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Web-based Population Information System (Case Study of Ketapang Village Hall Office)

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Abstract. The development of information technology has brought significant changes in various aspects of life, including in the management of population data at the village level. Conventional population information systems that still use manual methods often have various problems such as data inconsistency, difficulty in finding information, and slow administrative service processes. Therefore, this research aims to develop a web-based village population information system that can overcome these problems. This web-based population information system is designed using a waterfall system development approach. Data collection methods were conducted through interviews, observations, and documentation studies. The system was built using PHP programming language and MySQL database. The results showed that this web-based population information system is able to present population data accurately, quickly, and easily accessible by the community and village officials. With this web-based population information system, it is expected to improve the efficiency and effectiveness of population data management at the village level, as well as provide convenience for the community in accessing information and obtaining population administration services.

Keywords: Population Information System, Village, Web, PHP, MySQL

1 Introduction

Along with the rapid advancement of information technology, the demand for fast, precise, and accurate information is increasing. The growing human dependence on information demands technological solutions to manage, process, and analyze data on a larger and more complex scale[1].

Ketapang Village is a village in Tanggulangin Sub-district, Sidoarjo Regency, East Java Province. Ketapang Village has an area of 134.4 ha[1]. It is divided into 15 RTs (Neighborhood Associations) and 4 RWs (Community Associations) and two hamlets, namely Gondang Hamlet and Ketapang Hamlet. As one of the lower-level government agencies, Ketapang Village has an important role in governance. One of the important roles of the village is to be the most accurate source of data for population data such as death and birth data, data on residents moving in and moving out.

Most villages in Indonesia in recording population data are still manual or use the bookkeeping method and Ketapang Village is one village that still applies this. Therefore, a web-based information system is needed, especially for population data.

The final result of the research based on the background above, the authors designed "Web-Based Population Information System (Case Study of Ketapang Village Hall Office)". This system is designed to solve problems in managing population administration and facilitate the management of population data. All data is stored in one organized database [2].

2 Methods

This information system uses the *Waterfall* method, the stages of the *Waterfall* method applied in this study are shown in Figure 1, as follows:

a. Software Requirements Analysis
b. Design
c. Program Code Generation
d. Testing,
e. Maintenance

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The stages of waterfall design can be seen in the figure below.

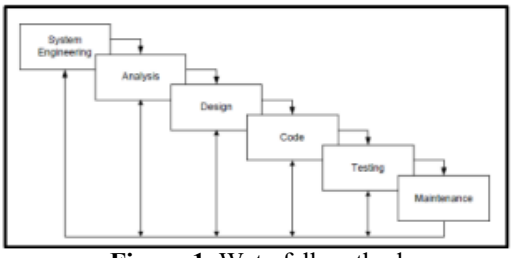

Figure 1. Waterfall method

The following is an explanation of the waterfall method:

a. Analysis: the process of analyzing the system required by the user.[3]
b. Design: In this stage, developers design the system to determine hardware specifications and requirements, and contribute to establishing the overall system architecture.[4]
c. Coding: This stage is the implementation of the design that has been made before. The design is then processed into a system using coding. The coding process is done by utilizing the PHP programming language with the Bootstrap framework, and the MYSQL database. [5]
d. Testing: To minimize testing errors focus on software in terms of lojik and functional and ensure that all parts have been tested. The author uses blacbox testing as a software testing method by testing the Website page using a browser then entering input and checking whether the output is as expected or not.[6]
e. Maintenance: This is the final stage of the waterfall method. The software is ready at the operation and maintenance stage. Maintenance includes fixing errors that were missed in the previous step.[7].

3 Results and Discussion

After collecting data and analyzing the system, then proceed with designing an efficient system.

3.1 Flowchart

Flowchart is a way of presenting an algorithm. A flowchart is a chart that shows the flow in a program or system procedure logically. [8] This flowchart is usually made using straight lines, arrow lines, and various shapes such as boxes, rectangles, ovals, and so on. It directly describes the sequence of steps in an algorithm, which is for a series of activities that are also the function of the flowchart. The symbols used in flowcharts allow a clear and structured visualization of each stage of the process. [9]

Flowchart contains several stages that must be done by the system. Some of the stages in the system are displayed by the flowchart as follows

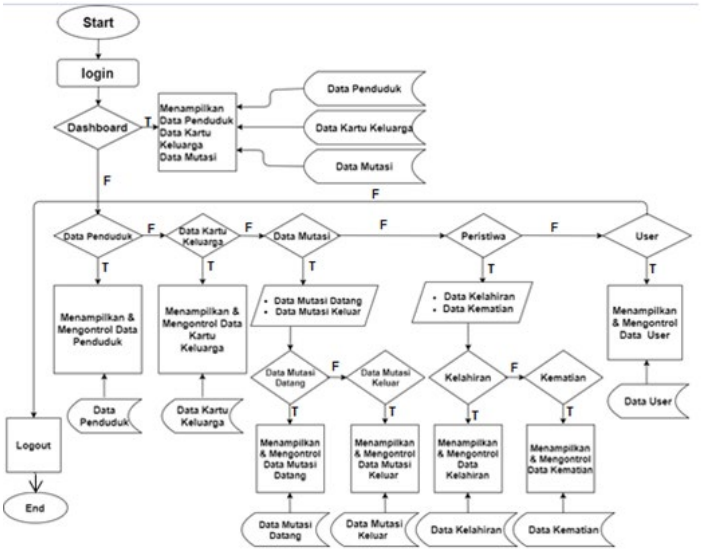

Figure 2. Flowchart

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3.2 Context Diagram

Context Diagram is a diagram that contains the process and contains a depiction of the system created[10] . In this system, the diagram serves to describe the running process of processing population data at the Ketapang Village Hall Office.

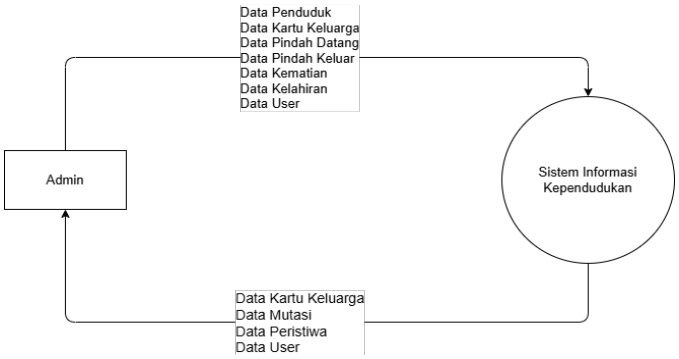

Figure 3. Context Diagram

3.3 DFD

DFD or what is called Data Flow Diagram is a structured analysis and design tool that allows system analysts to visually understand the system and subsystems as a series of interrelated data flows [11]. This diagram is shown as a diagram to be used as a depiction of the running system.

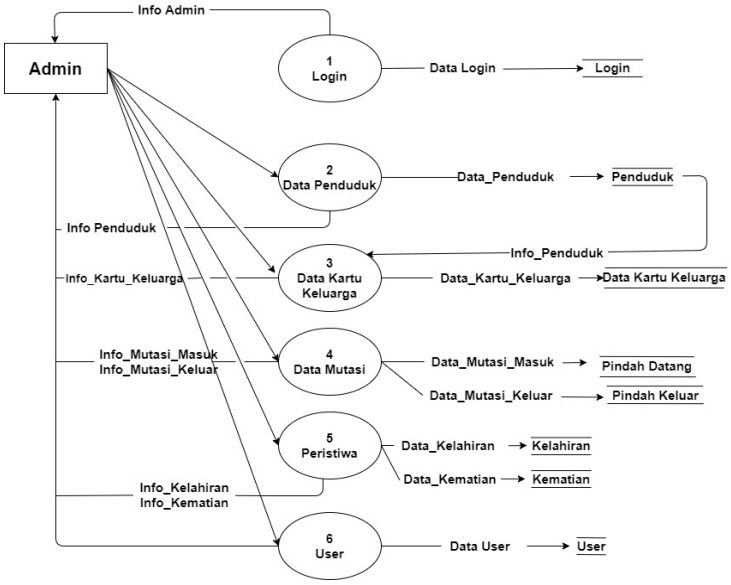

Figure 4. DFD

3.4 Use Case Diagram

Use Case Diagrams describe the functionality of a system from the user's perspective, use case diagrams work by describing the pattern of interaction between the user and the system. [12]. This diagram is important for organizing and modeling the behavior of a system that users need and expect. Use cases work by using scenarios that describe user and system interactions step by step. [13]. The two main things in use cases are actors and use cases.

Use Case Diagrams have a function that is a simple general description of the relationship between the system and the user and knows the various functions that exist in the system. Then the Use Case Diagram can be seen below:

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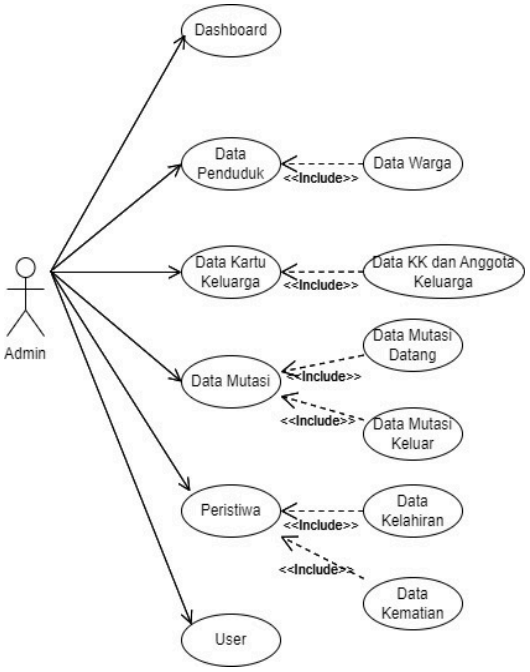

Figure 5. Use Case Diagram

3.5 User Interface

3.5.1 Login Page

Before entering the main page / *dashboard*, the admin must log in first by filling in the username and *password.*

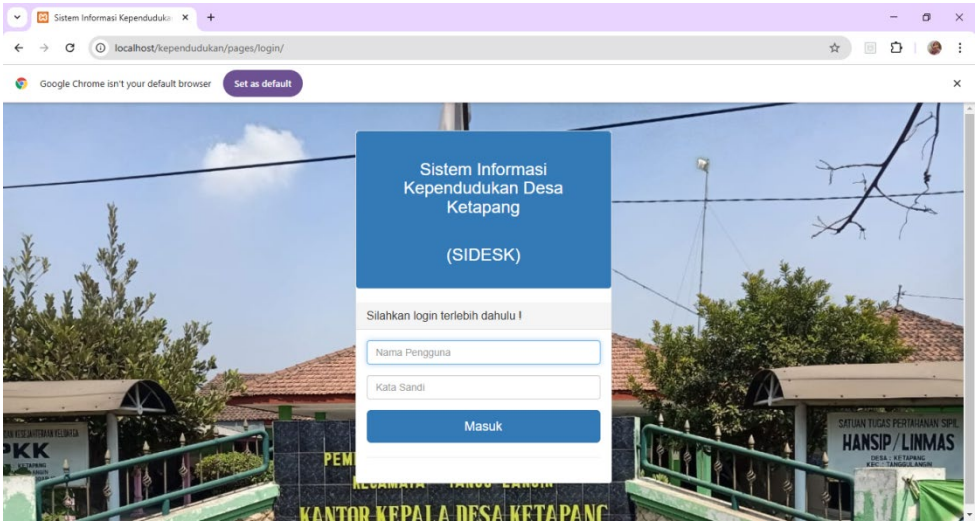

Figure 6. Login Page

3.5.2 Home Page

This page displays several menus including: Population data menu, family card data menu, mutation data menu, event data menu and user data menu.

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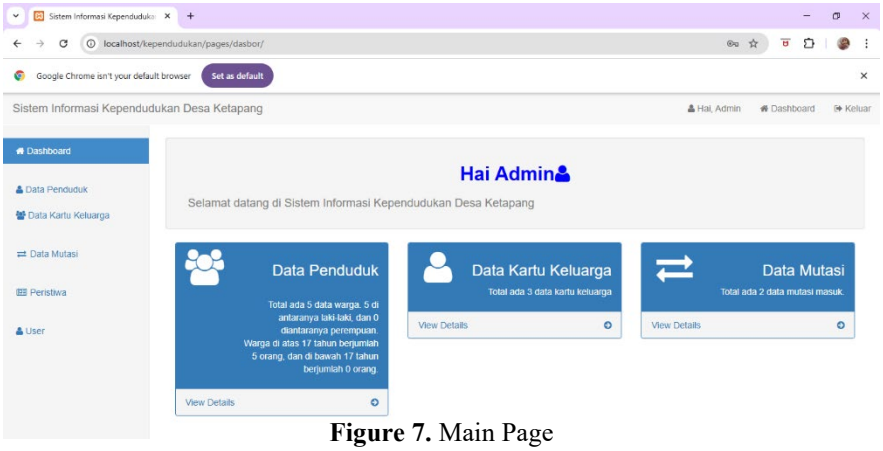

Figure 7. Main Page

3.5.3 Resident Data Menu

This page displays all resident data of Ketapang Village, and this page can also control data such as adding data, changing data, viewing resident data details and also printing data.

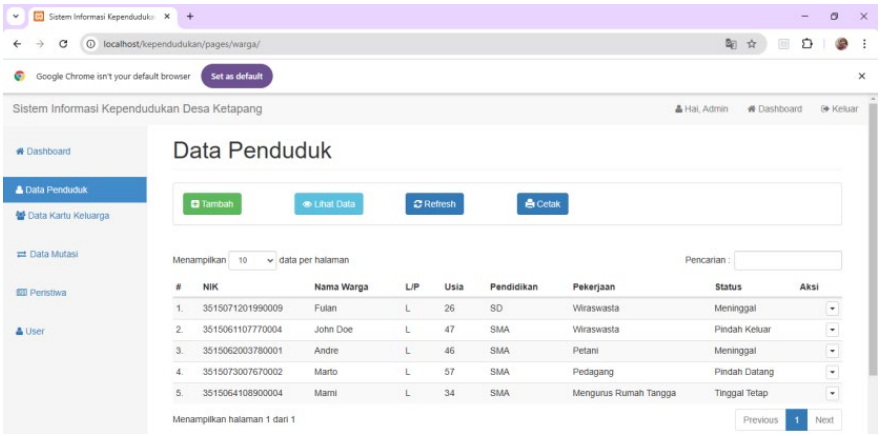

Figure 8. Resident Data Display

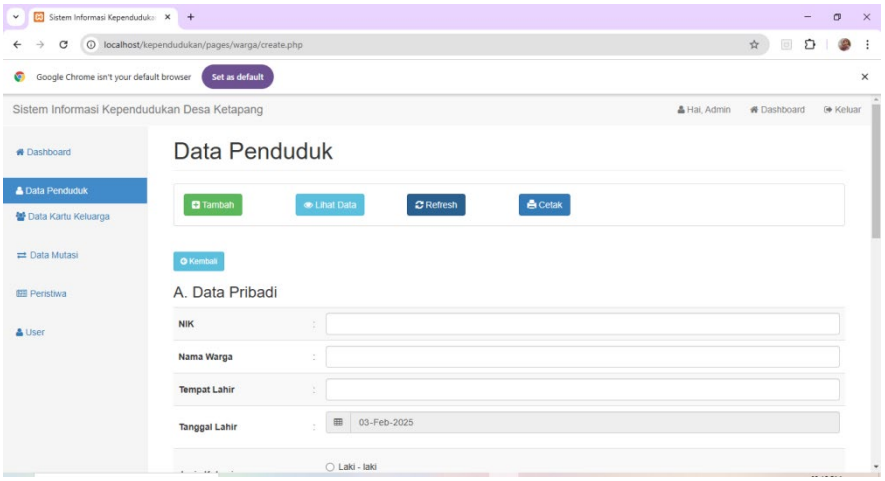

Figure 9. Form View

3.5.4 Family Card Data Menu

This page displays all Ketapang Village Family Head data, and this page can also control data such as adding data, changing data, viewing data details and also printing data.

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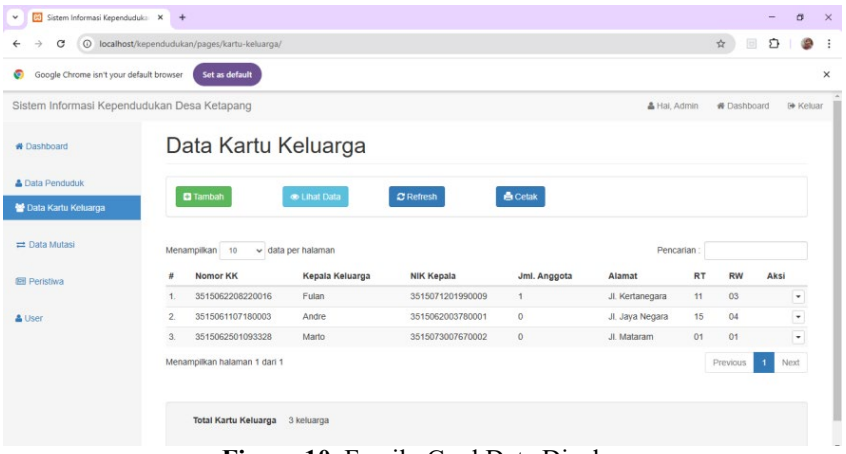

Figure 10. Family Card Data Display

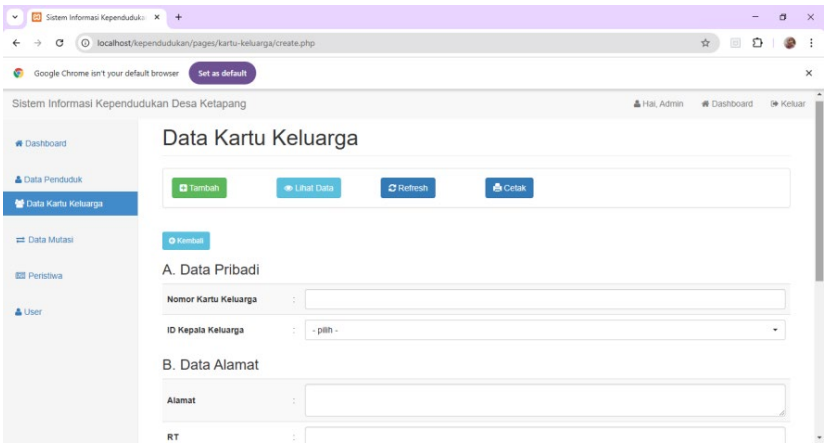

Figure 11. Form View

3.5.5 Mutation Menu

The mutation data menu is divided into 2 menus, namely the move-in menu and the move-out menu. Where both menus have the same page display and also the same data control. As with other menus, this page can also control data such as adding data, changing data, viewing data details and also printing data.

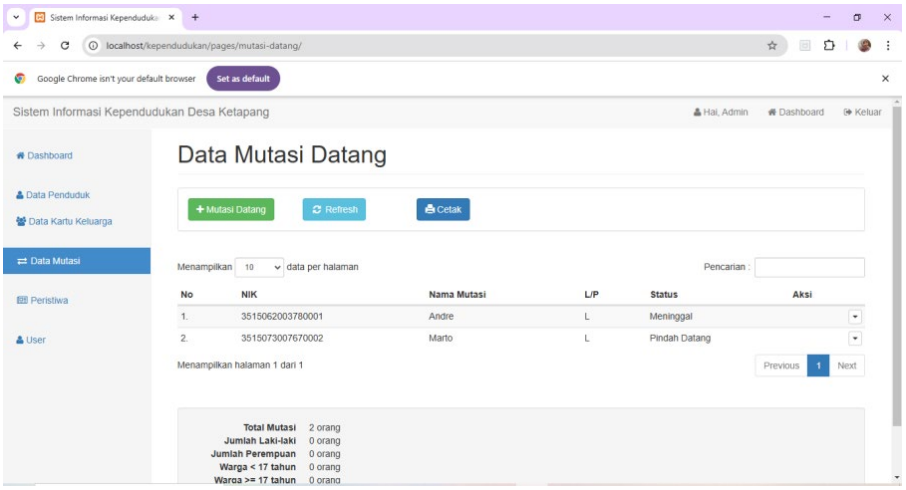

Figure 12. Display of the Coming Mutation Menu

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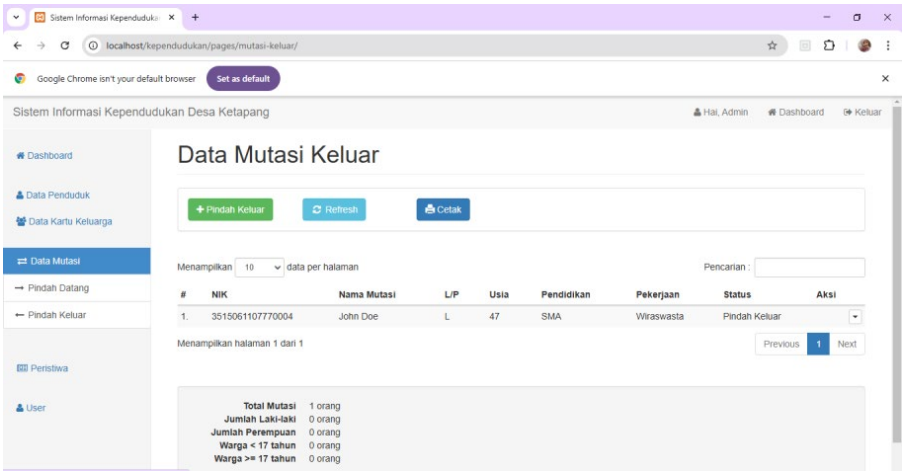

Figure 13. Outgoing Mutation Menu Display

3.5.6 Events Menu

The event data menu is divided into 2 menus, namely the birth menu and the death menu. Where both menus have the same page display and also the same data control. As with other menus, this page can also control data such as adding data, changing data, viewing data details and also printing data.

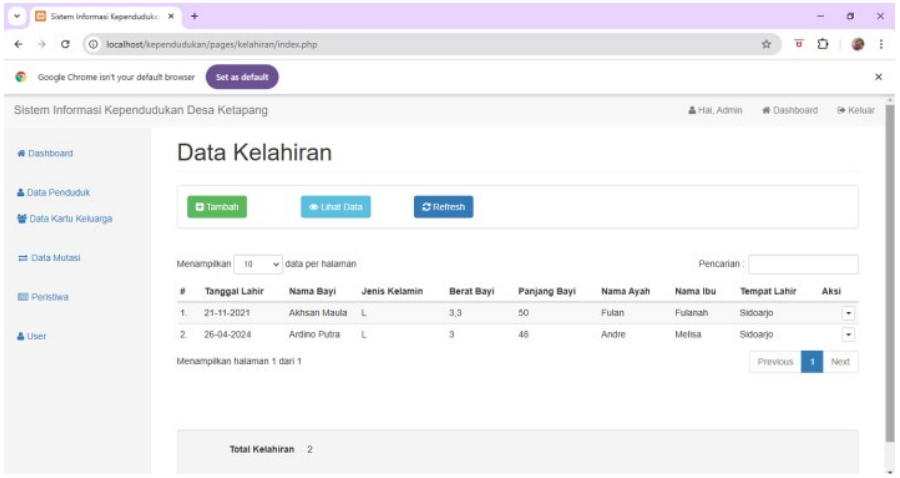

Figure 13. Birth Menu Display

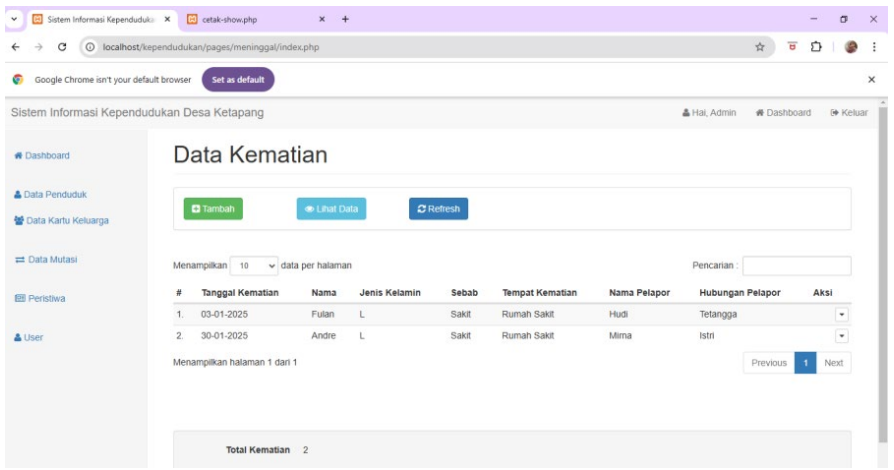

Figure 14. Death Menu DisplayUser Menu

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This page displays User data or application users, and this page can also control data such as adding data, changing data and viewing data details.

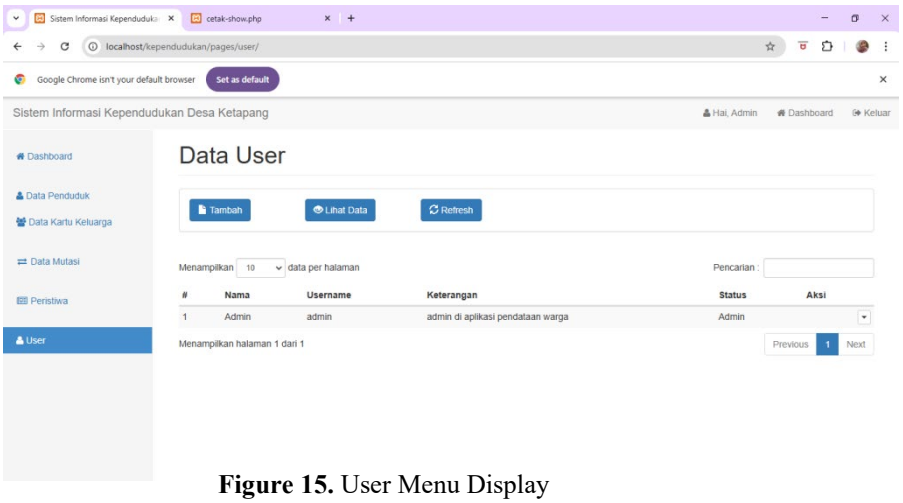

Figure 15. User Menu Display

3.5.7 System Testing

Black box testing is a software testing technique that focuses on verifying the functions of software without examining its internal code or design. The goal is to ensure that the inputs and outputs of the software conform to predetermined specifications.[14] The results of the tests carried out are summarized in Table 1.[15]

Table 1. *Black Box* System Testing

No.	Page	Testing Details	Testing Type	Testing Results
1	Login	Input username and password	Input and login	Successful
2	Dashboard	Display the population data panel, family card data and mutation data	Navigation between pages	Successful
3	Resident Data Menu	Add data, view data, refresh, print data, print individual data, Change data, upload files	Input Save, print	Successful
4	Family Card Menu	Add data, view data, refresh, print data, print individual data, Change data, Change family members, upload files	Input Save, print, delete	Successful
5	Coming Mutation Menu	Add data, refresh, print data, print individual data, Change data, upload files	Input Save, print	Successful
6	Outgoing Mutation Menu	Add data, refresh, print data, print individual data, Change data, upload files	Input Save, print	Successful
7	Birth Menu	Add data, refresh, print individual data, change data, upload files	Input Save, print	Successful
8	Death Menu	Add data, refresh, print individual data, change data, upload files	Input Save, print	Successful
9	User Menu	Add data, refresh, view data details, change, delete	Input Save, delete	Successful

4 Conclusion

The development of a web-based population information system has been successfully carried out and has shown positive results. This system is proven to be able to overcome problems that often arise in the management of population data manually, such as data inconsistency, difficulty in searching for information, and the slow process of administrative services. For further development, it is recommended to add additional features such as integration with other information systems, better security features, and a more attractive interface. In addition, it is necessary to conduct socialization and training to the community and village officials so that this system can be utilized optimally.

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References

[1] W. E. Mulatsari, D. M. Candrasari, and S. Suyudi, "Website-Based Population Administration Service Information System for Kenteng Village with System Quality Test Using the Mccall Software Quality Method," *Joined J. (Journal Informatics Educ.*, vol. 6, no. 1, p. 22, 2023, doi: 10.31331/joined.v6i1.2597.

[2] V. Y. P. Ardhana, "Web-based Village Population Data Information System," *SainsTech Innov. J.*, vol. 2, no. 2, pp. 1-5, 2019, doi: 10.37824/sij.v2i2.2019.99.

[3] S. F. Ula, U. N. Putra, J. R. Cibatu, C. No, and J. Barat, "Personnel Information System for Education Office using Waterfall Method," vol. 05, no. 21, pp. 403-411, 2020.

[4] Eka Hartati, Y. Aprizal, P. Informatics Studies, and P. Information Systems Studies, "Reading Room Digitization System ... 1191," pp. 1191-1203, 2023.

[5] A. Ardiansyah and S. Aji, "Development of a Mobile Phone Sales Information System Using the Waterfall Method," *J. Sist. Inf. Akunt.*, vol. 1, no. 1, pp. 2776-7973, 2021, [Online]. Available: http://jurnal.bsi.ac.id/index.php/jasika54.

[6] A. Anna, N. Nurmalasari, and Y. Rohayani, "Application of the Waterfall Method in the Design of a Goods Delivery Accounting Information System," *J. Sist. Inf. Account.*, vol. 1, no. 1, pp. 1-9, 2021, doi: 10.31294/justian.v1i1.279.

[7] A. A. Wahid, "'Analysis of the Waterfall Method for Information System Development,'" *J. Sciences Inform. and Manaj. STMIK*, vol. 1, no. November, 2020.

[8] A. Fajr Dinhar Saputri, J. Handoyo Student of Electrical Engineering Department, S. Ronggolawe Cepu Lecturer of Electrical Engineering Department, and S. Ronggolawe Cepu, "Web-based Personnel Information System (Case Study: Ronggolawe Cepu College of Technology)," *Simetris*, vol. 9, no. 1, pp. 1-7, 2015, [Online]. Available: https://www.sttrcepu.ac.id/jurnal/index.php/simetris/article/view/99.

[9] S. Fuadi and O. Candra, "Prototype of Automatic Plant Sprinkler with Arduino-based Humidity and Temperature Sensor," *JTEIN J. Tech. Elektro Indones.*, vol. 1, no. 1, pp. 21-25, 2020, doi: 10.24036/jtein.v1i1.12.

[10] Anggela Wulan, Syahidin Yuda, and Sari Irda, "Design of Inpatient Disease Index Information System at Pakuwon Sumedang General Hospital," *Open J. Syst.*, vol. 17, no. 3, pp. 549-554, 2022.

[11] L. A. N. Bpmn, "Recolecta - 2020 - Unknown - 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1," vol. 4, no. 1, pp. 7-13, 2022.

[12] R. R. Wijayanti, "Implementation of Augmented Reality as an Interactive Promotion Media for Food and Beverage Catalog at Hokcafe," *JIKA (Journal of Inform.*, vol. 2, no. 2, pp. 73-83, 2019, doi: 10.31000/.v2i2.1519.

[13] L. Setiyani, "System Design: Use Case Diagram Introduction," *Pros. Semin. Nas. Inov. Adoption Technol.* 2021, no. September, pp. 246-260, 2021, [Online]. Available: https://journal.uii.ac.id/AUTOMATA/article/view/19517.

[14] L. Tastilia, D. A. Megawaty, and A. Sulistiyawati, "Academic Administration Information System to Improve Services to Students (Case Study: Sma Pgri Katibung)," *J. Technol. and Sist. Inf.*, vol. 3, no. 2, pp. 63-69, 2022, [Online]. Available: http://jim.teknokrat.ac.id/index.php/JTSI.

[15] N. L. G. P. Suwirmayanti, I. K. A. A. Aryanto, I. G. A. N. W. Putra, N. K. Sukerti, and R. Hadi, "Implementation of Helpdesk System with Blackbox Testing," *J. Ilm. Intech Inf. Technol. J. UMUS*, vol. 2, no. 02, 2020, doi: 10.46772/intech.v2i02.290.