


Web-Based Geographic Information System of Livable House in Kandolo Village

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Abstract—A livable house is abbreviated as the feasibility of a residential house which can be measured from 2 aspects, namely the physical quality of the house and the quality of house facilities. The physical quality of the residential house is measured by 3 variables, namely the type of roof, the type of wall, and the type of floor, while the quality of the housing facilities is measured by 2 variables, namely the source of lighting and the availability of toilet facilities. In this study, the authors use the prototype method using data analysis and system design. This web-based geographic information system for livable houses in Kandolo Village aims to assist in the data collection process for livable houses in Kandolo Village. The results of this study 257 house data have been entered, of which 247 houses are suitable for livable on, 6 houses that are less suitable for livable on, and 4 houses that are not suitable for livable on. For visitors, this system functions to select houses that are livable by looking at several registered pins, then the system will take the resident data detail page. Then in the detail section of citizen data, there will be some resident data, photos of houses, and routes to their destination. From the application trial results, the author conducted a black box test with 11 test class items and respondent tests for direct users at the Kandolo Village Office where the features are used to well and are accepted among the community.

Keywords—Geographic Information System (GIS), Prototype, Livable House

I. INTRODUCTION

A livable house abbreviated as the feasibility of a residential house can be measured from two aspects, namely the physical quality of the house and the quality of the house facilities. The physical quality of the residential house is measured by 3 variables, namely the type of roof, the type of wall, and the type of floor, while the quality of the house facilities is measured by 2 variables, namely the source of lighting and the availability of toilet facilities.

Kandolo Village is one of the villages located in Teluk Pandan District, precisely in Kutai Timur Regency, East Kalimantan Province. In the system that is running at the Kandolo Village Office in the process of collecting

livable houses, some have been computerized but are still manual such as data entry can only be done at the village office, this is what makes the data collection process for healthy houses considered less effective.

The following are the problems that will be raised in this paper's research on how to design a livable house geographic information system in Kandolo Village, and how to map livable houses using the geographic information system of livable houses in Kandolo Village.

To focus on the problems to be discussed, the following limitations are given the data presented is in the form of resident data in Kandolo Village only and the attributes are in the form of a map on a website, making this web-based system using the Laravel Framework, and making this application covers the Kandolo Village area only.

This paper's research aims to map houses considered healthy houses in Kandolo Village and to find out which houses are livable in Kandolo Village. With the creation of this geographic information system, it is hoped that the author can map livable houses in Kandolo village and can facilitate and assist the work of village officials in conducting field surveys, and collecting data on livable houses online and the data that has been entered is neatly organized.

II. LITERATURE REVIEW

A. Study of Literature

Research conducted by Darussalam and Arief, G. (2017). Titled Data Analysis of Geographical Information Systems for Livable Houses Using the Fuzzy Logic Method. This system discusses the application and testing using fuzzy logic Mamdani method helps in determining the pattern that will be applied to the discussion of fuzzy sets 0 – 100 or 0 SD 100 percent, so that the linguistic decisions obtained are not only feasible or not feasible but can sort in which residential priority. It should be noted that the value obtained will differ depending on the conditions, based on the calculation results, it is hoped that the government and stakeholders will be assisted and support non-decision decisions in formulating optimal development program policies, planning, and budgeting

facts and location data in the field as supporting decisions.

Research conducted by Marlin Lasena & Dedi Tambayong (2016). Titled the geographic information system for web-based housing assistance at the North Bolaang Mongondow District Social Service. This system discusses the geographical information system for livable housing that can maximize the data collection process for livable housing assistance (MAHYANI) in the North Bolaang Mongondow Regency area. Testing using test cases proves that this geographic information system for housing assistance is more effective and efficient than manually.

Research conducted by Julian Chandra Wibawa & Bella Hardiyana (2019). Entitled Design and Build a Geographical Information System for Unlivable Houses to Support Policy Decisions at the Village Level. This system discusses applications that can be used by RT / RW and village officials in carrying out both data collection, making building plans, and others, can also be used by the community even though it is only limited to seeing data from houses that are being renovated or those that have been completed in the renovation, providing the community with facilities to participate in renovating houses with the go feature if the community itself does not know the address of the house being renovated, this application can also help make it easier for the RT / RW in.

Research conducted by Tri Afriliyanti & Sri Winiarti (2013). entitled the design of a decision support system for determining a healthy house. This system discusses system requirements analysis that has been carried out to support decisions in determining a house to be built, and a system has been designed that can help provide advice, input, or considerations in making decisions to determine the feasibility of a house.

Research conducted by Nasrul Vadil Setiawan (2017). The title is a website-based healthy house geographic information system. This system discusses applications that can be used by RT, RW, and village officials in carrying out both data collection and building planning. This application can also be used by the public but is only limited to viewing data from houses that are being renovated or those that have been completed renovations, this application also provides if the public wants to participate in renovating houses with the go feature if the community itself does not know the address of the house. which is being renovated, this application is also expected to help the RT, and RW in reporting so they don't have to go back and forth to the village office, and this application is also expected to make RLH data neat. The application made by the author can store data on livable houses for the community through a database, this application can also verify houses that are livable through a system that has been created, and the admin who enters the data can more easily determine habitable houses, the points entered can be entered directly without the need to enter the coordinates point.

B. Geographic Information System(GIS)

According to Beze et al., (2016) stated that development of geographic information systems (GIS) based on the web can make it easier for people to monitor issues related to the public interest because the web application is easily accessible general public. Putri et al., (2014) also stated that the geographic presentation of data is capable of providing a different picture or perspective in solving the problem. Moreover, the GIS was developed to mix and match spatial databases and non-spatial so that it can provide information up-to-date and powerful to solve a problem.

C. Livable house

Nasrul vadil Setiawan, (2017) livable houses there are several criteria for houses that can be seen whether they are livable or not based on the criteria for building unlivable houses, namely:

1. The walls and frame of the house are not feasible and are still made of earth.
2. The roof structure is dangerous to the occupants.
3. The house does not fulfill aspects of a healthy house, such as lighting.
4. Poor air circulation.
5. It has no WC and inadequate garbage disposal.

D. LeafletJS

LeafletJS is the most advanced open-source JavaScript library for maps on smartphones that has many of the mapping features a developer will ever need. The leaflet can work efficiently on all major smartphone and desktop platforms and can be equipped with many plugins. (Soepomo, P. 2013) .

E. Websites, Web Services, and Web Frameworks

A website or site can be defined as a collection of pages that display text data information, still or motion image data, animation data, sound, or a combination of all of them, both static and dynamic, forming a series of interrelated buildings, each of which is connected to a network of pages. (Gustina & Leidiyana, 2020).

F. Laravel

Laravel is a web framework based on the PHP programming language that is free and open source, Laravel is released under the MIT license with source code provided by Github, Laravel is made by Taylor Otwell and is intended for web application development that follows the model-view-controller architecture pattern (MVC). Laravel is the only framework that helps you to maximize the use of PHP in the website development process.

G. Xampp

XAMPP is an instant installation package for Apache, PHP, and MySQL that can be used to assist the installation process of the three products (Sihotang, 2019).

H. MySQL

MySQL (My Structure Query Language) is database software, which is a relational data type, which means that MySQL stores its data in the form of interconnected tables (Sihotang, 2019).

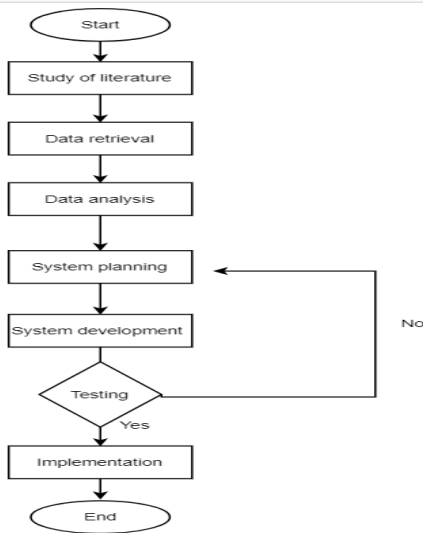
I. Prototype Method

According to Yanuarti (2017), "Prototype is one approach in software engineering that directly demonstrates how a software or software components will work in their environment before the actual construction stage is carried out. The prototype model is used as an indicator of the image to be created. in the future and distinguish between the two functions of exploration and demonstration".

III. RESEARCH METHOD

A. Research Procedures

According to Yanuarti (2017), this study uses the Prototype method as a system development method. The stages of making the Geographical Information System for Livable Houses in Kandolo Village there are stages to be carried out, by research procedures. The stages of making the Healthy House Geographic Information System design are in Picture 1.

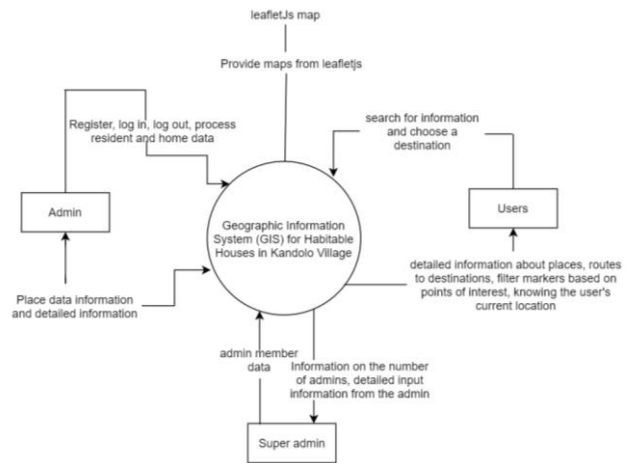


Picture 1. research procedures

B. Analysis Design

1. Data flow diagram level 0

The level 0 diagram in the system that will be made describes the general data flow process, where the process of the geographic information system of livable houses has sources and destinations from which will be processed in detail so that it can describe the data flow that will be processed in detail up to and including the following: can describe the flow of data to be processed, a level 0 diagram can be seen in Picture 2.

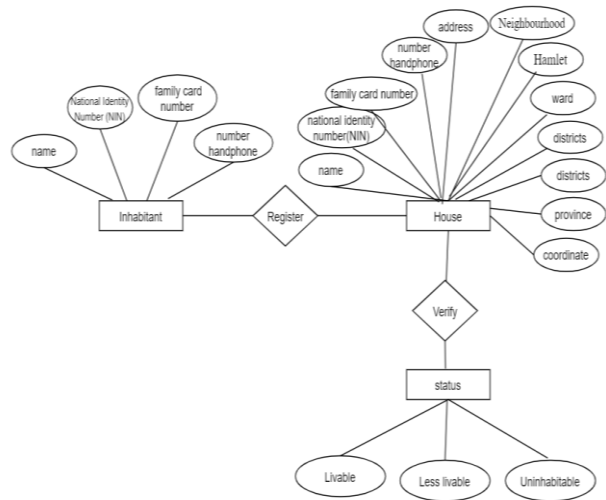


Picture 2. DFD level 0

C. Database Design

1. Entity Relationship Diagram(ERD)

The ERD in the system that will be made describes the general data flow process, where the process of the webGIS system for the geographic information system of healthy houses in Kandolo village has the source and destination of what will be processed in detail so that it can describe the data flow that will be processed in detail so that it can be processed. Describe the flow of data to be processed, the ERD can be seen in Picture 3.



Picture 3. Entity Relationship Diagram(ERD)

It can be seen in the livable house diagram above, there are three entities in it. The three entities are citizens, houses, and status. Each entity has its attributes, namely:

1. Residents have several attributes, namely name, National Identity Number (NIN), family card number, number phone.
2. The house has several attributes, namely name, National Identity Number (NIN), family card number, number phone, address, Neighborhood, Hamlet, sub-district, district, province, and coordinates.

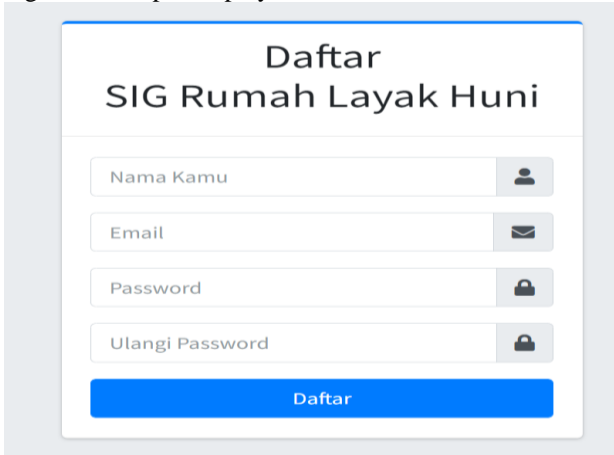
- Status has several attributes, namely livable, less livable, and unlivable.

map, or using the search on the search icon, the display of added data can be seen in Picture 6.

IV. RESULT AND DISCUSSION

A. Register page

The registration page is a page that is intended for visitors who want to register before logging in. The registration input display can be seen in Picture 4.

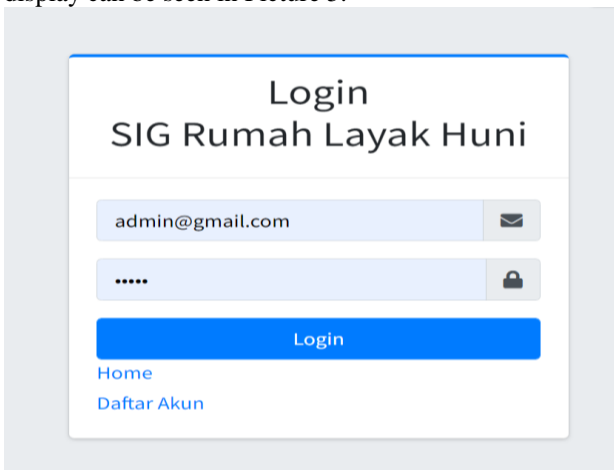


Picture 4. Register page

The registration page is a page that is intended for visitors who want to register before logging in. The register provides 1 label, 1 button, and 4 text boxes consisting of name, email, password, and new password.

B. Login page

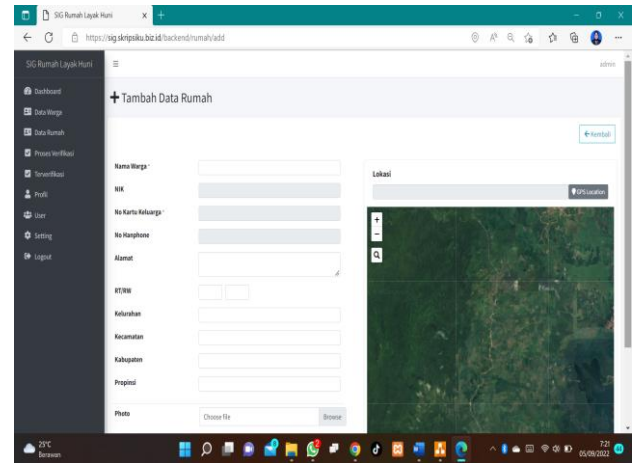
Login is the page shown for admin and super admin. The login page provides 1 label, 1 button, and 2 text boxes consisting of email and password. The login input display can be seen in Picture 5.



Picture 5. Login page

C. Add house data page

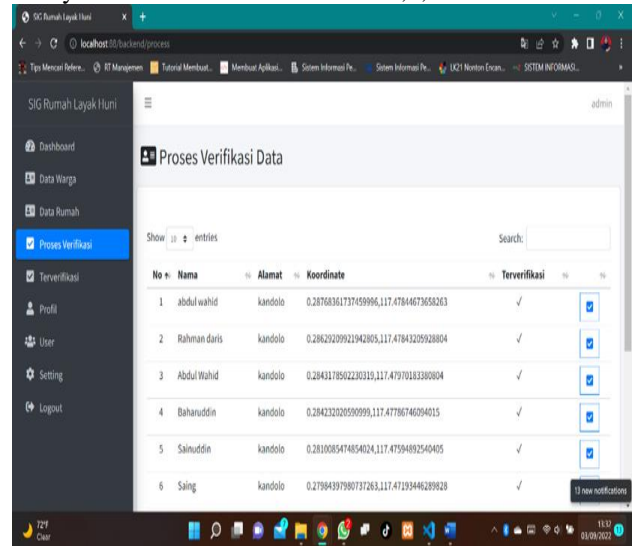
The Add data page is provided with 10 text boxes containing the name of the citizen, nick, number kk, cellphone number, address, RT/RW, ward, sub-district, district, province, and pictures. Especially for coordinates, which can be selected by clicking on the



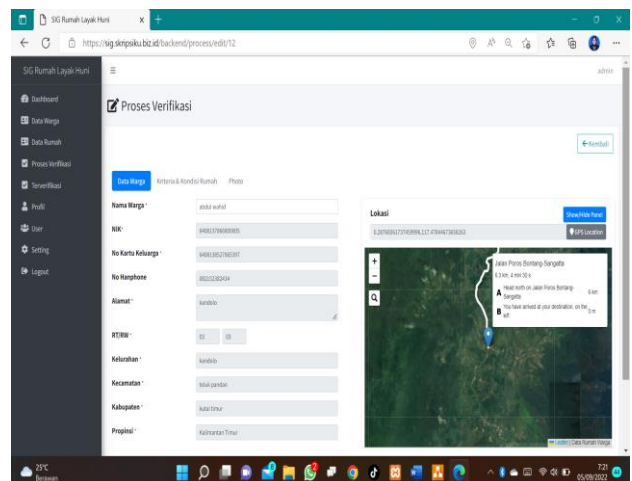
Picture 6. Add house data page

D. Verification process page

After there is new data input, citizen data will appear in the verification process menu, there is also a button to verify the data as shown in Picture 7,8, and 9.

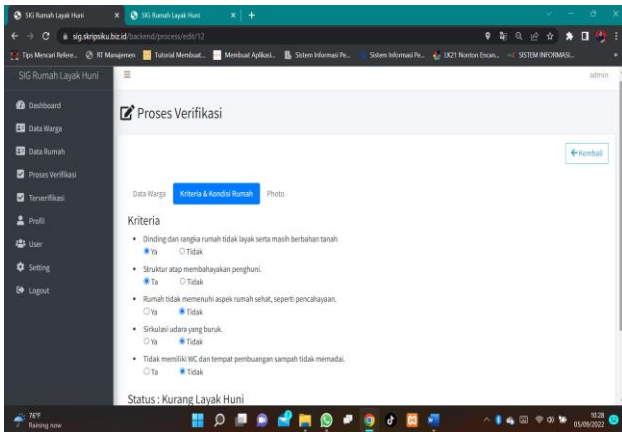


Picture 7. Verification process page



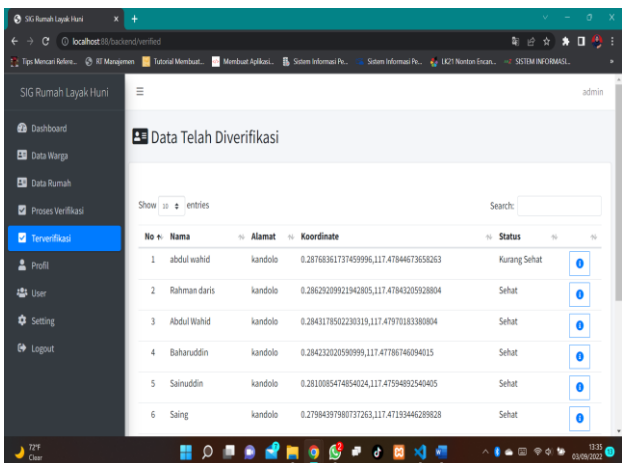
Picture 8. The data page you want to verify

In the verification process menu there will be displayed some data on residents' houses that have been registered, there is also an option to choose the criteria and conditions of the house, and photos of residents' houses. And the location of the residents' houses that have been entered previously.



Picture 9. Check criteria and house conditions page

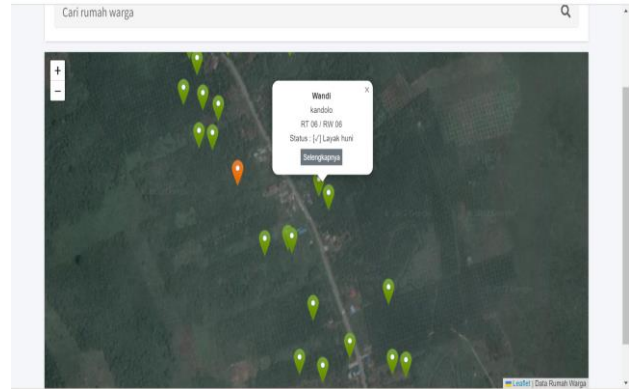
In direct data verification, it is determined by the system if there are only 2 criteria that fall into the category of the house, it is said to be unfit for habitation, if 3 criteria are met, it is considered unfit for habitation, and if there are 4 criteria that are met, it can be said to be livable. Once saved, the data status will automatically change to verification. And the data will move to the Verified menu as shown in Picture 10.



Picture 10. Verified data page

E. Main page

The main page contains several registered citizen data pins, the page can be seen in Picture 11.

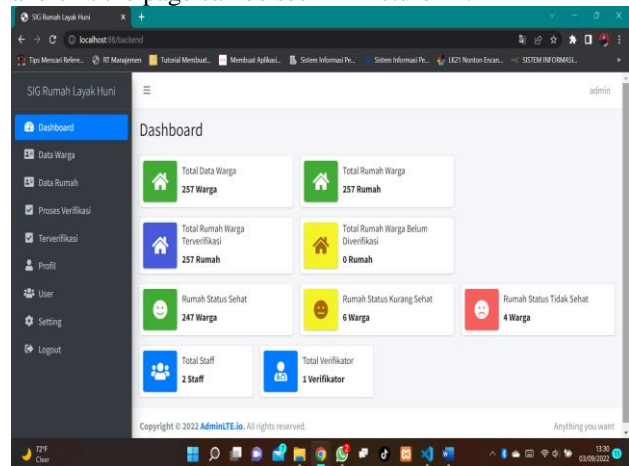


Picture 11. Main page

The main page contains several registered citizen pin data. Where the blue pin is the status register data, the green pin is the data that has been proven and the status of the house is healthy, the orange pin is the data that has been owned and the status of the house is unhealthy, and the red pin is the data that has been owned and the status of the house is unlivable.

F. Dashboard page

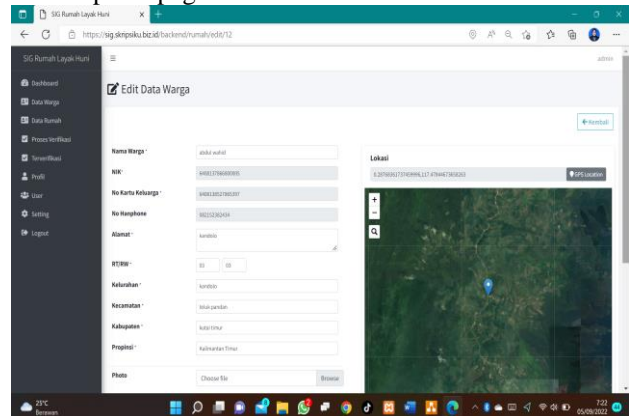
The dashboard page consists of several menus, namely citizen data, verification process, verified, profile, user, and exit the page can be seen in Picture 12.



Picture 12. Dashboard Pages

G. Updates page

The update page can be seen in Picture 13.

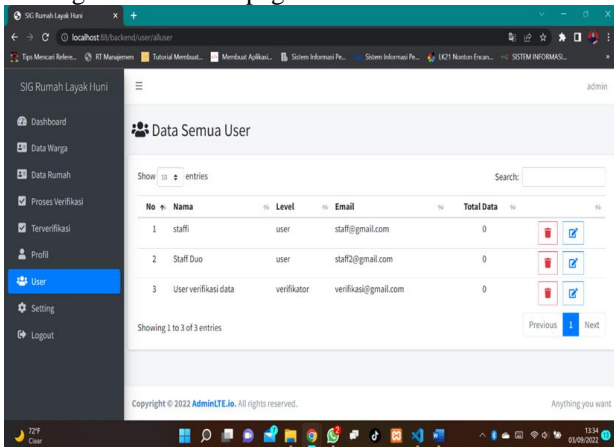


Picture 13. Update page

To edit residents' house data, if there is an error, it can be directly edited by pressing the edit menu of residents' houses.

H. User Page

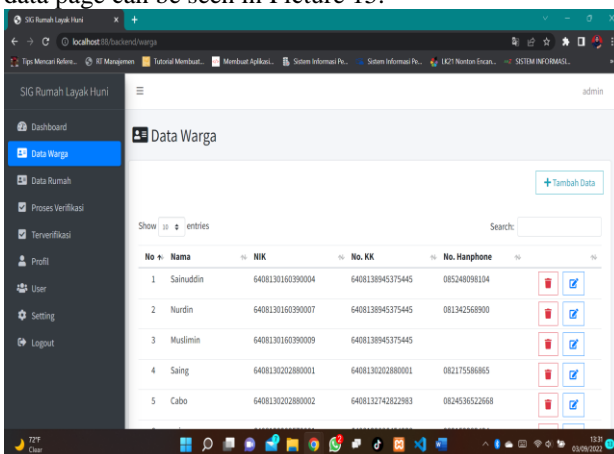
A user is a system user who has access rights to manipulate data, whether it is adding, editing, or deleting all existing data on the system, for the user menu, several accounts that have been registered for super admins can change each registered account to a verification account or a regular admin. the page can be seen in Picture 14.



Picture 14. User

I. Citizen data page

The citizen data page contains several names of registered citizens, and in it there is also a menu for adding data, deleting data, and editing data, the citizen data page can be seen in Picture 15.



Picture 15. Citizen data page

J. Application Trial Results

The results of the coding error test were checked by trying every feature in the application, no errors were found in the application test that was run on the localhost server. Testing of this application is carried out thoroughly to find out whether this application can run as planned. Application testing can be seen in table 1 and table 2.

Table 1. Blackbox Test Table

Test Scenario	Test Items	Results
Register	Enter name, email, password, repeat password	Valid
Login/Logout	Enter your email and password	Valid
User Can Adding Data	Enter the owner's email, Name, National Identity Number (NIN), family card number, number phone, address, Neighborhood/Hamlet, ward, sub-district, district, province, photo, location	Valid
User	Update Input data	Valid
User	Deleting Input data	Valid
User	Can change the inputted data and can see the amount inputted	Valid
User	Can change the inputted data and can see the amount inputted	Valid
Super Admin	Can see the total residents and total users	Valid
Super Admin	Can delete and change User	Valid
User Can Adding Data	Enter the owner's email, Name, National Identity Number (NIN), family card number, phone, address, Neighborhood/Hamlet, ward, sub-district, district, province, photo, location	Valid
User	Update Input data	Valid
User	Deleting Input data	Valid
User	Can change the inputted data and can see the amount inputted	Valid
User	Can change the inputted data and can see the amount inputted	Valid
Super Admin	Can see the total residents and total users	Valid
Super Admin	Can delete and change User	Valid

Testing this application is carried out thoroughly to find out whether this application can run as planned. Testing this application using the black box method with 11 test class items with all valid results.

V. CONCLUSIONS

Based on the development in making the application the author succeeded in developing of a livable house geographic information system, the work carried out by the author is by collecting data, analyzing, designing databases, and progress (coding). In making the application, the author succeeded in designing a livable

house geographic information system in Kandolo Village, and the use of livable houses using a livable house geographic information system in Kandolo Village. Based on the results of the application trial, 11 test classes were tested to get valid results, and there were 257 data on houses in Kandolo Village where there were 247 houses that were suitable for livable, 6 houses that were less suitable for livable on and 4 houses that were not suitable for livable on. And some shortcomings in the application that the author designed, namely the pointing out where the geographic information system application for livable houses in Kandolo Village is still not accurate, so it is hoped that further research can use the Garmin tool or the camera GPS maps application, the location point must be by the current location, and for the region. can be further expanded for further research.

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