DEVELOPMENT OF APPLICATION OF POLYLINIC REGISTRATION SYSTEM OF HOSPITAL BASED ON ANDROID IN GENERAL HOSPITAL BINA SEHAT

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ABSTRACT

General Hospital Bina Sehat Hospitals are health service institutions that provide full range of personal health services that provide inpatient, outpatient and emergency services, Outpatient services is one of the facilities provided at Bina Sehat General Hospital. People in desperate need of outpatient services in hospitals to support efforts in achieving health. Registration system is one important indicator that must be considered by the hospital. The problems that often occur in Bina Sehat Hospital are often too long patients waiting in the registration queue, Patients difficulty obtaining information availability and schedule of doctor's practice, Patients difficulty determining the disease based on symptoms of symptoms that are felt. By utilizing the advancement of the era of technology and information that increasingly rapidly at this time, can be designed an android-based registration application that can provide convenience for patients to register, monitoring the schedule of doctors and provide recommendations according to symptoms of poly, in providing Recommendations based on symptoms of disease felt by the patient. Artificial Neural Network (ANN) is one branch of AI (Artificial Intelligence) or artificial intelligence. Artificial Neural Network Method is one of the information processing system that is designed by mimicking the workings of the human brain in solving a problem by doing the learning process by performing the weight it receives.

Keywords: Android, Artificial Neural Networks, Polyclinic Registration

1. INTRODUCTION

Hospitals are health care institutions that provide full-scale personal health services that provide inpatient, outpatient and emergency care services [1].

Outpatient is patient service for observation, diagnosis, treatment, medical rehabilitation and other health service without stay in hospital. Outpatient service is one of the facilities provided at Bina Sehat General Hospital. People in desperate need of outpatient services in hospitals to support efforts in achieving health.

Registration system is one important indicator that must be considered by the hospital, based on survey through questionnaires given to 34 people the average patient waiting on registration is 30 people over 30 minutes and 4 people over 1 hour and this is due to lack of information schedule availability doctors average percentage of 34 people 28 diantarannya still do not know the schedule of doctor's practice so that the result of waiting for the old patients and this shows the lack of excellent service in order to achieve a satisfaction of services provided there are also other problems based on reviews and frequently answered at Rumah Sakit Bina Sehat the average patient is difficult to determine the illness of the symptoms of symptoms that are felt, therefore, to achieve excellent service satisfaction required a technology that is able to provide all the convenience so that patients at Bina Sehat Hospital feel helpful.

By taking advantage of advancements in the field of information technology and the rapidly nowadays, it can be designed a system of artificial neural network (Artifical Neural Network) in providing Recommendation of disease based on symptoms felt by the patient. Artificial Neural Network (ANN) is one branch of AI (Artificial Intelligence) or artificial intelligence. Artificial Neural Network is one of the information processing system that is designed with

imitating the workings of the human brain in solve a problem by doing the learning process by doing the weight it receives [2]

Artificial Neural Network (ANN) is one alternative problem solving and much in demand by researchers at this time. Research on the application of the use of ANN through pattern recognition of the occurrence of something has been studied in various science, including in the field of medicine for the diagnosis of disease [3].

1.2 Identification of problems

Based on the above background, then can escape the problems that exist are as follows:
1.Patients waiting diantrian registration too long
2.Patients access information.
3.Porang difficult to determine the disease based on symptoms of symptoms that are felt.

1.3 Research purposes

Based on the problems studied, the intent to be achieved by the authors is to conduct research to analyze and build the application of hospital polyclinic registration system at general hospital binasehat.Tujuan of this study are as follows:
1. Provide ease of patients in finding information on availability of doctors and doctor's schedule.
2. Assist the patient in registering the polyclinic.
3. Assist the patient to facilitate the recommendation of poly by diagnosing the illness from the patient's perceived symptoms.

1.4 Scope of problem

In making Mobile Application of this hospital polyclinic registration system to be able to achieve the expected goals and objectives, then the problems are limited as follows:
1. Case study conducted at General Hospital of Bina Sehat Dayeuh Kolot Bandung.
2. Applications to be built based on Android mobile.
3. The application will run on Android operating system at least version 4.3 (Jelly Bean).
4. Poly only covers child poly, internal poly, surgical poly, poly obgyn, dental poly.
5. Users who will use the application is the patient who will use the online registration service at Bina Sehat General Hospital.
6. This application is special outpatient.
7. This application uses the method of neural network algorithm.
8. Integrated Development Environment (IDE) used to build applications that is Android Studio.
9. The programming language used is Java Android.
10. Modeling systems using object-oriented modeling.
11. The database used Mongo DB

ISI PENELITIAN

2.1 Theory

2.1.1 Hospital

Hospitals are health service institutions that provide full range of personal health services providing inpatient, outpatient and emergency care services [1]

2.1.2 Rawat Jalan

Outpatient is patient service for observation, diagnosis, medication, medical rehabilitation and other health service without stay in hospital [5]2.1.3 Jaringan syaraf tiruan

2.1.3 Jaringan Syaraf Tiruan

Artificial Neural Network (ANN) is one of the artificial representations of the human brain that always tries to simulate the learning process of the human brain (M. F Andrijasa, 2010). for ANN was created as a generalization of the mathematical model of human cognition based on information processing assumptions occurring on a simple element called a neuron. The signal flows between nerve cells through a connecting link, each connecting connection having a corresponding weight and each nerve cell will be an activation function to the weighted signal summation that enters him to determine the output signal. [6].
Backpropagation training includes 3 Phases namely advanced stage, backward propagation, and weight changes. The training algorithm for networks with one hidden layer (with binary sigmoid activation function) is as follows:
Step 0: Initialize all weights with small random numbers
Step 1: If the termination condition has not been met, take steps 2-8
Step 2: For each pair of training data, perform steps 3-8
Stage I: Propagation Forward
Step 3: Each input unit (Xi, i = 1, ... n) receives the input sinal Xi and the signal is propagated to the upper unit of the hidden layer,
Step 4: Each hidden adds the weighing factor:
Z_netj = Vjo + Σ_ (i = 1) ^ n▒xivji
Zj = f (z_net j) = "1" / "1 + e" -z_net j
Step 5: Calculate all network outputs in unit Yk (k = 1,2,3 ...., m)
y_netj = Wko + Σ_ (j = 1) ^ p▒zjwkj
Yk = f (y_net k) "1" / "1 + e" -y_net k
STAGE 2 Reverse Propagation
Step 6: Calculate factor δ output unit based on error in each output unit
δk = (tk-yk) f (y_netk)
δk is the error unit to be used in the change in the layer weights below (Step 7)
Calculate the weight change rate Wkj (which will be used later to change the weights) with α acceleration rate.
ΔWk = αδkj; k = 1,2, ..., m; j = 0.1,2, ..., p
Step 7: Calculate factor δ hidden units based on errors in each hidden unit Zj (j = 1,2 ...., p)
δ_net j = Σ_ (k = 1) ^ m▒δjwkj
PHASE III AMOUNT CHANGES
Step 8: Calculate all weight changes
Line weighting changes to the output unit:
Wkj (new) = Wkj (old) + Δwkj (k = 1,2, ..., m; = 0,1,2, ... p)
The weight change of the line leading to the output unit
Wkj (new) = Wkj (old) + Δwkj (k = 1,2, ..., m; = 0,1,2, ... p)

Step 9: Once the training is done, the network can be used for pattern recognition. In this case, only forward propagation (steps 4 and 5) are used to determine the network output.

If the activation function used is not binary sigmoid, then steps 4 and 5 must be completed. Similarly, the derivatives in steps 6 and 7.

2.1.4 Mongo DB

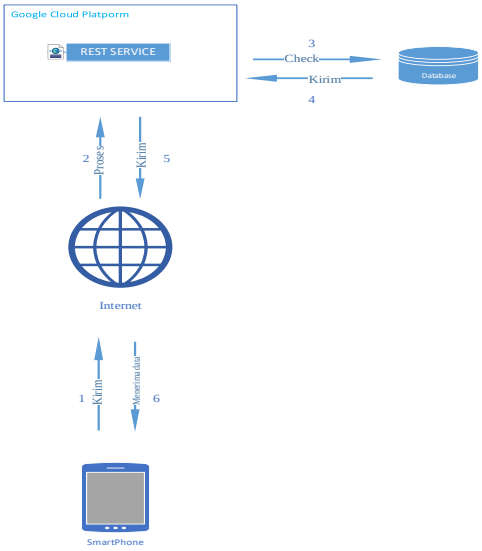
MongoDB is one type of NoSQL database, which is a non-relational data storage concept. The method used by MongoDB is document-oriented that stores documents such as JavaScript Object Notation(JSON)[10]

Characteristics of mongo db are data storage in collections and each collections have documents that are derived using BSON (Binarry JSON) [11].

2.2 Analisis Sistem

2.2.1 System Architecture Analysis

System architecture analysis aims to describe how a system sends data requests and how the system sends a response to the requested data to the user.



Picture 1 Arsitektur Sistem

Here is a description of the picture above system arstektur:

1. Smartphone users perform data requests.
2. Then internet network send request to url rest service on request.
3. Google cloud platporm receives the results of the request and then processed and checked in the database.
4. Database sends results.
5. Google Cloud Platporm sends results to smarphone.
6. Smartphone accepts data in json form.

2.2.2 Specification of Non Functional Requirement

The following will be explained about the non-functional requirement specifications that need to be viewed in table 1.

Table 1 Specification of Non Functional Requirement

KODE SKPL	Software Requirements Spesification
SKFL-NF-001	The built system has a mobile subsystem.
SKFL-NF-002	The system is built at least using the operating system android version 4.4 Kit Kat to the top.
SKFL-NF-003	The system can run on smartphones that have internet connection

2.2.3 software requirements specification

Tabel 2 software requirements specification

KODE SKPL	Software Requirements Spesification
SKFL-F-001	The mobile system provides facilities for patients to
SKFL-F-002	The mobile system provides facilities for patients to log into the system
SKFL-F-003	The mobile system provides facilities for patients to view schedules and doctors available
SKFL-F-004	The mobile system provides facilities for the patient to provide location information to the destination.
SKFL-F-005	The mobile system provides facilities for patients to view information on available hospital facilities
SKFL-F-006	The mobile system provides facilities for patients to view information on available hospital facilities
SKFL-F-007	The mobile system provides facilities for patients to apply for poly.
SKFL-F-008	The mobile system provides a facility for the patient to see the registration status.
SKFL-F-009	The mobile system provides facilities for patients to view user data.

2.2.4 Requirements analysis

Software that must be owned by the user. The following are required software requirements:

Table 3 Requirements analysis

No	Kebutuhan Perangkat Lunak

1	Minimum android operating system version 5.0 Lollipop
2	Smartphones can connect to the internet
3	Can enable GPS

2.2.5 Hardware Requirement Analysis

Hardware required based on needs that must be met include:

Table 4 hardware requirement analysis

No	Kebutuhan perangkat keras
1	Minimal Operating System Kitkat version 4.4
2	Random Access Memory (RAM) 1 GB
3	Has a Global Positioning System (GPS) feature.
4	Has 3G Internet Network or WLAN Wifi

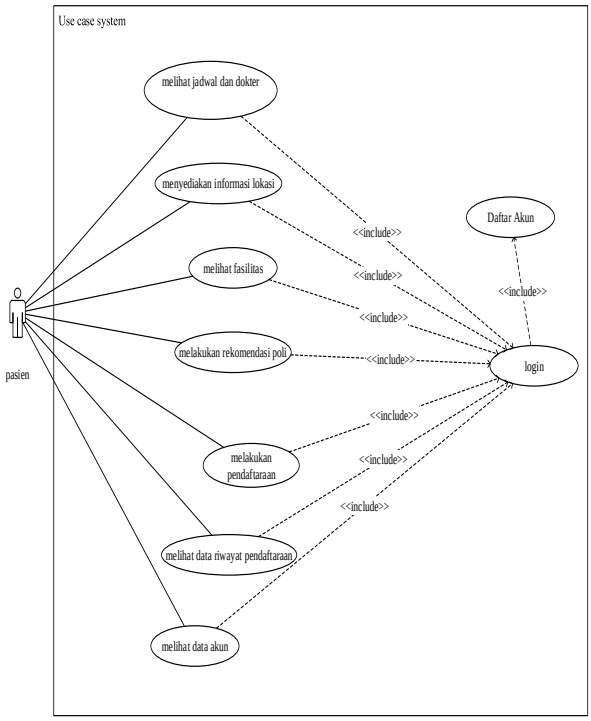
2.2.6 Analisis Kebutuhan Pengguna

The needs of the application user must have the ability to run the application. The software will be used by 2 types of users ie patients and administrators. Characteristics required to use the application are as follows:

Table 5 Hardware requirements

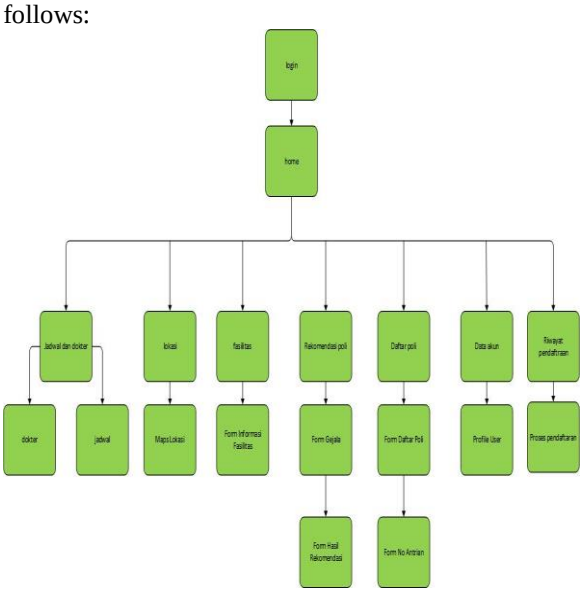
Pengguna	Kriteria
Patient	1. Understand using android smartphone 2. Have android
Admin	1. Understanding in using computer

2.2.7 Use Case Diagram



2.2.8 Menu Structure

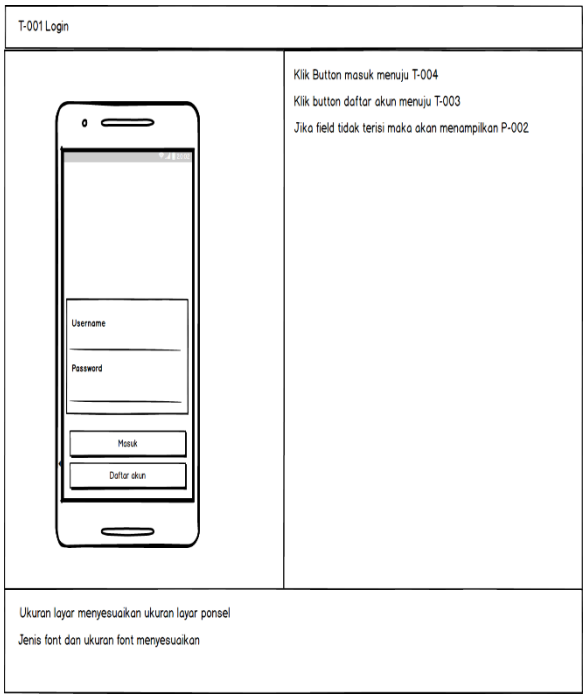
The design of the menu architecture describes the path of application usage so that the application is easy to understand. The design can be seen as follows:



Picture 2 Menu structure

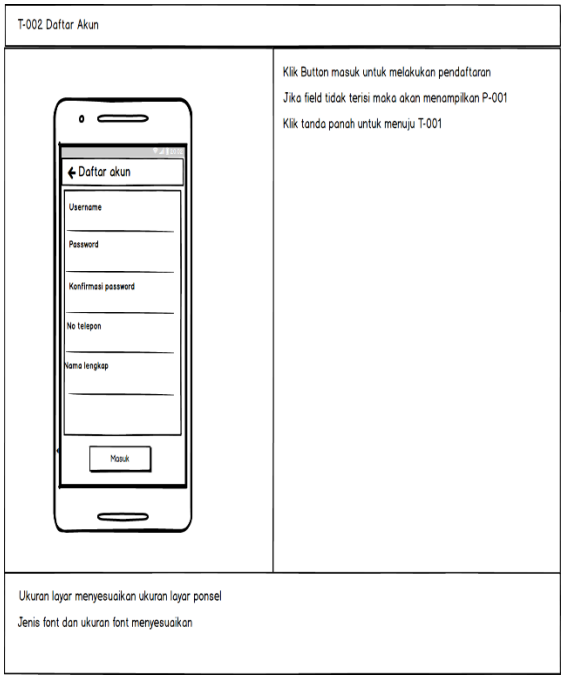
2.2.9 Interface Design

1. Login



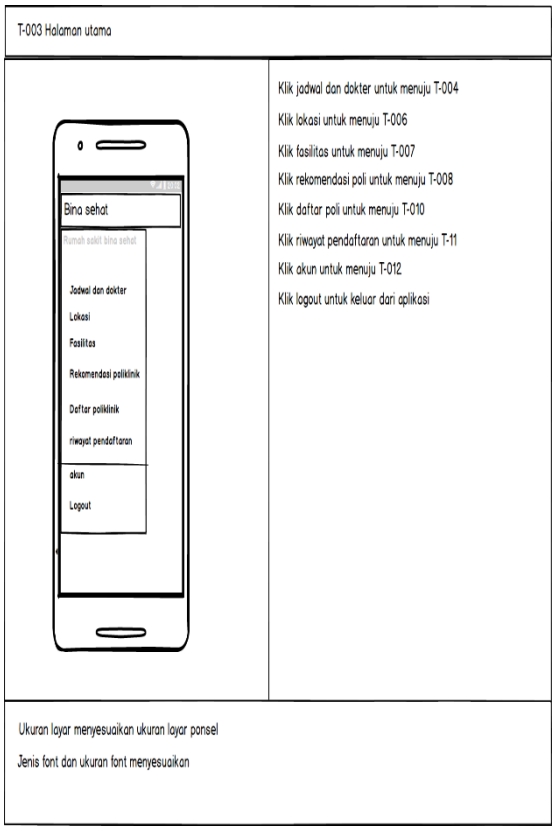
Picture 3 login

1. list of accounts



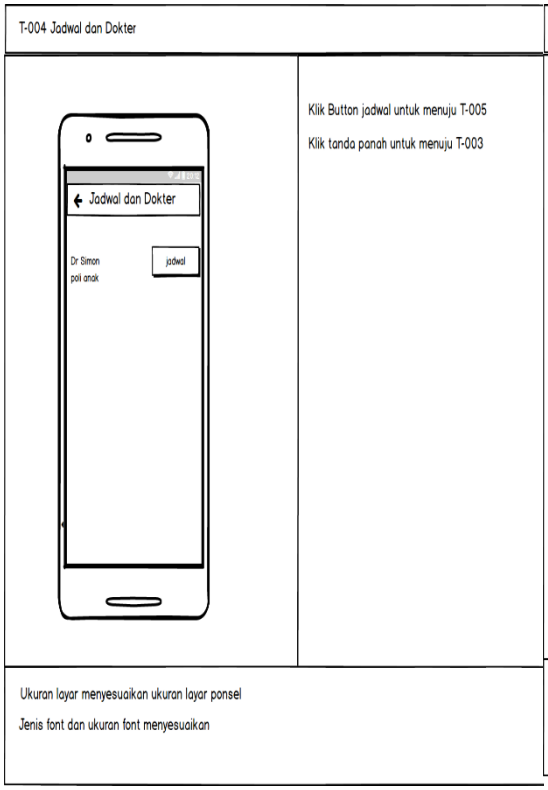
Picture 4 Registrasi

2. Main page



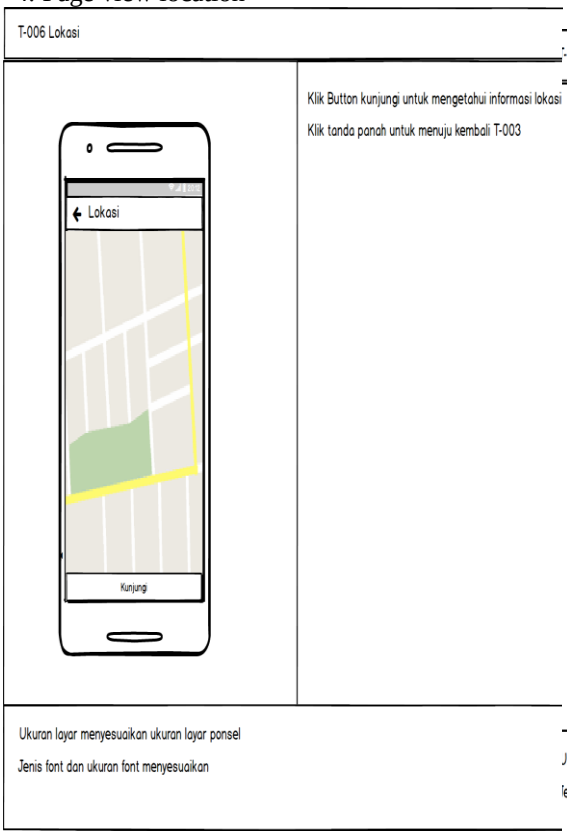
Picture 5 Main Page

3. Schedule page and doctor



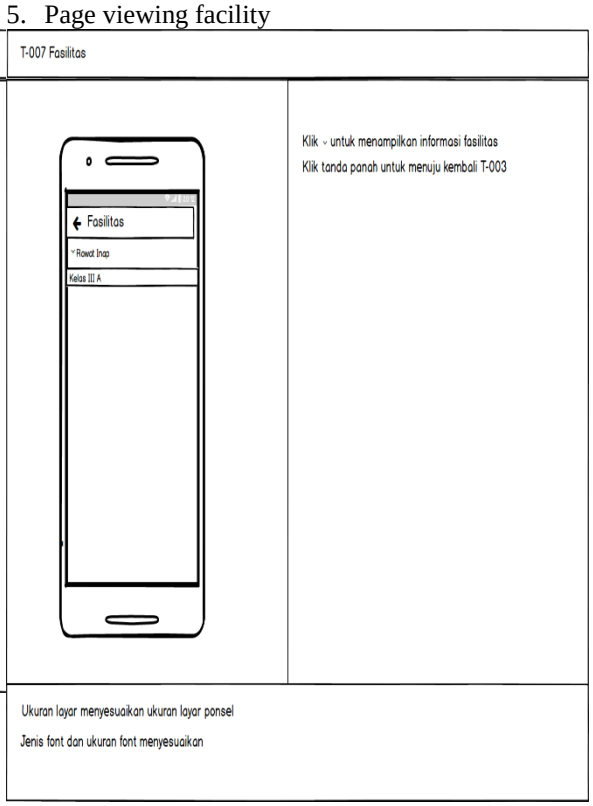
Picture 6 Page Schedule doctor

4. Page view location



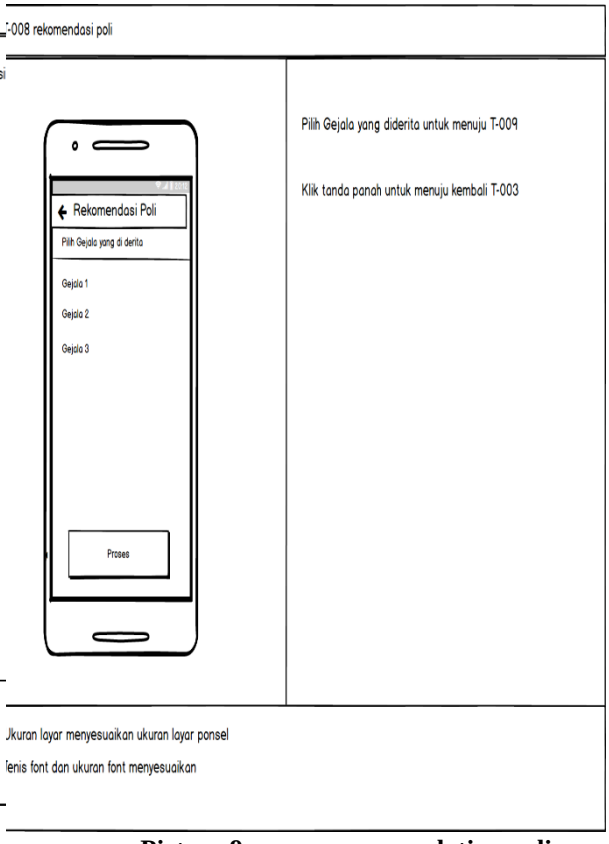
Picture 7 page view location

5. Page viewing facility



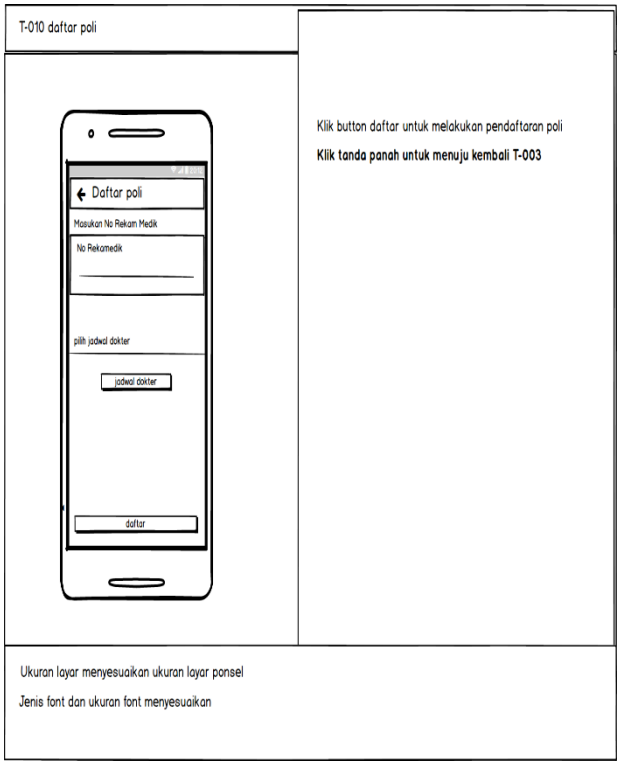
Picture 8 page view facility

6. Poly recommendation page



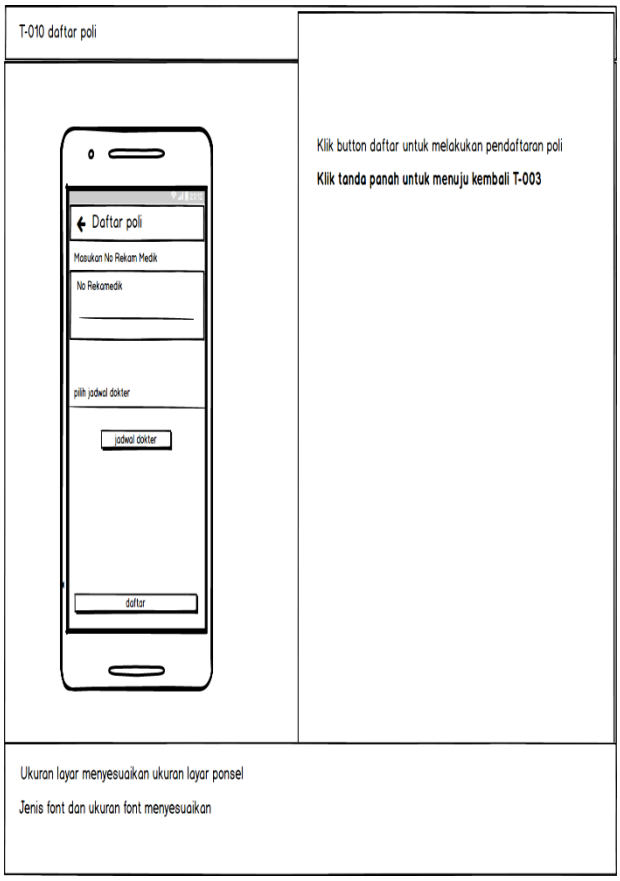
Picture 9 page recommendation poli

7. Poly list page



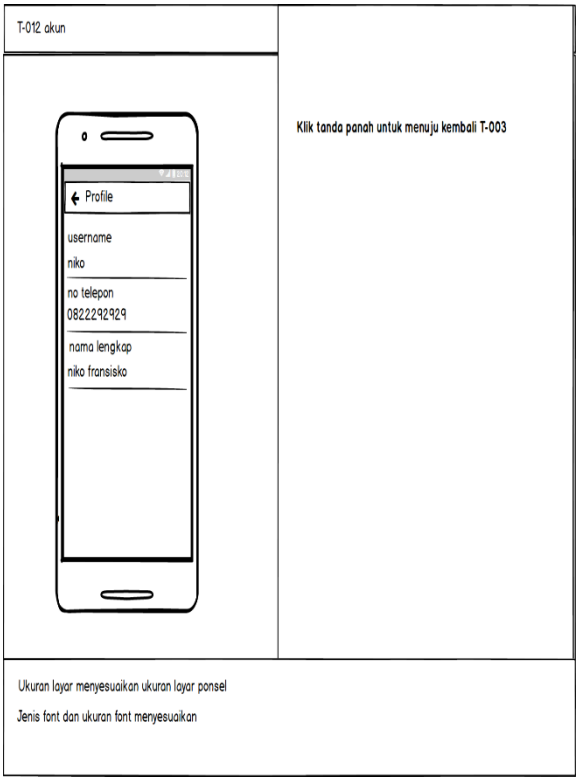
Picture 10 page daftar poli

8. Registration history page



Picture 11 page history

9. User Account page



Picture 12 page user account

2.3 System Testing

Testing the system is done testing blackbox system, Scenario testing contains stages to be performed with system testing. Scenario testing system contains scenario functionally to be done with blackbox testing. Here's the blackbox testing plan that will be done:

No	Functionality tested	Testing Points	Type of Testing
1	Account list	Input data account, data validation list of accounts	*Black box*
2	Login	Input login data, login data validation, login data authentication.	*Black box*
3	See the schedule and doctor	Displays a list of doctors and	*Black box*

		a doctor's schedule	
4	Provide location information	Show user location	*Black box*
5	See the facilities	Displays facility data	*Black box*
6	Make a recommendation poly	Result of recommendation of poly.	*Black box*
7	List the polyclinics	Data input medical record number, medical record number validation, medical record number authentication, poly physician data	*Black box*
8	View the registration history	Displays results of registration number	*Black box*
9	View your account data	Displays the user profile	*Black box*

3.Final

3.1 Conclusion

After doing the testing, then obtained some conclusions and suggestions, which is expected to be useful for further application development

1. Applications can help the registration process to be easier.
2. Applications may provide a poly recommendation in accordance with the symptoms in rasakanya.
3. Applications can assist in providing information availability of doctors.

3.2 Suggestion

Based on the evaluation of the system on the process and the results of this application, suggestion suggestions for further development is the application can run on iphone and blackberry.

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