Web-Based E-Location of A Palm Oil Processing Factory in Dharmasraya Regency

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ABSTRACT

Given the significance of oil palm plantations in contributing to the economy of Dharmasraya Regency, especially for industry players seeking suitable palm oil processing facilities, there is a need for detailed and easily accessible information. One approach to providing quick and convenient access to the locations of palm oil processing plants is through E-Location technology. E-Location is an electronic information system that displays a distribution map of palm oil processing plants in Dharmasraya Regency. This study aims to create a web-based E-Location information system using the CodeIgniter framework and Open Street Map (OSM) mapping software, facilitating easy access to information on the locations of Palm Oil Processing (POP) in Dharmasraya Regency. This system will enable users to view the distribution of POP locations and access a range of related information. The research results on the Design of a Web-Based Palm Oil Processing Plant E-Location Information System in Dharmasraya Regency show that this system is effective for viewing the distribution map and detailed information about palm oil processing plants in the region. Available information includes company profiles, maximum processing capacity for Fresh Fruit Bunches (FFB), number of employees, incoming palm oil volume, oil yield, kernel yield, and average annual oil yield.

1. INTRODUCTION

Development is series directed action in a way planned and sustainable for create supportive conditions various option going to a better life good. In Indonesia, the majority its population living in rural areas and dependent on the agricultural sector agriculture, development must give attention special to improvement welfare farmers. With more of the 60% of Indonesian population looking for livelihood in the sector agriculture, success sector This becomes very important. One of the sector strategic agriculture in development national is plantation coconut palm oil. coconut plantation palm oil play a role important in increase prosperity, state income, creation field work, improvement mark add, fulfillment need domestic, provision material standard industry, and maintain sustainability management source Power nature, according to with Law Number 39 of 2014. In West Sumatra Province, including Dharmasraya Regency, plantation coconut oil palm, especially those managed by farmers, has experience development significant. In 2012, the area plantation coconut palm oil in the Dharmasraya Regency reached 30,296 hectares, and in 2018, the area increase to 32,263 hectares (Putra et al., 2022) .

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Palm oil is one of commodity mainstay results plantations in Indonesia. Besides that, coconut palm oil play a role to improvement balance sheet trade, lower inflation, reduce shopping government, and improve *real capital return* (“BPDPKS Annual Report 2019,” 2020). Indonesia and Malaysia are manufacturer oil palm oil the largest in the world. The USDA projects Indonesia's CPO production can reached 45.5 million metric tons (MT) in the period 2022/2023 (“Badan Pusat Statistik Kabupaten Dharmasraya,” 2024). In addition opportunity increasing exports open , oil market coconut palm and palm kernel oil Still Enough big. The potential market that will absorb marketing Crude Palm Oil and Coconut Kernel Oil palm oil is industry fractionation (especially industry cooking oil) (Saragih et al., 2022). Dharmasraya Regency, which is located in West Sumatra Province, is one of the area with wide plantation coconut significant palm oil and a number of Palm Oil Mill (POP). POP plays a role as center processing of Fresh Fruit Bunches (FFB) into oil coconut palm oil, one of the product export Indonesia's main (Muslih and Iswarini, 2022). Although Thus, POP management is faced with a number of challenges, with limitations access information about POP location in Regency Dharmasraya be one of attention. Regency This has 7 POP holding vital role in industry coconut palm oil in the Regency area Dharmasraya. Therefore that, the importance accurate and up-to-date information about location as well as condition PKS operations become factor key in effort management and development sector coconut palm oil in the Dharmasraya Regency.

Recognizing the significant contribution of oil palm plantations to the economy of Dharmasraya Regency, it is essential to support this sector with detailed, easily understandable, and accessible information. One of the effort for give access easy and fast related location factory processing coconut palm oil is with use E-Location technology. E-Location is system information electronics used for display information about location as well as amount asset along with mark be under his jurisdiction (ANISYA and Wira Trise Putra, 2022) .

E-Location system allows monitoring location and status of various equipment and facilities in real-time (Capah and Herdi, 2021), which can used For increase efficiency operational, security, and management chain supply (Purba, 2021). In context this, design Web-Based E-Location System for Palm Oil Processing Factories the Regency Dharmasraya become very relevant and important. The system This aiming for give innovative space for actors in industry and related agencies as well as make it easier access for society, and actors industry in look for factory processing coconut suitable palm oil with need they.

Research (Warman et al., 2023) entitled " E-Location Cafe in Payakumbuh ". This web-based E-location application for cafes in Payakumbuh City is an application for displaying the location point and detailed information about a cafe, distribution cafe and detailed information about cafe in the city Payakumbuh. Existing information like name cafe, category cafe, address cafe, number phone, name instagram cafe, number tables provided by the cafe as well as amount the table is still empty and so on. So, visitors who want to visit the cafe do not have difficulty in finding the location of the cafe, and do not need to go directly to the cafe to find out prices, menus and other information related to the cafe. The process of creating this application uses the PHP Native programming language database by utilizing the MySQL database and OpenStreetMap as the map display platform. With the way OSM works, using leaflet js library call with make an access token request on the MapBox web and enter point area coordinates on Center View and map will automatic displayed (Grinberger et al., 2022) .

Research by Syahreza in 2023 reveal that the information system developed is a geographic information system for searching elementary school locations based on accreditation. Views on geographic search location Elementary School based on accreditation own information about address and description from every location Elementary School based on accreditation. The method used in do calculation is method Haversine Formula (Syahreza and Soeheri, 2023). The design of this geographic information system uses Programming language PHP with MySQL database. And its can be done using various software such as Mbtiles or MapTile. Modeling design use Unified Modeling Language (UML) (Lauw and Adil, 2022) . This system helps public in look for information and location school base based on accreditation in Medan city

Based on a number of literature that has been presented , research This will focus to make it easier monitoring , planning and management factory coconut palm oil , at a time increase efficiency and transparency information related year POP stands , amount employees , area owned plantations , average amount of kernel yield per month , average number of fresh fruit bunches (FFB) per month , CPO per month , capacity processing each factory , as well as Displays information on CPO income in the Dharmasraya Regency area's industry from January to December 2022.

2. METHOD

This study aims to designed special give access easy to information about location Factory Palm Oil Processing in the Regency Dharmasraya. System This will built website based use can accessed by whom only / related parties as well as facilitate user For see distribution POP location and get various information related. For that , the author use System Development Life Cycle (SDLC) method. The software development life cycle is a framework for analyzing, designing, developing, testing, and deploying software (Hossain, 2023). Description the method used in article This explained in the description following .

Figure 1System Development Life Cycle (Permana, 2023)

2.1 Problem and Needs Analysist

Based on discussion with service various party related, including party industry, government area like service agriculture Dharmasraya Regency field plantation, community local and stakeholders interest others. Obtained problem in the form of a comprehensive overview about location geographical each POP, as well as provide related detailed information Characteristics and operations of POP in the Regency Dharmasraya. With Thus, the system that will built expected can make it easier monitoring, planning and management factory coconut palm oil, at the same time increase efficiency and transparency information related year POP stands, number employees, area owned plantations, average amount of kernel income per month, average amount of fresh fruit bunches (FFB) per month, CPO per month, capacity processing of each factory.

2.2 Design

ERD (Entity Relationship Diagram) is a diagram used For describe rules business that exists in a system that will built (Andriati, 2023). Components main from ERD in the form of Entity, collection from object between one object with other objects can differentiated. Relationship, the relationship that happen between One entity or more. Attributes, collections data elements that form a entity that provides detailed explanation in entity. Degree Relations and Cardinality, number participating entities or related in one relation or another set.

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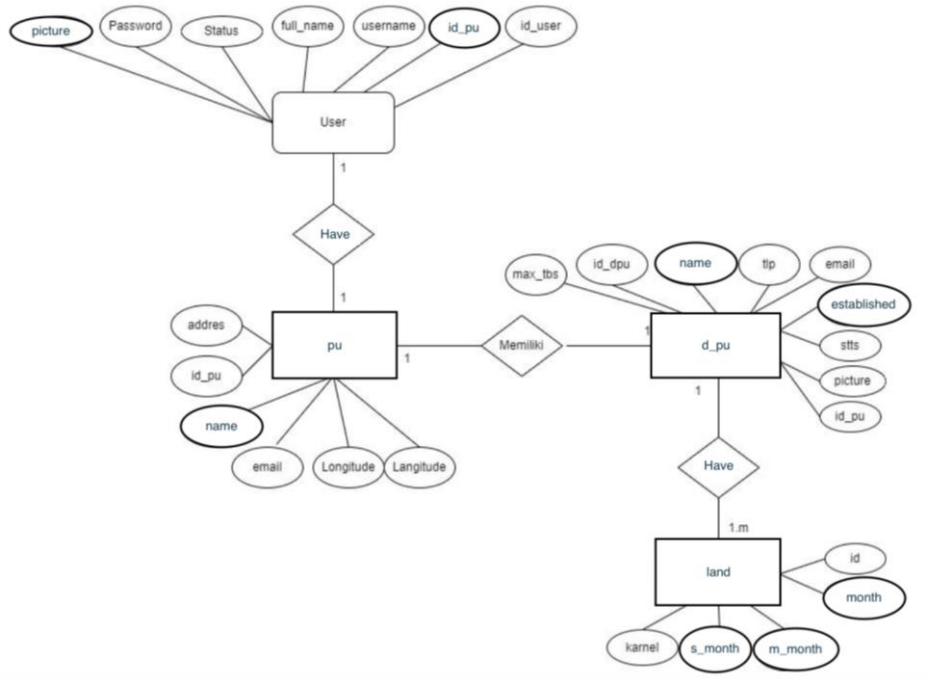

Figure 2. Entity Relationship Diagrams

Figure 2 shows the 3 tables used in the developing this e-location system. The user table is intended for holds permitted user data access system this. Table pu for store Company data from management coconut palm oil, while d_pu intended for accommodate Company details.

To view a general description related to the system created (Dinni and Sifaunajah, 2022) . In the context diagram the there are two entities involved that is Admin, Visitor and Factory Admin. shown in Figure 3.

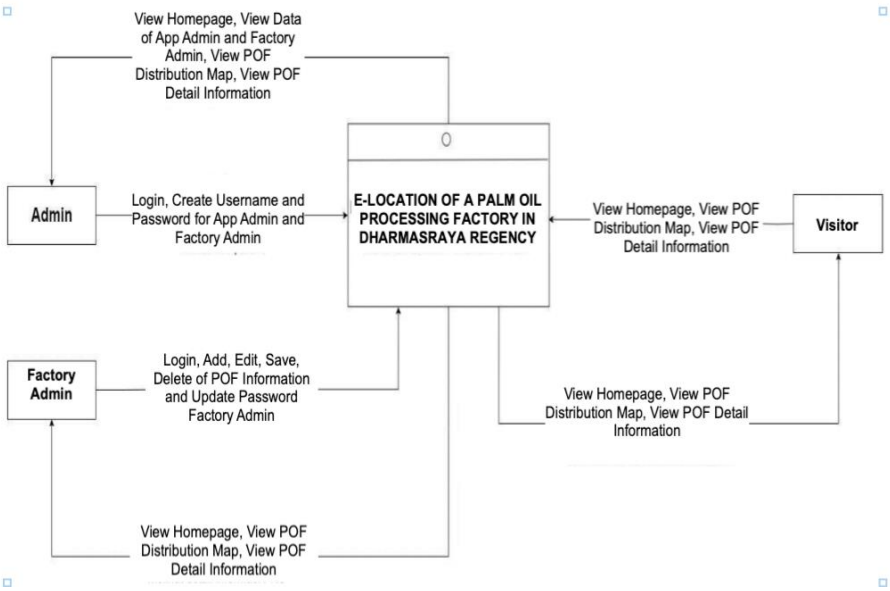

Figure 3Context Diagram

2.3 Development

After analyzing the database needs of the system or analyzing the solutions to existing problems, then proceed to the development stage of a web-based application built using the PHP CodeIgniter 3 framework and using php version 8.3 and using MySQL as its Database Management System. For the map, author uses OpenStreetMap (OSM) because OSM is open source and supports web-based programming.

3. RESULTS AND DISCUSSION

3.1 Development

Figure 3 shows the user level that will be accessing this system, the admin has authority for make accounts and manage access for application Admin and Factory Admin. Factory Admin can log in to the system to add, change, save, or delete POP information, as well as change their password. Meanwhile, visitor can access dashboard application, view map POP distribution, and view POP. information details without need to login.

First page from this system is main menu page. On the main menu display there are several menus that contain information from the system created, which can later be accessed by visitors and admins. Some of the menus include that is page main, Distribution Map factory processing Coconut Palm Oil (CPO), about and login.

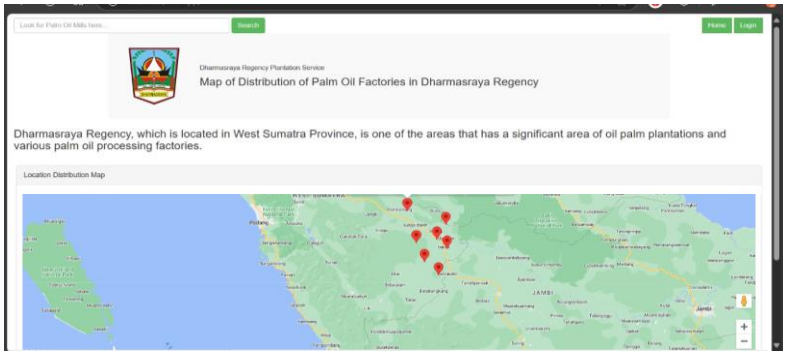

Figure 4Main Page View

The detailed information page in this figure 5 display information about the details of the Coconut Company palm oil. This page displayed by user visitor level / without right access. The data displayed here inputted previously by Factory Admin user level.

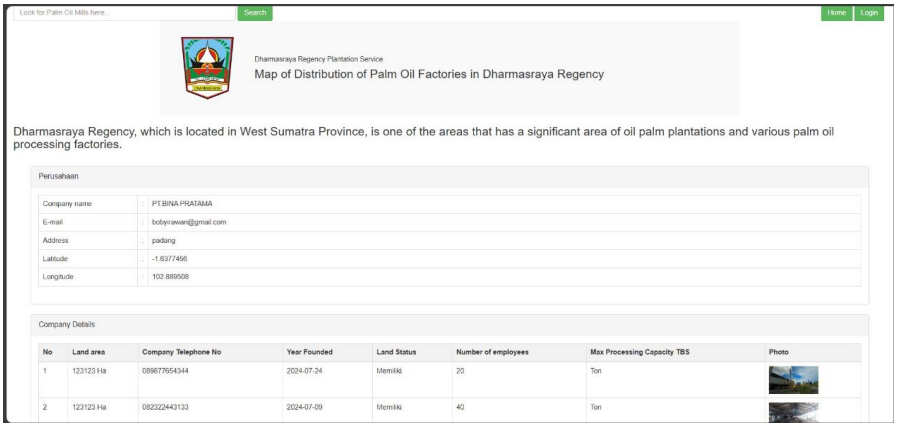

Figure 5View Detail Information Page View

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Factory Admin can add data because they have proper access to the system, the credentials they have are entered on the login page shown in figure 6. This login page is also used by Admin level users to enter to the system.

Figure 6Login Page

After logging in, Admin and Factory Admin will be redirected to the Home Page display of each user level, and the Admin can see all data and information on the palm oil processing factory that has been added by each palm oil processing Factory Admin and here the admin can also add and delete Factory Admin coconut processing palm oil, because the admin is a superuser .

Appearance The dashboard page from the Admin user level is place admin see data company Which Already in add And add company ,edit data admin And delete company as figure 7.

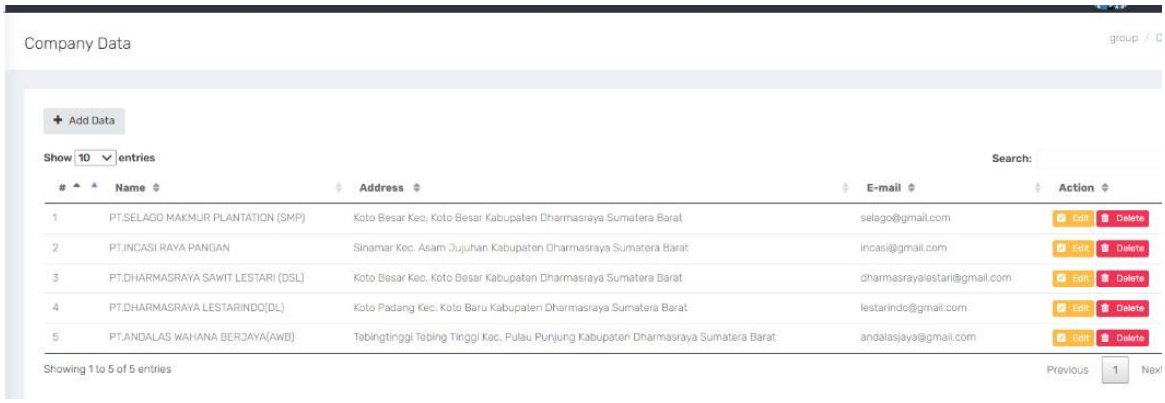

Figure 7Company Menu Page

The display in figure 7 is appearance all processing companies coconut palm oil in Dharmasraya. As explained previously, Admin is the superuser of this system, so Admin can see all data inputted by Factory Admin. Factory Admin can only input data of the Company where he/she is based, in the form of company name, Address, email and location point of the factory as shown in Figure 8.

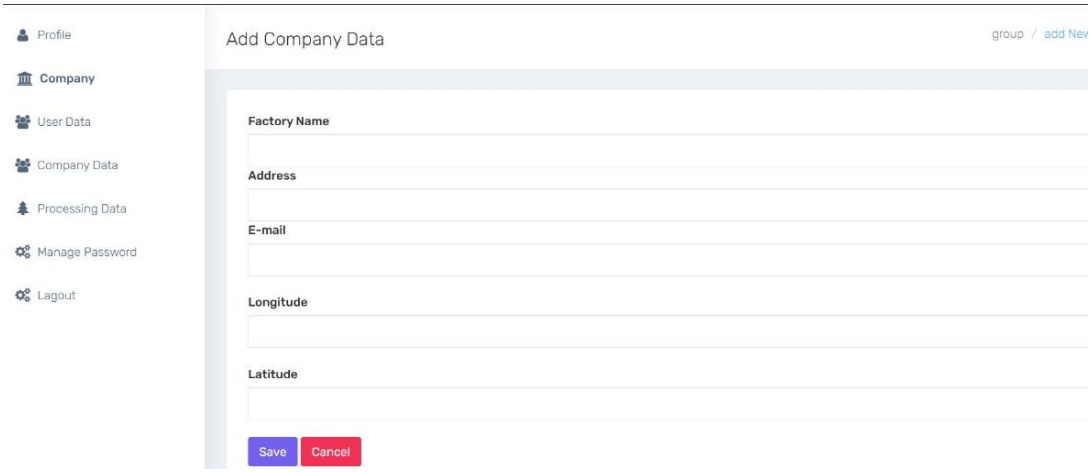

Figure 8Add Company Data Page

Factory Admin can also input palm oil processing data in the palm oil factory that he manages. In the form of months, years, and the amount of palm oil processed. The details of the display can be seen in the figure 9.

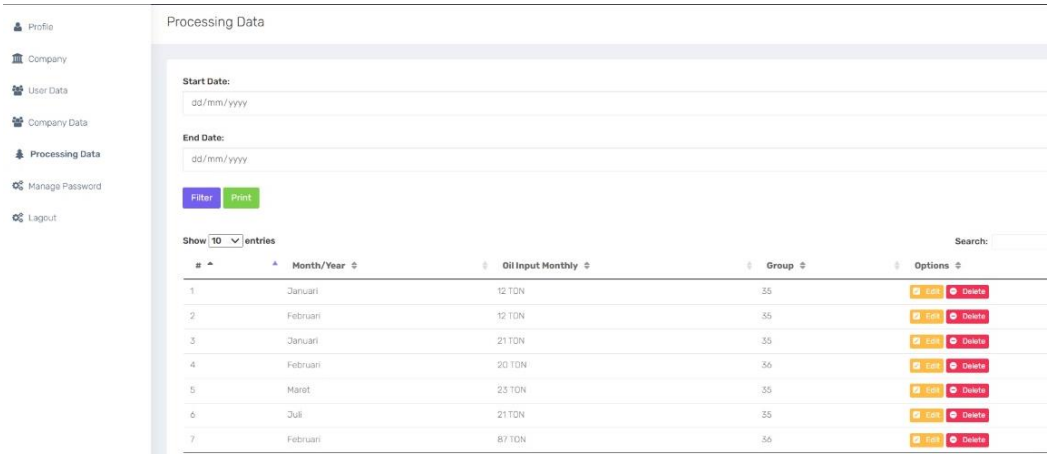

Figure 9Processing Data Page

3.2 Testing Black Box

In this test, the testing implementation process is carried out with the aim of finding errors in the user interface program design, as in the table below.

Table 1. Testing for Level User Admin

No.	Name	Scenario	Validity		Information
			Y	N	
1.	Login	Login system from form login userwhen e-mail and password Correct	Y		Succeed
2.	Notifications Login Email/ Password Wrong	Wrong email and correct password appear message No Can login And notification e-mail and password Wrong	Y		Succeed

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3.	Showing admin profile page	Admin can see admin profile page	Y	Succeed
4.	Showing add company page	Admin can add company	Y	Succeed
5.	Editing company data	Admin can edit company	Y	Succeed
6.	Showing add user data page	Admin can addition data user	Y	Succeed
7.	Editing data user	Admin can edit data user	Y	Succeed
8.	Showing company data page	Admin can add data company	Y	Succeed
9.	Showing processing data page	System display data processing	Y	Succeed
10.	Showing manage password	Admin can edit password	Y	Succeed

Table 2. Testing for Level User Visitor

No.	Name	Scenario	Validity		Information
			Y	N	
1.	Login	Login to system from login user page when username and password correct	Y		Succeed
2.	Showing user profile page	Menu profile come on stage when user login	Y		Succeed
3.	Showing company data page	System display page data company.	Y		Succeed
4.	Showing processing data page	System display data processing.	Y		Succeed
5.	Adding data processing	User can add data processing	Y		Succeed
6.	Editing data processing	Users can edit data processing	Y		Succeed
7.	Manage password	Users can edit password or image	Y		Succeed

4. CONCLUSION

As for the conclusion from research that has been done about Design of Factory E-location Information System Palm Oil Processing in the Regency Dharmasraya Web-Based, namely this System used For see map distribution factory processing coconut palm oil and detailed information

about factory processing coconut palm oil located in the Regency Dharmasraya. The information available like company name, address, number telephone company, company e-mail, year of establishment, land area, land status whether the company has core land or no, maximum capacity Fresh Fruit Bunches (FFB) processing, amount employees, palm oil per month, results oil per month, kernel yield per month, and average yield oil per year.

With the existing system running or the system being developed, it is recommended:

1. The company's location mapping website for the palm oil industry still lacks detail, resulting in less accurate location data. However, the system has been developed to use a pre-paid Google Maps application, which provides highly accurate location points.
2. A weakness of this system is that coconut palm oil companies in Dharmasraya Regency must currently register through an admin. For future improvements, the system could be developed to allow company administrators to register independently, making the system more efficient
3. The author also suggests that further studies could develop instructions to guide visitors by showing directions.

5. DECLARATION OF COMPETING INTEREST

We declare that we have no conflict of interest.

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