

PURE GREEN: MOBILE BASED RECYCLING WASTE PICKUP SERVICE

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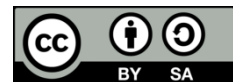
Mobile

Garbage

ABSTRACT

The increasing amount of indiscriminate waste disposal and the use of non-recyclable waste. Waste problems in Indonesia include the increasing amount of waste generated by the community, the lack of places for waste disposal. Waste management is still a very important issue. With so much waste, there can be many problems. This allows the accumulation of waste caused by delays in the waste pickup process. Therefore, a new design is needed to be a solution to the problem. This research is to design the UI/UX of a recyclable waste pick-up service application called Pure Green based on Mobile using the Unified Modeling Language (UML) as the basis for modeling. This research was conducted at TPS 3R which is located in Talunombo Village, Sapuran District, Wonosobo Regency. The methods we used in this research were observation, interviews and literature study. We also used the system development model. With this application design, it is expected that garbage pickup can be done more effectively and efficiently, so that the problem of garbage accumulation can be minimized and environmental cleanliness will be maintained. This research is the first step in developing technological solutions for better waste management.

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1. INTRODUCTION

Garbage is something that is inherent in humans. In their daily lives, humans meet and encounter garbage. This is because humans have activities and activities that produce garbage every day. The garbage comes from industrial and household activities, both organic and non-organic waste. Along with the increasing population growth in Indonesia and people's consumption patterns, the amount of waste from time to time has increased. In 2016, the amount of garbage in Indonesia reached 65,200,000 tons per year with a population of 261,115,456 people. The population projection of Indonesia shows a population that continues to grow and of course will increase the amount of garbage. In 2025, it is estimated that the total population of Indonesia will be 284,829,000 people or an increase of 23,731,544 from 2016. If it is assumed that the

amount of waste produced per year is the same, then the amount of waste that will increase is 5,928,386 tons (Central Statistics Agency, 2018).

It is also stated in the 2022 National Waste Management Information System (SIPSN) Data of the Ministry of Environment and Forestry (KLHK) that the results of input from 202 regencies/cities throughout Indonesia stated that the amount of national waste accumulation reached 21.1 million tons. Of the total national waste production, 65.71 percent (13.9 million tons) can be managed, while the remaining 34.29 percent (7.2 million tons) has not been managed properly. Collective awareness and community involvement in waste management is a form of social capital so that healthy and prosperous people can be achieved in the future, a healthy residential environment is needed. From the waste aspect, the word healthy will mean a condition that can be achieved if waste can be managed properly so that a clean residential environment is created.

Waste management in Indonesia, especially in Sapuran District, is one of them, with the increasing population which has an impact on the increasing amount of waste. Talunombo Village is one of the small villages in Sapuran District, Wonosobo Regency. It is about 7 kilometers from the capital of the district. With two hamlets, namely, Peniron and Krajan. Talunombo Village has a population of around 5000 people. The majority of the population works in the agricultural sector, only a small part is a trader. This small village turns out to have quite a lot of potential. From an economic aspect. Since 2008, the batik home industry has begun to be developed, which has now become an icon for the village. Not only that, Talunombo Village also has one of the advantages that stands out compared to other villages. Talunombo Village is one of the villages in Wonosobo Regency that has a machine for processing plastic waste into biodiesel. This machine can work for 12 hours to produce diesel oil.

Talunombo Village has a 3R TPS. The entire community piles up waste, which is then sorted by the village government. To be processed into biodiesel and organic fertilizer. With this, it would be very appropriate if the community is able to utilize the existing facilities properly. Given the problem of inadequate waste disposal sites so that they pile up and are scattered due to a lack of awareness in the community environment and a lack of TPA with an inappropriate system. Waste management includes sorting, waste collection, transportation, processing and final disposal (Vigintan, Rahayu and Hardiana, 2019).

TPS is a place to process and return waste to the environmental media safely for humans and the environment. In TPS 3R there is Reduce (Reduction) which is an effort to minimize the amount of waste produced. Then there is Reuse (Reuse) which emphasizes the reuse of materials or products that are still suitable for use. And Recycle (Recycling) which is the process of converting waste into raw materials to make new products. One of them is making biosolar oil and making organic fertilizer. So from the concept above, several studies have been conducted to reuse waste that has been dumped into the environment.

In the midst of increasingly sophisticated technology, people already understand technology, so they can use technology as a medium of daily communication. With this, we propose Pure Green (a mobile-based waste collection service application) that can be accessed anywhere via smartphone. Judging from the waste problem in Wonosobo Regency, especially in Sapuran District, we created a similar application by adding product updates to several features to develop the application, such as adding educational features. Education here is in the form of tips

for sorting, benefits, and detailed information about recycled waste. We will also add a feature that provides results from each sale/exchange of recycled waste in the form of a cash balance and will be given a reward, if points or small incentives are collected, they can be exchanged for vouchers such as credit/data vouchers.

In the final phase, Pure Green is present as a solution to facilitate users in managing waste better through mobile technology, according to its name to increase awareness in maintaining the green environment of the importance of recycling and waste reduction to reach Wonosobo ASRI. This recycling waste management pattern will be handed over to the nearest collector or waste bank that has collaborated, the recycled waste will later produce something useful.

2. METHOD

Research is a systematic process carried out to gain an in-depth understanding of a topic or phenomenon. In conducting research, data collection is an important step in obtaining the necessary information. Appropriate data collection techniques and valid research instruments play a very important role in producing accurate and reliable data (Ardiansyah, Risnita and Jailani, 2023). In creating a mobile-based recycling waste collection service application, we use the following research methods:

1.1. Data collection technique

A. Observation

The author conducted direct observations at TPS 3R Talunombo Village, Sapuran.

B. Interview

In designing this application, we also conducted direct interviews with residents and the Talunombo village government regarding waste processing.

C. Literature review

The literature study conducted was by collecting data related to the creation of the application, the author also collected data related to current Android information systems and technology through books and the internet.

1.2. System Development Model

The system development model that we use in writing this article is:

A. System Development Methods

The system development method we use is the waterfall method. The Waterfall method is something that describes a systematic and sequential approach (step by step) in software development (Novitasari, 2018). The stages of the method that we have applied are planning, analysis, and design.

B. System Requirements Analysis

According to research from IBM, software development is a term in computer science. It means a series of activities carried out to design, create, apply, and support or improve the function of software.

In the system development model, the author carries out several stages in analyzing software needs, the author also plans the use of appropriate software that can support the creation of an Android-based waste bank information system.

C. Design

In developing this system, the author used Figma software to design the appearance of this application.

3. RESULTS AND DISCUSSION

3.1. Software Requirements Analysis

A. Analysis Stages

Pure Green Mobile-Based Recycling Waste Pickup Service, has 3 pages including pages for officers as Collectors, Drivers, and the Community. The following are the specifications of the needs of Pure Green Mobile-Based Recycling Waste Pickup Service:

Collector Page

- A.1 Collectors Can Login
- A.2 Collectors Can Edit User Data
- A.3 Collectors Can Edit Waste Types
- A.4 Collectors Can Print Transaction History
- A.5 Collectors Can Create User History Reports

Driver Page

- A.1 Drivers Can Register
- A.2 Drivers Can Login
- A.3 Driver Can Confirm Garbage Pickup Service Order

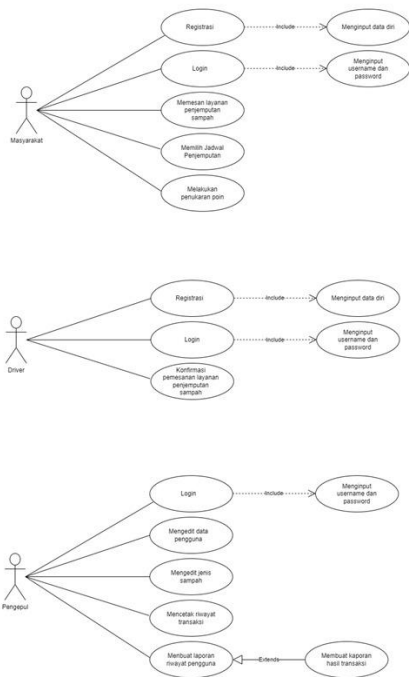
Community Page

- A.1 The Public Can Register
- A.2 The Public Can Login
- A.3 The Public Can Order Garbage Pickup Services
- A.4 The public can choose a pick-up schedule
- A.5 The Public Can Exchange Points

B. Use Case Diagram

1. Use Case Diagram of Collector, Driver and Community Pages

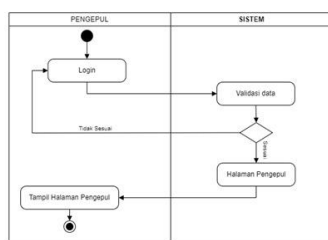
This research was conducted at TPS 3R Talunombo Village, Sapuran. The first modeling in system development is workshop design, where at this stage analyzes functional and non-functional needs that will be modeled logically and physically. The image below is a Use Case which is a logical system interaction modeling that describes the actors involved in the system.



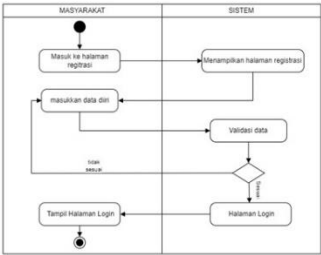
C. Activity Diagram

The second modeling of Activity Diagram where at this stage is the design stage of logical system process modeling. Process modeling starts from the community registering on the system, the community logging into the system, the community depositing recyclable waste by selecting the type of specification available on the system, the community waiting for the waste collection schedule, until the community receives money from the collector.

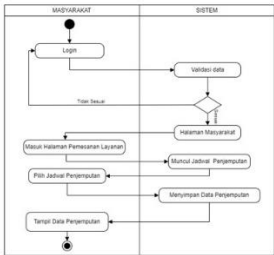
1. Activity Diagram of Login System Collector



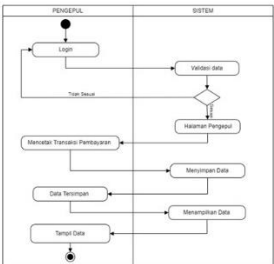
2. Activity Diagram of Registration Community



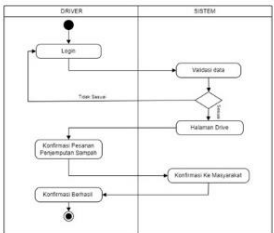
3. Activity Diagram of the Community Ordering Garbage Pickup Services



4. Activity Diagram Managing Garbage Pickup Order Reports And Printing Transactions

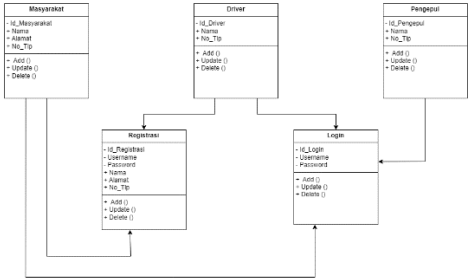


5. Activity Diagram Driver Informs Garbage Pickup Service Order



D. Class Diagram

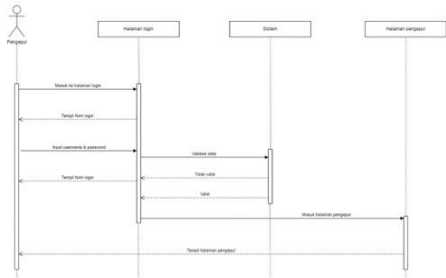
The third model is the Class Diagram, a logical data structure model which describes the relationship between data in the new system. Later, the data in the system will become the basis of a database.



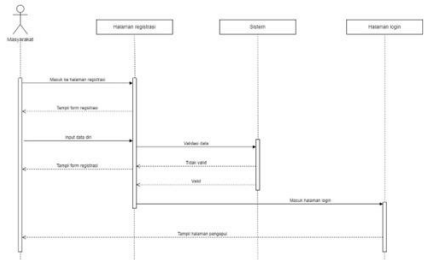
E. Sequence Diagram

The fourth modeling is the Sequence Diagram in which it describes the interaction of objects arranged in a time sequence. Where the sequence of events carried out by an actor in running the system associated with Use Case.

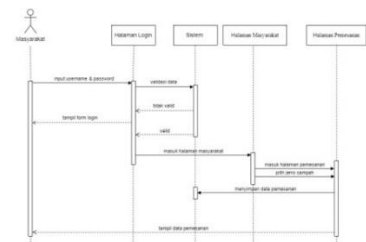
1. Collector Login System



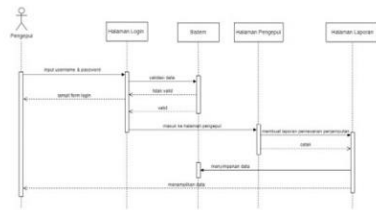
2. Registration Society



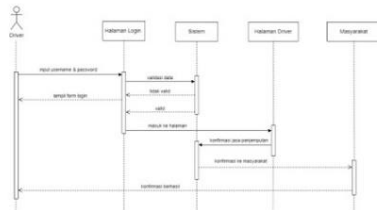
3. Community Makes Recycling Pickup Service Orders



4. Collectors Manage Recyclable Waste Pickup Reports

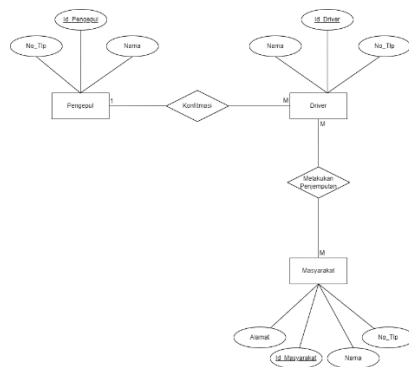


5. Driver Confirms Booking



F. ERD

The fifth modeling is described by ERD (Entity Relationship Diagram). In logical data modeling there are several entities in it such as society, collectors, and drivers.



3.2. User Interface

This application was developed by considering the city conditions in Wonosobo. In the long term, collectors can monitor the development of recycled waste. Where the application also regulates several costs that are obtained by the community when they sell recycled waste to collectors. In addition, this service will also facilitate the community in effective and efficient waste management. Below are some examples of features in the application that we have developed.

A. Collector

1. Home page, functions as the main page for collectors

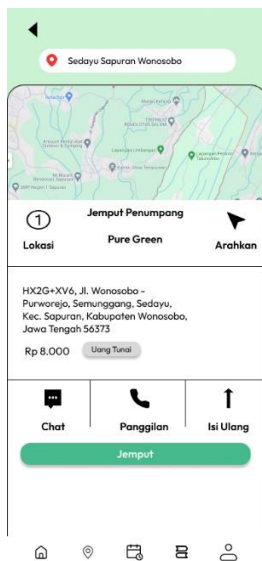


- 2. Community Data Page, functions as a page to view total community data and add to the community list, both for Talunombo village communities and outside Talunombo.

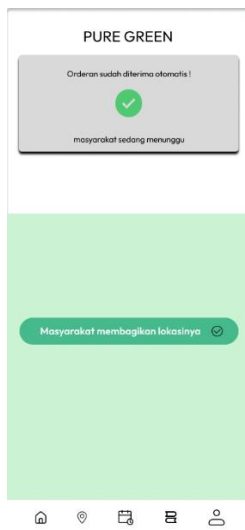


B. Driver

- 1. Home page, functions as the main page for drivers.



3. Receive Orders page, functions to receive incoming orders.



C. Public

1. Home page, functions as the main page for the community.



2. The Point Exchange page functions to exchange points that have been obtained by the public, both for exchanging cellphone credit and cash withdrawals.



4. CONCLUSION

This application can provide convenience to users in doing every service using the android application. This application provides convenience for the community in disposing of waste anywhere by using the android application on their smartphone. This application is made with a familiar interface so that users find it easier to use.

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potential. Through this opportunity, we can accelerate the various ideas and initiatives that we have planned, as well as reach more parties who will benefit from the results of our hard work. Once again, thank you for your trust and support, with this we can make the most of this grant and continue to provide the best results.

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