

# Web-based Leave Management System for Politeknik Negeri Batam

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**Abstract:** Every employee has their own right to apply for a leave in an institution or company. Applying for a leave in Politeknik Negeri Batam still run in a conventional way. An employee fills in a paper form, seek for an approval by a supervisor, and deliver it to HR department. Yet, a problem arises for tracking, managing and storing the data. In this study, a web-based leave management system has been built to overcome the problem. It was built on Yii2 framework and MySQL database. Besides, it also generated a report for HR department. Based on testing result, the system has been able to facilitate employee to directly apply for a leave. The supervisor can approve the leave application, and HR department can produce a report from the system.

## 1 INTRODUCTION

Leave of absence means a right granted to every employee who absence from work with permission in accordance with applicable regulation/law in a company/workplace. There are several types of leave on a company. The most common leave that every company has are vacation leave, urgent family leave, sick leave, marriage leave, maternity leave, etc.

Normally, to apply for a leave, an employee must apply for it in advance, discuss with supervisor to get an approval, then submit it to human resource department. There are some companies might have done it using paper work where employee fill a paper form and seek for supervisor approval. Thus, it runs inefficiently. A drawback exists when the supervisor is not around. Employees find it difficult to get an approval for leave application. It may cause delay to submit the application.

With a grew number of technology development nowadays, the conventional method turned into smart method. This study proposes leave management system automatically through web-based application. Through the application, employee can apply for a leave submitting an e-form into the system. Submissions will be granted by supervisors directly through the application as well.

Politeknik Negeri Batam (Polibatam) is an educational institution in Batam, Kepulauan Riau. Polibatam is our case study to implement the system that has been developed. The system has been designed to be integrated with current system and database.

Numbers or research has been published in developing leave management system using various method and framework such as laravel (Saryanti, 2018), and native programming language (Safitri, 2018; Setyabudhi, 2017). The case for the system includes private company that have specific needs such as performance appraisal (Nugroho and Putra 2018).

This research focus on specific case study which is Polibatam, a government-operated educational institution that have certain rules on leave management. The system also designed to be integrated with current systems.

The remainder of this paper is arranged in this fashion. Section two present the analysis and design process. Section three present the implementation and testing of the application, while last section concludes the work.

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## 2 ANALYSIS AND DESIGN

### 2.1 Research and Methodology

A research methodology used in this research is waterfall. Waterfall methodology was a systematic and sequential information system development model (Pressman, 2005). Figure 1 depict stages in waterfall methodology that used in this research.

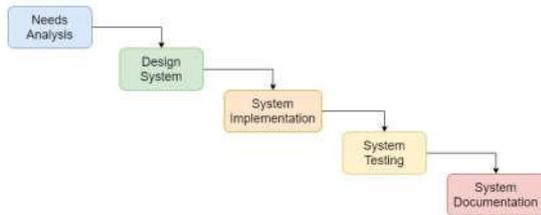


Figure 1: Research methodology.

Waterfall methodology has several stages. The stages are explained as follow:

1. Requirement Analysis  
At this stage, researcher performs collection of reference and requirement analysis, and business process analysis needed to build the system. The method includes interview the head of personnel department and document analysis for the leave procedures.
2. System Design  
This stage has been conducted by creating a system design based on previous analysis. It includes an interface design and application design. We employ Use Case driven modelling using UML to design the system (Resenberg and Scott, 1999).
3. System Implementation  
This stage was an implementation of system design. The previous system design has been implemented through coding processes using Yii framework.
4. System Testing  
At this stage was conducted system testing after implementation of the system. The test was divided into two types, white box and black box testing. System testing was done to know whether the application can work properly in accordance with the objectives specified.
5. System Documentation  
System documentation was done started from the beginning of built application processes until completed the application. It was then collected into a research report.

### 2.2 Requirement Definition

Requirement definition process is done with two method, namely interview and document analysis. Interview was conducted with HR department in Polibatam to gather the needs and information system department to gather the information about existing system and database. The document analysis we explore the current procedure of employee leave in Polibatam. The requirement definition process results are:

1. System have authentication process
2. Employee can submit a leave
3. Employee can track leave progress
4. Head of department have authority to accept or reject
5. HR can manage master data
6. System can generate report for HR
7. System can calculate leave for each employee.

### 2.3 Use Case Design

Use case is a mechanism used to simplify and make the system understandable to all stakeholders (Pressman, 2005). Use Case explains relationship between actors and systems, cases that occurs between actors and systems, as well as functions that fit the existing functional needs. Use case design for the system is depict in Figure 2.

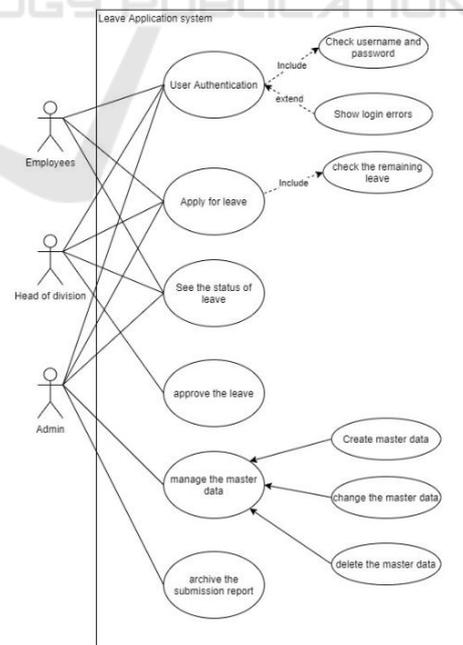


Figure 2: Use case design for leave management system.

There were three actors, namely employees, head of division and administrator. Actors are connected with multiple use cases i.e. user authentication, submitting a leave that must check the remaining leave from the user. Status of leave, approve leave, manage master data, and archive submission report. All of the use cases are functional requirement that will be implemented in the system.

### 2.4 Entity Relationship Diagram

Entity Relationship Diagram is a network model that uses the data arrangement that is stored in the system in an abstract model (Larman, 2007). In Figure 4, there are 7 entities and 6 relationships. The 7 entities are users, leave, study programs, units, types, HR, and email. Each entity has attribute, and relationships with another entities. Like user entity that has a relationship with leave entity, Prodi, and unit. While the leave entity has a relationship with personnel entities, HR department, email, and users.

### 2.5 Class Diagram

Class diagram shows relationship between the classes and the detailed explanation of each classes in design mode of a system (Ladjamudin, 2013). Class diagram design for the system is depict in Figure 5. There were 17 classes in the system. These classes have a relationship according to their function, such as user class that corresponds to user controller, and leave is associated with submission controller. The class design is based on model view controller where there are view class that act as user interface, control class that has function and procedure, and the model class that connect to the data.

## 3 IMPLEMENTATION AND TESTING

The system was built by using Yii2 framework with PHP 5.6.40 version, and MySQL database. Yii2 is a PHP-based open source framework. It has adopted MVC concept or model, view and controller. MySQL is the popular open source database software.

### 3.1 Database Implementation

The database implementation is based on the ER Diagram design in the Figure 4. There were seven tables for database, namely users, leave, units, study programs, supervisor, types and e-mail. We also

integrate the leave management system authentication with single sign on system that exist in Polibatam. With this integration, the system doesn't need to store the information about authentication. User can use one identity to authenticate into the leave management system.

### 3.2 Interface Implementation

Interface implementation implements the user interface that user can use to interact with the system.

1. Leave Application Page  
In this page, there is an application form. This form filled by employee to apply for leave. The employee needs to state the leave type, start date, number of working days and reason of leave, the page is depicted in Figure 3.
2. Application Status Page  
This page shows the status of requested leave for employee. As in the Figure 6, employee can monitor whether the leave application has been approved.
3. Lists of request application page  
This page in Figure 7 shows annual leave information that has been requested and will be verified by supervisor. This page used by HR department to get all leave data for all employee.
4. HR Page  
It is page that contain master data of employee and leave regulation.
5. Report Page  
This page shows a report related to staff's leave application as an archive.

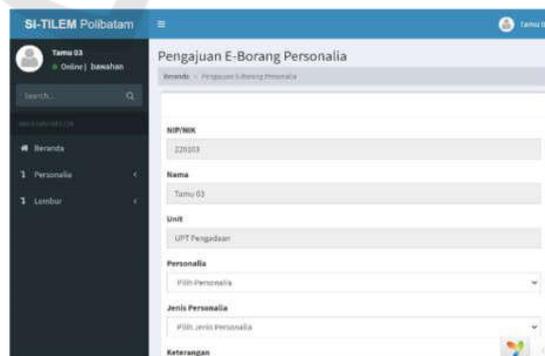


Figure 3: Leave application page.

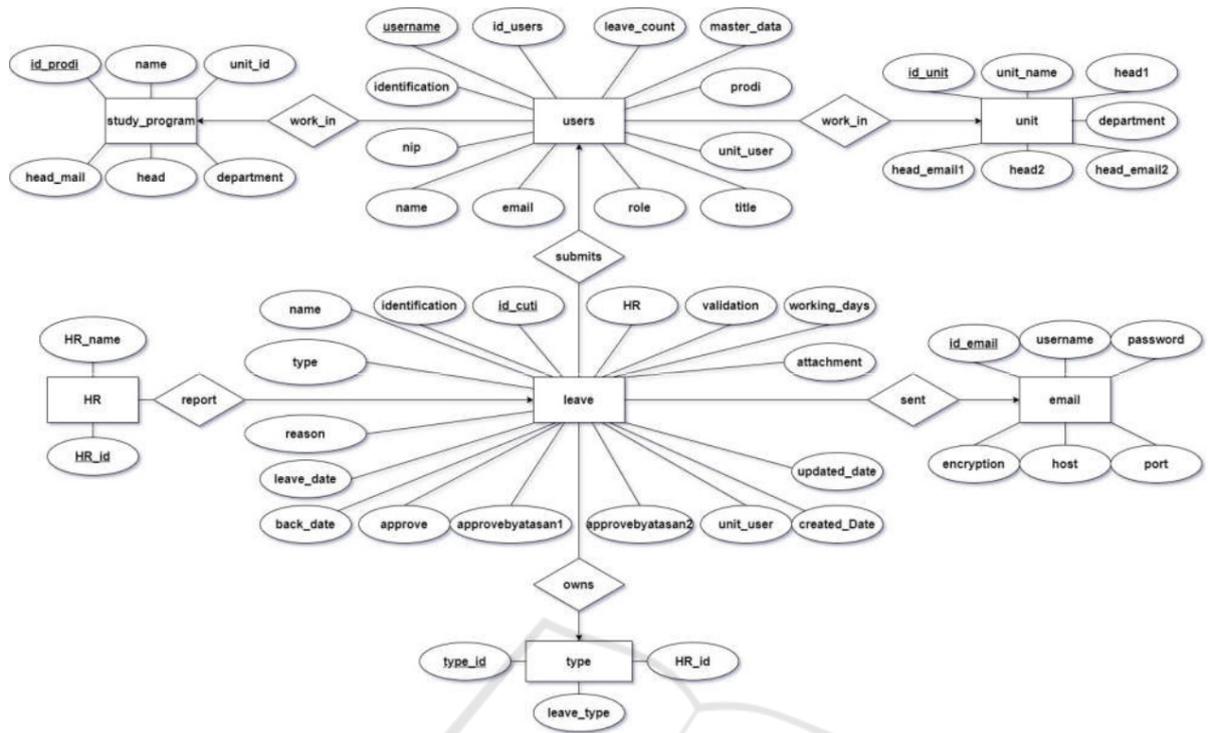


Figure 4: Entity relationship diagram design for leave management system.

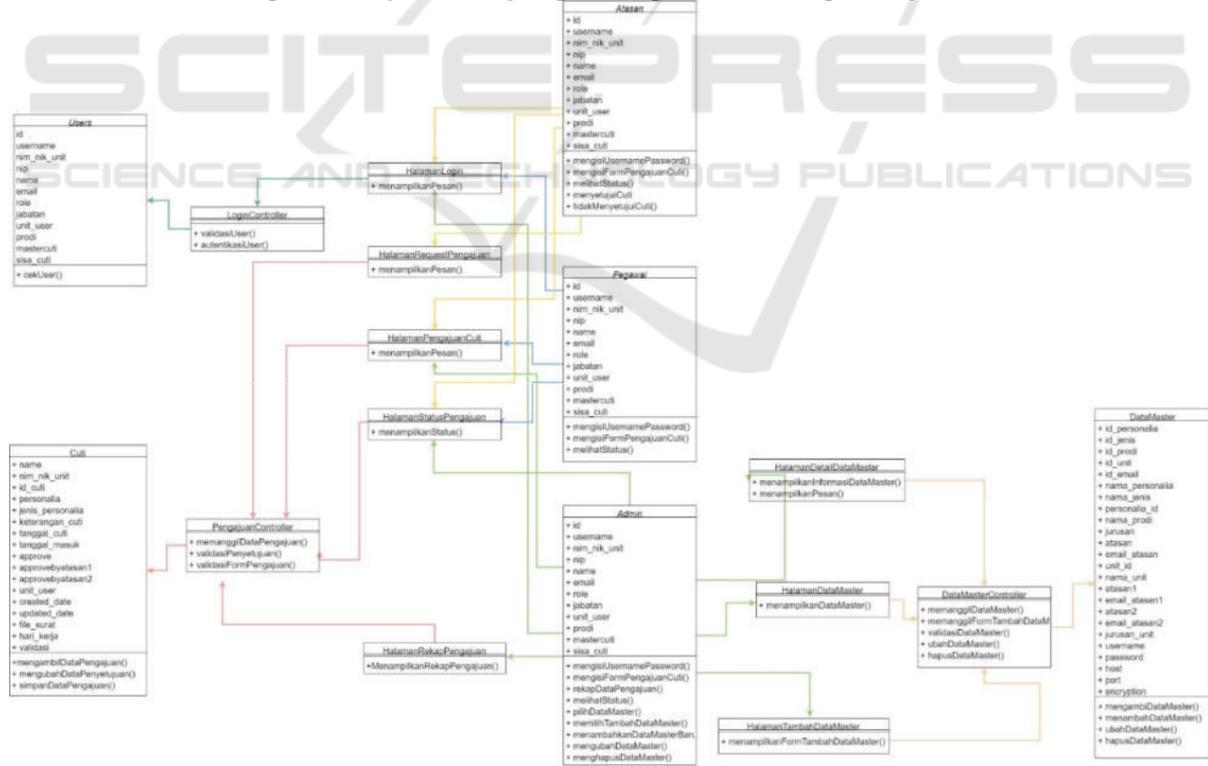


Figure 5: Class diagram design for leave management system.



Figure 6: Leave application status page.

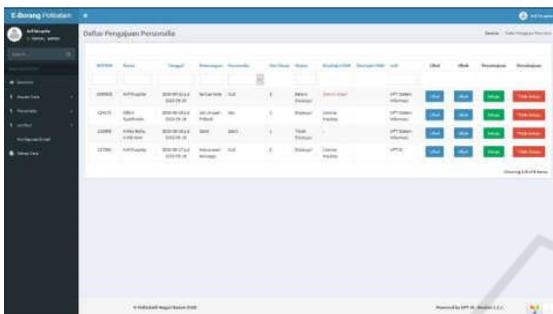


Figure 7: List of requests.

### 3.3 System Setting

The system testing is done using white box and black box testing. White box testing done by developer to see internal system algorithm and function to match the requirement. The black box is functional testing to check whether every function in the system are working and match the requirements.

The black box testing is done by HR department and information system department of Polibatam. The test was done on 11th June 2020 at Polibatam. Testing result is described in Table 1.

Table 1: Testing result.

No	Function	Scenario	Result
1	Authenti-cation	Entering right and wrong identity to test system authentication using single sign on Polibatam user account	Function accordingly
2	Leave application	Submit a leave form	Function accordingly
3	Leave application status	See leave approval status	Function accordingly
4	Leave approval	Supervisor accept/reject leave application	Function accordingly
5	Manage master	HR department can do	Function

	data	CRUD on master data	accordingly
6	Leave calculation	System calculate and accumulate leave for each employee	Function accordingly
7	Generate report	System can generate leave report for all employee	Function accordingly

## 4 CONCLUSIONS

This study developed and deployed web-based leave management system for Polibatam. The system facilitates the business process of leave application, such as forms, approval and report. Based on testing result done by HR department and information system department at Polibatam, the system can match the requirement and function accordingly.

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