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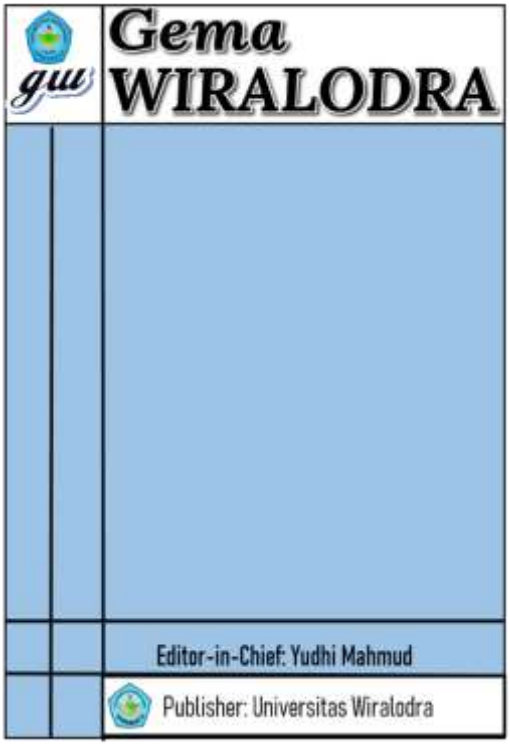

Development of Smart Villages through Electronic Population Census in Kalimati Village, Jatibarang District

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Orginal Article

Development of Smart Villages through Electronic Population Census in Kalimati Village, Jatibarang District

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Abstract
Kalimati Village is one of the villages in Jatibarang District, Indramayu Regency, West Java Province. Most of the residents work as farm laborer's, who need attention in Information Technology assistance so that residents understand the formation of a smart village. To form a smart village, there are problems that occur, namely economic, educational, and social. The research was carried out using the Action Research method and the prototype system development model. By looking at the problems above, we get a population of 80% farm laborers and 30% random sample as respondents. The results of this study are in the form of data analysis that will be used for the development of a system with a multi-access-based prototype model that focuses on the economic census of the population towards a zero poverty society.
Keywords: Kalimati Village, Smart Village, Action Research, Prototype Model

1. Introduction

The development of information technology (IT) is currently a very important requirement for almost all business organizations, including government and private industries, as a support for increasing the effectiveness and efficiency of performance processes. Centralized digitalization is still being carried out massively and measurably, so as to provide knowledge value for the future (Sumardiono & Marfu'ah, 2021). The application of information technology as a tool in administrative processes and the provision of useful information for all parties can improve government performance and be in line with the goals set. A higher degree of digitalization in new ventures' product/ service offerings and their processes can lead to a faster time to market and the ability to rapidly scale (Proksch et al., 2021). As stated above, digitalization can improve performance, the possibility to significantly impact the performance (Proksch et al., 2021). In fact, digitizing or applying the required system is a data.

Data is a requirement as information for users. Data as information in question is evidence of a group/population/world community including the population of the Republic of Indonesia. Data such as religion, social, economic, or other identities that are used as data. The data referred to above is a census. Census is data collection that is carried out through enumeration of all population units throughout the territory of the Republic of Indonesia to obtain the characteristics of a population at a certain time (Undang-Undang Republik Indonesia No. 16 Tahun 1997 Tentang Statistik, 1997). The census is the beginning of a data that is used as information for a country, urban areas, and villages, and the village of Kalimati is no exception. A concept developed in rural area that provides solutions to problems occurred and improves the quality of life (Cahyo et al., 2020). With the quality of life in rural areas (rural) with the concept of digitization (information technology) as a solution to rural performance, digitally advanced information environments (Olsen, 2020) in Kalimati Village, Jatibarang District, Indramayu Regency. Looking at several problems in the population census data, such as incorrect recording of the population census causing the census results to be illegible, the results of the population census report often result in discrepancies between the exact data and the data recorded by officers, so that the population declared to be working, farming and not working is still estimate. With electronic population data collection (information system), it is hoped that it can help provide effective and efficient village government services.

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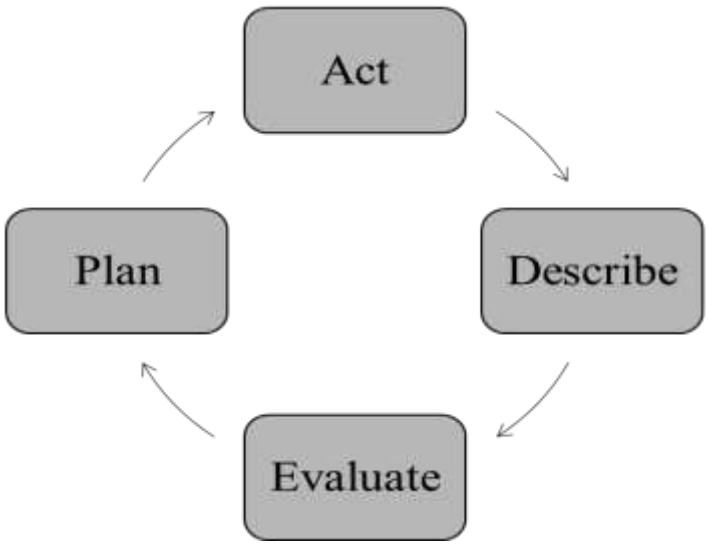
Kalimati Village, Jatibarang District, Indramayu Regency is a village where a portion of the population is of a middle to lower socio-economic level, and with village population data in question are such as economic strata or economic conditions, education (level of education), or those relating to the geography of the villagers. As explained above, services are still provided in writing and reports often contain errors (inappropriate), so it is necessary to develop an electronic population census. The above, is combining technology with insight into the behavior of rural communities, combining technology with behavioral insights may allow (Ranchordás, 2020), smart rural and help these urban centers achieve their sustainability goals and promote civic engagement (Ranchordás, 2020).

2. Method

A Smart village is an adopted or derivative concept of a smart city (Kennedy et al., 2022), which is seen from the elements of smart government, smart environment and smart community (Muhtar et al., 2023). In this study using research with the action research method, in which action research is a method that pivots in an action. Action research is research that is both qualitative and quantitative (Sauda & Agustini, 2020). Action research can address a problem at the same time with the aim of improvement or participation (Hasibuan, 2007). The action research there is a discrete action research method, the results of this research can contribute greatly in determining various policies taken at the district level (Muhammad Yaumi & Damopolii, 2015). Research can either be applied (or action) research or fundamental (to basic or pure) research, Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organization (Kothari, 2004). To carry out this research so that the research is right on target, the research makes research methods as shown in Figure 1.

Figure 1
Action Research Method



Action research is utilized to resolve issues and problems in the academic or workplace environment with a strategy to interpret, explain, and gather data (Quayson, 2019). PELRS is an experiment in focused experimental intervention in the English school system, adopting action research methodology (Somekh, 2006). The PELRS frameworks and case studies were put on a password-protected area of the project website as they emerged, so that reporting and dissemination of the work was in the form of a digital ethnography emerging incrementally (Somekh, 2006).

The development of a population census information system by looking at the economic strata field with the method used is SDLC (system development life cycle) which focuses on

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prototype models. The SDLC method is a traditional method, which is carried out up to the verification stage, meaning that in this model several evaluation stages are carried out if a system failure occurs until the system is working properly (Sumardiono, 2021). The lifecycle begins with designing and implementation followed by testing, verification (Dehraj et al., 2019). Prototype system development model that adapts to user conditions. With the prototype model, it can be efficiently evaluated. Prototypes are not new in categorization and concept learning where the abstractions of ideal prototypes can optimize performance (Henriksson, 2019). The project has four phases, design and develop, evaluated people to assess the structure, design, and presentation format, the development of a full the program, evaluate efficacy and user acceptability (Cunningham et al., 2006). Steps of the requirements technique in the prototyping model method: Analyze, Creating, Adjusting, Creating a New System, Doing System Testing, Adjusting to User's Desires, Using the System (Wulandari et al., 2021). The prototype development model has five stages, namely the communication stage, the rapid planning stage, the model design stage, the prototype building stage, the monitoring and controlling stage (Mangani & Shadiq, 2022).

Figure 2
Prototype Model System Development

Looking at figure 2 above, it will explain the stages as in figure 2 above.

Plan
In this case, the planning stage in question is explaining literacy studies and field observations on research objects carried out in Kalimi Village, Jatibarang District, Indramayu Regency.

Analysis, Design, Implementation
Currently, development needs analysis and smart village analysis have produced primary data results, analysis of smart villages in the form of looking at several domains, aspects and indicators (Aziiza et al., 2023). These will be used to build a system design and description using an object-oriented model (UML) and to implement the system as a web-based e-census application.

System and Evaluation
This system stage is the result of the implementation of a product, which then takes the form of an application prototype product and will be evaluated through product use approximately 1 year after product implementation. The evaluation stage will be carried out if there are bugs or fatal errors.

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3. Results and Discussion

The research was carried out in the form of action in the form of direct observation of objects in order to obtain data from the results of interviews and questionnaires that depict respondents' understanding of information systems as well as literacy related to this research. With a sample of 30% of respondents from a total population of 188 farmers and 7 village officials, the results of interviews obtained by looking at indicators of knowledge of information technology/information systems showed that 59% knew and 41% did not know; the use of information technology/information systems found that 61% used it and 39% did not; information technology infrastructure/information systems, data was obtained that 5% existed and 95% did not exist. The explanation above is depicted in Table 1.

Table 1
Indicators of Understanding of Information Technology and Information Systems

	Yes	No
Knowledge IT/IS	59%	41%
Use of IT/IS	61%	39%
Understanding of IT/IS Infrastructure	5%	95%
Understanding of Operating a Computer	3%	97%

Plan

Considering the information technology and information systems indicators in table 1 above—which will serve as primary data for the needs analysis—as well as the Kalimantan village population as reported by the local population census, which shows 3236 people overall—of whom 1730 are men and 1506 are women. The number of education levels is the next indicator, which might affect how users use the system that researchers will be developing. A needs analysis will then be conducted and a multiuser system will be constructed based on several indicators mentioned above. Indicators of the range of educational attainment among a sample population are displayed in.

Table 2
Total Population

	Sum
Mans	1730
Womans	1506
Total	3236

Table 3
Education Levels

	Sum	%
No School	30	15%
Elementary School	34	17%
Junior High School	50	26%
Senior High School	60	31%
College	21	11%

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Sum Total	195

Analysis, Design, Implementation

A system design, as illustrated in the figure, was derived from the findings of the system development analysis. It took the shape of sequence diagrams, class diagrams, the e-census use case diagram, login activity diagram, data validation activity diagram, population data activity diagram, report activity diagram, and logout activity diagram. beneath this

Figure 3

Use case Diagram

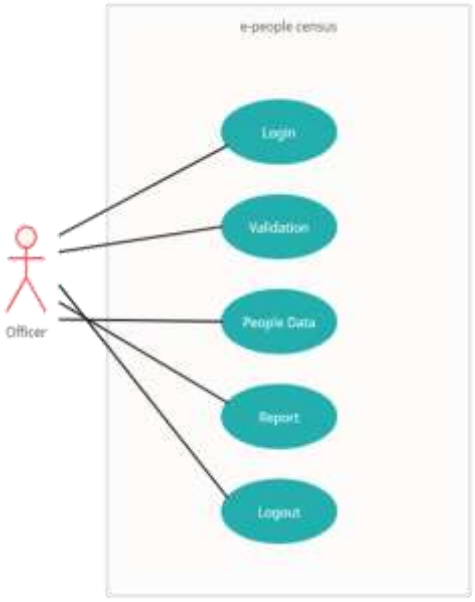

Figure 3 explains the application design that the author will create. where the design is explained using a Use case Diagram (user diagram). In the use case diagram, officers can do things like log in, validate data, add resident data, make reports, and log out. This application is only used by one user, namely village officials.

Figure 4

Activity Diagram Login

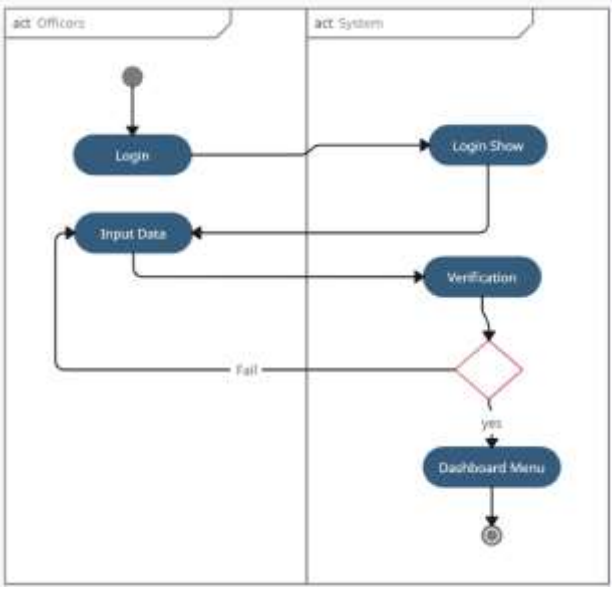

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Figure 4 explains login access before inputting data or updating data, so Figure 4 is the system security level of e-census.

Figure 5

Activity Diagram Validation and Update Data

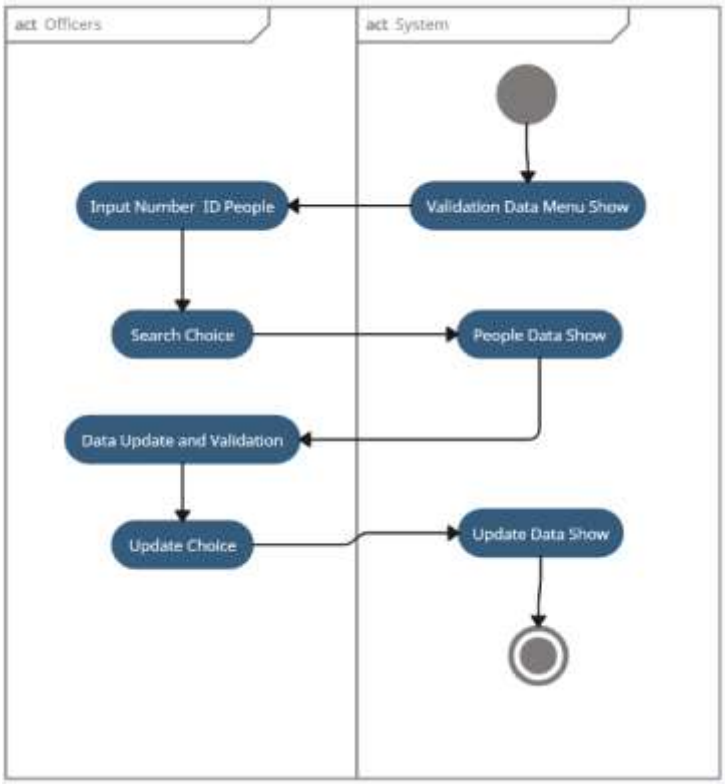

Figure 5 explains the validation of community data such as education, employment, income, family size, and data about self and family on the family card. Figure 5 is necessary because certainty regarding education and income will have an impact on welfare.

Figure 6

Activity Diagram Report

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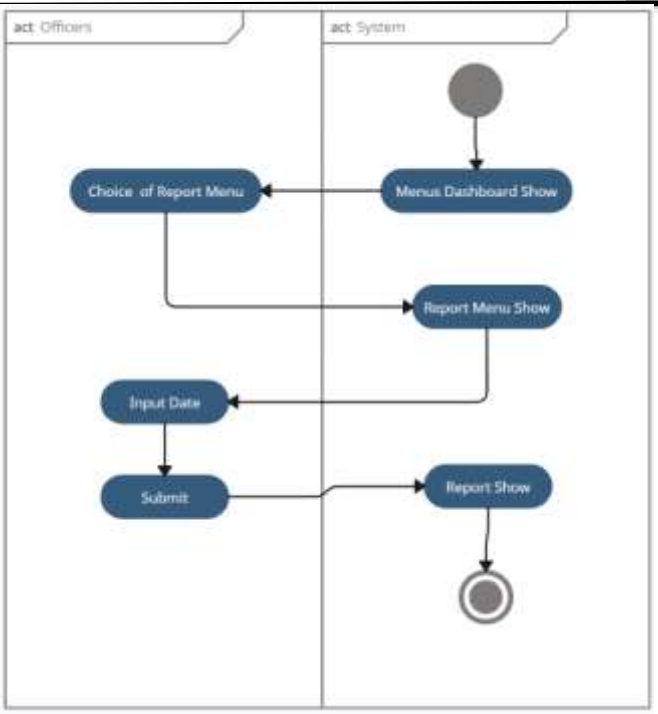

Figure 6 explains the flow of officer activities in displaying and providing reports regarding the results of validating or updating population data. The report as in Figure 6 only officers can access and report.

Figure 8
Sequence Diagram Data Validation

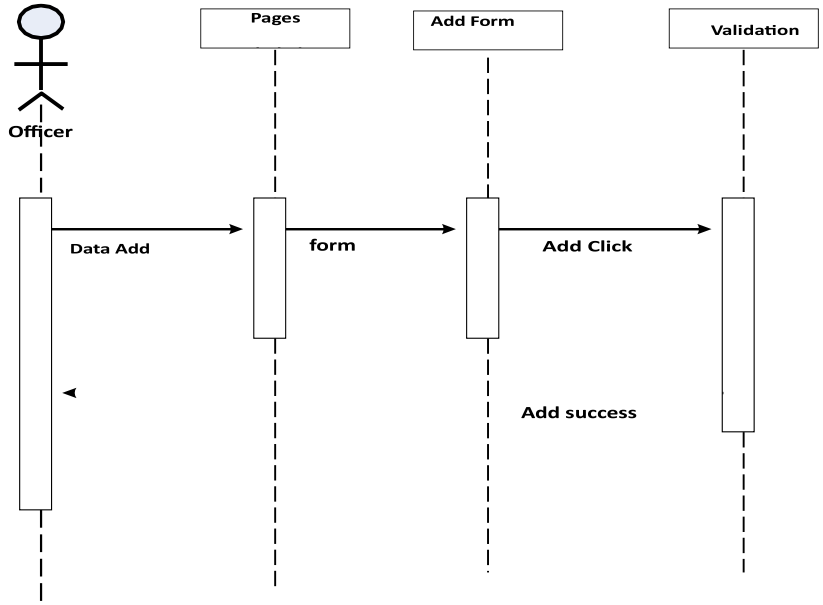

Figure 9
Sequence Diagram Report

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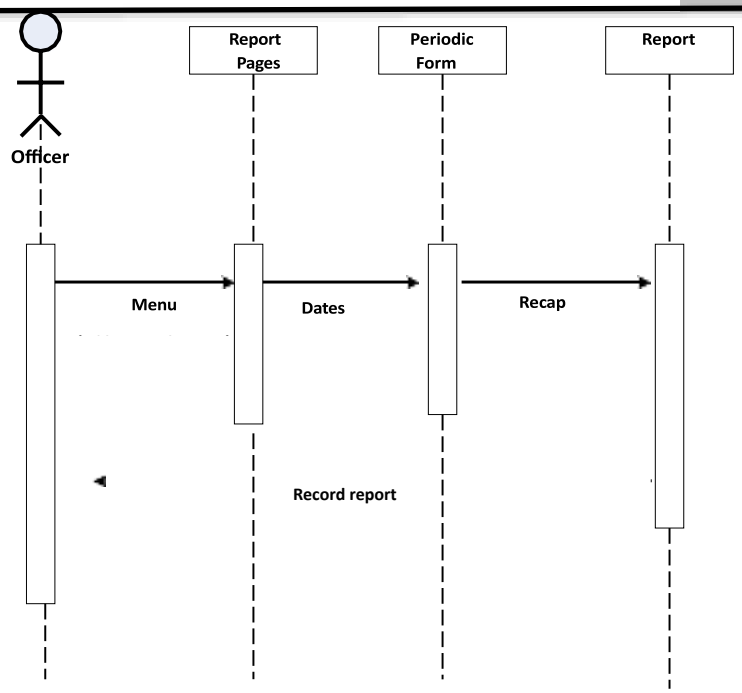

Figure 10
Class Diagram

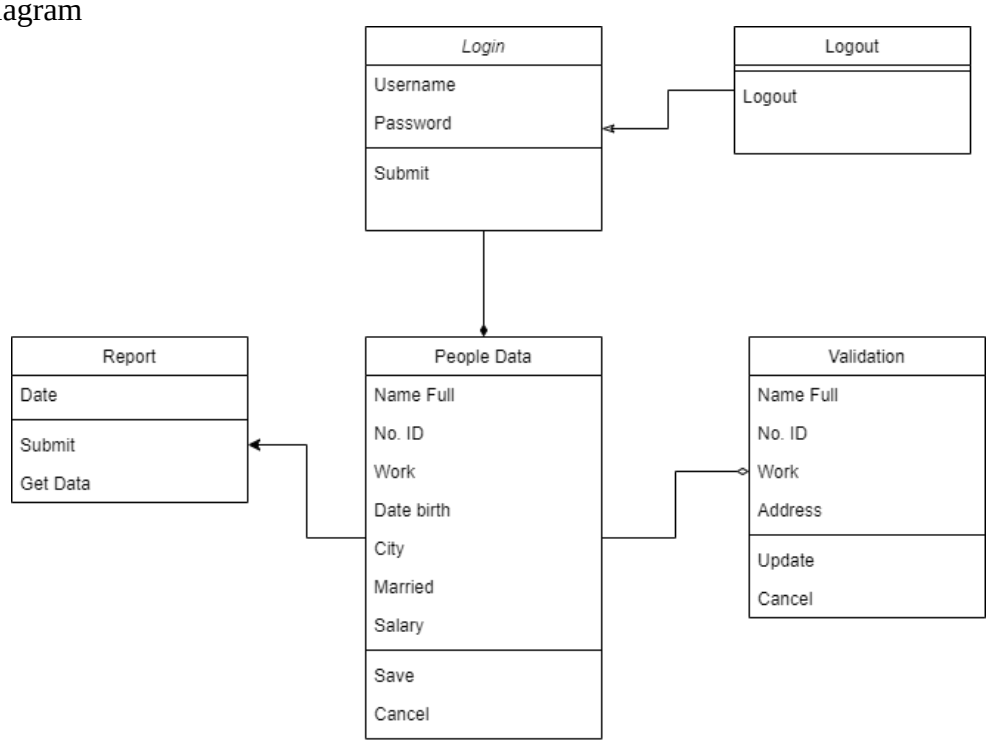

Figure 10 explains the class diagram, where the diagram describes the use case diagram, such as the login use case with the login class. The login class explains the attributes and methods it uses, as well as the menu class, validation class and user class.

System and Evaluation
Figure 11
Main Page and Login form

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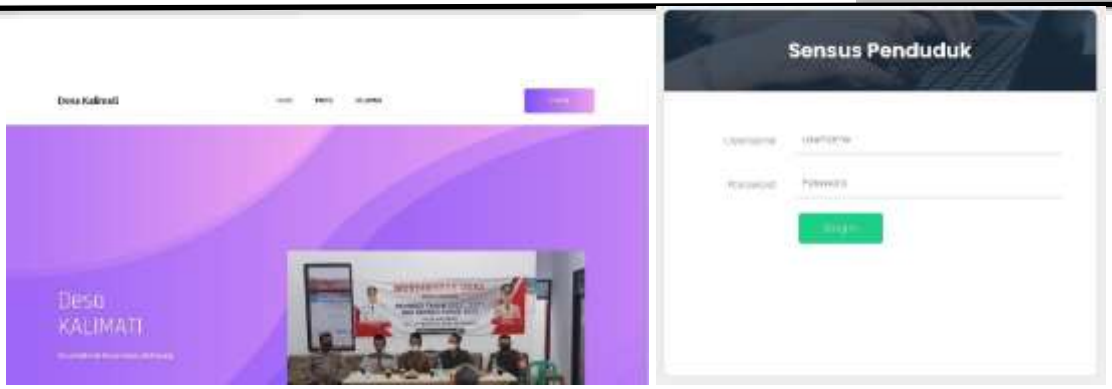

Figure 12
Data Add Page

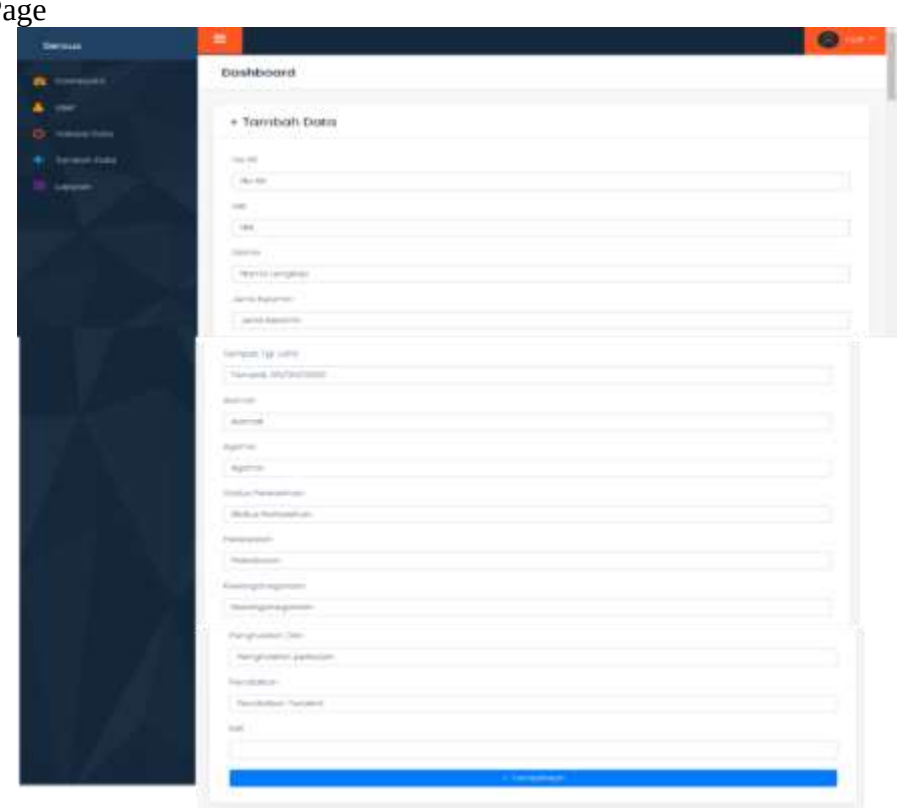

Figure 13
Report Page

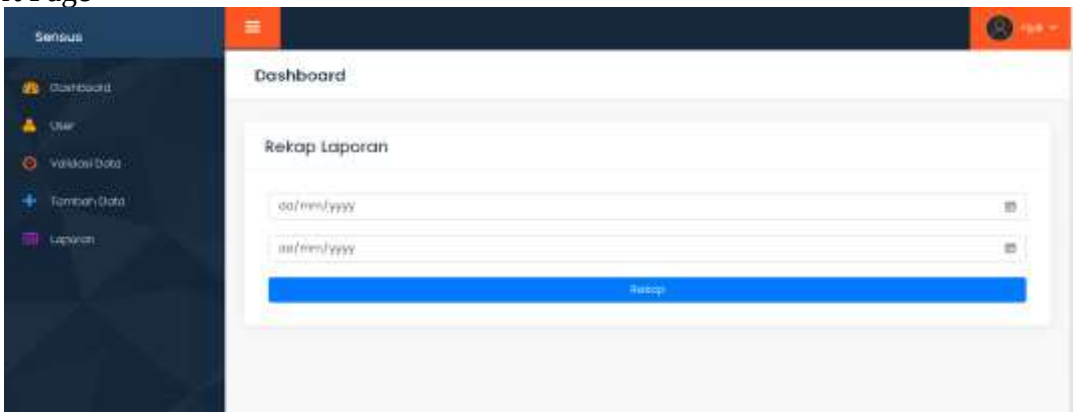

Figure 14
Report

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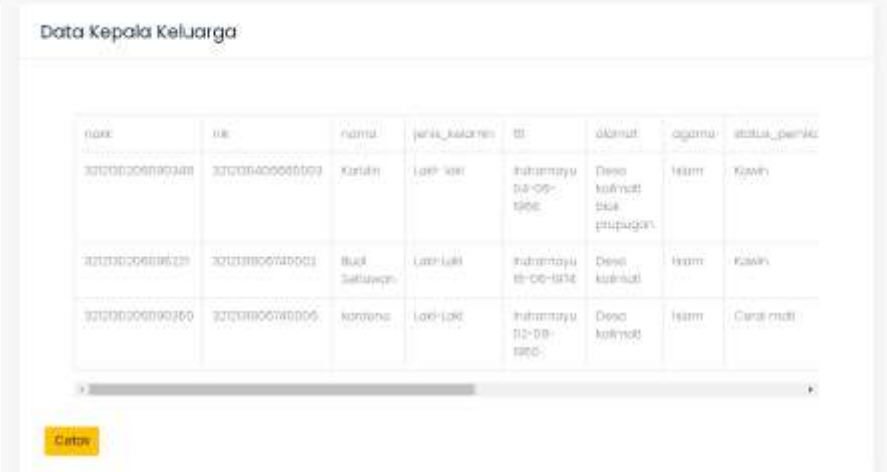

This phase, which stands for the last cycle of the prototype process, entails evaluating the system in its design state. For the system to continue providing the required support, the program must be modified in different ways as the user uses it. This stage might be referred to as a system maintenance process. Examine a number of public service aspects from smart village implementation for the assessment phase, including integrated services, utilization of ICT-based services, administrative service indicators, and community complaints (Aziiza et al., 2023). This research provides results regarding ease of access for officers in providing information to the public effectively and efficiently. This system still needs to be reviewed, especially for other users, namely the Kalimati village community, so that the actual impact is not that the community is able and understands the use of information technology. If you see from other authors that the population census information system only determines the poor and rich, in this system the approach is to working and non-working populations, so that the data can be valid for population administration use.

4. Conclusion

Private and semi-public data together with evidence of consensus work are characteristics designed for the smart census that serve to validate and verify the success of gathering population data according to economic strata. 3236 people live in Kalimati Village, Jatibarang District, Indramayu Regency, West Java, and there is a growing need for research that would result in smart villages. An project called the "smart village" in Kalimati village makes use of demographic information from 30% of random samples. A product known as e-census development is derived from a number of factors that are measured for application in the development of smart villages, such as administrative services, ICT-based services, as well as indicators for the formation of smart villages.

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5. References

Aziiza, A. A., Sulistiyani, E., & Fitri, A. S. (2023). What is the Element of the Smart Village Model?: Domains, aspects and indicators. *INTENSIF: Jurnal Ilmiah Penelitian Dan Penerapan Teknologi Sistem Informasi*, *7*(1), 146–160.

p-ISSN: **1693-7945**
e –ISSN: **2622 - 1969**

https://doi.org/10.29407/intensif.v7i1.18898

Cahyo, D. S. D., Silubun, A. J., Kalalo, J. J. J., Yudianto, E., & Susanto, S. (2020). *The Smart Village Model for Rural Area (Case Study : Banyuwangi Regency) The Smart Village Model for Rural Area (Case Study : Banyuwangi Regency)*. https://doi.org/10.1088/1757-899X/722/1/012011

Cunningham, M., Rapee, R., & Lyneham, H. (2006). Feedback to a prototype self-help computer program for anxiety disorders in adolescents. *Australian E-Journal for the Advancement of Mental Health*, *5*(3), 216–224. https://doi.org/10.5172/jamh.5.3.216

Dehraj, P., Sharma, A., & Grover, P. S. (2019). Maintenance assessment guidelines for autonomic system using ANP approach. *Journal of Statistics and Management Systems*, *22*(2), 289–300. https://doi.org/10.1080/09720510.2019.1580906

Hasibuan, Z. A. (2007). Metodologi Penelitian Pada Bidang Ilmu Komputer Dan Teknologi Informasi. *Konsep, Teknik, Dan Aplikasi, Universitas Indonesia*, 194.

Henriksson, M. P. (2019). Cue abstraction and ideal prototype abstraction in estimation tasks. *Journal of Cognitive Psychology*, *31*(1), 76–91. https://doi.org/10.1080/20445911.2018.1564755

Kennedy, P. S. J., Tobing, S. J. L., Toruan, R. L., & ... (2022). Smart Village Implementation Concept for Community Empowerment in Tourism Villages in the Lake Toba Region. *... , Education, Law, and ...*, 985–997. http://journal.unj.ac.id/unj/index.php/hispisi/article/download/31014/13797

Kothari, C. R. (2004). *Research Methodology* (Second Edi). New Age Internasional (P) Limited. https://www.ptonline.com/articles/how-to-get-better-mfi-results

Mangani, S. A., & Shadiq, J. (2022). Alat Monitoring Dan Kontrol Peralatan Listrik Pada Ruangan Berbasis Internet Of Things. *INFORMATICS FOR EDUCATORS AND PROFESSIONAL : Journal of Informatics*, *6*(1), 63. https://doi.org/10.51211/itbi.v6i1.1673

Muhammad Yaumi, & Damopolii, M. (2015). Action research. In *Pflege* (Vol. 28, Issue 5). https://doi.org/10.1177/001872677602900302

Muhtar, E. A., Abdillah, A., Widianingsih, I., & Adikancana, Q. M. (2023). Smart villages, rural development and community vulnerability in Indonesia: A bibliometric analysis. *Cogent Social Sciences*, *9*(1). https://doi.org/10.1080/23311886.2023.2219118

Olsen, R. K. (2020). Connecting People? Understanding Media's Role as Democratic Resources for People in Digitally Advanced Local Environments. *Digital Journalism*, *8*(4), 506–525. https://doi.org/10.1080/21670811.2019.1679029

Proksch, D., Rosin, A. F., Stubner, S., & Pinkwart, A. (2021). The influence of a digital strategy on the digitalization of new ventures: The mediating effect of digital capabilities and a digital culture. *Journal of Small Business Management*, *00*(00), 1–29. https://doi.org/10.1080/00472778.2021.1883036

Quayson, F. (2019). Understanding Action Research Methodology As A Strategy To Reflect, Design, Implement, Refine, And Gather Data To Explore Questions Of Professional Interest. *The Interdisciplinary Journal of Advances in Research in Education*, *2*(1), 1–14. https://doi.org/10.55138/sq104284feo

Ranchordás, S. (2020). Nudging citizens through technology in smart cities. *International Review of Law, Computers and Technology*, *34*(3), 254–276. https://doi.org/10.1080/13600869.2019.1590928

Sauda, S., & Agustini, E. P. (2020). Implementasi Prototype Model dalam Pengembangan Aplikasi Smart Cleaning Sebagai Pendukung Aplikasi Smart City. *MATRIK : Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, *20*(1), 73–84. https://doi.org/10.30812/matrik.v20i1.673

p-ISSN: **1693-7945**
e –ISSN: **2622 - 1969**

Somekh, B. (2006). *Action Research : a Methodology for Change and Development*.

Sumardiono. (2021). Perancangan Sistem Penilaian (E-Result) Pegawai dengan Model Waterfall di Universitas XYZ. *TEKNOSAINS : Jurnal Sains, Teknologi Dan Informatika*, *8*(1), 45–53. https://doi.org/10.37373/tekno.v8i1.76

Sumardiono, S., & Marfu'ah. (2021). Rancang Bangun Sistem Informasi Kearsipan Surat dengan Model Waterfall. *Gema Wiralodra*, *12*(2), 269–278. https://doi.org/10.31943/gemawiralodra.v12i2.192

Undang-Undang Republik Indonesia No. 16 Tahun 1997 Tentang Statistik, Pub. L. No. No. 16 (1997). https://jdihn.go.id/files/4/1997uu016.pdf

Wulandari, D. A. N., Bahar, A. A. H., Arfananda, M. G., & Apriyani, H. (2021). Prototyping Model in Information System Development of Al-Ruhamaa' Bogor Yatim Center Foundation. *Jurnal PILAR Nusa Mandiri*, *17*(2), 127–136. www.bsi.ac.id