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# Self-Workplace Inspection Information System

**Cheong Chun Pin[1], Shahreen Kasim[1]***

[1]Faculty of Computer Science and Information Technology,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

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***Abstract***: *The Self-Workplace Inspection Information System is a data management system built for Sawit Kinabalu Sdn Bhd that helps to improve business processes that still use Excel sheets for manually filled assessments. The system was developed to improve the business process of the operating unit in recording inspection compliance status, carrying out a comprehensive report, and making sure all the inspection aspects are in good shape. The target user of the system is the operating unit manager, inspection officer, admin, and the sustainability unit with 5 modules provided. Throughout this project, the agile scrum approach has been applied, and PHP with the Laravel framework and XAMPP has been used to construct the system. This developed system can be able to help provide efficiency to the operating unit and staff activity on inspections.*

***Keywords***: *Self-workplace inspections, web-based system, inspections, checklist, Laravel*

## 1. Introduction

Sawit Kinabalu Sdn Bhd is a company that is in Kota Kinabalu, Sabah. This company is an investment arm of the State Government in the oil palm industry in Sabah [1]. Also, there are 36 estates, 7 mills, and 6 nurseries belonging to the company. In order to ensure those estates and mills abide by the Regulations 1996. Tuan Lafris is the person taking charge of collecting the report of inspections based on different aspects that would be inspected by their workers in estates and mills.

In order to make sure the workplace is away from harmful hazards [2], inspections need to be carried out to fulfill the requirements of the Safety and Health Committee. The operating unit needs to implement those inspections every three months. Not only that, but also scheduled inspections in estates and mills will be discussed with the Safety and Health Committee. All results are recorded in forms. However, the business process of inspections is using Excel to print out the inspections and there is no system for managing the inspection data. Therefore, a system is needed to build up for storing data, summary, and the report printout of the inspections.

The remainder of the document was structured as follows: The literature review of relevant work and current applications or systems is covered in Section 2 of this article. Next, Section 3 describes

*Shahreen Kasim: shahreen@uthm.edu.my*

the methods utilized to create the application, including the analysis and design. The last part summarizes the work that has been done thus far and emphasizes the work that will be done in Final Year's Project 2 going forward.

## 2. Related Work

This literature review was carried out to obtain a study of the existing system at present. In this section as well, various materials are used as reference sources such as journals, theses, and so on. This comparison of the existing system has been conducted on studying features used, the interface as well as the improvement of the existing system that can be implemented to the system that will be developed for the inspections information system.

### 2.1 Domain Background

The Department of Occupational Safety and Health forms about 3 to 4 as a group on conducting inspections in Sawit Kinabalu Sdn Bhd[3]. In order to ensure those estates and mills abide by the Regulations 1996, self-workplace inspections have to be carried out to solve any problems of mills and estates. Sawit Kinabalu Sdn Bhd uses Excel spreadsheets to document and rate the self-workplace inspections condition of selected locations. All the data have to be recorded manually, all the records have to be checked to make sure the inspections all achieve the requirement of the regulations of the Safety and Health Committee.

### 2.2 Laravel PHP

Laravel PHP is used for designing the code of the system. Laravel is a popular open-source web framework known for its server-side routing, HTML authentication, templating, and other capabilities. [4]. Laravel is a PHP framework created by Taylor Otwell, which utilizes the Symfony framework's reusable PHP components and modules. It provides developers with a comprehensive toolkit for building web applications, including predefined architectural patterns, customizable backend logic, website templates, and support for developing full-stack applications. Additionally, Laravel offers features for managing Software-as-a-Service (SaaS) products because it is a server-side-based framework. Therefore, it is convenient to use Laravel to design the system. An expressive, beautiful syntax characterizes the web application framework Laravel. For development to be genuinely meaningful, we think it needs to be fun and creative. Laravel aims to streamline the development process by simplifying common tasks found in most web applications, such as authentication, routing, sessions, and caching. By providing easy-to-use features and abstractions for these routine activities, Laravel aims to alleviate the complexities and challenges typically associated with web development, making the overall development experience less cumbersome and more efficient [5].

### 2.3 Current non-computerized inspection system

Sawit Kinabalu Sdn Bhd does not have a system for storing and managing the data of the inspections. By printing out the documents of the file, every result is recorded in paper form. They have to print out everything including their inspection schedule. They have to send their files to the inspector of the mills and estates for them to record their inspections. If they have any changes to the inspections, they have to wait for several days to receive the reports.

**Table 1: Comparison between Existing Systems and Proposed System**

| Features | Qualityze | Intelex | PCMS | Proposed system (Self-Workplace Inspection Information System) |
|---|---|---|---|---|
| **Login** | ✓ | ✓ | | ✓ |
| **Logout** | ✓ | ✓ | | ✓ |
| **Easy to access** | ✓ | | ✓ | ✓ |
| **Homepage** | ✓ | ✓ | ✓ | ✓ |
| **Edit page** | ✓ | ✓ | ✓ | ✓ |
| **User convenience** | ✓ | ✓ | ✓ | ✓ |
| **Report** | ✓ | | | ✓ |
| **Grouping** | | ✓ | | ✓ |
| **Result usability** | | | ✓ | ✓ |

## 3. Methodology/Framework

Subsection 3.1 discusses agile scrum methodology and the other subsection is for functional and non-functional requirements.

### 3.1 Agile scrum methodology

For this section, the chosen methodology to develop the Self-Workplace Inspection Information System will be discussed and explained in each phase. The agile scrum technique is a combination of the scrum framework and the agile mindset. Agile emphasizes incremental development, allowing teams to break down projects into manageable chunks [6]. One specific agile technique is scrum, which divides projects into sprints, which are substantial units of work. The agile scrum technique is particularly beneficial for companies that require rapid project completion. The agile scrum methodology follows an incremental development approach to project management [7]. Each iteration, known as a sprint, typically lasts for two to four weeks. The primary objective is to prioritize and complete the most critical features first, ensuring that a potentially marketable product is delivered at the end of each sprint. This iterative process enables continuous improvement and adaptation throughout the project lifecycle. In the initial phase of the project, there are interviews and collected requirements from key stakeholders. There are some discussions with individuals from MZR Group, including Mrs. Norfai'eza Zainuren, as well as representatives from the Sawit Kinabalu Sdn Bhd

Company, namely Mr. Asbudi Amire. These interviews took place during the sprint sessions within the Agile Scrum model, which was chosen as the methodology for this project.

As shown in Table 2, each phase of the prototype model has its own set of tasks and activities that must be completed to produce the desired output.

**Table 2: Software development activities and their task**

| Phase | Task | Output |
|---|---|---|
| Initiation | ● Specify the epics | ● Project backlog |
| Sprint Planning | ● User stories are separated to understand the details and requirements of the project<br>● Breaking the project into different or separate time | ● Sprint schedule.<br>● Email invitation to sprint meeting |
| Daily Scrum and Implementation | ● Complete tasks on the given time | ● Gantt chart<br>● Achieve objectives of each sprint |
| Sprint Review | ● Demonstrate the system.<br>● Review the system by giving suggestions for system improvement | ● RESIP UTHM: Sprint Review Meeting that is conducted on Thursday every two weeks. |
| Sprint Retrospective | i. Studies the sprint before<br>ii. Review the weaknesses of the system | i. - |

## 3.2 Function and Non-Functional Requirements

In order for users to achieve their goals, developers need to incorporate specific features and functionality into products. It is crucial to clearly communicate these requirements to both the development team and stakeholders. Functional requirements often outline the expected behavior of a system in various scenarios [8]. An example of a functional requirement is that the admin must register user accounts for others to be able to log in. On the other hand, non-functional requirements are equally important for creating a usable software system. Unlike functional requirements, non-functional requirements are not directly related to the system's internal workings, but rather define how the system should function..

Functional Requirements:

- Login/Signup
- General configuration
- Generate checklist
- Generate report
- Logout

Non-Functional Requirements:

- Operational
- Usability
- Availability
- Performance

## 4. System Analysis and Design

The professional systems engineer may use system requirements analysis to draw up an accurate study of the materials, timetables, and people required to start and finish any significant, complicated project.

### 4.1 Business Workflow

A business workflow is a recurrent process comprising several tasks that often need to be finished in a specific order [9]. It may be pictured as the evolution of a project from one stage to the next until it is finished. Workflows are useful in making sure that important procedures are routinely carried out correctly. For instance, a procedure for onboarding new workers might be established to ensure that everyone who joins the organization is provided with the knowledge, guidelines, and tools they need to carry out their duties.

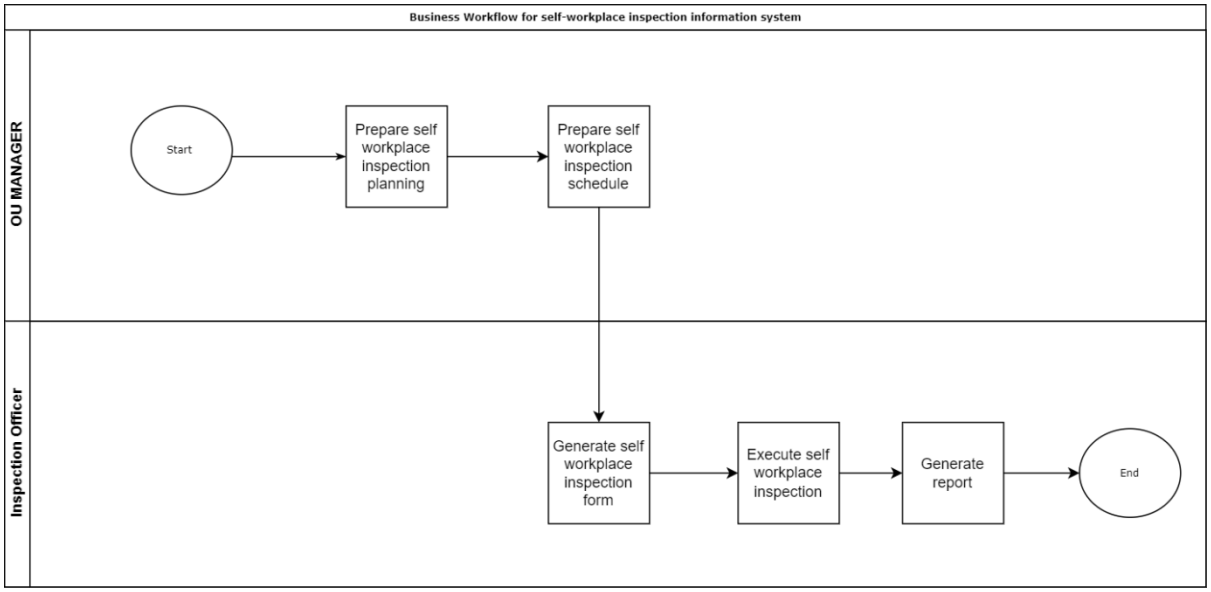


**Figure 1: Business Workflow of Self-Workplace Inspection Information System**

### 4.2 Use Case Diagram

A use case diagram is a valuable tool for summarizing information about a system and its users [10]. It serves as a visual representation, illustrating the interactions between different components of the system. Use case diagrams depict the system's activities and the sequence in which they occur, providing an overview of the system's functionality. However, they do not delve into the specifics of how these activities are executed or implemented. Instead, use case diagrams focus on capturing the high-level interactions and relationships between users and the system, helping to establish a shared understanding among stakeholders.

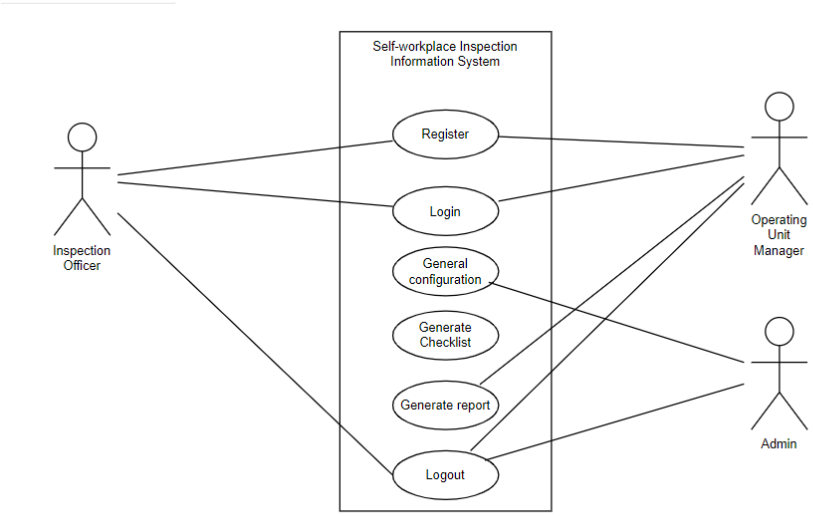


**Figure 2: Use Case Diagram**

## 4.3 General System Architecture

In software development, the process of developing a system's components is referred to as system design. To define, create, and design a system that would meet requirements and needs, system aspects including the architecture, modules and components, interfaces, and data are included in the system design process. A flowchart is used to show the architecture of the system for a mobile application for managing the retail sales of vegetables. The architecture is used to explain the structure and behavior of the system. The modules are derived from several parts that would carry out a certain system function. Each component in the system is given a component assignment and serves as a representation of that component for one particular task. The system architecture design of the Self-Workplace Inspection Information System is shown in Figure 3.

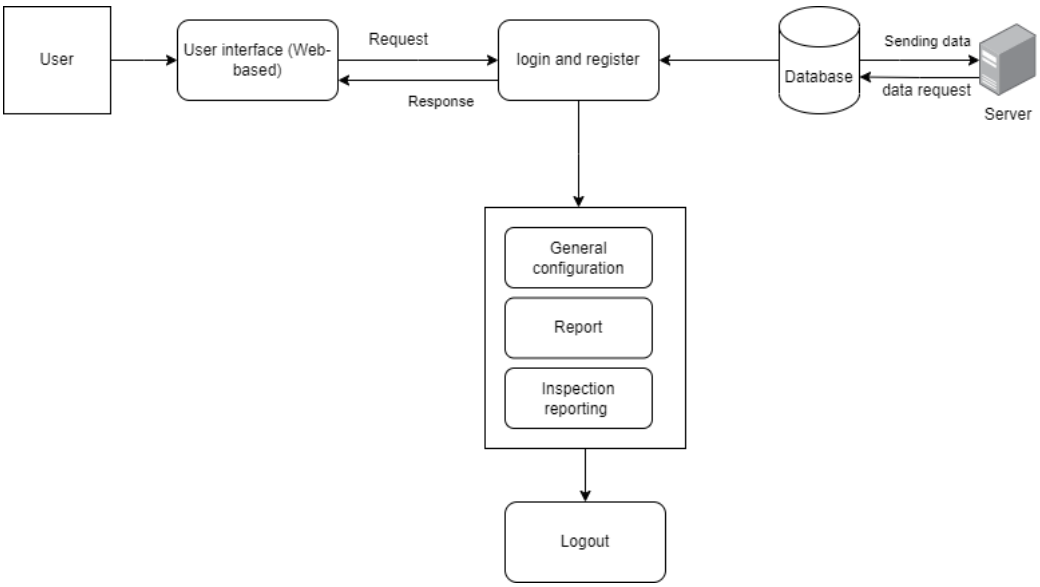


**Figure 3: System architecture design of Self-Workplace Inspection Information System**

### 4.4 Class Diagram

Among the six types of structural diagrams in the Unified Modeling Language (UML), the class diagram holds significant importance. It plays a crucial role in the object modeling process as it portrays the static structure of a system [11]. Depending on the system's complexity, a single class diagram may suffice to describe the entire system or multiple class diagrams may be required to represent various components. Class diagrams serve as blueprints or schematics for the system or its subsystems. They are instrumental in representing the elements of the system's components, illustrating their relationships, and outlining the attributes and functionalities each element offers. By visualizing the classes, their associations, and their properties, class diagrams facilitate a comprehensive understanding of the system's structure and its constituent parts.

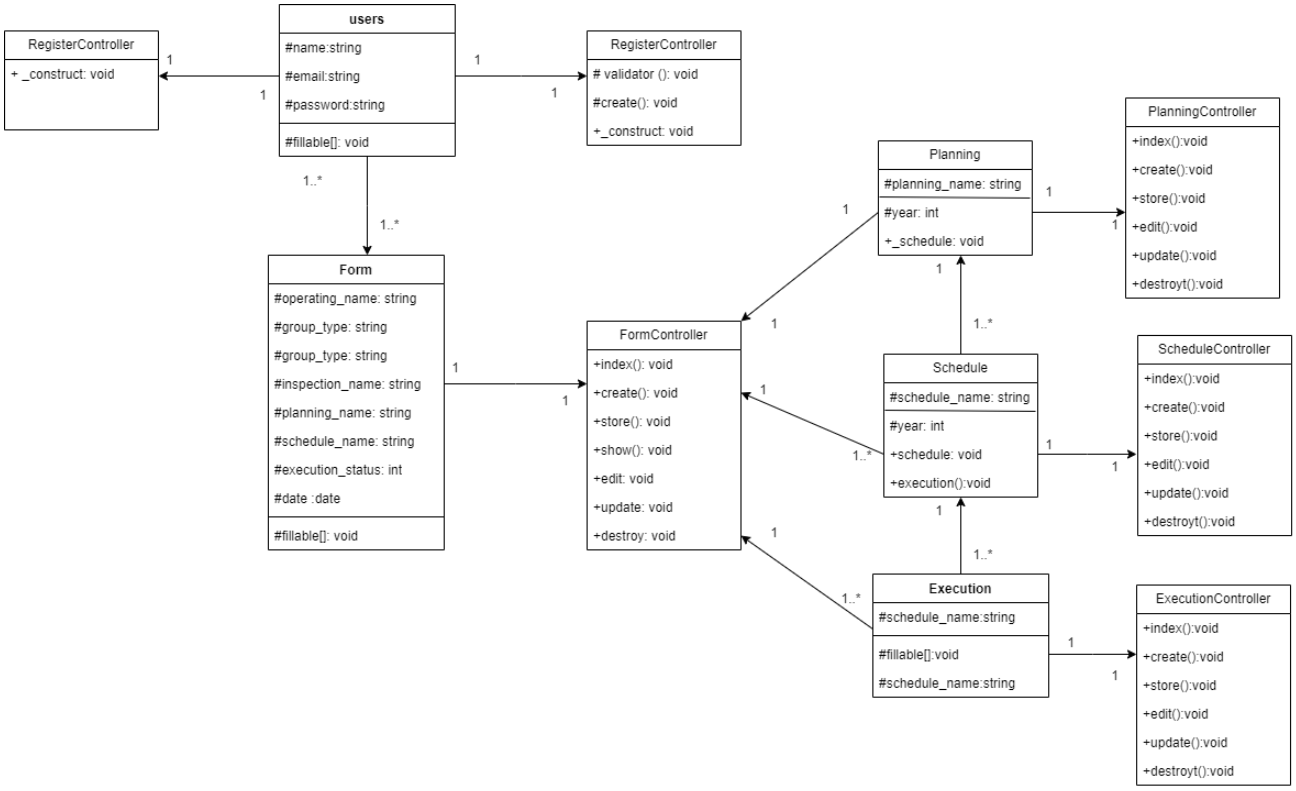


**Figure 4: Class Diagram**

## 5. Results and Discussion

This chapter discusses the testing results that were conducted for the proposed system for representatives from Sawit Kinabalu Sdn Bhd Company, namely Mr Asbudi Amire. This chapter involves two sub-sections which are the test plan in section 5.1 and section 5.2 for user interface design.

### 5.1 Test Plan

A test plan is a detailed document that outlines the project's objectives, strategies, time frame, budget, and resources. Look into a manual for test managers on how to do the tests required to ensure the product is working successfully.

**Table 3: Test Category**

| Test Category | Description |
|---|---|
| **1** | Test function for operating unit manager |
| **2** | Test function for inspection officer |
| **3** | Test function for admin |

**Table 4: Test Plan for the Proposed System**

| Module | Test Category | Expected Result | Actual Result |
|---|---|---|---|
| **Login** | 1 | The operating unit manager can log in to the system using email and a password | Pass |
| | 2 | The inspection officer can log in to the system using email and password | Pass |
| | 3 | Admin can login into the system using email and password | Pass |
| **Logout** | 1,2,3 | Users can logout from the system | Pass |
| **Register** | 1 | The operating unit manager can register a new account | Pass |
| | 2 | The inspection officer can register a new account | Pass |
| | 3 | Admin can register a new account | Pass |
| **General configuration** | 3 | Admin able to create, read, remove, and update the configuration information. | Pass |
| **Generate checklist** | 1 | The inspection officer is able to assign users in a group to an inspection checklist. | Pass |
| **Generate report** | 2 | The operating Unit Manager can generate the report into a PDF document successfully. | Pass |

## 5.2 User Interface

An application's or device's user interface (UI) is the visually appealing portion that controls how users interact with it and how information is shown on screens. Below Figure 5 to Figure 12 shows the system user interface.

Figure 5 shows the index page of the system when the system is being loaded by the users. On the right top corner, there are two buttons that can be clicked, which are “Login” and “Register” to log in or create an account in this system.

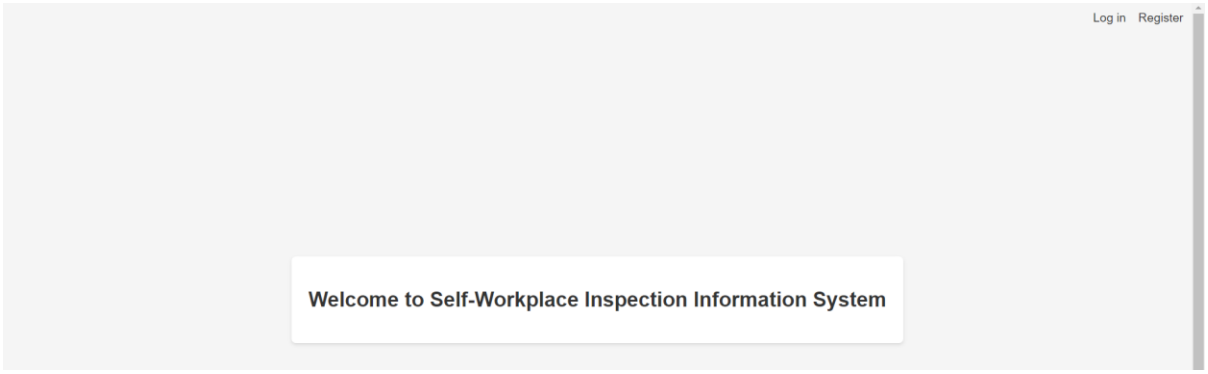


**Figure 5: Index page**

Figure 6 shows the interface of the login page. The operating unit manager and inspection officer are able to log in to the system by using email and password.

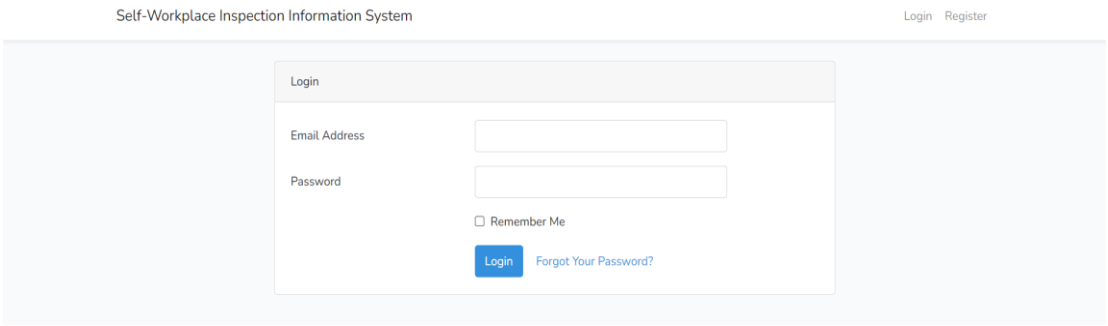


**Figure 6: Login page**

The output of the configuration dashboard in Figure 7 once the users have successfully logged in from the login page.

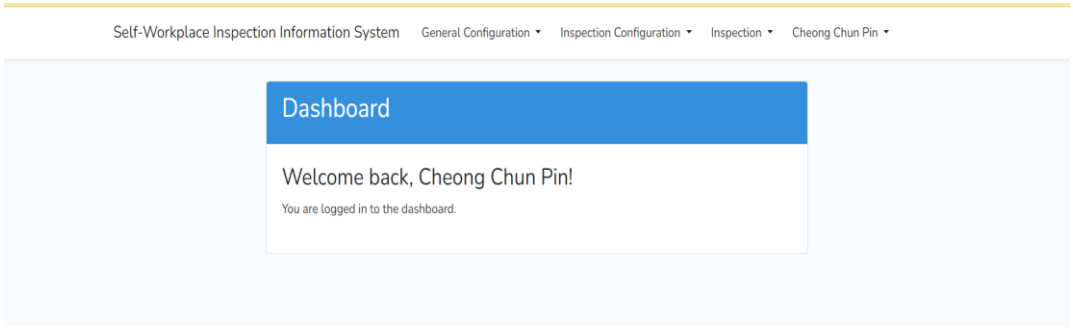


**Figure 7: Welcome dashboard page**

User management has been displayed in Figure 8. This is one of the general configurations of the system. When a user has been registered in this system, the registered user will be added to this page. The user initially does not have any roles in the system which means that they do not have any permissions on viewing that restricted page like in the picture shown in row number 5, a column called "roles" is remained empty, and only the admin able to place the permissions to a user. Admin is also able to create and edit the user information on this page.

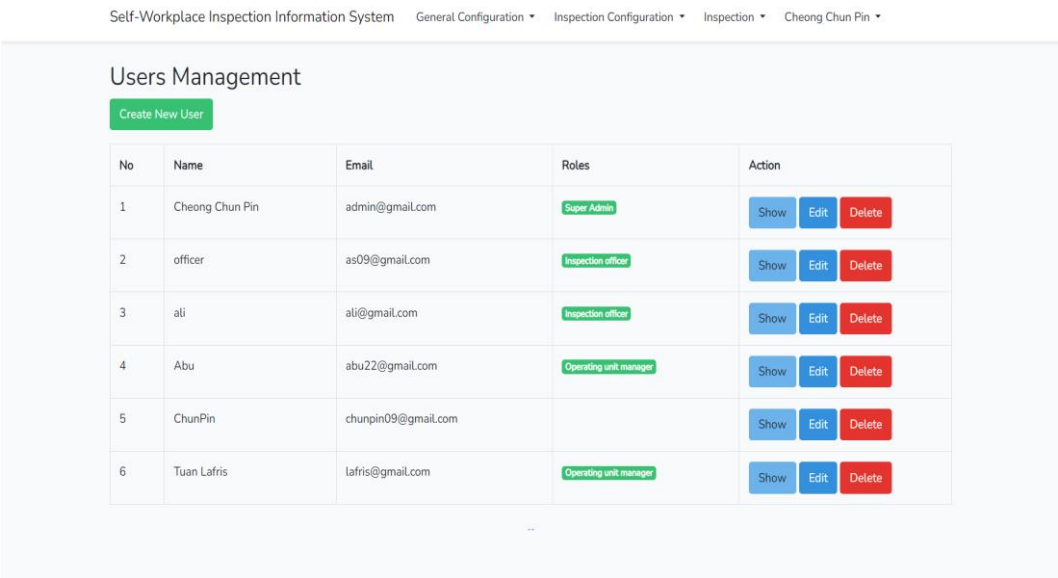


**Figure 8: Interface of user management page**

Then, Figure 9 shows the role management of the users. To assign a role to one user, this is the page to configure what are the permissions that the roles are able to do. Admin can assign role names and edit the user permissions on each role for them to access the pages that are restricted. Then, they can assign the role to the user on the user management page.

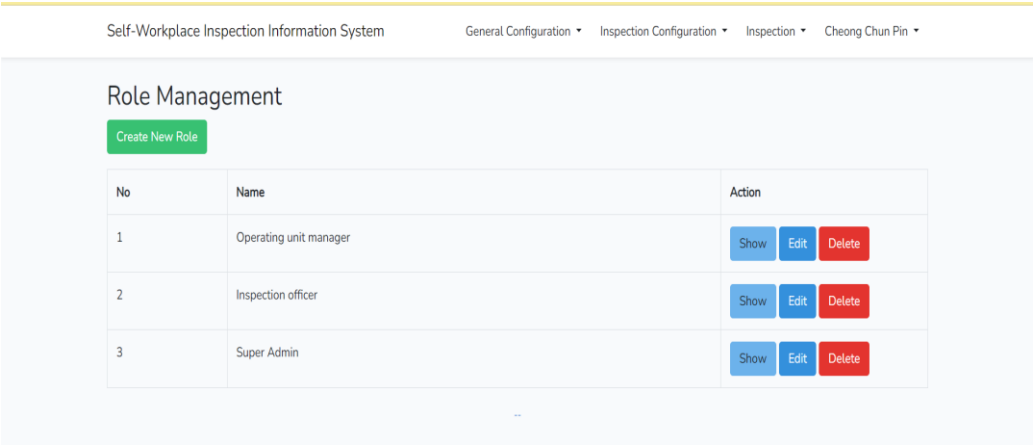


**Figure 9: Interface of work activity form page**

Inspection configuration has been shown in Figure 10 in which the user registered can be grouped into a group. This configuration will be useful when it is used for generating a checklist that needs to have an assigned group that contains the users. Inside the edit page, users can be assigned, and

it will be placed in the table below. The first person will be highlighted to be the indicator of a group leader in a group.

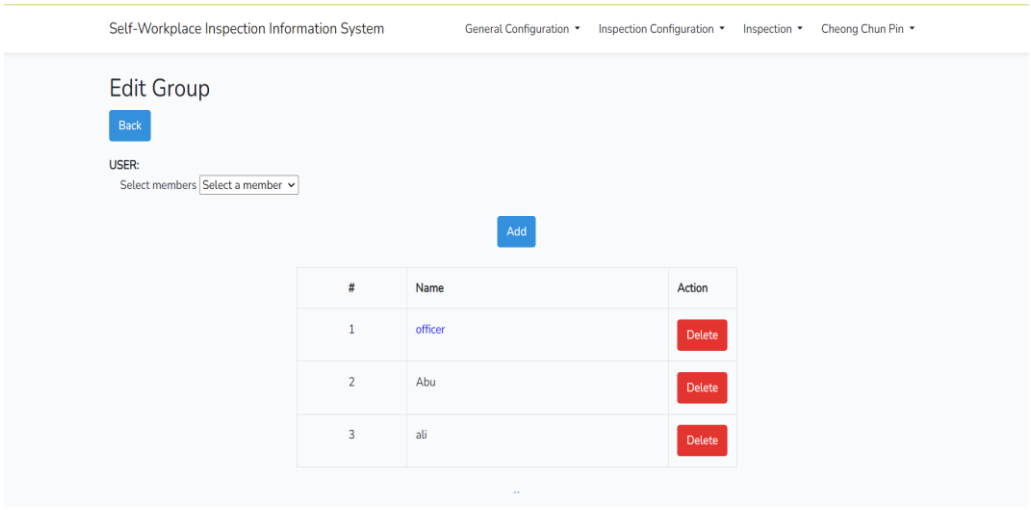


**Figure 10: Interface of adding a user in a group**

Figure 11 shows another inspection configuration for checklist items. There are at most three layers of the inspection checklist item. All the first layers are displayed on this page, the children of the aspects are found when the user has clicked the "subcategory" page. All the aspects can be edited. There will be a search for users to find the specific aspects on this page.

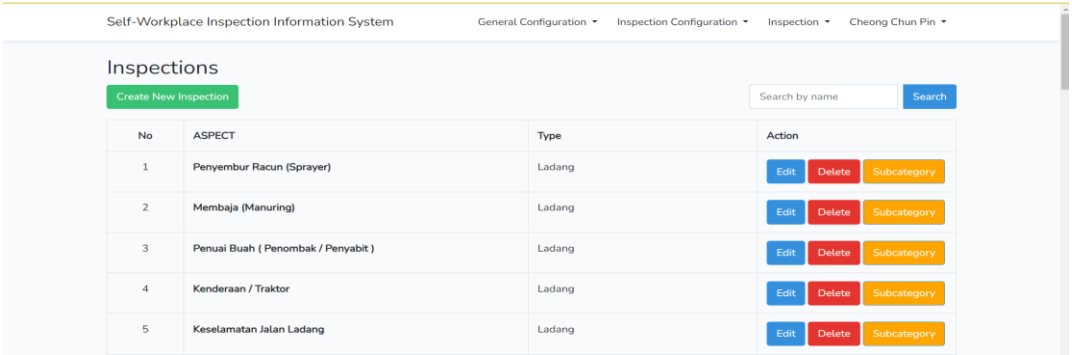


**Figure 11: Interface of the inspection checklist item**

Figure 12 shows the page to generate the checklist, this is the final layer on generating a checklist form.

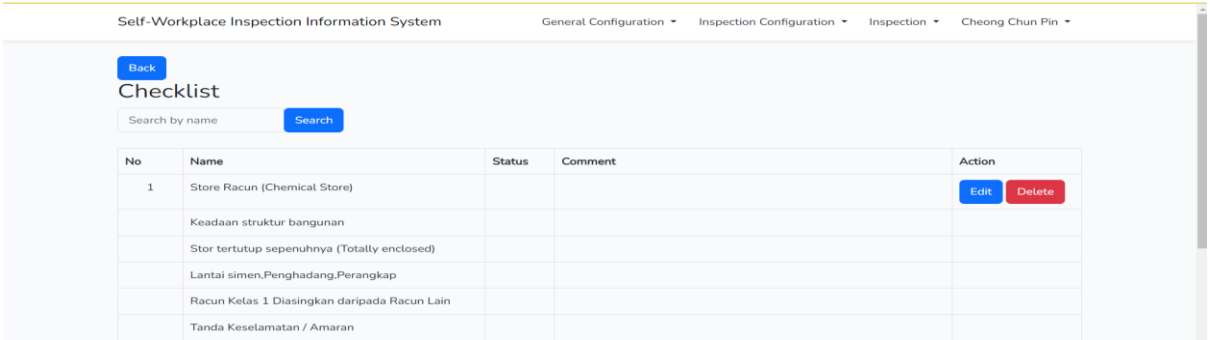


**Figure 12: Interface of generated checklist**

## 6. Conclusion

In conclusion, the system was developed to help improve the business process of the operating unit in recording and managing the data of inspections. Besides that, by having this system, they can carry out a comprehensive report using the web-based approach, and the report can abide by the Regulations of the Safety and Health Committee. Improvement features on the system such as mobile-based applications and QR codes for logging in before inspections before the inspections, are also considered in the continuation of the system.

## Acknowledgment

First of all, I would like to thank my supervisor for guiding me throughout this whole project, I feel blessed to have had such opportunities to get the project from the company MZR Global Sdn Bhd and Sawit Kinabalu Sdn Bhd, which really helps me to grow to learn the programming language better than before. My final year project supervisor, PROF. MADYA DR. SHAHREEN BINTI KASIM really pushes me to face unfamiliar challenges ever in my life, I really appreciate this project for letting me grow to become a more time management person and eager to learn something new.

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