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Android-Based Population Information System of Gunung Sugih Village as a Public Service Innovation

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Abstract

This research aims to develop an Android-based Population Data Information System for Gunung Sugih Village as an innovative solution to improve the efficiency of population administration services. The main problem faced by the village is the manual data collection process, which often leads to delays, data duplication, and recording errors. The research methodology includes system requirements analysis, system design using the waterfall model, and functional testing through the *black box testing* method. The results show that the developed system can manage population data in a more structured and accessible manner through mobile devices. The application provides key features such as recording births, deaths, population movements, and managing administrative documents digitally. Based on testing results, all application functions operated properly and met user needs. The implementation of this system has been proven to improve the speed of administrative services, enhance data transparency, and ensure accuracy. Therefore, the development of this Android-based information system is expected to be an initial step toward realizing modern, effective, and digitally oriented village governance that supports sustainable public service transformation.

INTRODUCTION

In today's digital era, society has undergone many changes, especially in technology and government systems. Advances in information technology today can help humans in completing various tasks. Information about Android is an important need for today's society. Android is one of the rapidly developing technologies, which can provide information about certain areas, especially Gunung Sugih Village. Gunung Sugih is a village in the Kedondong Pesawaran sub-district area which is currently struggling to become a more developed and better village. Maybe there is a lot of information that we need and should know about Mount Sugih. According to the data obtained, the population of Mount Sugih is 2,789 people, consisting of 1,419 men and 1,370 women.

The previous research on population data collection includes Research I Made Sudibya et al. [2019] An application system for collecting data on immigrant residents in Tegallalang sub-district has been developed using the CodeIgniter framework. The purpose of creating this application is to simplify the data collection process. This application uses the blackbox

method. Research by Kristia Yuliawan [2021] Based on testing using the blackbox method, the BTN citizen data collection application. Griya Amban Pantai has succeeded well and made it easier for the RT chairman to add data and search for citizen data. So that residents are made easier to register and do not waste a lot of time. Ingrid Felicia's Research [2021] Application of non-permanent population data collection to support population data collection activities through the Banjarmasin City Civil Registration and Population Registration Office. This application is to make it easier for residents who want to collect data, make it easier for officers to record and make it easier for officers to manage data collection. So there are no errors in managing data or losing documents. Researcher Anna Syahrani et al. [2017] family data collection application is designed to be run on smartphone devices with the android operating system.this application has 8 interface display pages, namely the main page, the list page, the login page, the menu page, the population data input page, the summary page, the family planning page, the development and family page. So from the researchers above, there are still shortcomings and some limitations. This encourages me to create an android-based population data collection application that has more features, so that in the process of understanding it can be easier and liked by users.

Based on the first research, a feature is needed that allows finding the location of immigrants using Google Maps to make the data recording process easier. The second researcher has used google maps in collecting data on residents' houses but in displaying the results of field data in the form of graphs. Third, researchers have managed to produce good work, but there is still the possibility of developing using the latest technologies such as API (Application Programming Interface) instant messaging, so that both officers and residents can connect through existing systems. Fourth, a feature is needed to display data results in the field in the form of graphs and a feature that can be connected to google maps so that it can find residents' houses. The Gunung Sugih Village Village Office is one of the government agencies to collect population data for this reason, the village needs an application that can make it easier to do population data collection.

Gunung Sugih Village is currently still using a manual population data collection system, namely by visiting residents' homes directly and recording data using paper and pen. However, this method makes a lot of data not well archived, limited file storage space, and an ineffective and efficient data search process because you have to search one by one. Therefore, the researcher wants to create an application that aims to make it easier to find citizen data and make it easier for employees to manage population data collection with an android-based information system. With this application, it is hoped that it will be able to overcome the problems faced by Gunung Sugih Village Village in population data collection.

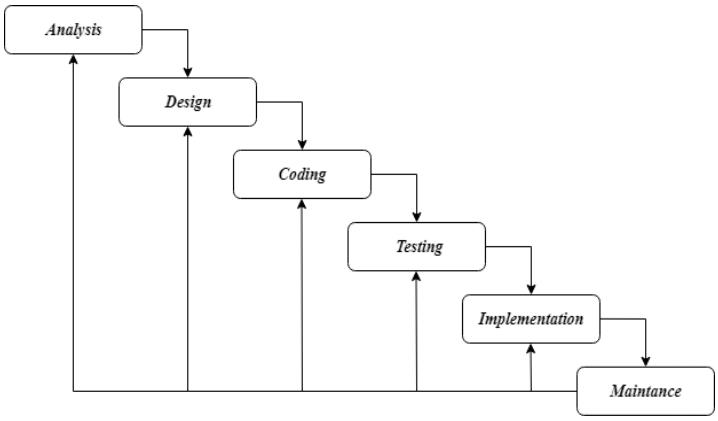
RESEARCH METHODS

Data Collection

In the early stages of the study, the authors obtained data using three different methods. First, literature studies are conducted to study sources such as books, media, experts, and the results of previous research. The goal is to establish the theoretical basis in this study. Second, observation is carried out by seeking information directly from residents in Gunung Sugih village, recording data and determining the right coordinates. Finally, the author also conducted interviews with village officials and related residents to obtain information about the population data collection process.

Planning Model

The Waterfall method is used in the development of population data collection applications in Gunung Sugih Village. This model emphasizes a structured and systematic process, where each stage is done sequentially. This concept can be compared to a waterfall flowing from top to bottom.



Gamabar 2. Waterfall

The Waterfall method is an application development model that emphasizes sequential and systematic phases. In the application of data collection of Gunung Sugih villagers, this method is used through several stages, namely needs analysis, design, code writing, testing, implementation, and maintenance.

1. The requirements analysis stage involves collecting software requirements.
2. At the design stage, the data structure, software architecture, detailed procedures, and interface characteristics are carefully considered. This is done to ensure that the software design is well-structured, has an easy-to-use interface, and detailed working procedures to meet the needs of users.
3. At the code writing stage, the need is transformed into code that can be understood by machines using the PHP programming language. Meanwhile, at the testing stage, checks are carried out on the internal logic of the software, external functions, and the possibility of errors or bugs in the software.
4. The implementation phase is carried out after the application has passed the test and requires computer hardware support and appropriate policies. This is done to ensure that the application can run smoothly and meet the requirements that have been set.
5. The maintenance phase includes efforts to maintain the software so that it can remain optimally used, by handling data developments, intruder program threats, errors or bugs in running applications, adding new features, and keeping up with technological developments. This is done to ensure that the software can run properly and meet the needs of users at this time and in the future.

DISCUSSION

System Design

Context diagrams are used to show the relationship between the system and external entities such as inputs and outputs from the system. This diagram is depicted in the form of a single circle that represents the system as a whole. In the data collection information system of Gunung Sugih villagers, a context diagram is used to explain the scope of the system.

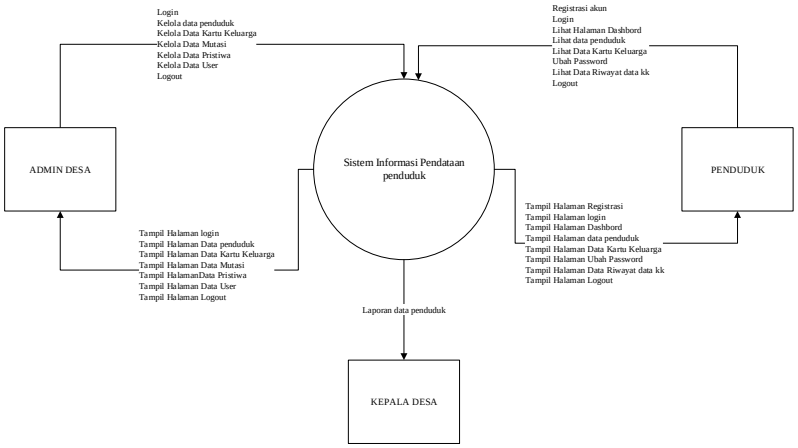


Figure 2. Context Diagram

Data Flow Diagram (DFD) Level 0

Data Flow Diagram (DFD) is a diagram that describes the data flow of an information system. The diagram also shows information about the inputs and outputs of each entity and process involved. The DFD image below is an example of DFD applied in the population data collection information system.

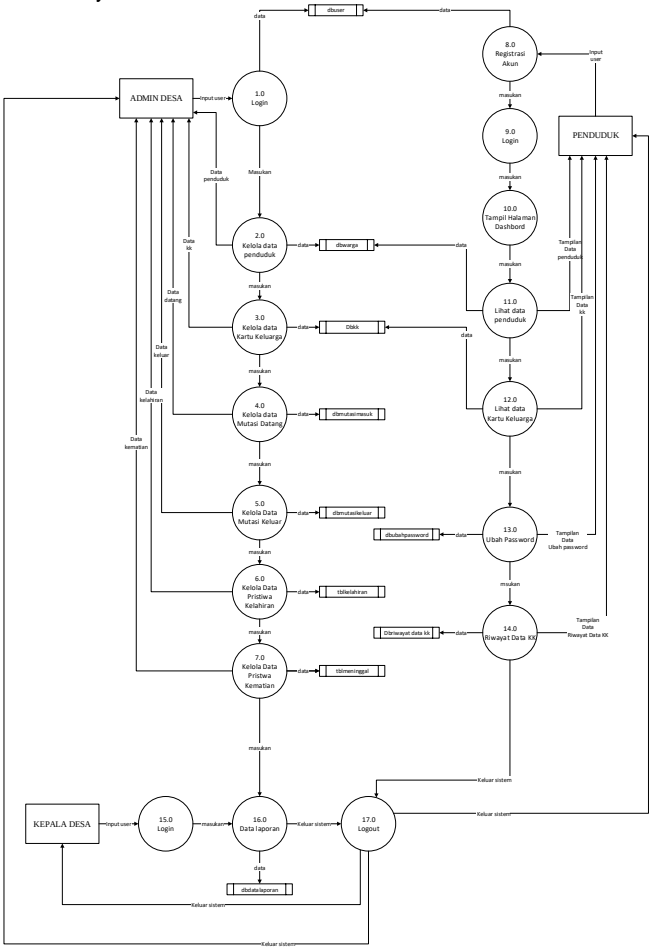


Figure 2. DFD level 0

Program Implementation

Registration page view

On this page, Residents must register first by registering using email and password.

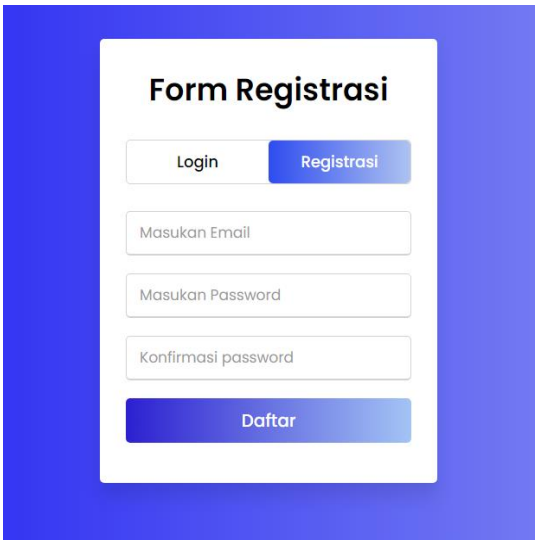


Figure 3. Registration Page

Main menu view

On this page, the Village Administrator can see all the information about the Resident stored in the system. On this page, Village Administrators have access to view information about citizen data can add, edit, and delete citizen data.

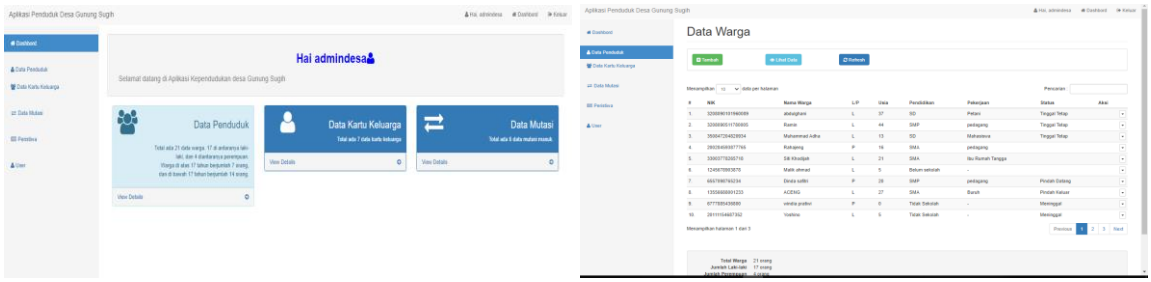


Figure 4. Main Menu

Family Card Data menu display

On this page, the Village Administrator has the ability to view information regarding family card data. In addition, Administrators can also add, edit, and delete family card data.

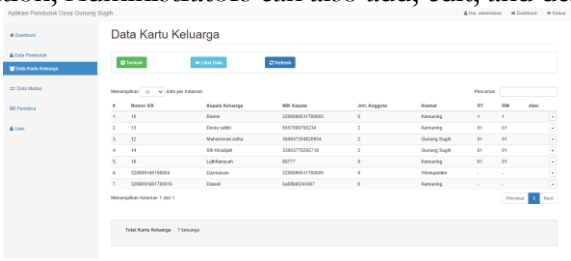


Figure 5. Family Card Data Menu Page

Incoming Mutation Data menu display

On this page, Village Administrators can view information about the Coming Mutation data, including adding, editing, and deleting the Coming Mutation data.

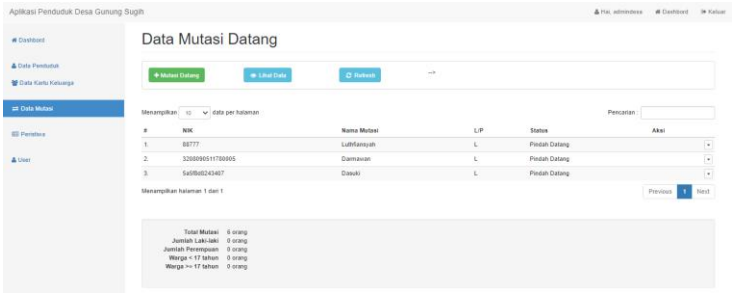


Figure 6. Mutation Data Menu Page Comes

Analysis of Research Testing Results

Based on the results of the test using the black box testing method, all the main functions in the population data collection application have been tested and show results that are running as expected**.** Every menu contained in the system, from the registration page to the death event data menu, can be run properly without any bugs or system errors being found. This shows that the integration process between the user interface components and the system logic has been functioning optimally.

At the test stage, the test is carried out with a focus on the functionality of the system without looking at the structure of the program code, in accordance with the principles of the black box method. The test results in the table show that each application menu, such as registration, login, dashboard, and population data management (mutation, birth, death) has operated correctly and provides outputs according to the input entered by the user. Thus, the system is considered stable, responsive, and ready to be used by users in the village government or pekon environment.

Overall, the results of this study prove that the web-based population data collection information system developed has met the criteria of functional validity, namely that each feature is able to work according to the design without experiencing errors during testing. In addition, the success of this test also indicates that the application has a good level of reliability to be implemented in population administration activities. These findings support the research goal, which is to create an efficient, accurate, and easy-to-use information system to improve public administration governance at the village level.

The results of software testing using the black box testing method show that all major functions in the population data collection application have run well without any errors or *bugs* found. Every feature, from the registration process, login, population data management, to recording birth and death events, functions according to the initial design of the system. This success indicates that the application has a high level of functional validity and is able to provide output results that match the input received. Thus, the system is considered feasible to be implemented at the village government level as a means of digitizing population administration services.

The positive impact of the results of this test can be seen in the increase in the effectiveness and efficiency of village administration management. The system that has been tested is able to assist village officials in managing data quickly, accurately, and integratedly, thereby minimizing the risk of recording errors that often occur in manual systems. In addition, the implementation of this application has the potential to increase the transparency of public services, because the public can obtain population information more easily and quickly. This is in line with the direction of government policies in strengthening information technology-based governance to realize the concept *of smart villages* that are accountable and oriented towards optimal public services.

The results of this study are in line with several previous studies that support the effectiveness of the black box testing method in testing government information systems.

Research by Sari and Prasetyo (2021) shows that black box testing is effective in ensuring the readiness of public service systems before implementation. Similar findings were put forward by Nugroho et al. (2020) who stated that web-based information systems that pass functional tests can increase the efficiency of village administration by up to 40%. In addition, research by Wahyudi and Lestari (2022) revealed that the digital administration system that has gone through black box testing has a positive effect on increasing the speed of service and public trust. Thus, the results of this study strengthen the empirical evidence that black box testing plays an important role in ensuring the successful implementation of a reliable, efficient, and transparent village information system.

CONCLUSION

This study shows that the development of an Android-based Gunung Sugih Village Population Data Collection Information System is able to make a real contribution to improving the quality of population administration services at the village level. Through the design and implementation of the system, the data collection process that was originally carried out manually can now be done digitally, quickly, and accurately. This application makes it easier for village officials to manage population data such as births, deaths, transfers, and the creation of administrative documents without having to go through a repetitive recording process. From the results of testing the system using the *black box testing* method, it was obtained that all functions run according to user needs. User responses, both from the village apparatus and the community, show a high level of satisfaction with the ease of use and efficiency of service time. This proves that the application of mobile technology can be an effective solution in facing the challenges of digitizing public services in rural areas. Overall, the implementation of this system supports the principles of transparent, accountable, and efficient village governance. The implementation of Android-based applications not only improves the performance of village officials, but also strengthens community participation in obtaining faster and more reliable population services. Thus, this information system can be used as a model for the implementation *of e-Government* at the village level towards a sustainable digital transformation of government.

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