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The Development of Human Resources Data Management Application at PT. Anugrah Laut Indonesia

Dahliar Ananda [a *], Hetti Hidayati [a], Cahyana [a]

[a] *Dept. of Applied Software Engineering, Telkom University, Indonesia*
ananda@telkomuniversity.ac.id, hettihd@telkomuniversity.ac.id, cahyanayana@telkomuniversity.ac.id

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ABSTRACT

Human Resources and employees are an important part of the continuity of a company. Employee data management is crucial for a company. Misconduct in managing it could lead to data inconsistency that may cause loss for the company. Previously, ALI Seafood use only office applications to make a simple record of the employee data raising some difficulties in managing the data. These difficulties such as human errors, low capability of the operator, loss of employee data, or errors in real-time data sharing. Centralized Information Technology (IT) system can assist a company in carrying out the process of managing employees, not only to overcome the difficulties above but also in carrying out the process of compiling information that is useful in making strategic decisions for company owners. This research carries out the process of analysis, design, and development of a web-based application and has been fully utilized at ALI Seafood. The main features of the application include managing the organization structure, employment data, attendance, payroll, and application management access. ALI Seafood HR application developed using Laravel framework and MySQL database.

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* Corresponding author at:
Department Applied Software Engineering, School of Applied Science, Telkom University,
Jl. Telekomunikasi No. 1, Terusan Buah Batu, Bandung, 40257
Indonesia.
E-mail address: dahliar@ittelkom-sby.ac.id

ORCID ID:
First Author: 0009-0002-0756-2287

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1. Introduction

Human Resources (HR) and employees are an important part of the continuity of a company. HR, along with other resources such as cash, machinery, raw materials, and method, has the ability of a managerial function to drive other organizational resources [1].

The utilization of IT for human resources management systems has been proposed by several researchers. In [2], a web-based application to manage employees' data at PT. Altermyth was developed. The system records and manages the personal data of the employee, as well as their attendance records and paid leaving. The development of the human resources (HR) information system at a clothing factory (Oidokids) is discussed in [3]. It is a web-based system that is used to manage recruitment data, training data, employee attendance data, and employee payroll. Djamen and Pratasik used extreme programming model to build an HR system at PT PLN Suluttenggo Region [4]. Meanwhile, in [5] Laravel framework is used in developing the human resources information system (HRIS) at PT Octagon Studio Ltd Bandung. In addition, in [6] [7] [8] web-based HRIS were developed for several different companies. Employee data management is crucial for a company. Misconduct in this management could lead to data inconsistency that may cause loss for the company.

ALI Seafood is a company engaged in the processing and trading of marine products. ALI Seafood is involved in processing and exporting marine products targeting the worldwide seafood market [9].

Based on the results of surveys and interviews conducted at PT Anugrah Laut Indonesia (ALI Seafood), there were several difficulties occurred in the company. Before the usage of the HR application was built, ALI Seafood used only office applications to make a simple record of the employee data, and it could raise some difficulties in managing the data. These difficulties occurred because of several factors, such as human errors, low capability of the operator, loss of employees' data, or errors in real-time data sharing. For example, the weekly salary process payments are recapitulated based on a manual. For example, the process of payment for daily and wholesale employee payroll is carried out at the end of the week. In some cases, the amount paid does not match the total hours worked. This means the payment process must be done in 2 payment terms. The archive of payments was also not carried out neatly and caused payroll documents to be lost. The loss of this data makes it difficult when carrying out the financial audit process and annual tax payments.

The problem that occurs at ALI Seafood is the lack of a computerized information system that can be used to manage organizational structure, employee data, employees' attendance, as well as their payroll. The process of recording and managing HR data is still carried out using office applications, so it is prone to errors. The company has several types of employees, which are full-time, daily, and contract employees. Due to these conditions, the attendance and payroll management process becomes quite difficult to handle. Furthermore, ALI Seafood has two offices, namely the head office in Sidoarjo and a processing plant in Tuban. This is also a problem that must be resolved since human resource management should be done in real-time for both offices.

Centralized Information Technology (IT) system can assist a company in carrying out the process of managing employees, not only to overcome the difficulties above but also in carrying out the process of compiling information that is useful in making strategic decisions for company owners. Laravel framework was used in this research because of its strong advantage over other framework

[10] for the documentation, encryption package, unit testing, and development ecosystem.

The contributions of this paper are as follows.

1. Designing an application to manage organization structure, employees' attendance and payroll, and employees' data management in general.
2. Developing a web-based application in Laravel framework to accommodate the requirements and implementing the design for ALI Seafood.

As for the rest of this paper, section 2 describes the literature reviews while section 3 explains the method used in this paper. Then, the implementation and discussion are described in section 4. Finally, section 5 gives the conclusions and future recommendations of this paper.

2. Literature Review

2.1. Human Resources (HR)

According to Sutrisno, Human Resources (HR) is a source of power that comes from humans that can be utilized by organizations [11]. Meanwhile, human resource management is planning, organizing, directing, and supervising the procurement, development, compensation, integration, maintenance, and termination of employment to achieve the goals of the company's organization in an integrated manner [11].

HR development is all activities (education, training, career, organizational development) carried out by organizations in facilitating employees to have the knowledge, skills, and/or attitudes needed to handle current or future jobs [12].

Furthermore, with the diversity of human resources today, it is necessary to create an effective communication system, provide training, create a comfortable and efficient work environment, and be able to provide employee performance feedback based on the results that have been made [12].

2.2. Agile Software Development

According to [13] the agile method is an incremental development method that focuses on developing quickly, releasing software (software) frequently, reducing the cost of the development process, and producing high-quality code. In this method, the customer is directly involved in the development process.

This method requires feedback so that the development process can run incrementally. This iterative approach allows customers to regularly evaluate software improvements, provide feedback for the development team and influence the software adaptation process to accommodate the provision of feedback [14].

This method combines several software development philosophies that aim to increase client satisfaction, incremental software delivery, informal methods, minimal product work engineering, and overall development simplicity [14].

Whereas Extreme programming is an Agile method that integrates good programming practices such as frequent software releases, continuous software upgrades, and customer participation in the development process. The main strength of this method is the development of automated tests before the program features are created. All tests must run successfully when the software upgrade is loaded into the system [14].

2.3. Test Driven Development

Test Driven Development (TDD) is a development approach in which the testing and development processes are carried out alternately. Basically, the development and testing process is carried out in stages. The development process cannot be carried out to the next stage or feature before the code that has been built passes testing. TDD was introduced as part of Agile methods such as Extreme programming [13]. According [15] TDD consists of the following steps.

1. Create an example and execute it,
2. Create a unit test and execute it,
3. Write a system code and then re-execute unit tests and examples,
4. Repeat 3, if necessary, until get the right results,
5. Refactor system code to improve code structure,
6. Re-run all test and example to make sure all test is passed.

3. Methodology

The development of the application discussed in this paper is carried out in extreme programming as explained in [14]. The steps in this method are shown in Figure 1.

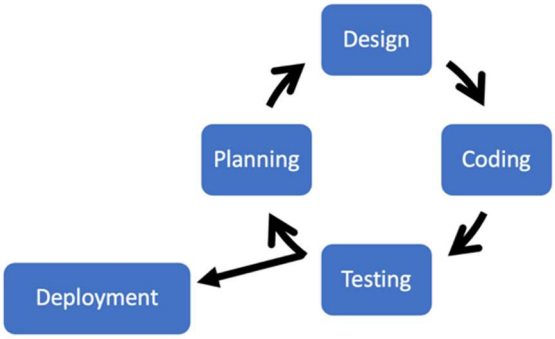


Figure 1 Extreme Programming Processes [14]

3.1. Planning

In this stage, discussion and requirement gathering is carried out to understand the problems faced by ALI Seafood. Some of the obstacles are:

1. Information dissemination between two offices that are separately in distinction locations (Sidoarjo and Tuban),
2. Recording and managing HR data at ALI Seafood is still using office applications, hence it is prone to data loss. Moreover, there is a need for data decentralization and real-time information,
3. There are several types of employees; full-time, daily, and piecework. It makes the process of managing attendance and payroll more complex if they are handled manually,
4. There is no computerized information system for managing organizational structure, employee data, attendance, and payroll.

From this stage, it is found that there is a need for a centralized system that can be used to carry out input activities, data processing, and data dissemination.

3.2. Designing

The designing stage uses the results of the previous stages. There are analysis and design processes to acquire initial requirements that produce a model for the application. Use Case Diagram is used to describe the functional requirements of the system whereas Entity Relationship Diagrams (ERD) are used in modeling data requirements of the application.

3.3. Coding

The initial requirement of ALI Seafood is carefully examined in this stage. According to the requirements, the developed application should accommodate data centralization as well as be accessed from several different locations. Therefore, the system is developed as a web-based application, as it is the best choice to comply with the requirements. The web is built in Laravel framework with MySQL as its database.

3.4. Testing

Since this paper uses Test Driven Development in the developing method, there is an alternate process of coding and testing the application. The application is going through test processes before it is fully developed. In this paper, we use two methods of testing, namely Black Box Testing and Usability Testing. Black Box Testing is carried out by the development team, while Usability Testing is carried out by the user to provide feedback for further improvement and incremental development.

3.5. Deploying

This stage is held after the feature requirements of the user (ALI Seafood) have been accommodated and the application has passed the testing process. The application will be hosted on a cloud-based web server so that it can be accessed by users from any location.

4. Result and Discussion

The development of the application discussed in this paper is carried out in extreme programming as explained in [15]. The steps in this method are shown in Figure 1.

4.1. Analysis and Design

Table 1 Human Resources Data and Process Mapping

	Employee Feature	Permanent Employees	Freelance / Daily Employees	Wholesale Employees
1.	Daily presences	√	√	
2.	Payroll payment	Monthly	Weekly	Weekly
3.	Fix salary	√		
4.	Overtime	√	√	
5.	Honorarium	√	√	√
6.	Information system access	Yes, by mapping	Yes, by mapping	-
7.	Organizational structure mapping	√	√	√

Managed HR data in ALISeafood including employee data, organizational structure, work position, employee positional mapping, attendance, payroll

generation, mapping of access rights to application functionality, and reporting. The mapping analysist is as seen in Table 1. These data are then analyzed using ERD diagrams and Use Case diagrams. The results of the analysis using ERD can be seen in Figure 3, while the Use Case Diagram is in Figure 2.

4.1.1. Employment

ALI Seafood has types of employment status, namely permanent employees, daily employees, and contract employees. The three types of employment have the same data. The differences between them are employment status, application access rights, and the calculation of employee payroll data. The same data structure will make it easier for management when there is a change in employment status by only changing employee data and employment status.

4.1.2. Organizational Structure

In terms of organizational structure (department, position, and placement) is a dynamic mapping and depends on the needs that exist in the company. Therefore, determining the organizational structure becomes a dynamic requirement in application operations. It is necessary to record staffing archives to view employee placement history data.

4.1.3. Attendance

Attendance at ALIseafood is not only used to record employee attendance. Attendance is also used to calculate the daily wages for Daily employees and overtime fees for Daily employees and Permanent employees. Attendance data is subject to restrictions based on shifts and working hours. The attendance process can be done in several ways, including:

1. Individual attendance input using
   a. employee card by using a barcode scanner,
   b. web-based attendance presence.
2. Presence as a group by utilizing an Excel file upload that was previously generated from the system.

4.1.4. Payroll

Payroll at ALIseafood is determined based on the type of employment. There are 3 (three) components in the process, namely:

1. Basic salary for permanent employees,
2. Daily salary for daily employees,
3. Overtime pays for permanent and daily employees,
4. Wholesale salary for wholesale employees, which is determined based on activities. Determination of the calculation is carried out based on the total tonnage of carrying out activities and the number of employees who carry out the work.
5. Honorarium for all types of employees.

Payroll payment is already using the payroll system through the Bank which requires an account number for each employee. Therefore, a payroll calculation process that can be generated directly based on attendance and work data is urgently needed to help speed up the payroll process. The generation process is carried out using the system based on the provisions in the previous point. This process is carried out on a weekly and monthly basis.

4.1.5. Application Access

To address the need for application and data access flexibility, a user mapping mechanism is implemented according to their work functionality. The mapping is done by mapping the needs of each user to the required functionality. In general, the results of the analysis carried out on the process of mapping the functional requirements can be seen in the use case diagram in Figure 2.

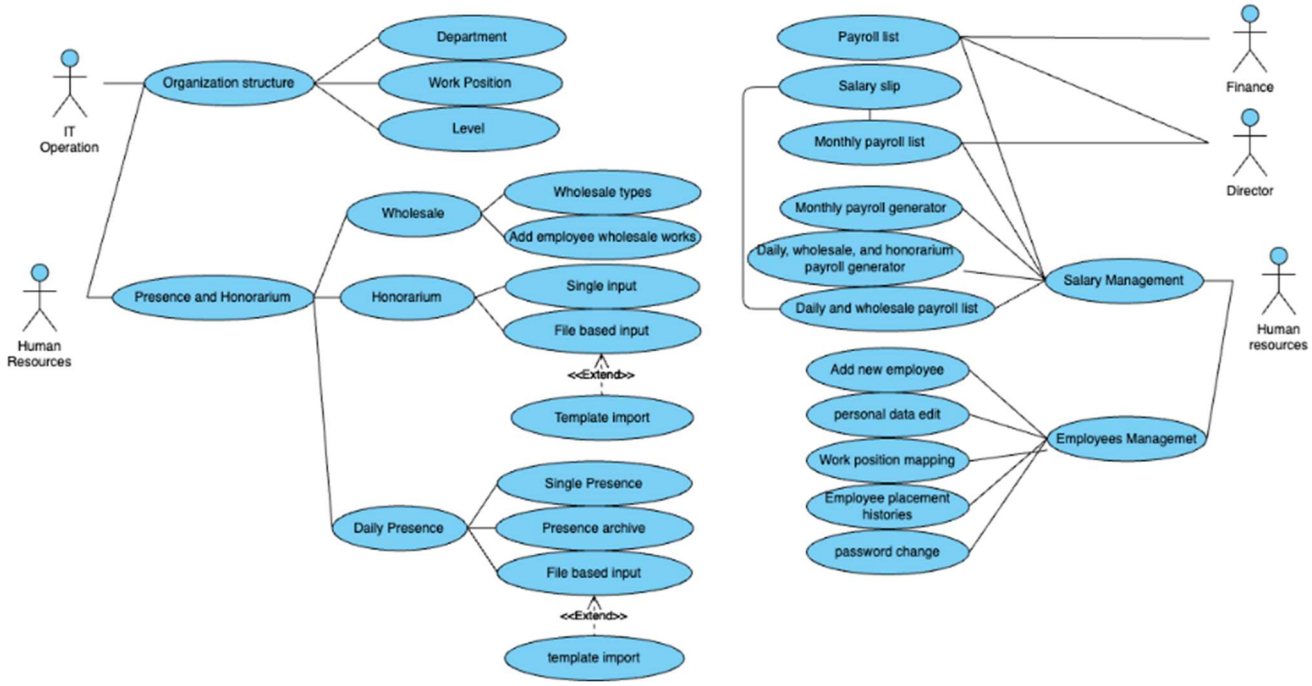


Figure 2 Use case diagram of ALI Seafood HR Management

There are 4 (four) main actors in this system,

1. IT Operations. This actor has main function access rights to provide initial data for system requirements, like organizational structure data and other supporting data.
2. Human Resources. Has a role to carry out the process of managing personnel data, the process of inputting attendance and honorarium, the wholesale process, and the process of generating payroll data.
3. Finance. Has a role to carry out processes related to payroll, view salary data, and print payroll slips.
4. Director. Have access to view attendance and payroll management reports.

4.2. Development Implementation and Testing

The analysis has been carried out in section 3.1, resulting in a list of features and then implemented into an application. The tools used in this development are the Laravel PHP framework, MySQL database, Javascript jQuery library, CSS Stylesheet Bootstrap, and table plugin Yajra Datatables. The sample results of the implementation process can be seen in Figure 4-8.

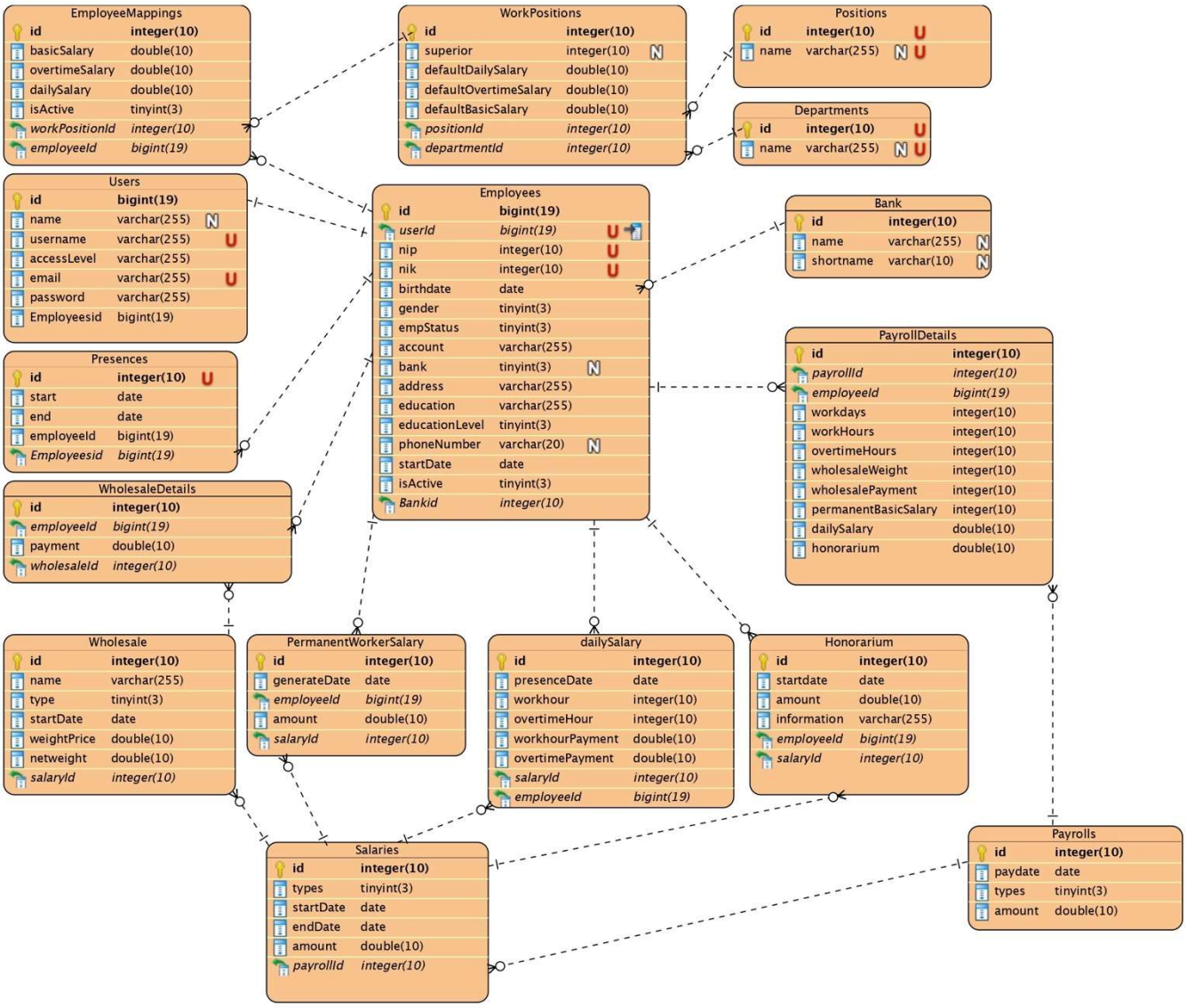


Figure 3 Entity relationship Diagram of ALI Seafood HR Data Management

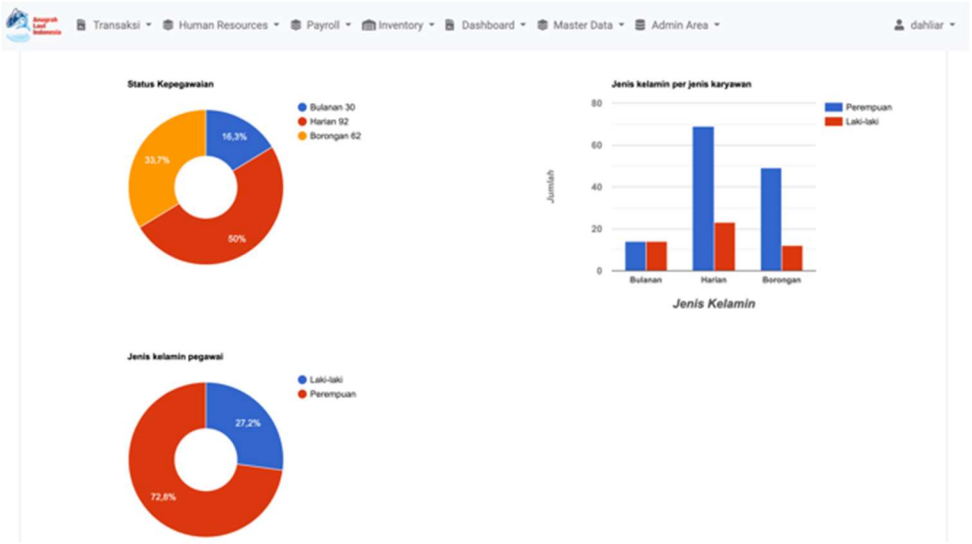


Figure 4 Dashboard General Page for Employees' Data

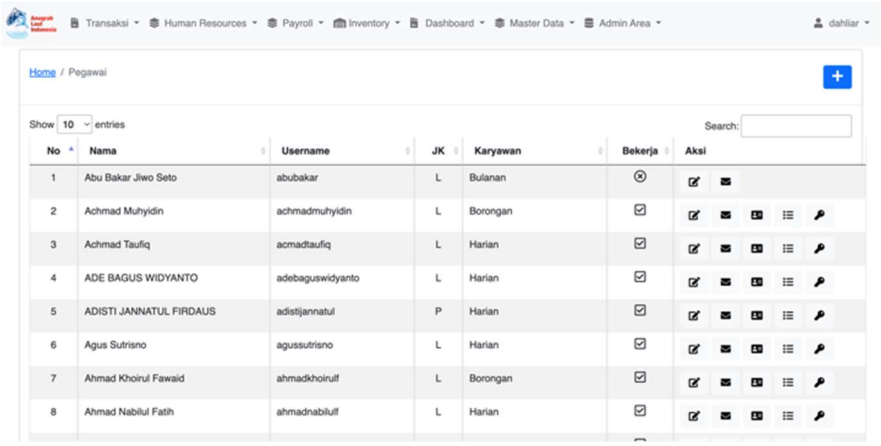


Figure 5 Employee Management Main Page to Manage the Employee's Data

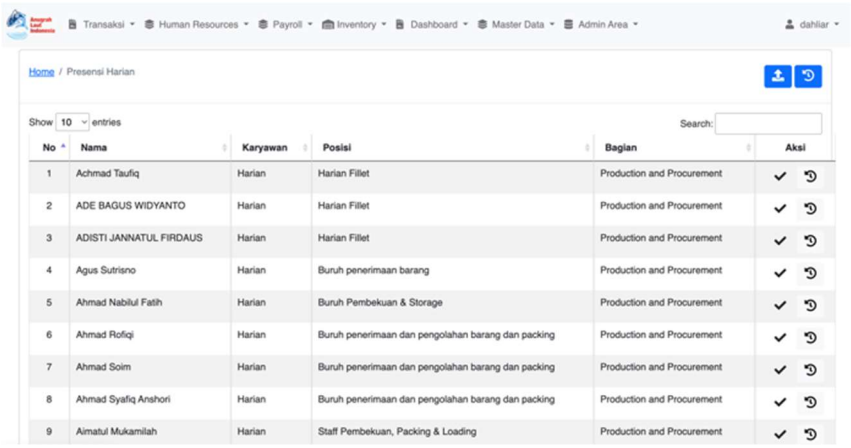
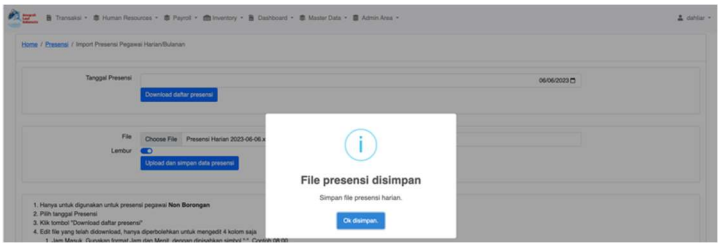
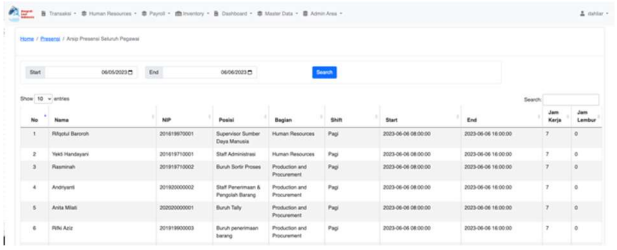


Figure 6 Daily Attendance Page for Each Employee

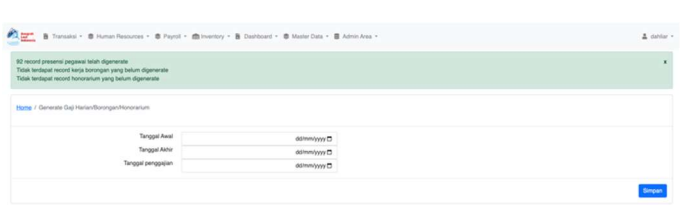


(a)

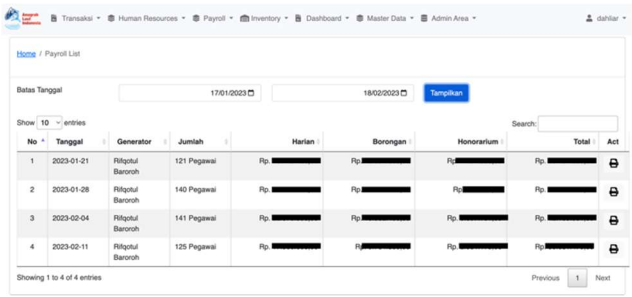


(b)

Figure 7 (a) Presence Input Using Microsoft Excel-Based File; (b) Result of Daily Attendance Input



(a)



(b)

Figure 8 (a) Payroll Generation Page to Generate Daily and Wholesale Employees; (b) Payroll List for The Daily, Wholesale, and Permanent

As described before, we used test-drive development as a mechanism to make sure the codes are working properly. This research used Laravel PHPUnit as a testing mechanism. Figure 9(a) is an example of Unit Testing to test the login process for both successful and declined using an invalid password. While figure 9(b) is to add a new employee. Figure 10 is the testing process conducted in Figure 9(a) and Figure 9(b) and get the pass result for all 3 (three) tests.

```php
public function test_users_can_authenticate_using_the_login_screen()
{
    $response = $this->post('/login', [
        'username' => 'dahliar',
        'password' => 'dahliar123',
    ]);

    $this->assertAuthenticated();
    $response->assertRedirect(RouteServiceProvider::HOME);
}

public function test_users_can_not_authenticate_with_invalid_password()
{
    $this->post('/login', [
        'username' => 'dahliar',
        'password' => '123344',
    ]);

    $this->assertGuest();
}
```

(a)

```php
public function testTambahPegawai()
{
    $response = $this->post('/login', [
        'username' => 'dahliar',
        'password' => 'dahliar123',
    ]);

    $response = $this->post('/employeeStore', [
        'name'                  => 'Bejo Sugiantoro',
        'username'              => 'bejos',
        'password'              => '123456789',
        'accessLevel'           => '1',
        'phone'                 => '123456778',
        'email'                 => 'bejos@gmail.com',
        'nik'                   => '1122334455',
        'birthdate'             => '1988-03-04',
        'gender'                => '1',
        'startdate'             => '2020-01-01',
        'address'               => 'Surabaya',
        'structural'            => '1',
        'workPosition'          => '1',
        'OrgStructureOption'    => '1',
        'employmentStatus'      => '1',
        'pendidikan'            => '1',
        'bidangPendidikan'      => 'IT',
        'gajiPokok'             => '50000000',
        'gajiHarian'            => '0',
        'uangLembur'            => '0',
        'noRekening'            => '123456678',
        'bankid'                => '1'
    ]);

    $this->assertAuthenticated();
    $response->assertStatus(302);
}
```

(b)

Figure 9 (a) Test Example for Successful and Unsuccessful Login; (b) Test Example to Add a New Employee

```
dahliar@Dahliars-MacBook-Air aliTesting % php artisan test

  PASS  Tests\Unit\ExampleTest
  ✔ example

  PASS  Tests\Feature\AuthenticationTest
  ✔ login screen can be rendered
  ✔ users can authenticate using the login screen
  ✔ users can not authenticate with invalid password

  PASS  Tests\Feature\RegistrationTest
  ✔ tambah pegawai

  Tests:  5 passed
  Time:   0.62s
```

Figure 10 Test Running Using Laravel PHPUnit Test Feature

4.3. Conclusions

Based on the research that has been done, the development of a Human Resources data management application produces an application that can be utilized in:

1. Managing employee data, organizational structure and employee work locations, and organizational structure mapping as can be seen in Figure 5.
2. Employee presence based on both one-by-one or Excel-file-based import was successfully conducted as can be seen in Figure 6 and Figure 7.
3. Generating employee salaries and payroll reports as can be seen in figure 8(a) and figure 8(b).
4. In terms of application functionality, a testing process has been carried out by using the Laravel PHPUnit testing method.

There are some future works for this research and development, such as employee presence based on QRCode/Barcode or RFID-based system, detailed financial report, and the whole HR management system.

Bibliography

[1] M. Abdullah, Manajemen dan Evaluasi Kinerja Karyawan, Yogyakarta: Aswaja Pressindo, 2014.

[2] M. T. Habibie, H. Sulaiman and R. Wirawan, "Rancang Bangun Aplikasi Manajemen Sumber Daya Manusia pada PT. ALTERMYTH," in *Seminar Nasional Informatika, Sistem Informasi dan Keamanan Siber (SEINASI-KESI)*, Jakarta, 2019.

[3] S. Widaningsih, A. Suheri and E. Nurullatipah, "Sistem Informasi Sumber Daya Manusia (SDM) di Konfeksi Oidokids Bandung," *Media Jurnal Informatika,* vol. 13, no. 2, pp. 85-91, 2021.

[4] A. C. Djamen and S. Pratasik, "Pembangunan Aplikasi Arsip Pegawai PT. PLN Persero Wilayah Suluttenggo," *Cogito Smart Journal,* vol. 6, no. 1, pp. 60-72, 2020.

[5] M. M. H. Junaedi, S. Susanti and A. Mubarok, "Penerapan Framework Laravel pada Aplikasi HRIS (Human Resource Information System)," *Jurnal Responsif,* vol. 2, no. 2, pp. 176-183, 2020.

[6] M. Jonni and S. . M. Husain, "Perancangan Aplikasi Human Resource Information System (HRIS) Berbasis Website pada PT. Super Tata Raya Steel," *Jurnal Teknik,* vol. 5, no. 2, pp. 102-107, 2019.

[7] I. S. Panjaitan, S. H. Widiastuti and A. Zain, "Aplikasi Human Resource Information System Payroll Berbasis Web pada PT. BPR Paro Tua," *Jurnal Nasional Komputasi dan Teknologi Informasi,* vol. 5, no. 2, pp. 183-192, 2022.

[8] M. A. Nugraha, Y. Septiana and D. D. S. Fatimah, "Rancang Bangun Human Resource Information System Berbasis Web," *Jurnal Algoritma,* vol. 19, no. 2, pp. 701-711, 2022.

[9] P. A. L. Indonesia, "PT. Anugrah Laut Indonesia Pages," PT. Anugrah Laut Indonesia, 2021. [Online]. Available: http://www.aliseafood.co.id. [Accessed 07 May 2023].

[10] N. Yadav, D. S. Rajpoot and S. K. Dhakad, "Laravel: a PHP Framework for E-commerce Website," in *International Conference on Image Information Processing*, Waknaghat, 2019.

[11] E. Sutrisno, Manajemen Sumber Daya Manusia, Jakarta: Kencana, 2009.

[12] B. Bukit, T. Malusa and A. Rahmat, Pengembangan Sumber Daya Manusia Teori, Dimensi Pengukuran, dan Implementasi dalam Organisasi, Yogyakarta: Zahir Publishing, 2017.

[13] I. Sommerville, Software Engineering 9th Edition, Harlow, England: Addison-Wesley, 2010.

[14] R. Pressman and B. Maxim, Software Engineering: A Practitioner's Approach 9th Edition, McGraw Hill, 2019.

[15] J. Andrea, "Test-Driven Development: Driving New Standards of Beauty," in *Beautiful Testing Leading Professionals Reveal How They Improve Software*, Sebastopol, O'Reilly, 2010, pp. 181-194.