



DESIGN AND DEVELOPMENT OF A MOBILE-BASED E-RT INFORMATION SYSTEM IN AN EFFORT TO IMPROVE SERVICES TO CITIZENS

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ABSTRACT

E-RT is a development of E-Government to improve public services so that people in the surrounding environment can more easily access information. One of the neighborhood Association functions is to create security, order, harmony and comfort in the environment. This security and order can be realized with one rule: guests must report 1 x 24 hours. However, the lack of public awareness of this rule means that the rule is not implemented. So this research aims to develop e-RT applications in the fields of security and order and comfort to increase effectiveness and efficiency, especially in reporting guests who come to the neighborhood Association environment as well as reporting on citizen activities and finances that are transparent and easy to access information. The approach used is qualitative with descriptive methods. The research results are in the form of an e-RT application that can be accessed by residents and neighborhood Association administrators. In this research, application design is based on user needs analysis, where data collection uses the interview method. In visualizing and building application model concepts, this research uses UML. Application testing uses the black box method with initial results containing errors in scenarios three and seven, so the test success is only 80%. After scenarios 3 and 7 have been repaired, especially in the coding part, the application can run 100% according to its needs or function. The conclusion in this research is that E-RT is a faster system for carrying out reporting without being limited by time and distance.

Keywords: E-government; E-RT; information technology; neighborhood association; public services

INTRODUCTION

Sustainable Cities and Communities is one of the 17 points on the agenda or objectives of the Sustainable Development Goals (SDGs) (UNICEF, 2020). In urban areas, it is still very vulnerable and there is even a higher crime rate in the environment. Low security has the potential for crime or crimes to occur (Ilham, 2019). The increasingly high crime rate means that the mandatory 1x24 hour reporting rule must be implemented in various regions. This is expected to improve the maintenance of security, order and harmony between citizens starting from the lowest level of government, namely the Neighborhood Unit (Yura et al., 2021). However, due to the lack of public awareness of this rule, residents have to come to the neighborhood Association's house to report. The distance that is too far from residents' houses to the neighborhood Association's house is also a problem in implementing guests who are required to report 1 x 24 hours, which is not optimal.

The government has developed an information technology system for government known as e-government. E-Government aims to increase the formation of information networks between the government and the community and improve public services so that it is easier for the public

to get access to information (Dhevina, 2018). According to Wirawan, (2020), in this era of revolution 4.0, the application of e-government has developed following technological developments, especially information technology. By utilizing information technology, the government can improve public service processes that are more effective and efficient, affordable, and expand public access (Kurniati et al., 2021).

This increase will result in increased public participation and transparency towards the government. However, this expansion of public access has not reached the lowest levels of government such as the neighborhood Association. In the framework of government and community services, the village government or village head, through community deliberations, forms an institution. This institution is known as neighborhood Association. Where one of the functions of the neighborhood Association is maintaining security, order and harmony between residents as well as the comfort of residents, which has been stated in the Minister of Home Affairs Regulation Number 5 of 2007 (Permendagri 5/2007) concerning Guidelines for Structuring Community Institutions.

In the local government's efforts to create security, order, harmony and comfort for residents, a rule has been made that requires guests to report 1 x 24 hours in terms of implementing community order and reporting activities related to residents' activities so that residents can obtain information quickly. When residents in a different environment visit a friend or relative's house for a long time, the friend or relative should report the guest to the authorities. This rule, apart from data collection, is also an effort by the local neighborhood Association government to protect the community from crime and to anticipate crime levels including terrorism (Yogi et al., 2022), (Bachtiar et al., 2022).

Based on Maulana et al., (2023), the fact that this rule is not implemented well is one of the causes is the low level of public awareness of this rule. This low level of public concern is also supported by elements within the government, both the community itself and related officials. This is proven by the failure to implement sanctions for not following this regulation. Apart from the lack of public awareness, based on the results of interviews with residents and neighborhood Association officials, the problem with mandatory reporting is that residents have to come to the neighborhood Association house to report, while guests who come sometimes do not visit at the usual time, namely 6 am to 11 pm. The distance that is too far from residents' houses to the neighborhood Association's house is also the next problem (Pelu et al., 2017).

On the other hand, neighborhood Association activities in order to maintain security, order and comfort certainly require supporting human resources which include operational costs in the form of salaries for security guards and cleaning staff and environmental maintenance. Of course, this requires transparent accountability so that information can be easily obtained by citizens regarding the use of this funding. The problem that occurs is that all recording activities are still compiled manually and have not been published, making it difficult for residents to obtain this information.

The results of a case study conducted at Giwang Pratama Estate Housing, located in Giwangan Village, Umbulharjo District, Special Region of Yogyakarta, also found the same problem, namely that it was not implemented properly. Residents who visited and stayed at the housing complex were required to report due to the long distance so that residents were reluctant to come. to the neighborhood Association's house to report, while guests who come sometimes do not visit at the usual time, namely 6 am to 11 pm. Based on these problems, a faster system is needed to carry out reporting without being limited by time and distance. One way to make

guest reporting easier is by utilizing information technology.

E-RT is e-government within the neighborhood government environment which utilizes information technology to increase effectiveness and efficiency in the implementation of neighborhood Association community services. The use of E-RT is aimed at solving problems by providing an information system that is able to solve problems of public order, especially in terms of guest reporting and activity information as well as transparent and accountable financial reports. Seeing this, the aim of this research is to formulate the design process for a mobile-based E-RT Information System in an effort to improve services to citizens.

METHOD

The research method used in this research is the action research method (Action Research) because it aims to make changes, improvements and increase company performance. Action research is a systematic approach to conducting investigations that allows people to find effective solutions to the problems they are facing. To analyze and design this Information System, the Prototyping model is used, where the prototyping model is one model that is suitable for system development. Prototyping is a software development method, in the form of a physical working model of the system and functions as an initial version of the system (Ogedebe, 2012).

The research stages carried out in compiling this research began with the formulation of the research problem, which resulted in a research question about the problem under study, literature study by studying various documents/references related to the company and theories related to the Prototyping framework, components -its components, and how to identify a function to then turn it into a service that can be shared or reused. The literature study was carried out both online and through books and printed documents, data collection, both primary and secondary data, according to the company environment.

Primary data, in the form of interviews with the Giwang Pratama Estate Yogyakarta Housing Management related to the research issue. The results of data collection through interviews will then be used as a basis for analyzing the business environment and information systems/information technology, so that future information technology architecture needs can be identified. Secondary data, in the form of documents/references relating to research issues contained in the company, such as business processes through the Giwang Pratama Estate Yogyakarta Housing Evaluation Report, neighborhood Association profiles, neighborhood Association activity plan documents.

The next stage, if the data taken is not enough, then data collection is carried out again. However, if the data collected is sufficient, then the next stage is to analyze the data that has been collected using the Prototyping model. Then the data from the data collection and literature study is in the design process according to the stages of the thinking framework in analysis. The final stage of the research methodology in preparing this research is drawing conclusions and suggestions from the research that has been carried out. This research was carried out for 8 months, starting from March 2024 to October 2024. The research location was carried out at Giwang Pratama Estate Housing, Giwangan Village, Umbulharjo District, Yogyakarta Special Region.

RESULTS AND DISCUSSION

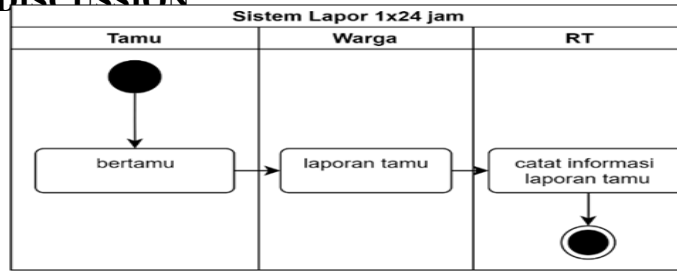


Figure 1. Running System for Guest Reporting

Figure 1 shows the system for guests who are required to report within 1x2 hours at the current neighborhood Association. In general, the process of reporting guests who come to the neighborhood Association area is that residents who are visited can report the guest by taking the guest to the neighborhood Association 's house. Then the neighborhood Association officer will record the guest's identity and needs in the guest ledger.

Table 1.

Guest Reporting System User Requirements

User	System Fuctional Requirements
Inhabitant	The system must be able to report the arrival and departure of guests at any time.
Neighborhood Association	The system can show the authenticity of the identity of existing guests. The system creates reports of guests who have visited The system can implement more efficient 1x24 hour reporting regulations. The system can find out guests who come to the RT environment in an updated manner.

Design of a 1x24 Mandatory Reporting System in neighborhood Association



Figure 2. Guest Report Application Architecture

The initial stage of designing this system is designing the application architecture (Figure 2). The picture shows 2 users who will use this system, namely residents and neighborhood Association admin. This system will run on Android-based mobile systems and websites. This was created to make it easier for users to access the application anywhere and anytime.

Designing interactions between users, this design uses use case diagrams

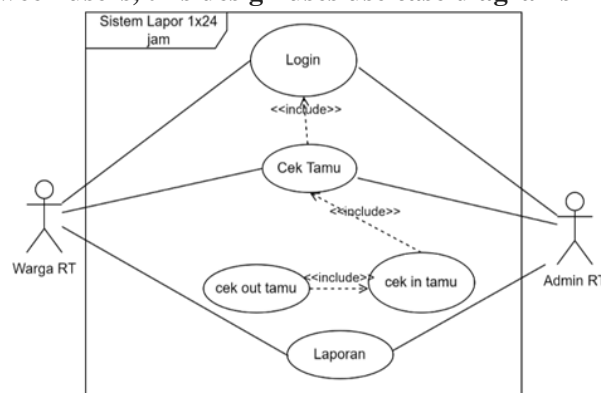


Figure 3. Guest Report System Use Case

Based on Figure 3, the information and actions of each actor in the system can be seen in Table 2. Where "Information" refers to the information that will be processed by each actor. "Action" refers to any action the system will take after receiving information.

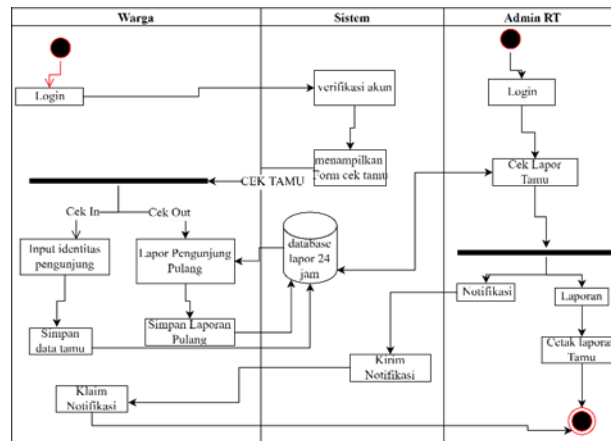


Figure 4. Activity Diagram of the Guest Report Application

In Figure 4 is the activity diagram of the guest reporting application, there are 3 partitions, namely residents, system and neighborhood Association admin. This diagram describes the process of activities carried out by each user in the application.

Table 2.

Information about Each Actor

Actor	Information	Action
Neighborhood Association residents	Information on guest attendance and requirements Resident and guest identity information Information on returning guests	Residents log in to the application and enter the date of arrival, guest requirements, and guest identity as well as take a photo of the guest's face and ID card to make sure authenticity of guest identity. After the guest leaves, the resident also enters the guest's return date. All entered data is stored in the database
Neighborhood Association Admin	Guest visit report information	Admin will log in to the application and do every check visit. And provide notifications and reports to residents to ensure that there are visits at that time. The application will provide an automatic notification if the admin does not provide information within 15 minutes notification reports to residents.

User interface

The user interface plays an important role in making it easier for users to run the 1x24 hour guest reporting application for resident users.

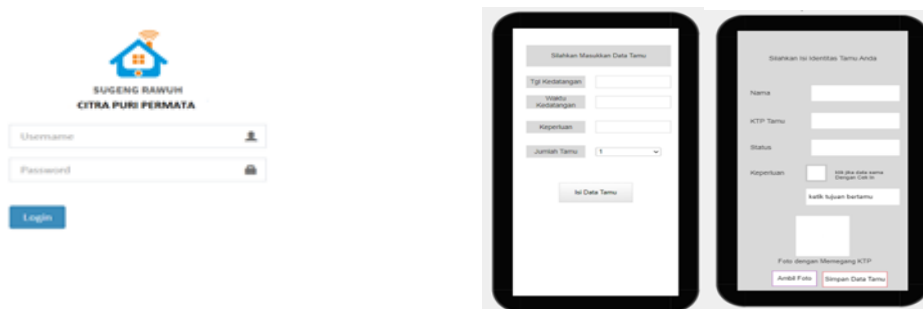


Figure 5. Citizen User Interface

Figure 5 is the user interface for citizen users. Figure 5(a) is the page display when the user logs in to their account. Where users are required to enter the User and Password provided by the RT admin. In Figures 5(b) and 5(c), the user will enter data on visiting guests, from the identity of the visitor to taking a photo with the visitor holding the KTP which serves to prove that the KTP and the person visiting are the same.

Table 3.

Recap of Analysis of Application Testing Results with Black Box		
Need	Scenario	Test Result
The system must be able to identify citizen and Admin accounts	Citizens and Admins log in to the application	The application successfully identified citizen and Admin accounts
The system must be able to report the arrival and return of guests	Residents can report guests by entering and saving the guest's identity	The application successfully displays the identity of the guest entered by the resident
The system can show the authenticity of the identity of existing guests	Residents upload KTPs and photos of guests	The application failed to display the results of residents' uploads
The system can monitor guests	Admin checks guests	The application successfully displays the guest list entered by residents
The system can provide information that there are guests in the RT environment	Admin can confirm guests	The application successfully displays notifications to residents to ensure that there is a visit at that time. The app fails to display notifications automatically
The system can provide detailed reports on guests who attend each required period	Admin can make a recap Reports about guests	The application successfully produces a recap report of guests who have visited the RT environment
The system must be able to report guest returns	Residents can report guests by looking for guests who have visited	The application successfully displays the results of searching for the identity of visiting guests and reports the guest's return

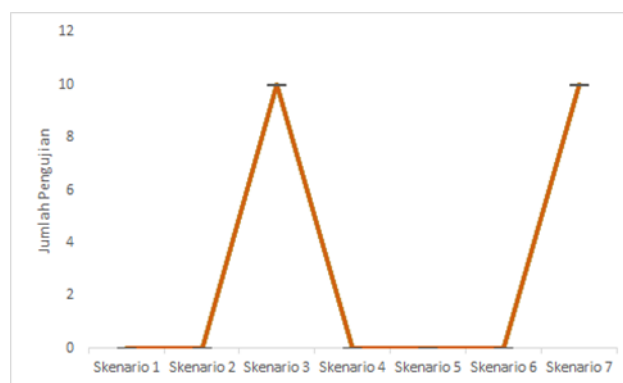


Figure 6. Graph of Number of Errors in Scenario Testing

Needs Analysis Stage

The analysis stage was carried out on the results obtained from observations and interviews with the neighborhood Association head and administrators of RT.46 RW.06 Giwang Pratama Housing Ponggalan Karangmiri Giwangan Umbulharjo Yogyakarta. Based on the results of observations and interviews conducted, we can see the big picture of the system running at RT.46 RW.06 Giwang Pratama Housing Ponggalan Karangmiri Giwangan Umbulharjo

Yogyakarta. The results of the interviews and observations made are as follows: Administrative management of RT.46 RW.06 Housing Giwang Pratama Ponggalan Karangmiri Giwangan Umbulharjo Yogyakarta still applies conventional methods, namely manually. Guests are required to report when staying more than 1 x 24 hours it is still recorded manually by security officers or security guards at RT.46 RW.06 Giwang Pratama Housing Ponggalan Karangmiri Giwangan Umbulharjo Yogyakarta. Recording of residents' contributions is still done manually, where when residents pay contributions, the neighborhood Association treasurer will record them in the contribution receipt notebook manually. Registration of new residents occupying the house, both homeowners and renters, is still done manually. Recording of neighborhood Association operational costs is still done manually. News information related to citizen activities and the latest news is carried out by sharing on the WhatsApp group. Financial reports and minutes of monthly neighborhood Association meetings are still done manually and distributed to residents via WhatsApp group media.

In developing an old system into a better system, system analysis is needed. Based on the results of interviews with residents and neighborhood Association officials, a picture of the 1x24 mandatory guest reporting system was obtained as shown in Figure 1. Figure 1 shows the system for guests who are required to report within 1x2 hours at the current neighborhood Association. In general, the process of reporting guests who come to the neighborhood Association area is that residents who are visited can report the guest by taking the guest to the neighborhood Association 's house. Then the neighborhood Association officer will record the guest's identity and needs in the guest ledger. However, this system has a weakness in that residents do not want to report to the neighborhood Association. These weaknesses include, among other things, the lack of awareness among residents about the importance of reporting when guests visit. Residents have to visit the neighborhood Association's house to report, but sometimes guests come at other times than the usual time, namely 6 am to 11 pm. The distance is too far from residents' houses to neighborhood Association's houses.

To ensure that the system to be developed is a system that meets what is needed, the researcher's next step is to prepare a user needs analysis. Where the users who will use this system are residents and neighborhood Association (Jason & Glenwick, 2016). The results of the analysis of user needs from residents hope that the existing system must be able to report the arrival and return of guests, while the neighborhood Association hopes that the system can record guest identity data and data can be updated about guest whereabouts.

Design of a 1x24 Mandatory Reporting System in Neighborhood Association

This system design runs on an Android-based mobile system and website. This was created to make it easier for users to access the application anywhere and anytime. The next design also includes an interaction design between users (Novria Rahma et al., 2022). This design uses a use case diagram where each actor in the system can access information about the whereabouts of guests. In the activity diagram menu of the guest reporting application, there are 3 partitions, namely residents, system and neighborhood Association admin. This diagram describes the process of activities carried out by each user in the application. Residents log in to the application and enter the date of arrival, guest requirements, and guest identity and take a facial photo along with the guest's ID card to ensure the authenticity of the guest's identity. After the guest leaves, the resident also enters the guest's return date. All entered data is stored in the database. Neighborhood Association admins can log in to the application and check each visit, and can provide notifications and reports to residents to ensure that there is a visit at that time.

Application User Interface Must Report Guests 1x24 Hours

User ease in using the application is very important in this system, this will increase user comfort which results in increased citizen awareness of the regulations for reporting guest visits in their environment. The user interface plays an important role in making it easier for users to run the application (Tambuwun et al., 2017). Where users are required to enter the User and Password provided by the neighborhood Association admin.

Application User Interface Must Report Guests 1x24 Hours

Testing steps for each feature used in functional based scenarios (Use case). Every performance is checked to see if it meets expectations (Fitriana, 2020). This test is carried out by developers and users, testing consists of seven scenarios. The test results can be seen in Table 3. Meanwhile the test error rate results can be seen in Figure 6. Figure 6 explains that of the seven scenarios there are 2 scenarios that fail or do not comply with what is needed. scenario 3, there is a failure when the resident uploads the KTP, the KTP should be uploaded together with the guest by taking a photo directly (using a cellphone camera), but the system can still accept KTP uploads without uploading the guest's photo directly.

The next failure is in scenario 7, where the system automatically generates a report that the guest has returned if the return is not reported within 1x24 hours. Meanwhile, the requirement is that residents must report guests home, not automatically, because guests may be in the neighborhood Association environment for more than 1 x 24 hours. After testing, the next step is to improve the application by improving the application coding according to needs. The results of testing using the black-box method, there were 7 scenarios which resulted in an initial test of 80%. Where there are 2 scenarios that do not run according to requirements, namely scenarios 2 and 3. After scenarios 3 and 7 are repaired, especially in the coding section, the application can run 100% according to its needs or function. This research only uses the application for each neighborhood Association. There is no system synchronization between neighborhood Associations. So for further research, there should be synchronized data between neighborhood Associations so that residents who visit are truly detected, because there are still many visitors who have ID cards that do not match their place of residence. This will make it difficult for security forces to follow up on visitors if they have problems.

CONCLUSION

The increasingly high crime rate means that the mandatory 1x24 hour reporting rule must be implemented in various regions. This is expected to improve the maintenance of security, order and harmony between citizens starting from the lowest level of government, namely the Neighborhood Unit. The distance that is too far from residents' houses to the neighborhood Association's house is also a problem in implementing guests who are required to report 1 x 24 hours, which is not optimal. In this research, a faster system was created to carry out reporting without being limited by time and distance. One way to make guest reporting easier is by utilizing information technology. The application uses the Unified Modeling Language, which is built on a mobile-based system that can be operated on devices such as cellphones or smartphones that work on the Android operating system. So this rule will no longer be hindered by distance and time. So that it can increase effectiveness and efficiency in reporting guests who come to the neighborhood Association environment. It is hoped that the implementation of this application can help the neighborhood Association government in improving security, order and harmony between residents.

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