



Application Design for Identification of Car Garbage Prone Points for Pringsewu Regional Government Cleanliness Based on Mobile Web

Muhammad Muslihudin¹, Rizky Purnama², Uning Lestari³, Widiyanto¹, Mardiyanto¹

3492

¹Faculty of Technology and Computer Science, Institut Bakti Nusantara, Lampung, Indonesia

^{2,3}Department of Informatics Engineering, IST AKPRIND, Yogyakarta, Indonesia

Corresponding author e-mail: muslihudinstmikpsw@gmail.com

Abstract:

Pringsewu Regency is one of 15 regencies/cities in Lampung Province with an area of 625 km². In order to realize Pringsewu's vision and mission to be harmonious, clean and prosperous (SAHAJA). The government and the people work together to make Pringsewu Regency better, one of which is cleanliness. In an effort to achieve cleanliness and prevent diseases originating from waste, monitoring in waste handling is important and must be focused on. Cleaning trash bins, apart from being a shared responsibility of the community and local government, waste management is also the responsibility of the Environment Agency. Management and monitoring of waste handling is currently still manual with a weak monitoring system. For example, if the garbage has piled up in a temporary shelter, it is not immediately picked up because sometimes the car is picking up garbage at another location. There is no special information system for monitoring the Garbage Location. Therefore, through the design and manufacture of the Garbage Cloud R Point Monitoring Application with the combination of Web Mobile which is expected to be able to help display the Location a map of the Waste Hazard Points in Pringsewu Regency, so that the Garbage Officer and the Community know which locations must be cleaned first. Presentation of information in the form of an application that will make it easier for the community to monitor it. The system development methodology used in this research is the system development life cycle (SDLC) method. The map design displayed in the system uses the Google API, the software used in building this application is Android Studio with a combination of PHP (hypertext preprocessor) as a programming language.

Keywords: GIS, Hotspots, SDLC, Android Studio, PHP

DOI Number: 10.14704/NQ.2022.20.12.NQ77357

NeuroQuantology2022;20(12): 3492-3503

1. INTRODUCTION

Pringsewu Regency is one of 15 urban regencies in Lampung Province with an area of 625 km², Pringsewu Regency consists of 126 Pekon and 5 Kelurahan spread over 9 Subdistricts, has the motto *Jejama Secanaan* which means together hand in hand to build Pringsewu. Pringsewu Regency was formed based on law number 48 of 2008 which was inaugurated by the Minister of Home Affairs of the Republic of Indonesia Haji Mardianto on April 3, 2009. In order to realize Pringsewu's vision and mission to be competitive, harmonious and prosperous (BERSAHAJA). The Pringsewu Regency

Government together with the Pringsewu community continue to be enthusiastic about building a better Pringsewu Regency. This can be seen by the rapid development in Pringsewu Regency in various fields. One of them is in the field of Environmental Hygiene and trash cans. (pringsewukab.go.id, 2019).

In the field of cleanliness, Pringsewu Regency has locations trash cans that are cleaned every day by the Pringsewu Regency Garbage Officer. The locations of waste specifically for waste from the main market in Pringsewu Regency are the Main Market in Pringsewu District, the Main Market in Gading



District, the Main Market in Pagelaran District, the Main Market in North Pagelaran District, the Main Market in Banyumas District, the Main Market in Sukoharjo District, and the Pardasuka Main Market. Source: Pringsewu Regency Environmental Service in 2019.

The beginning of the introduction of GIS can not be separated from the progress in the field of technology, especially computers. During the second world war data processing experienced rapid progress, especially to meet the needs of the military in predicting *ballistic trajectories* . In the early 1960s developments in computer science grew rapidly and were ready to be used in other fields outside the military. Meteorologists, geologists, and geophysicists began to use computers in making maps. In 1963 in Canada appeared CGIS (*Canadian Geographic Information System*), and subsequently became the first GIS in the world. Two years later, in the United States, a similar system called MIDAS was operated, which was used to process natural resource data. Along with the development of technology, GIS is also changing for the better. The following is the history of GIS development from time to time (Malahayati.ac.id) .

Results of research conducted (Setiawan et al., 2017) Geographic Information System Technology (GIS) is software that functions to enter, store, manipulate and display geographic information and its attributes, so that GIS technology is very suitable to be applied in information systems for natural disaster management and management. The purpose of this research is to create a means of information in terms of natural disaster mitigation by utilizing geographic information systems, namely by making Garut natural disaster management and management application software based on Geographic Information Systems, so that it can be used by interested parties in facilitating the management and provision of information. natural disaster mitigation in Garut Regency.

From the research above, it is a reference used by the author to create and develop a system using an android application to make it easier for application users. In this study, the authors raised information about the location of garbage in Pringsewu Regency so that it could make it easier for the community, especially garbage collectors when cleaning garbage using Android. Not only information about trash locations, this application also provides information about full garbage data that must be cleaned up immediately.

2. LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Application

The application comes from the word Application, which is the noun form of the verb to apply which in Indonesian means processing. In terms of computer application is a subclass of computer software that uses direct computer capabilities to carry out user commands [7] . An application is a set of program commands created to perform a specific job. So the application can be said to be a subclass of computer software that utilizes the capabilities of the computer directly to perform a task that the user wants. (Suhendra, et al, 2018) .

According to (Jubilee Enterprise, 2017:3) The purpose of learning programming languages is to be able to create applications. There are several kinds of applications that are widely found in the world of computers and the internet, namely:

- a. Desktop app

Stand-alone applications that generally have an interface such as windows or windows.

- b. Console Application

Text -based applications that do not require interfaces (eg windows / windows)

- c. Website Based Application

browser window , website -based applications can take many forms,

such as online shops, blogs and so on

d. Mobile Based Application

This application is run using a mobile device such as a Smartphone or tablet.

2.1.2 Garbage

According to the World Health Organization (WHO), waste is anything that is not used, not used, not liked or something that is thrown away that comes from human activities and does not happen by itself [7] . waste is the residue of human daily activities and/or natural processes in solid form and specific waste is waste which due to its nature, concentration, and/or volume requires special management. (Albiyan Pratama, et al, 2019) .

From some of the definitions above, it can be concluded that waste is goods or remnants of products that are no longer suitable for use, are not liked anymore and are not used anymore.

2.1.3 Classification of Waste Types

The classification of types of waste according to Law No. 18 of 2008 explains that the types of waste can be divided into the following:

a. Household waste is defined as goods originating from daily activities in the household, excluding feces and specific waste.

b. The type of household waste as intended comes from commercial areas, industrial areas, special areas, social facilities, public facilities, and/or other facilities.

c. Specific waste, including:

1) Waste containing hazardous and toxic materials;

2) Waste containing hazardous and toxic waste;

3) Waste arising from disasters;

4) Demolition of the building;

5) Waste that cannot be processed technologically; and/or

6) Waste that does not arise periodically (Law No. 18 of 2008).

Suwerda explained that waste is divided into 2 types, namely;

a. Organic waste is waste that is biodegradable, that is, waste that can be completely decomposed through biological processes both aerobically and anaerobically. Examples of organic waste are kitchen waste, animal remains and agricultural or plantation waste;

b. Inorganic waste is non-biodegradable waste, namely waste that cannot be completely decomposed through biological processes, both aerobically and anaerobically. Inorganic waste is divided into reusable and non-reusable waste

2.1.4 Hotspots

Based on data from the Pringsewu Regional Disaster Management Agency (BPBD), flood-prone areas exist in a number of sub-districts. According to the Head of BPBD Pringsewu M. Khotim, villages prone to flooding include Ambarawa Village, West Ambarawa, Ambarawa District. Then Pekon Sukaratu, Pagelaran, Lugusari, Pagelaran sub-district. Next is Pekon Wates, Bulokarto, East Gdingrejo, Krandegan, Parerejo, Gadingrejo District. Furthermore, Sidoharjo Village, East Pringsewu Village, South Pringsewu, North Pringsewu, and West Pringsewu District, Pringsewu District. "Sukoharjo and Adiluwih sub-districts also have the potential for flooding," said M. Khotim. BPBD, according to M Khotim, also asked for an active role from the community to minimize the occurrence of floods and landslides. "By making efforts not to throw garbage carelessly. Also do not cut down trees carelessly. And always work together to clean the environment. Especially in the area where there are many drains or small irrigation which often results in blockages," said M. Khotim, saying if you need help, you can call 0729 21108. (sag/sur) [12]

2.1.5 Information System



Information system is a collection of components within the organization related to the process of creating the flow of information. In (Muhammad & Oktafianto, 2016:11) . Hall 2001 said "Information system is a series of formal procedures in which data is grouped, processed into information, and distributed to users." In (Kadir, 2003:11)

Turban, Mclean, and Wetherbe 1999 Say "An information system collects, processes, stores, analyzes, and disseminates information for a specific purpose." In (Kadir, 2003:11) . An information system is a system consisting of organized components that interact and support the operation function and form a single unit to achieve its goals.

2.1.6 Apps

The application comes from the word Application, which is the noun form of the verb to apply which in Indonesian means processing. In terms of computer application is a subclass of computer software that uses direct computer capabilities to carry out user commands. (Priana & Fitriani, 2017). An application is a set of program commands created to perform a specific job. So the application can be said to be a subclass of computer software that utilizes the capabilities of the computer directly to perform a task that the user wants. (Suhendra, et al, 2018) . An application is a group of files that have interrelated activities for a specific purpose on the computer to input, process and output data to provide functions to the user who uses it. In this development the applications that will be used include:

2.1.7 Application Features

In the world of information and computers there are many programming languages. Call it, Visual Basic, C++, PHP, JavaScript, Perl Python, Delphi, and so on. In general,

programming languages have the following characteristics (Jubilee Enterprise, 2017:1) as follows:

- a. Have clear and standard syntax (commands)
- b. Get to know the concept of variables and constants
- c. Have a problem-solving flow using conditionals, for example in the form of If/Then
- d. Equipped with looping commands, for example For...Next Loop Repeat and So on
- e. Know the concept of procedure and function (procedure and function)
- f. Provides a way to process data, both text, numbers, and other data using various operators, and so on.

2.1.2 Garbage

According to the World Health Organization (WHO), waste is anything that is not used, not used, not liked or something that is thrown away that comes from human activities and does not happen by itself (Priana & Fitriani, 2017) . waste is the residue of human daily activities and or natural processes in solid form and specific waste is waste which due to its nature, concentration and/or volume requires special management. (Albiyan Pratama, et al, 2019) (Albiyan Pratama, et al, 2019) . Garbage is goods or remnants of products that are no longer suitable for use, are no longer enjoyable and are not used anymore.

2.1.3 Classification of Waste Types

(Norrina Aprida Ulfah, 2016) The classification of types of waste according to Law No. 18 of 2008 explains that the types of waste can be divided into the following:

- a. Household waste is defined as goods originating from daily activities in the household, excluding feces and specific waste.
- b. The type of household waste as intended comes from commercial



areas, industrial areas, special areas, social facilities, public facilities, and/or other facilities.

- c. Specific waste, including:
 - 1) Waste containing hazardous and toxic materials;
 - 2) Waste containing hazardous and toxic waste;
 - 3) Waste arising from disasters;
 - 4) Demolition of the building;
 - 5) Waste that cannot be processed technologically; and/or
 - 6) Waste that does not arise periodically (Law No. 18 of 2008).

Suwerda explained that waste is divided into 2 types, namely;

1. Organic waste is waste that is biodegradable, that is, waste that can be completely decomposed through biological processes both aerobically and anaerobically. Examples of organic waste are kitchen waste, animal remains and agricultural or plantation waste;
2. Inorganic waste is non-biodegradable waste, namely waste that cannot be completely decomposed through biological processes, both aerobically and anaerobically. Inorganic waste is divided into reusable and non-reusable waste.

3. RESEARCH METHOD

3.1 Method of collecting data

The data collection method is an important thing in research and is a strategy or method used by researchers in collecting the data

needed in their research. Data collection methods used in this study are:

3.1.1 Observation

According to (Ayudia et al, 2016) "Observation is a report written through analyzing and recording systematically by seeing or observing directly". Observation is an expression of language in the form of spoken or written about an observation, review, and systematic recording of objects based on what is seen, heard and felt. (Ridhani et al., 2017) . Observation is an activity that involves all the powers of the senses such as hearing, sight, taste, touch, and taste based on the facts of empirical events. (Hasanah, 2016) . Observation is an observation that is made directly to observe or collect data used in research. Data collection is carried out at the observation stage in this study, namely the researcher visits the Pringsewu Regency Environmental Service and asks directly the waste-prone areas that are used as research samples.

3.1.2 Documentation

Documentation is intended to obtain data directly from the research site, including relevant books, regulations, activity reports, photographs, documentary films, research relevant data. (Sudaryono, 2016:75) . Documentation comes from the document language which is used as written evidence that has legal value for sources of information, scientific investigations, tools to prove the validity of activities and is stored for a certain period of time. (Rosmalia and Hariyadi, 2019:2) . Documentation is one method of collecting data through books, reports, photographs, magazines, notes, transcripts, newspapers and relevant files to obtain data that can be things or variables.

3.2 Literature Study



According to (Muslim et al 2018) "Library study is a series of activities related to the method of collecting library data, reading and recording and processing research materials". Literature studies contain descriptions of theories, findings and other research materials obtained from reference materials to be used as a basis research activities. (Zuliyanti and Nurlina 2019:48) . Literature study is a technique of collecting data or information from books, previous research, magazines, historical manuscripts, and including news recordings from radio, television and other electronic media.

3.3 Data Source

Data sources in a study can be divided into two, namely *primary data* sources and *secondary data sources* which are described as follows:

3.3.1 Primary Data Source

According to (Yulianto et al 2018:37) " *Primary data* is data that is specifically collected for ongoing research needs". *Primary data* is data collected directly by researchers to answer problems or research objectives carried out in exploratory, descriptive and casual research using data collection methods in the form of surveys or observations. (Hermawan, 2005:143) . Primary data sources are data that are owned or obtained by oneself, in this writing the authors obtain primary data sources which

are profile data of the Environmental Service. from the Department of the Environment .

3.3.2 Secondary Data Source

According to (Yulianto et al 2018:37) "Secondary data is data collected not only for the purposes of a particular research" . *Secondary data* is data obtained from the first source, for example from individuals or individuals. This data can be in the form of interviews, filling out questionnaires, or proof of transactions such as proof of purchase of goods and parking tickets. Husein Umar (2002:91)

3.4 SDLC System Development Method

3.4.1 SDLC

SDLC is a method used in developing a system, SDLC has a logical process used by a system analyst to develop an information system that involves requirements, validation, training and system owners (Mulyani, 2016 : 24) . Development of information systems with a traditional approach, namely SDLC (*Systems Development Life Cycle*). SDLC is a development that serves as a mechanism to identify software. The stages in system development are called the *System Development Life Cycle*, because each stage will be carried out sequentially from planning, analysis, design, implementation and maintenance. The following is an overview of the *System Development Life Cycle*:



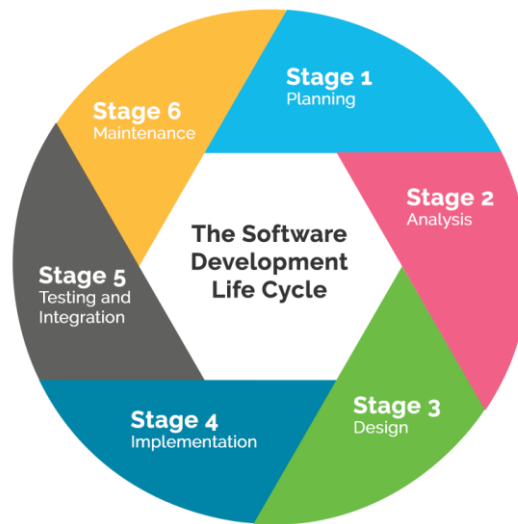


Figure 1. System Development Life Cycle Chart

The description according to the SDLC figure above is as follows:

- a. System Planning**
Planning is the initial stage where at this stage the authors identify the system to be used and developed, and determine the targets to be achieved.
- b. System Analysis**
System analysis is the second stage where problem identification, problem solving proposals and system requirements analysis are focused on making software. At this stage, the author describes a complete information system into its component parts which aims to identify and evaluate the problems and expected needs.
- c. System Design**
At this stage, it is done to design an overview of the system that will be built as a guide for making applications. The purpose of making this model is to obtain a good understanding of the data flow and control, functional processes, operating behavior and the information contained therein.
- d. Coding**
At this stage, the implementation of the design results is carried out in a form that can be read by a computer. At this stage the results of the design begin to be translated into machine language through a programming language.
- e. System Implementation**
At this stage, the implementation of the previously planned system is carried out.
- f. Testing and Integration**
This stage is a process where application testing is carried out through program testing and improvements found in the test.
- g. System Maintenance**
At this stage the purchase of hosting and the installation of applications to the internet *server* so that it can be used by everyone wherever and

whenever, after that maintenance activities are carried out on the system which aims to maintain and repair the system to an acceptable condition.

4 DISCUSSION

4.1 Design Stage

The design stage aims to meet the needs of system users regarding a clear picture of the system design that will be created and implemented using *Context Diagrams*, *Flow Diagrams (DFD)*, *Entity Relationship Diagrams (ERD)*, *Data Dictionary*, *Flowcharts* and input

output page views. The following symbols are used in the data flow system, among others:

4.1.1 Context Diagrams

Context diagram is a diagram that consists of a process and describes the scope of a system. Context diagram is the highest level of DFD which describes all inputs to the system or outputs from the system. Then it will give an overview of the whole system. The system is bounded by a *boundary (can be represented by a dotted line)*. In a context diagram there is only one process. There can be no store in the context diagram, here is the flow of the *context diagram*.

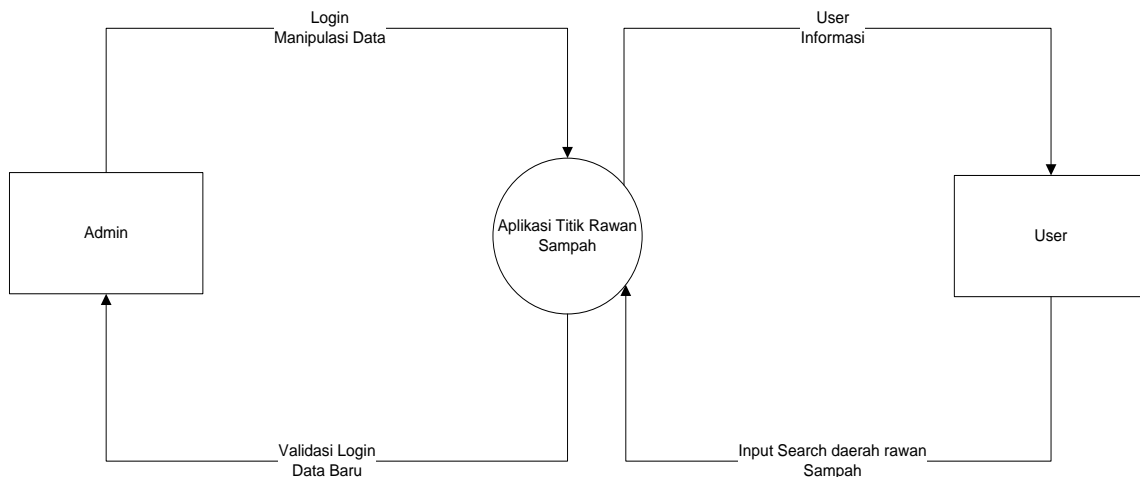


Figure 2. Context Diagram

4.1.2 Data Flow Diagrams (DFD)

DFD describes a system contextual *data flow diagram* that will first appear is the interaction between the system and external entities. DFD is designed to show a system that is divided into a subsystem that is smaller

and to underline the flow of data between the two things mentioned above. This diagram is then developed to see in more detail so that the models contained in it can be seen. The existing DFD in this application are as follows:



DFD Level-1

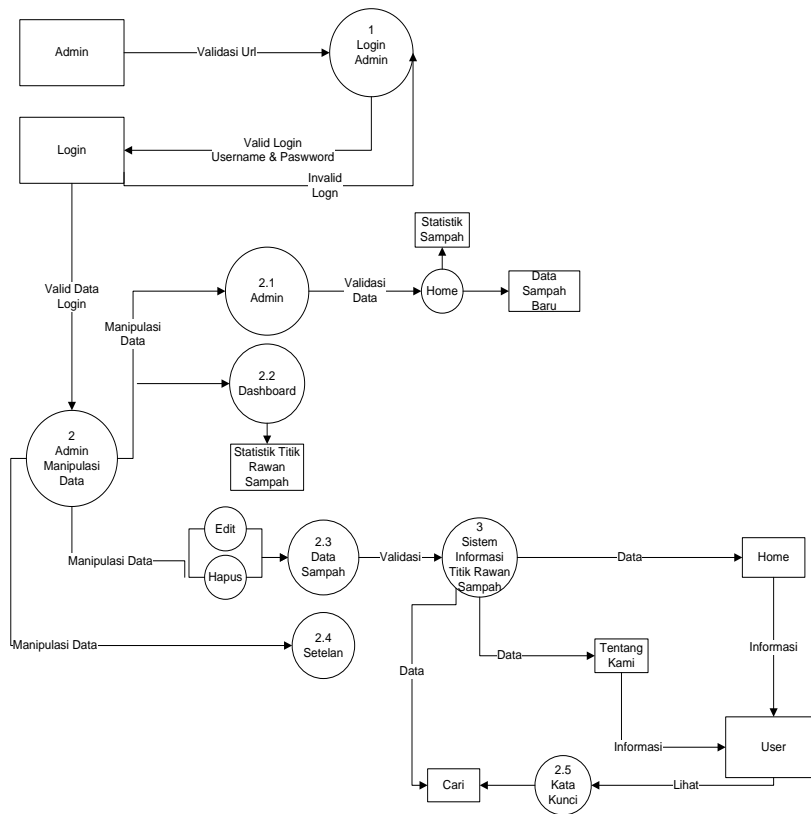


Figure 3. DFD Level-2

4.1.1 Entity Realitionship Diagram (ERD)

ERD is a model used to design data with the aim of describing data related to a data base. ERD design is used to find out how many entities and attributes are used and to know the relationship between entities and attributes of a database. For the design of the waste-prone point database Based on

Android, ERD is a tool that can be used to describe the database of a system so that the relationship between tables can be clearly identified, besides that ERD is also used to show the attributes in the database are interrelated and normalized so that it does not cause data that is not clearly related.



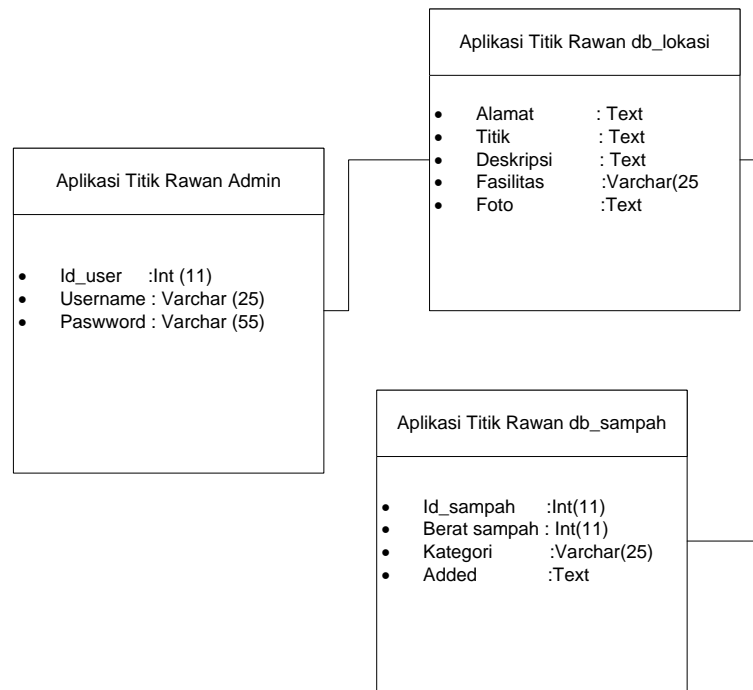


Figure 4. ERD

4.2 Program Writing

After the display design stage is complete, the next process, namely the program writing process, is carried out by translating the program design that has been made using programming language codes that have been determined and adapted to the design that has been made. Making a geographic information system for Waste-Prone Points Pringsewu Regency uses the main programming languages used are PHP, Flutter SDK and Android SDK which are edited through the Flutter application as an editor application and xampp to run the program results that have been written.

4.3 Program Implementation

Implementing this application, first a *smartphone* and human resources must be provided as application users. Below will be described *hardware*, *software* and resource specifications.

5 CONCLUSION

Waste Hazard Point Information System as an information medium for the Waste Hazard Point in Pringsewu Regency, it can be concluded that the Waste Hazard Point information

system can be concluded. It is built using *Flutter Software*, *Android SDK*, *Xampp* and *PHP* programming language. With the implementation of the Information System in waste-prone areas, it is easier for Garbage Officers and the public to get information and monitor the daily waste development without having to check directly to the location but only open an Android-based waste-prone point application anytime and anywhere as long as it is connected to the Internet network.

ACKNOWLEDGMENT

This paper has been presented in National Seminar on Technology, Business and Multidisciplinary Research in Yogyakarta, Indonesia, 23 – 24 August 2022. This work is supported by Institut Bakti Nusantara,



Lampung, Indonesia. We gratefully appreciate this support.

6 REFERENCES

- [1]. Abdullah, R. (2016). Web Programming. PT. Elex Media Komputindo.
- [2]. Adnan Mustofa Kamal, & Andria, T. (2016).Pemberdayaan Ekonomi Umat Melalui Bank Sampah Pada Majelis Taklim Wilayah Kecamatan Koja Jakarta Utara. 355–374.
- [3]. Albiyan Pratama. (2019). Optimalisasi Rute Pengangkutan Sampah Berbasis Sistem Informasi Geografis Di Kupang.Di Kupang, 8(1), 1–14.
- [4]. Andrea adelheid. (2013). 1 hari menjadi Hacker(1st ed.). Mediakita.
- [5]. Ayudia, Suryanto, E., & Waluyo, B. (2016). Analisis Kesalahan Penggunaan Bahasa Indonesia Dalam Laporan Hasil Observasi Pada Siswa SMP. 4(April), 34–49.
- [6]. Dadan. (2015). Membuat CMS Multifitur. PT. Elex Media Komputindo.
- [7]. Edi, F. R. sarwo. (2016). Teori Wawancara Psikodiagnostik (1st ed.). PT.Leutika Nouvarelitera.
- [8]. Elisabet Yunaeti Anggraini dan Rita Irvanin. (2017). Pengantar Sistem Informasi(E. RISANTO (ed.); 1st ed., Issue Mm). CV. ANDI OFFSET.
- [9]. Firmansya, R., Nurhadi, & Mulyadi. (2019). Perancangan aplikasi sig lokasi bank sampah di kota jambi berbasis android.1(4).
- [10]. Harahap, A. Z. S. N. (2019). Pengertian studi Pustaka.pdf. CV BUDI UTAMA.
- [11]. Hariyadi, D. R. (2019). Dokumentasi Keperawatan Pada Poliklinik Gigi(1st ed.). CV BUDI UTAMA.
- [12]. Hasanah, H. (2016). Teknik-teknik observasi. 21–46.
- [13]. Jannah, M., & Sarwandi. (2019). Mahir Bahasa Pemograman PHP. PT. Elex Media Komputindo.
- [14]. Jubilee Enterprise. (2017). mengenal pemograman Komputer dan Android untuk Pemula. PT. Elex Media Komputindo.
- [15]. Kadir, A. (2003). Pengenalan Sistem Informasi (1st ed.). ANDI OFFSET.
- [16]. Kurosaki, M. (2020). FLUTTER DARI NOL Mengupas Flutter Dari Sudut Pandang OTODIDAK (p. 30). Blackangel Media.
- [17]. Madcoms. (2018). manfaat Aplikasi Pendukung Android ada Sistem Operasi Windows(1st ed.). CV. ANDI OFFSET.
- [18]. Magdalena, H., Santoso, H., Rahayuningsih, H., Rochmayani, K., Namang, D., Besar, P., & Jelutung, D. (2019). Model Sistem Pendukung Keputusan Menentukan Tempat Pembuangan Akhir Sampah di Kotamadya Pangkalpinang The Decision Support System Model Determines Waste Final Disposal in the Municipality of Pangkalpinang. 5(1), 22–34.
- [19]. Malahayati.ac.id. (n.d.). Sejarah Perkembangan Ilmu Sistem Informasi Geografis. 2020.
- [20]. Muhammad, M., & Oktafianto. (2016). Analisis dan Perancangan sistem informasi .pdf (A. Pramesta (ed.)). CV ANDI OFFSET.
- [21]. Muhammad Muslihudin, & Oktafianto. (2016). Analisis dan Perancangan Sistem Informasi(A. PRAMESTA (ed.); 1st ed.). CV. ANDI OFFSET.
- [22]. Mulyani, S. (2016). Analisis Perancangan Sistem Informasi Manajemen Keuangan Daerah(1st ed.). Abdi Sistematika.
- [23]. Muslim, Hayyie, A., & Supraha, W. (2018). Perspektif Ibn Abd Al-Barr Al-Andalusi Anak. CV BUDI UTAMA.
- [24]. Nazaruddin Safaat. (2018). android Versi.pdf(1st ed.). CV ANDI OFFSET.
- [25]. Norrina Aprida Ulfah. (2016). Studi Efektifitas Bank Sampah Sebagai Salah Satu Pendekatan Dalam Pengelolaan



- Sampah Tingkat Sekolah Menengah Atas (SMA) Di Banjarmasin. *Jurnal Pendidikan Geografi*, 3(5), 22–37.
- [26]. Oktarino, A., & Listautin. (2018). Perancangan Pemetaan TPS dikota Jambi Dengan Sistem Informasi Geografis Berbasis Android. 53–61.
- [27]. Pratama, N. A. (2016). APLIKASI PEMBELAJARAN TES POTENSI AKADEMIK BERBASIS ANDROID komputer yang dibuat untuk menolong manusia Dalvik Virtual Machine (DVM) adalah Android SDK adalah tools API (Application Examination) yang sudah menjadi standar Pengertian Android1–
[.http://jurnal.unda.ac.id/index.php/Jpdf/article/view/11/13](http://jurnal.unda.ac.id/index.php/Jpdf/article/view/11/13)
- [28]. Premana, B. B. (2018). Aplikasi Sistem Digital Trainer Support Atlet Ikatan Pencak Silat Berbasis Android. *Universitas 17 Agustus 1945 Surabaya*, 5–14.
- [29]. Priana, I., & Fitriani, L. (2017). Perancangan Aplikasi Perangkat Lunak Pengelolaan Data Bank Sampahdi PT. Inpower Karya Mandiri Garut. *Jurnal Algoritma*, 13(2), 407–413. <https://doi.org/10.33364/algoritma/v.13-2.407>
- [30]. pringsewukab.go.id. (2019). Tentang Pringsewu. *Pringsewukab.Go.Id*, 1.
- [31]. Radarlampung.co.id. (2018). daerah Rawan Bencana Kab pringsewu.
- [32]. Ridhani, A., Arifin, S., Studi, P., Pendidikan, M., Indonesia, B., & Mulawarman, U. (2017). TEKS LAPORAN HASIL OBSERVASI MODEL PEMBELAJARAN BERBASIS PROYEK SISWA KELAS X SMA. 1, 353–366.
- [33]. Setiawan, R., Kurniadi, D., & Bunyamin, H. (2017). Perancangan sistem pengelolaan penanggulangan bencana alam garut berbasis sistem informasi geografis. 343–349.
- [34]. Sudaryono. (2016a). Metode Penelitian Pendidikan. Kencana Prenada Media Grup.
- [35]. Sudaryono. (2016b). Pendidikan. Kencana Prenada Media Grup.
- [36]. Suhendra. (2018). *Jurnal Informasi dan Komputer Volume 6 Nomor 1 2018 Jurnal Informasi dan Komputer*. 6, 20–30.
- [37]. Sujarweni, V. W. (2014). *Metodologi Penelitian Lengkap, Praktis, dan Mudah Dipahami(1st ed.)*. PUSTAKABARUPRESS.
- [38]. Suryono, S., & Hardiansah. (2020). *Falling in Love with LUTTER*. PT Lauwba Techno Indonesia. <https://doi.org/10.3138/9781442657380-006>
- [39]. Virdiandry, S. (2016). Pemograman Web Dengan Menggunakan PHP Dan Framework Codeigniter. CV BUDI UTAMA.
- [40]. Yuandari, E., & Rahman, R. T. . (2017). *Metodologi Penelitian Dan Statistik (1st ed.)*. IN MEDIA.
- [41]. Yudhanto, Y., & Prasetyo, H. A. (2019). *Mudah Menguasai Framework Laravel*. PT. Elex Media Komputindo.
- [42]. Yulianto, N. A. B. (2018). *Metodologi Penelitian Bisnis (1st ed.)*. POLINEMA PRESS.

