaining leaves, used leaves, and approved or rejected leaves. The dashboard also shows the leaves request status, so the employees can track the progress of their leave approval process.

b. Dashboard page for manager and leader.

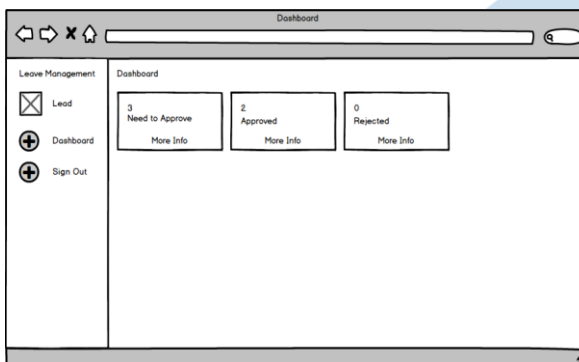


Fig. 6. Dashboard page for manager and leader.

This dashboard in Fig. 6, shows the number of leaves that becomes a responsibility for a manager or leader to approve or reject. The user can click on the “more info” link in each of the boxes to see the details of the list.

c. Dashboard page for HR manager.

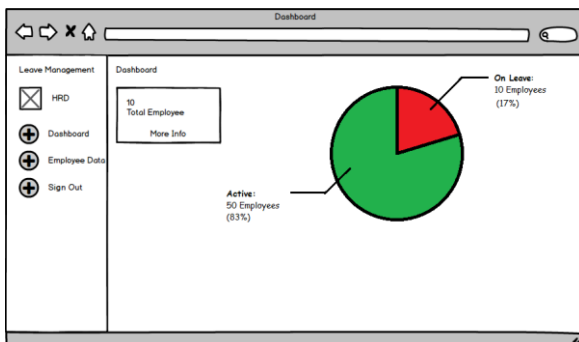


Fig. 7. Dashboard page for HR manager.

This dashboard in Fig. 7, is for the HR manager, it shows how many employees take their leave in

total. It also has a pie chart displaying the composition of a group of employees that take their leave and another group that is still actively working.

2) Profile Page

This page in Fig. 8, displays various user information, including name, NIK, position, phone number, telegram username, and email address.

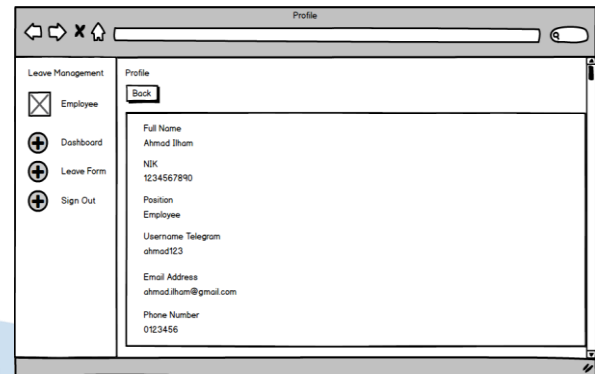


Fig. 8. Profile page.

3) Change the Password Page

On this page in Fig. 9, users can change their password to be used for logging in to the Leave Management System.

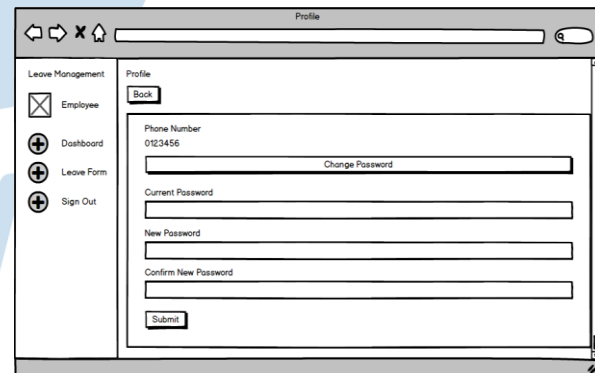


Fig. 9. Change password page.

4) Insert User's Data Page

This page in Fig. 10, is restricted to only HRD, which can be used for inserting new employee data.

Fig. 10. Insert users' data page.

5) View Users Data Page

This page in Fig. 11, can only be accessed by HRD, which can be used for viewing and managing all the user's data, such as editing, resetting password, and deleting data.

No	NIK	Name	Position	Telegram	Email	Phone	Action
1	123	Rizky	HRD	hrd	hrd@example.com	01281	Edit Reset Password Delete
2	234	Naufal	Manager	manager	manager@example.com	01241	Edit Reset Password Delete

Fig. 11. View users' data page.

6) Edit the User's Data Page

This page in Fig. 12, displays User's data that can be edited by only HRD, such as name, NIK, position, email address, telegram username, and phone number.

Fig. 12. Edit users' data page.

7) Create a Leave Request Page

This page in Fig. 13, displays the fields that employees should fill in to apply for leave requests, including start date, end date, leave duration, and leave reason.

Fig. 13. Create a leave request page.

8) View Data Leave Request by Employee Page

This page in Fig. 14, can be used to view employees' submitted leave requests, which can only be accessed by employees.

No	NIK	Request Date	Start Date	End Date	Leave Duration	Leave Reason	Status	Action
1	UK-001	2022-10-29 04:50:3	2022-11-02	2022-11-04	1	Beribur	New	Edit Cancel
2	UK-002	2022-10-30 00:51:5	2022-10-31	2022-10-31	2	Menikah	Approve	Cancel

Fig. 14. View data leave request by employee page.

9) View Data Leave Request by Manager and Leader Page

This page, in Fig. 15, contains information about leave requests that need to be approved/rejected by the Manager and Leader.

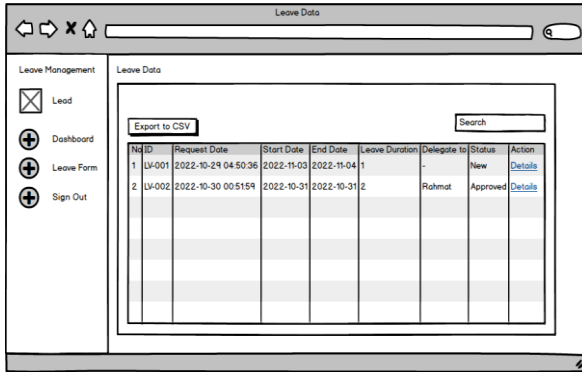


Fig. 15. View data leave request by manager and leader page.

10) Leave Confirmation by Manager and Leader Page

Managers and Leaders can use this page in Fig. 16, to confirm leave requests submitted by Employees.

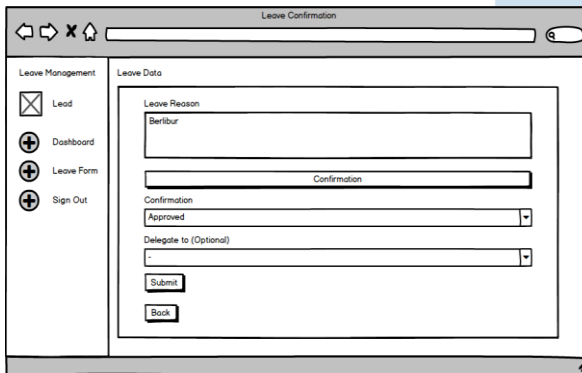


Fig. 16. Leave confirmation by manager and leader page.

11) Edit Leave Request Data by Employee Page

This page in Fig. 17, contains information on leave request data that can be edited by the employee, in which the status still hasn't been accepted by the Leader/Manager.

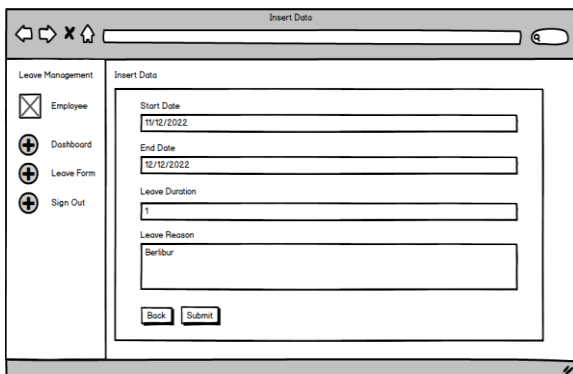


Fig. 17. Edit leave request data by employee page.

B. Implementation

After the development of the Leave Management system for crowdsource employees at PT Sigma Cipta Caraka, these are the highlight result from the Testing phase with the users (user acceptance test) (Table 1-6):

TABLE 1. Crowdsource employee dashboard page test result.

No	Scenario	Expected Result	Actual Result	Status
1.	View the total number of remaining days off employees	Displays the total number of remaining days off CRS Employee	Managed to see the total number of remaining days off CRS Employee	PASSED
2.	View the total amount of leave that has been used on "Leave Used"	Displays the total number of vacations that have been used	Successfully see the total amount of leave that has been used on "Leave Used"	PASSED
3.	Click "More Info" on Leave Used	Displays the leave list requests that have been used	Managed to see the list of request lists that have been used	PASSED
4.	View the total number of approved leaves	Displays the total number of approved leaves	Managed to see the total amount of leave that has been approved by the manager or leader	PASSED
5.	Click "More Info" on Leave Approved	Displays the approved leave request list	Managed to see the leave request list that has been approved by the manager or leader	PASSED
6.	View the total number of disapproved leaves	Displays the total number of disapproved leaves	Managed to see the total number of leaves that neither the manager nor the leader approved	PASSED
7.	Click "More Info" on Leave Rejected	Displays a leave request list that is not approved	Managed to see a leave request list that neither the manager nor the	PASSED

			leader approved	
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TABLE 2. List of leave requests page test result.

No	Scenario	Expected Result	Actual Result	Status
1.	Click "Leave Form" on the menu bar	Displays a leave list request	Displays the leave list request data by clicking "Leave Form"	PASSED
2.	Type request leave data in the search field	Displays request leave data that has been entered in the search field	Successfully displays the request leave data that has been entered in the search field	PASSED
3.	Klik "Edit" pada kolom Action	Click "Edit" in the Action column	Successfully displays the edit data request leave page after clicking "Edit"	PASSED
4.	Enter the data you want to change then click "Submit"	Displays a success message changing data	Successfully changed the leave request data	PASSED
5.	Click "Cancel" in the Action column	Displays the Cancel Request Leave confirmation popup	Successfully cancel request leave	PASSED
6.	Click "Export to CSV" on the user data list page	User data will be downloaded in .csv file format	Successfully download user data	PASSED

TABLE 3. Create leave request page test result.

No	Scenario	Expected Result	Actual Result	Status
1.	Click "Create New Leave" on the leave list request page	Displays a page for leave list data	Successfully displays the page for leave list data	PASSED

2.	Enter valid data on the page for leave list data	The new data leave list was added successfully	Successfully added a new data leave list by clicking the "Submit" button	PASSED
3.	Enter invalid data on the page to leave the data list	New leave list data failed to be added	Failed to add new data leave list with error message "Invalid data"	PASSED
4.	Enter empty data in the End Date field	New leave list data failed to be added	Failed to add new data leave list with the error message "Phone Number is required"	PASSED
5.	Click "Back" on the add data leave list page	Return to the leave list data page	Successfully return to the leave list data page using the "Back" button	PASSED

TABLE 4. Dashboard manager & leader page test result.

No	Scenario	Expected Result	Actual Result	Status
1.	View the total number of leave that needs to be approved in "Need to Approve"	Displays the total number of leave needed to be approved	Managed to see the total number of leaves needing to be approved on "Need to Approve"	PASSED
3.	Click "More Info" on Need to Approve	Displays a leave list of requests that need to be approved	Managed to see a list of request lists that need to be approved	PASSED
4.	View the total number of leave approved by the manager in "Approved"	Displays the total number of leave approved by the manager	Managed to see the total amount of leave that has been approved by the manager	PASSED

5.	Click "More Info" on Approved	Displays a leave request list that has been approved by the manager	Managed to see the leave request list that has been approved by the manager	PASSED
6.	View the total number of leaves that were not approved by the manager	Displays the total number of leaves that were not approved by the manager	Managed to see the total number of leaves that were not approved by the manager	PASSED
7.	Click "More Info" on Rejected	Displays a leave request list that is not approved by the manager	Managed to see a leave request list that was not approved by the manager	PASSED

TABLE 5. Leave confirmation by manager page test result.

No	Scenario	Expected Result	Actual Result	Status
1.	Click "Confirmation" on the details page	Displays the confirmation leave page	Successfully displays the confirmation leave page	PASSED
2.	Select "Approved" on the confirmation page	<i>Request leave approved</i>	Successfully approved the leave request after clicking "Submit"	PASSED
3.	Select "Rejected" on the confirmation page	<i>Request leave is not approved</i>	Successfully disapproved of the leave request after clicking "Submit"	PASSED
4.	Enter the name of the replacement employee in the "Delegate to" field	Add the overriding employee delegate	Successfully added employee delegation that replaced leave after clicking "Submit"	PASSED

5.	Click "Back" on the add data leave list page	Return to the leave list data page	Successfully return to the list data leave list page using the "Back" button	PASSED
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TABLE 6. Leave confirmation by leader page test result.

No	Scenario	Expected Result	Actual Result	Status
1.	Click "Confirmation" on the details page	Displays the confirmation leave page	Successfully displays the confirmation leave page	PASSED
2.	Select "Approved" on the confirmation page	<i>Request leave approved</i>	Successfully approved the leave request after clicking "Submit"	PASSED
3.	Select "Rejected" on the confirmation page	<i>Request leave is not approved</i>	Successfully disapproved of the leave request after clicking "Submit"	PASSED
4.	Enter the name of the replacement employee in the "Delegate to" field	Add the overriding employee delegate	Successfully added employee delegation that replaced leave after clicking "Submit"	PASSED
5.	Click "Back" on the add data leave list page	Return to the leave list data page	Successfully return to the list data leave list page using the "Back" button	PASSED

The user team involved in the user acceptance test process consists of 5 staff level members, 2 supervisors, and 1 HR staff.

The UI of the web application itself is listed below (Fig. 18-30).

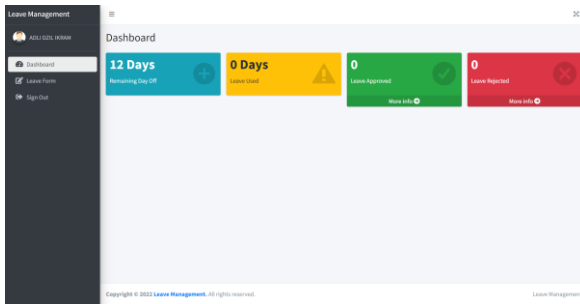


Fig. 18. Employee dashboard.

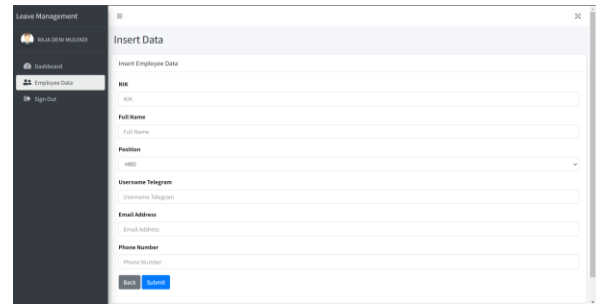


Fig. 23. Insert employee data page.

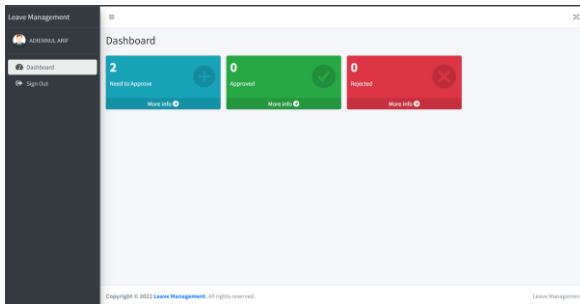


Fig. 19. Lead and manager dashboard.

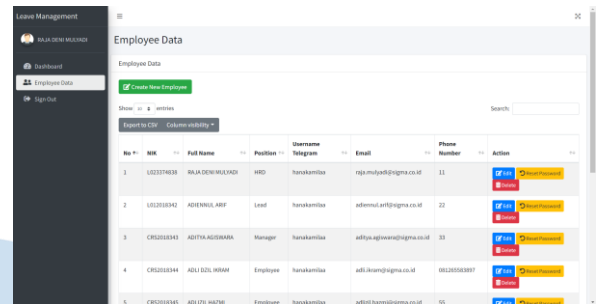


Fig. 24. View employee list page.

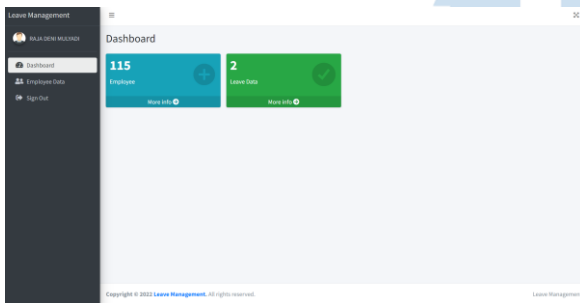


Fig. 20. HR Dashboard.

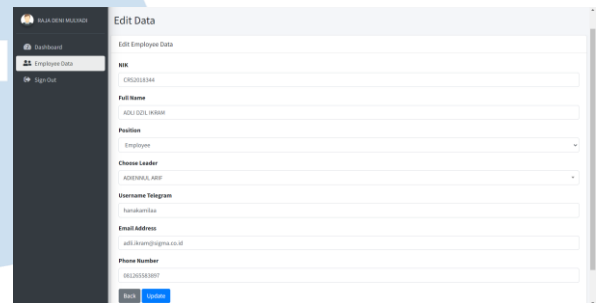


Fig. 25. Edit user data page.

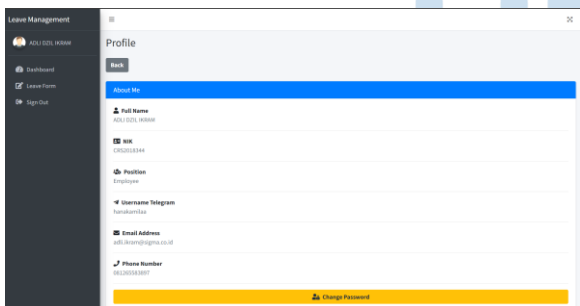


Fig. 21. Employee profile page.

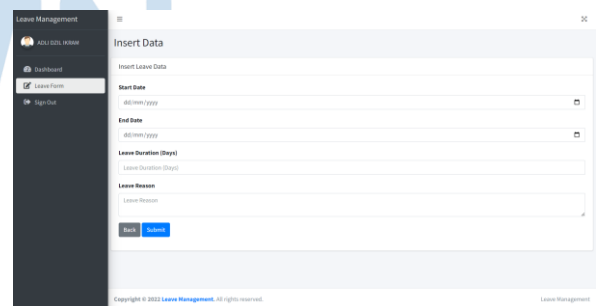


Fig. 26. Employee leave request form page.

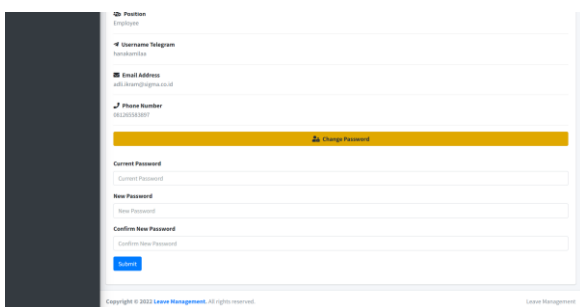


Fig. 22. Change password page.

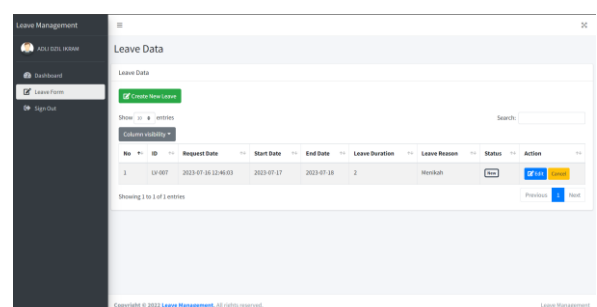


Fig. 27. Employee view leave list page.

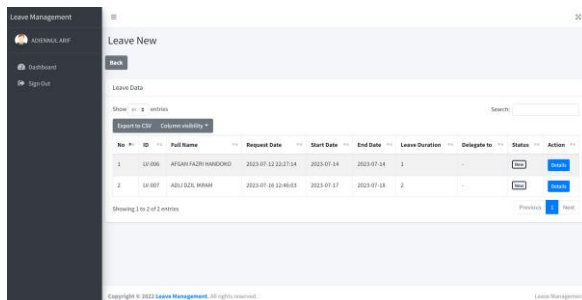


Fig. 28. Manager view leave list page.

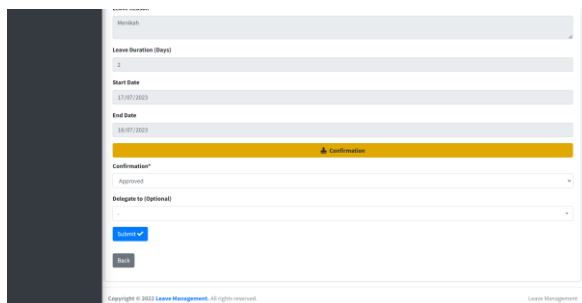


Fig. 29. Managers leave confirmation page.

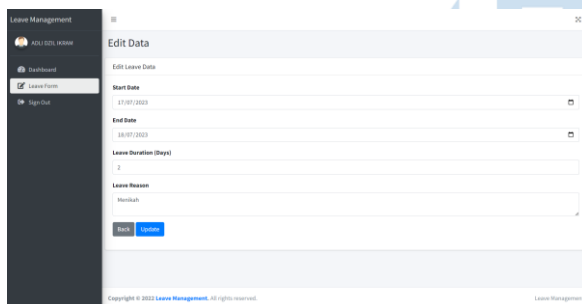


Fig. 30. Employees edit leaves data page

IV. CONCLUSION

A. Conclusion

Based on the statements in the sections above, the authors can draw the following conclusions:

- Development of a leave management information system for Telkom Delivery crowdsource employee at PT Sigma Cipta Caraka was successfully carried out. The system includes a real-time leave application and approval function so that the leave application process can be done more efficiently based on the testing result summary in the implementation section, compared to the current system which is still done manually.
- As for this leave management information system, Leads and Managers can view the list of information about employees' leave and will receive leave notifications of employee leave via Telegram, which can assist in the monitoring of employee leave.

- With the support of data storage using MySQL database, all data related to Telkom Delivery crowdsource employee leave can be stored structurally in the database space.

B. Suggestion

The authors try to propose some suggestions that can be used in the development of further research, as follows:

- This research still has the potential for further development by exploring aspects of employee division scope, so that can include another Telkom Delivery crowdsource employee.
- Further research has the possibility to be upgraded in the website design aspect that adapts to the characteristic theme of Telkomsigma.
- This research can be developed in the form of adding other different leave types including maternity leave and annual.

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