

E-Waste Management System for Collection Centre (Pusat Kitar Semula Presint 9 Putrajaya)

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Abstract: The increasing use of electronic devices worldwide has led to a rapid increase in the manufacturing of electronic equipment, which has in turn led to a growing amount of E-Waste that needs to be managed or disposed of properly. Incorrect disposal methods can have negative effects on human health and the environment. One of the recommended methods for E-Waste disposal is through collection centers, but lack of time and transportation can interrupt the process, and the management of the collection centers can be inefficient. To address these challenges, the E-Waste Collection Center Management System was developed to provide a platform for users to request pickup services for their E-Waste and for the collection center to manage pickups efficiently based on the information received. This system is an important step towards responsible management of E-Waste for sustainable development.

Keywords: E-waste; Online management system.



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1. INTRODUCTION

Usage of electronic devices by people around the world in their world in their daily life causes the manufacturing of electronic is rapidly increases. The increasing of EEE caused the E-Waste is growing and each one of E-Waste need to be managed or disposed properly. In addition, wrong way of disposal can lead to bad effect to the human health and causing to the deterioration of environmental quality. The right mechanism discard E-Waste is to send it directly to the collection centre or call the nearby collection centre that offered pickup service from home to the collection centre. However, lack of time and transportation by the user make the process interrupted. At the same time, the management of the collection centre having difficulty to manage the expect vehicle that suitable with the quantity of item that they need to pick up at the residents. Therefore, based on the objectives of the project, a website system that provides an online platform for users to apply for E-Waste collection services at any time is developed. In addition, a database was built to store information related to E-Waste. Next, the third objective is to develop an organized and effective E-Waste management system to negate the above problems.

2. METHOD & MATERIAL

Prototype model is being used as methodology to developed this system. This type of model consists four phases such as planning, system analysis, designing and implementation. This model was chosen because it allows the user to evaluate the system and provide suggestions for improvements or some insights for the system design. Next, suggestions and comments for system improvement will be collected and used to repair or modify the system based on information received from users.

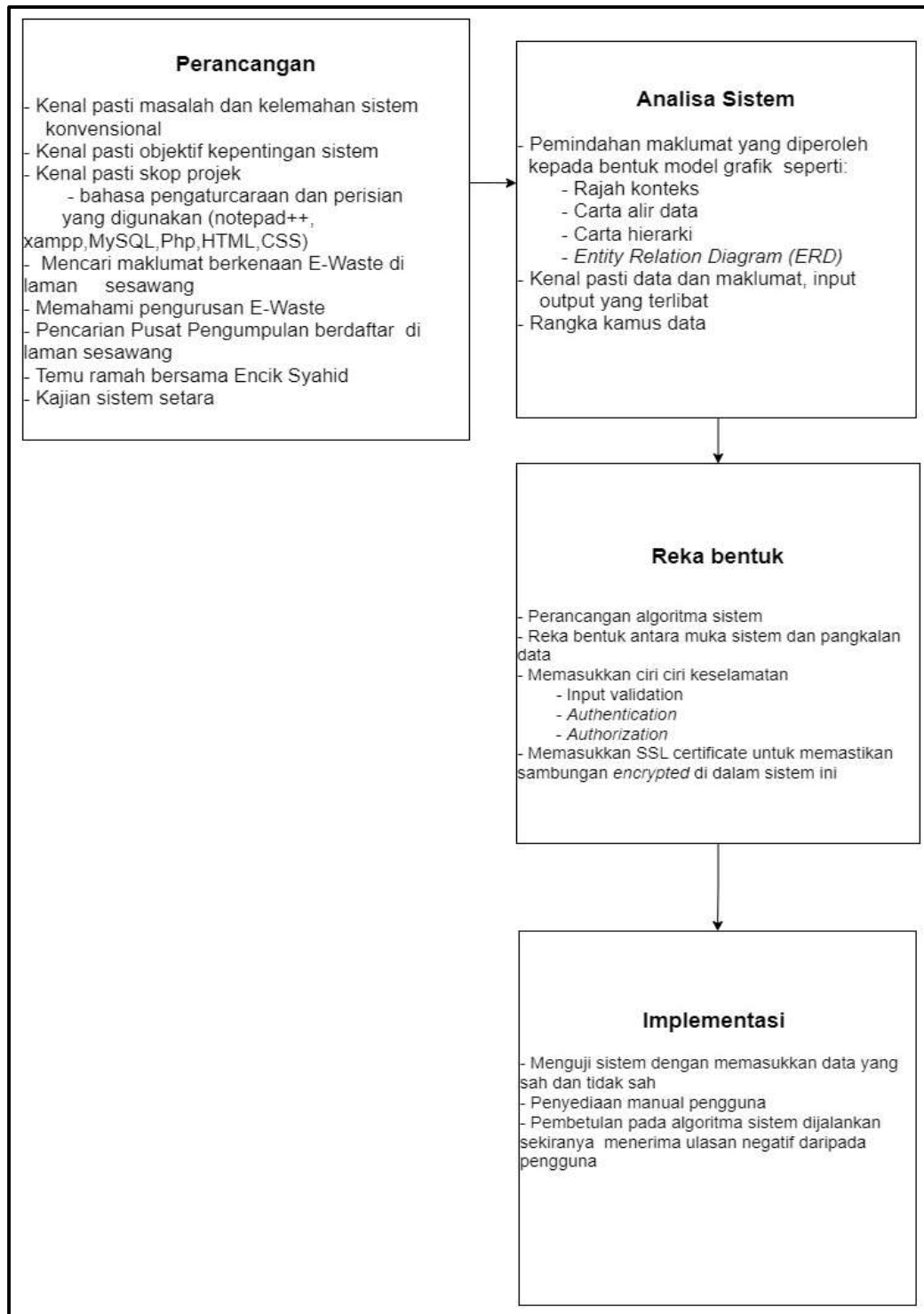


Figure 1. Model Prototype for E-Waste Management System

There are three types of materials that involved throughout the development of the project. The materials are important to make sure that the project achieves the objectives that have been mentioned above. The materials are:

i. Users

There are three types of users that involves in this project which are user(residents of Presint 9), driver and administrators. User can view the information and status of their pickup application. Driver(staff that in charge in pickup service) can view information of the application and update the status of pickup. While administrators can view, edit, delete the information of application by user and driver. In addition, administrators also can update and view the status of application and pickup.

ii. Software and Programming Language

There are few tools that have been used to developed this system.

- Xampp – webserver
- Microsoft Edge- Platform to access the system, displays the system and view database
- MySQL- Database of system
- Sublime – Used to write the code of HTML,CSS,SQL,PHP and Javascript.

3. FINDINGS

In this project, we aimed to develop the usability of an interface for E-Waste Management System that includes a pickup service for E-Waste in resident area Presint 9 Putrajaya. As the electronic waste continues to be growing environmental concern, there is a need for effective systems to manage and dispose of this waste in right mechanism. To address this, need a web-based system was developed that allows the user to schedule pickup appointment for their E-Waste items and evaluated the system's effectiveness in managing the process of pickup services. In this section, interface of the system will be show below.

3.1 Interface of System

Figure 2 shows the main page of this system. The system will display this interface at the time they browse this system. At the top of the system interface there are three options to log into the systems either user, admin or driver.



Figure 2. The main page of the system

Figure 3 shows the login page for user. Users that already have an account need to fill in their email and password and click the login button. If the information that is entered by the user is invalid, then an error message will be displayed and the user must re-enter the information required to access the system

Figure 3. Log in page for registered user

Figure 4 and Figure 5 show the login page for admin and driver. There are two information that admin and driver needs to fill in to access the system (username and password) and click the login button. If the user enters invalid information, an error message will be displayed.

Figure 4. Log in page for driver

Figure 5. Log in page for admin

Based on Figure 6, users need to enter information for account registration, namely phone number, name, email and password. If the user does not fill in all the information, an error message will be displayed and the user must fill in all the information. Meanwhile, when the system finds that the password and the repeat password do not match, an error message will be displayed and the user must enter the correct password to match and register the account. Then a message will be displayed if the user enters valid information to the system.

Figure 6. Sign up page for user

Figure 7 shows the home page for users. Once the user logs into the system, this page will be displayed. There are several pages that users can view, among which are the main page, the page to request a collection service, Application History, User Profile, Settings and Log Out.



Figure 7. Homepage for User

Figure 8 shows the E-Waste collection service application page. Users need to fill in the information as shown in the figure below. Then, click submit to save in the database and wait for the approval from admin.

Figure 8. E-Waste Collection Application page

Figure 9 shows the user's application history page. The system displays a list of applications that have been made by the user. The function of the blue button 'butiran' is used to display the full details of the application filled in by the user.



#	No Permohonan	Tarikh pengutipan	Masa	status	Tindakan
1	334765961	2023-02-18	09:07:00	Accepted	View
2	655597333	2023-02-18	18:20:00	Rejected	View

Figure 9. List of user's application page

Figure 10 shows the full information display of the application. This view will be shown when the user clicks the details button. This page shows full application information and details.



Maklumat Lengkap Permohonan	
No permohonan	334765961
Nama	mal ummah
Kuota	percuti 11 Pulaujaya
Email	mal98@gmail.com
No. telefon	019887141
Tarikh Pengutipan	2023-02-02
Masa	09:08:00
Photo	
Status	

Figure 10. Full view of application's information

Based on the diagram in Figure 11, the page will display the latest information related to collection applications. Admin can see the latest application status on the dashboard.



Figure 11. Main page (Dashboard) admin

Figure 12 shows a list of applications for E-Waste collection. There is some information displayed which is the application number, name, date, time, phone number and status. If the admin wants to confirm the application, the admin needs to click view to display the complete information of the application.



Figure 12. List of all new application

Figure 13 displays the complete information of new application when the admin clicks the details button. Admin needs to update the status of the application (accepted or rejected) and select the driver on duty for E-Waste collection.

The screenshot shows the 'View application' page in the EWSYS Admin Portal. The page has a header with the EWSYS logo and a user profile. The main content area contains a form with several fields. The 'Catatan' field is empty. The 'Pemeriksaan Berjalan' field is empty. The 'Status' field is a dropdown menu that is currently open, showing four options: 'diisi', 'dikur', 'di', and 'dikur'. A 'Submit' button is located at the bottom of the form.

Figure 13. View application page

Figure 14 displays the main page (Dashboard) for the driver. Drivers are displayed with three types of applications, which are tasks that have been given by the admin (assign application), collection in progress (in progress application) and collection applications that have been completed.

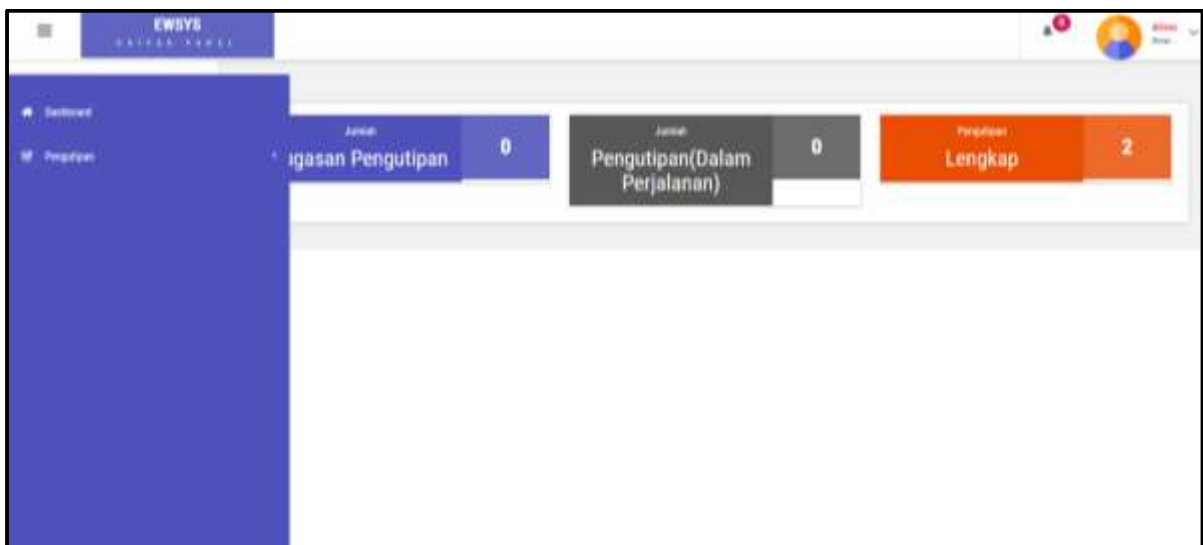


Figure 14. Dashboard for driver that collect the E-Waste item

Figure 15 shows the collection list page. There are three types of pages in the sidebar which are collection tasks, collection in progress and complete collection

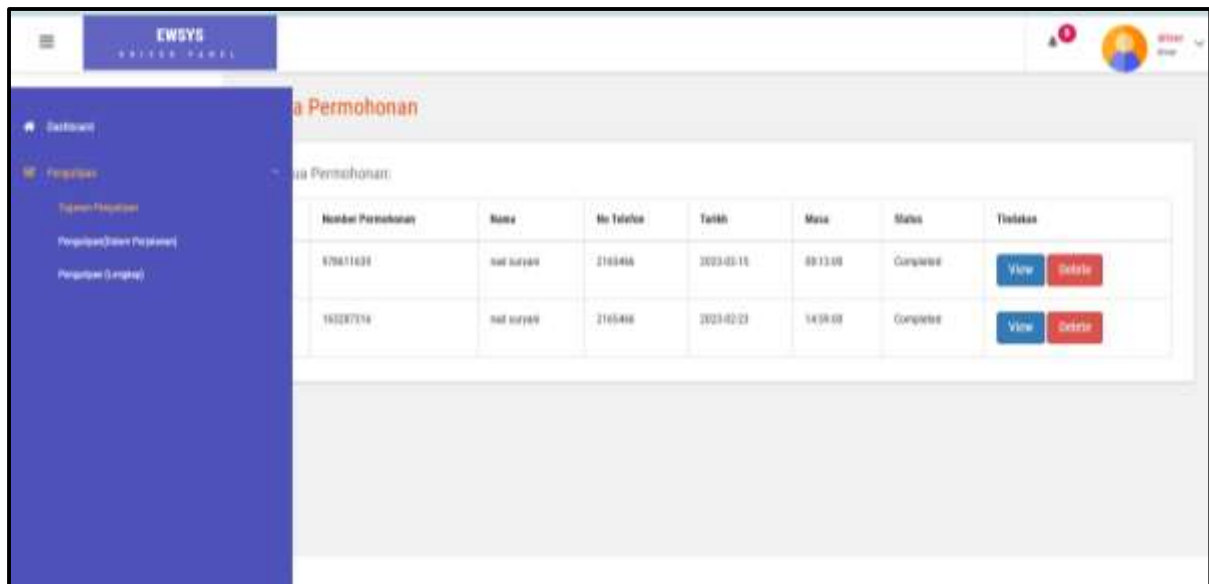


Figure 15. Assign application page

Figure 16 shows the page that will be displayed after the driver presses the view button. The driver will update the collection status either in progress or complete.

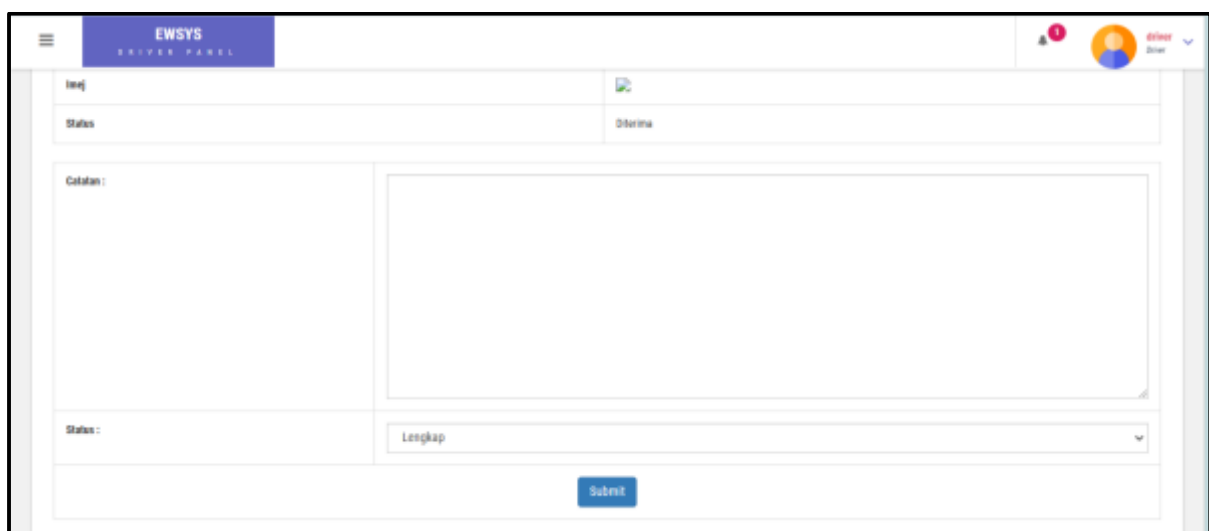


Figure 16. View Application page

3.2 Algorithm of the system

Algorithm is created to described the process in the system. Figure 17, Figure 18, and Figure 19 display the algorithm design for this system

Proses 1: User Registration

Input: User information (name, username, email, phone number, and password)

If user information is complete

Display successful registration message

Else

Display error message

Repeat Process 1.

Figure 17. Algorithm design for signup process

Process 2: Login

Input: Id (Email) and password.

If Id (Email) and password are valid

Display account verification message

Display main page interface (dashboard)

Else

Display error message

Repeat Process 2.

Figure 18. Algorithm design for Log In process

Process 3: Pickup Request

Input: Request information (address, phone number, date and time of pickup, type of E-Waste, image)

If Request information is complete

Display valid status message and save the request

Else

Display error message

Repeat Process 3.

Figure 19. Algorithm design pickup service application process

4. DISCUSSION

The E-Waste management system's development goals are focused on proving an online platform for the user to use the E-Waste pickup service at Collection Centre at Presint 9 Putrajaya, with advantages that are tailored to specific need and challenges. Some of the benefits of this system include:

- i) The system enables the admin to add and manage the information about drivers through the admin panel webpage.
- ii) The system stores password in hashed format (md5)
- iii) The system allows users to view all of the application forms that they have filled and check the updated status of their application and pickups
- iv) The assigned drivers can update the pickup status as (in progress or completed)
- v) The admin can view the current status of application (accepted, rejected, in progress and completed) through the dashboard panel

However, this system has some weakness although the system can run well. The weakness that has been found can be improved to make sure that the system follows current technologies. There are several weaknesses that occurred in this system:

- i) The system does not generate any notification through email or number phone
- ii) Admin and assigned driver only receive notification when they log in into the system
- iii) Features such as password reset for users are not included in the system
- iv) Drivers are not provided with a map to the location specified by the user.

5. CONCLUSION

In general, the E-Waste Collection Centre Management System (Presint 9, Putrajaya) is designed to facilitate users in requesting E-Waste pickup services. Additionally, it aims to enable the admin or staff to manage pickups based on the information received from the users. Overall, it can be concluded that the system has achieved its objectives and development targets. It is hoped that system improvements can be made in the future.

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