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# Health Services Place Construction Design Based on Android and ISO/TEC 25010

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ABSTRACT

Health services are places where health efforts are carried out. The study found several problems with health care information, such as the County's official website providing information on only a few major hospitals, not all locations, and if using the Google Maps application, there are still medical service locations that are not registered, so this application can add data that is not registered in the Google Maps application so that people can know more and find medical places easily. The design method used is a prototype and the testing technique used is ISO/TEC 25010. The results of this research are that the Android-based health service location mapping application in the district can display a list of information on hospitals, health centers, main clinics and google maps. Apart from that, the system testing carried out is the conformity aspect in terms of functionality and usability. Based on the functional suitability test, usability results were obtained with results of 81.6%. The conclusion from the test results using ISO/TEC 25010 testing shows that this application can help the community and can be said to be successful.



## I. Introduction

Health Services are a place to carry out health efforts [1]–[3]. Relating to information on health service facilities, websites The official district only provides information on several large hospitals, the official district website only provides information on several large hospitals, not all health service locations are known to the public, both those from the district and those from outside the city and if you search using the Google Maps application there are still locations health services that are not registered due to the lack of available information. This is due to a lack of information about health services in the district. Based on the explanation above, it is necessary to have a solution to deal with this problem, namely by building a District Health Service Location Mapping Application, in which the system can provide information to the wider community, especially the region, about health service providers precisely through an Android-based mobile application.

## II. The Proposed Method/Algorithm

### *A. Information Systems*

According "An information system is a system within a company an organization that meets the needs of daily transaction processing, supports operations, is managerial and strategic activities of an organization and provides certain external parties with the necessary reports" [4]-[5].

### *B. Component System Information*

In the book Analysis and Design of Information pointed out that system information consists from components are referred to as building blocks [6]–[9]:

- Block Input

  This block represents data that enters the information system. This block is methods and media for capturing data to be entered (can be basic documents).

- Block Model

  This block consists of a combination of procedures, logic and mathematical models that will manipulate input data and data stored in the database in a predetermined way to produce the desired output.

- Block Output

  The product of an information system is output which is quality information and documentation that is useful for all levels of management and all system users.

- Block Technology

  Information technology systems are used to receive input, run models, store data, access data, produce, send output and help control the system as a whole. The three main parts of technology are technicians (humanware or brainware). Software (software) and hardware (hardware).

- Block Base Data

  A database is a collection of data that is interconnected with others, it is stored in hardware and software is used to manipulate it. The data stored in the database is used to provide further information.

- Block Control

  Controls need to be designed and implemented to ensure that things that can damage the system (natural disasters, fraud, failures in the system itself, inefficient errors, etc.) can be prevented or, if errors occur, they can be addressed immediately.

### *C. System Information Geographical (SIG)*

A Geographic Information System (GIS) or Geographic Information System (GIS) is a system designed to capture, store, manipulate, analyze, organize and display all types of geographic data. The concept of a GIS is as follows [6], [10]–[14]:

- Geographic information is information about places on the earth's surface.
- Geographic information technology includes Global Positioning System (GPS), remote sensing and Geographic Information Systems.
- Geographic Information Systems are computer systems and software
- Geographic Information Systems are used for a wide variety of applications.
- Geographic Information Science is the science behind Geographic Information System technology.

### *D. Definition Service Health*

Health services according to the Ministry of Health of the Republic of Indonesia in 2009 from Depkes RI as stated in the Health Law concerning health are any efforts carried out individually or jointly within an organization to maintain and improve health, prevent and cure disease and restore health, individual, family, group or society [15]–[18].

### *E. Google Map Service*

Google Map Service is a free and online virtual global map service provided by the Google company [19]–[21]. Google Maps which can be found at the address http://maps.google.com. Google Maps offers draggable maps and satellite images for the entire world. Google Maps also offers searches for places and travel routes.

*F. Android*

According to Android is an operating system deliberately created for Linux- based mobile devices which includes an operating system, middleware and applications.

*G. Prototype*

The stages there is on development method device Prototype software can be seen in Figure 1. Following [22]–[25]:

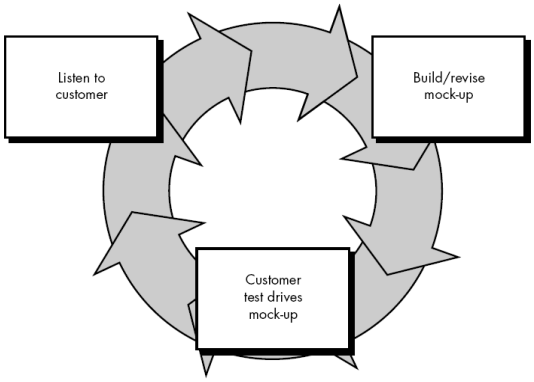


Fig. 1. Illustration model prototype

Stages in the making prototype namely:

- Listen Customer

  At this stage, requirements are collected from the system by listening to customer needs as users of the software system to analyze and develop user needs.

- Build/revise mock-up

  At this stage, designing and making a system prototype is carried out according to user needs.

- Custumer test drives mock-up

  prototype is tested by the user and then evaluated according to the shortcomings of the customer's needs. If the system is in accordance with the prototype, then the system will be completely completed. However, if it is still not suitable, return to the first stage.

*H. ISO 25010*

ISO 25010 is a software quality testing and evaluation model which is part of the Software Product Quality Requirements and Evaluation (SQuaRE). This testing technique is related to the software quality model which is a development of the previous ISO 9126 model with the addition of several structures and parts of the quality model standard.

Overall, the ISO/IEC 25010 software quality model is divided into 8 characteristics, namely: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability.

Of the eight quality characteristics of an application, the researcher determined only three characteristics to be used as testing variables in this research. The three characteristics are Functional Suitability and Usability.

## III. Method

*A. Data collection*

Preparing this research proposal certainly requires a variety of complete information. Researchers collected this data using various methods:

- Interview

Collection data with method interview that is method collection data with how to ask questions directly to the health service in Waykanan district.

- Observation

  Learn everything related to the system to be built. Observing directly how people search for information regarding health service information in.

- Study of literature

  Learn everything related to the system to be built. Observing directly how people search for information regarding health service information in.

*B. Needs Analysis*

- Functional Requirements

  Functional requirements are requirements in the form of data needed to input the function of the system, the following are functional requirements:

  Admin

  Admin is a capable actor manage data like:

  1. Manage data House Sick
  2. Manage data public health center
  3. Manage data Clinic Main

- User

  1. Users can see information location health in Regency.
  2. Users can see information House Sick, Public health center and Clinic.
  3. Users can display information distance location, direction location And time required to reach the location.
  4. Users apart do zoom-in function and zoom-out on map.

*C. Need Non- Functional*

- System can be executed on smartphones with a number of version android.
- Map come on stage If connected with Internet.
- The size program from system maximum as big as 50 MB.
- Application own appearance/interfaces Which easy user understands.

*D. Planning System*

- Use Cases Diagram

  A use case diagram is a scenario description of the interaction between the user and the system. Use case diagram depicts relationship between actors and activities Which can did it to application. Use The case used can be seen in the following figure 2:


Fig. 2. Use Cases Diagram

- Activity Admin Charts

  Following is activity diagram from system Which will be built.

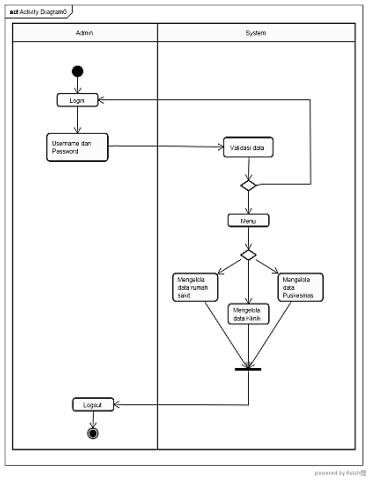


Fig. 3. Activity Diagram Admin

- Activity Diagram Users

  Following is activity user diagram from system Which will be built.

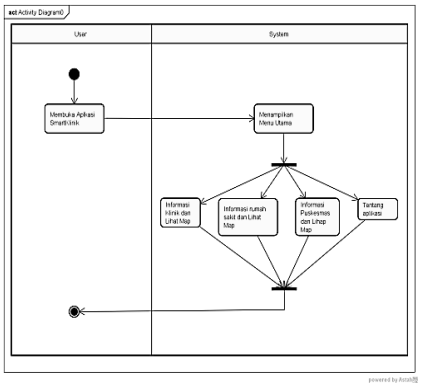


Fig. 4. Activity Diagram Users

- Class Diagrams

  Class Diagrams describe the structure and description of classes, packages and objects along with their relationships with each other. The class diagram in the district health location mapping application is presented in the following image:

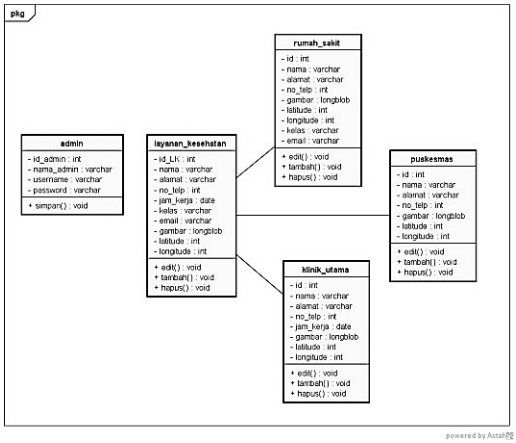


Fig. 5. Class Diagrams

## IV. Results and Discussion

### *A. Form login admin*

The login password is the first display when the program is run. The display of this form functions for data security when the user is asked to input a password Which has determined previously. Following is Form login Which there is in figure 6.

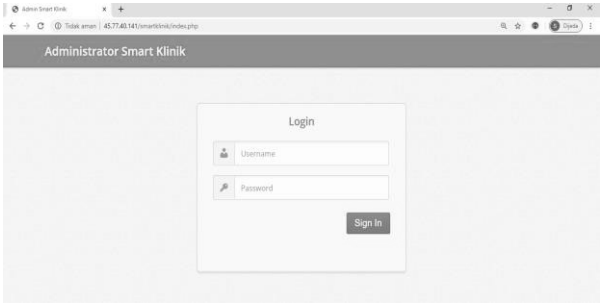


Fig. 6. Admin login

### *B. Main course*

Form is a display that functions to view the menus that will be accessed by the admin, there are several menus, namely homepage, hospital data, health center data, main clinic data, and change password. Form The main admin menu can be seen in Figure 7.


Fig. 7. Menu Main

### *C. Form Menu Data House Sick*

Input menu form is a display that functions to input hospital data into the District Health Service Location Mapping Application. The hospital data form can be seen in Figure 8.

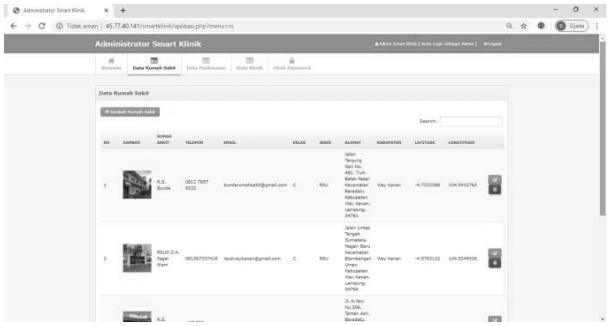


Fig. 8. Home Data Menu Sick

*D. Form Menu Data Public health center*

Input menu form is a display that functions to input hospital data into the District Health Service Location Mapping Application. The health center data form can be seen in Figure 9 below.

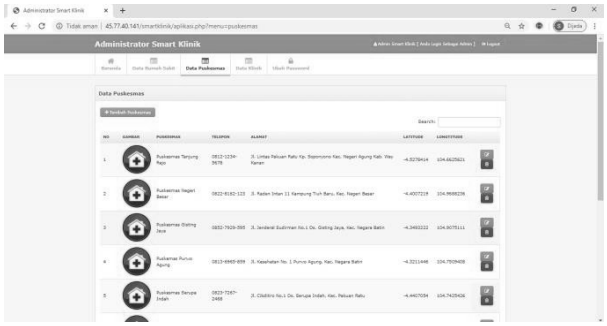


Fig. 9. Menu Data Public health center

*E. Menu forms Clinic data*

Input menu form is a display that functions to input hospital data into the District Health Service Location Mapping Application. The Main Clinic data form can be seen in Figure 10.

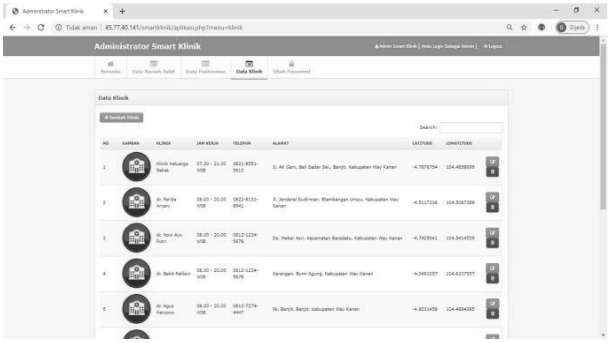


Fig. 10. Menus Clinic data

*F. Menu Change Password*

Password change menu form is input new password if the old password is no longer secure when you want to enter the system. The password change form can be seen in Figure 11.

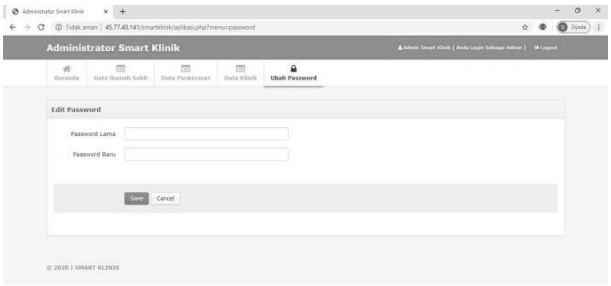


Fig. 11. Change password

*G. Form Menu Main (Mobile)*

Form is a display that functions to see the menus that will be accessed by the user. There are several menus for hospitals, health centers, main clinics, see map and about. The main menu can be seen in Figure 12.


Fig. 12. Menu Main

*H. Menu List House Sick*

Form is a display that functions to display a list of hospitals available in the district. The hospital menu form can be seen in Figure 13.


Fig. 13. Register Hospital

*I. Details Form Hospital*

Form details House Sick is appearance Which works for displays detailed information available at the hospital. The hospital detail form can be seen in Figure 14.


Fig. 14. Details Hospital

*J. Form List Public health center*

Form is a display that functions to display a list of Puskesmas available in the district. The health center menu form can be seen in Figure 15.


Fig. 15. List of Community Health Centers

*K. Health Center details*

Form is a display that functions to display the address and the telephone number of the health center. The detailed form for the health center can be seen in Figure 16.


Fig. 16. Health Center details

*L. List Clinic*

Form is a display that functions to display a list of clinics available in the district. The main clinic menu form can be seen in Figure 17.


Fig. 17. List of Clinics

*M. Clinic Details*

Form is a display that functions to display the address and number phone and opening hours clinic. Form clinic details main can be seen on figure 18.


Fig. 18. Clinic Details

*N. Appearance Look Folder*

Maps will be displayed showing all health service locations in the form of location points and showing the location from the user's position to the nearest health service. Menu layout View map can be seen in Figure 19.

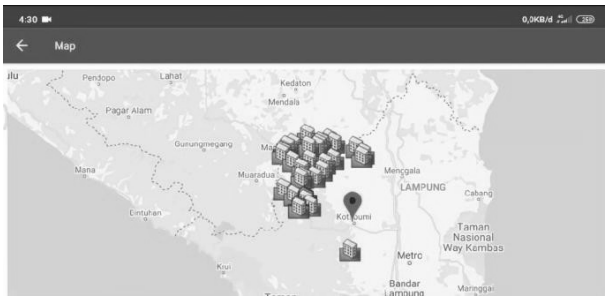


Fig. 19. View Map

*O. About*

The About Application menu contains the benefits of the health location mapping application in the district as well as developer information. Designing the about menu form can be seen in figure 20.


Fig. 20. About

*P. Testing ISO 25010*

System testing is carried out to check and ensure that the system is functioning as expected. Then in this research, ISO 25010 was tested based on two characteristics, namely Functional Suitability and Usability.

- Functional Suitability

  Functional suitability testing, the questionnaire is filled in by 1 person (attached data) to find out whether the functions in the application can run correctly. Each person gives 1 point if the functional suitability results are successful. Furthermore, done calculation percentage for testing aspect functional suitability that is as following:

  $$success = \frac{test\ result\ score}{highest\ score} x100\%$$

  $$percentage = \frac{27}{27} x100\%$$

  $$= 100\% \quad (1)$$

  Results score obtained from results respondents agree that application own mark functionality which is good according to the functions it has. The percentage of respondents' response score of 100% is within the good criteria. So based on the score results above it can be concluded that the level of application functionality is in the good criteria, with a percentage of 100%.

- Usability

  For standard user needs research scenarios use ISO 25010 usability testing quality standard, usability testing was carried out on 10 respondents through a questionnaire which can be seen in the attachment. Number of statements in the questionnaire the that is 15 statements with use scale SS=5, S=4, N=3, TS=2, STS=1. The results of the usability aspect testing can be seen in table 1 below:

Table 1. Results usability aspect testing

| **Sub-Characteristics** | **Operability** | **Learnability** | **Appropriateness** | **User Interface** |
|---|---|---|---|---|
| Total | 219 | 230 | 91 | 107 |
| Maximum Score | 250 | 250 | 100 | 150 |
| Percentage | 87.6% | 92% | 91% | 71.4% |
| Total Percentage | | 85.5% | | |

Usability sub-aspect were obtained from 10 respondents, with the results which can be seen in table 2 as follows:

Table 2. Results Eligibility sub–Usability Characteristics

| No. | Sub-Characteristics | Percentage | Eligibility Level |
|---|---|---|---|
| 1. | Operability | 87.6% | Very Worth It |
| 2. | Learnability | 92% | Very Worth It |
| 3. | Appropriateness recognizability | 91% | Very Worth It |
| 4. | User interface aesthetics | 71.4% | Worthy |

Next, the percentage calculation is carried out for testing the overall usability aspect from the test results data using the formula:

$$Percentage\ usability = \frac{test\ result\ score}{highest\ score} x100\%$$
$$= \frac{612}{750} x100\%$$
$$= 81.6\% \quad (2)$$

*Q. Analysis results Testing*

The design of a web-based public complaint service information system is tested in stages test quality software ISO 25010 (Functional suitability, And usability). Results testing Application Mapping Location Health services in Regency can be seen in table 3 as follows:

Table 3. Results Testing

| Aspect | Result |
|---|---|
| Functional Usability | 100% |
| Usability | 81.6% |
| Total | 90.8% |

## V. Conclusion

Based on the descriptions of the chapters that have been explained, researchers draw conclusions from several problems:

- Making this application uses the prototype method which goes through several stages. The first stage is listening to customers, namely at this stage the needs of the system are collected by listening to the needs of customers as users of the software system to analyze and develop user needs, designing and making a prototype, namely at this stage, designing and making a prototype of the system is carried out according to their needs. user, trial, namely at this stage, the system prototype is tested by the user and then an evaluation is carried out according to the shortcomings of the customer's needs. If the system is in accordance with the prototype, then the system will be completely completed. However, if it is still not suitable, return to the first stage.
- Carrying out library research consisting of literature review, data collection which consists of conducting interviews, observations and literature reviews, then identifying system requirements, namely consisting of functional and non-functional requirements. The second stage of design is carrying out UML designs such as use case diagrams, activity diagrams and class diagrams, then design interfaces such as forms that will be displayed in the health service location mapping application. The third stage of implementation is creating a coding program using language Java programming. This application is based on Android. The fourth stage of testing the health service location mapping application system uses ISO 25010 testing.
- This application was created using Android Studio and the Java programming language with the Android operating system (OS). Android OS is very flexible and can be used on various hardware platforms and is easy to use. This application provides information on the location and geographical position of hospitals, health centers and main clinics in.
- Based on the results of the implementation carried out by applying ISO 25010 testing, a calculation result is obtained. The functional suitability aspect got a result of 100%, usability got a result of 81.6%. So it was concluded that the average calculation results from several aspects that had been tested obtained a result of 90.8%, which means that the system that the researchers implemented was very suitable for use by the public.

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