DEVELOPMENT OF MARKETPLACE PROPERTY APPLICATION WITH PRICE FORECASTING FEATURES USING LOCATION BASED SERRVICE ON ANDROID SMARPHONE

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ABSTRACT

Property is one of the assets that someone must have in Indonesia today. The need for property or board belongs to the primary needs of humans. This means that everyone needs property, the property here is a place to live, while population growth currently reaches 1.2 percent or about three million people each year. In addition there are still 14 million out of 61 million families in Indonesia who do not have a home. With the rapid development of technology all problems can be found a solution through an information technology approach. The use of internet technology also has a good impact on the community in finding information about home purchases. Especially now with the internet for mobile, accessing and searching for information is so easy just in the hand and does not take up too much time. It can be seen from the results of the questionnaire that 78% of the 50 respondents still had difficulties in obtaining information from the internet and print media, because a good and comfortable place to live must also have a safe environment. Then based on data from the statistical center in 2016, 22.5% of Indonesians chose a house not only as a place to live or as a place to live but as an option to invest. The expected results with this application that can help, make it easier for people to find and obtain information about the house to be purchased.

Keyword : Location Based Service, Clarifai, Uclassify, Marketplace Property, Rumapedia.

INTRODUCTION

Property is one of the assets that someone must have in Indonesia today. The need for property or board belongs to the primary needs of humans. This means that everyone needs property, what is meant by property here is a place to live, a house or a residence, even though basically humans can live without a place to live. Many parameters can be seen in the community, for example, a lot of house construction and home sales through print and internet media. In this millennial era, many property sales can be done through website sites as well as mobile applications called E-marketplace. In Indonesia itself e-marketplace has been very widespread because it is a very suitable container in marketing goods to be sold [1].

Based on data from the Central Bureau of Statistics in 2016, the number of home needs or backlogs still reached 11.4 million units. While population growth currently reaches 1.2 percent or around three million people each year. In addition there are still 14 million out of 61 million families in Indonesia who do not have a house [1]. Therefore, the more population growth at this time, the more housing needs as a place to live.

With the rapid development of technology all problems can be found a solution through an information technology approach. The use of internet technology also has a good impact on the community in finding information about home purchases. Because it does not take so much time and place in finding information for the purposes of buying a house. Especially now with the internet for cars, accessing and searching for information is so easy just in the hand and does not take so much time.

But the search for home information through internet media is not very effective and there are still many problems such as, ignorance of the community about the condition of the house to be purchased. It can be seen from the results of the questionnaire that 78% of the 50 respondents still had difficulties in obtaining information from the internet and print media, because a good and comfortable place to live must also have a safe environment. People who will buy a house must immediately conduct a survey before choosing a house, whether the location is prone to natural disasters, traffic jams, or prone to crime. Because from the results of the questionnaire, 94.3% of people want a place to live in a safe and secure location. But there are things that must be considered by the community when moving to a location far enough, of course, will take a lot of time and energy, because ideally a residential home location is close to the place of work and place of activity. Based on the results of a questionnaire of 52% of the 50 respondents wanted the location of the house close to the work location and by 38% wanted to be close to the place of activity and other important places. Then based on data from the Central Statistics Agency in 2016, it turned out that 22.5% of

Indonesians chose a house not only as a place to live or a place to stay but as an option to invest [2].

Many applications provide a place for people to find and buy a house for example, such as the Lamudi Real Estate & Property and Urbanindo application from the application there is no system to predict a property price as a reference for someone to invest and buy a house, then the absence of features to find out the condition the environment and features and facilities are the closest places to the home location for the user and there is no validation when someone posts a home, because this can allow users to upload any image into the system.

Based on the problems described above, it can be concluded that there is a need to build a marketplace property software on the Android platform. By utilizing the price forecasting feature to be able to predict / predict a property price, and a location-based sevice on an Android smartphone as a feature to identify the location of the user's device to use, and utilize the Google place API to find out the nearest location information.

1.1 Problem Identification

Based on the exposure of the background of the problem, the problems that arise in the current system can be identified as follows:

1. People still have difficulties in finding information on the environmental safety conditions of the house to be purchased.
2. People often do not pay attention to the location around the house to be bought, because in addition to the house must be safe and comfortable, ideally the house must be close to the workplace, where to do activities and other places.
3. How to make a system that can predict / predict the increase in a house price.
4. How to make a system that can validate images when posting photos.

1.2 Goal and Purpose

The purpose of this study is to build a Property Marketplace application to make it easier for people to find and sell or buy a house, which will be implemented into an android platform. The objectives of this study are as follows:

1. Make it easier for the public to get detailed information on the environmental security status of the house to be purchased.
2. Make it easier for the public to get information on the nearest place from the house that is being sold.
3. Conduct a price forecasting / prediction process as a determinant of the selling price of the house.
4. Validate users so that no user posts photos that are not in accordance with the system that has been determined.

1.3 Data Collection Method

Data collection methods used in this study are as follows:

a. Study of literature

Data collection by collecting literature, journals, papers and readings that are related to the research title.

b. Observation

Data collection techniques by conducting research and direct review of the problems taken.

c. Interview

Data collection techniques by giving questions and answers to the community, which are related to what is our research.

1.4 Software Development Methods

The model used in making this application is the waterfall model. The waterfall paradigm is shown in figure 1.1 of the Waterfall Model

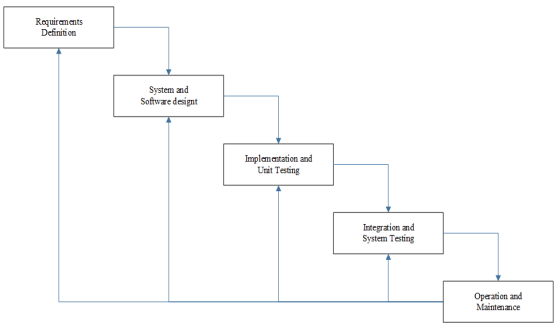


Image 1. Waterfall Model

The process stages of the waterfall model include:

1. Requirments Definition

At this stage an analysis of all needs is carried out in the software development that will be defined in full. Then the needs that have been defined will be analyzed and then what needs will be determined in the development of the software.

2. System and Software Design

At this stage, after all the needs in the software development have been collected, then the software that will be built will be designed first. The design of the software will be divided based on the activities of those parts which have been collected in full in the previous stages.

3. Integration and Unit Testing

At this stage, the results of the designs that have been made will be translated into codes or syntax programming syntax. Figure 1.1 Waterfall Model using predetermined programming languages such as java android, PHP or JSON first and the program built will be directly tested based on the units or parts thereof, so that each unit or part of the software is built in accordance with the objectives to be achieved.

4. Integration and System Testing

At this stage all program units which are divided into separate parts of the program will be combined into one program or one system that is intact, then the system that has been made will be tested so that it can run according to the results of the analysis that has

been done before. 5. Operation and Maintenance At this stage the software or system that has been created will be program maintenance, such as adjustments or system changes. This is done so that the system that has been built can adapt to the existing situation and also so that the program or system that has been built is maintained in terms of its functionality.

THE CONTENT OF RESEARCH

2.1 Definition of Home

The house is a building that is used as a residence for a certain period of time, and a house to take shelter or take shelter from the influence of the surrounding natural conditions.

2.2 Types of Houses

This type of house is classified based on the type of house The type of house consists of:

1. Simple house

A simple house is a small type of house, which has limitations in space planning. This type of house is very suitable for small families and people who have low purchasing power. A simple house is part of a government housing subsidy program to provide decent and affordable housing for people with low income or low purchasing power. In general, simple houses have a house area of 22 m² to 36 m², with a land area of 60 m² to 75 m².

2. Middle House

Middle house is a medium type house. In this type, quite a lot of space requirements can be planned and space planning is more flexible than in a simple house. In general, this middle house has a house area of 45 m² to 120 m² with a land area of 80 m² to 200 m².

3. Luxury Homes

Luxury houses are large types, usually owned by people with high income and purchasing power in general, this luxury house usually has a land area of more than 120 m² with a land area of more than 200 m².

2.3 Conditions of Residence

1. Accessibility
   a. Transfortation needs are met easily and cheaply.
   b. Distance to public facilities is easy and fast.
   c. The road to the location of the quality is quite good, safe, and comfortable should be smooth.
2. Environment
   a. Environmental health is met, for example: far from pollution (factories and public transportation).
   b. Environmental arrangement is quite beautiful and natural.
   c. Enough open space, for example: park or community.
   d. Adequate infrastructure and facilities, such as neighborhood roads, places of worship, sports, parks, schools etc.

2.4 Forecasting

Forecasting is the use of past data from a variable or collection of variables to estimate its value in the future. Therefore, choosing the right forecasting method is one of the important factors in determining forecasting [3].

2.5 Steps for forecasting

In forecasting there are several steps or steps taken. The role stage = forecasting briefly there are three stages that must be passed in the design of a forecasting method, namely:

1. Analyzing past data. this step aims to get a pattern description of the data in question.
2. Select the method to be used. There are various methods available with their needs. The choice of method can affect the outcome of the forecast. forecast results are measured by calculating the smallest error or error. Therefore there is no forecasting method that is certainly good for all types of data.
3. The transformation process from past data mas using the selected method. If necessary, changes are made. According to their needs.

2.6 Principles of forecasting

Basically forecasting is a prediction which certainly does not have 100% accuracy. there are four characteristics of forecasting [4]. The characteristics or principles of forecasting are as follows:

1. The biias forecasting is wrong. Forecasting tries to see a future that is not yet known to be wrong in some assumptions or estimates.
2. Each forecast should include an estimate of error (error). Because forecasting is predicted to run into errors, the real question is as big as the error.
3. Forecasting will be more accurate for groups or groups. The individual behavior of items in a group is random even when the group is stable.
4. Forecasting is more accurate for a shorter period of time. Forecasting for the long term will usually have a higher error rate, because of the unknown events that will occur in the future.

2.7 Calculation of House Price Predictions

In this study to predict or predict a property price is based on input of house prices, location of houses, facilities around the house, public transportation facilities and environmental conditions so that it can facilitate users in predicting a property price.

- Environmental conditions
  Environmental conditions are taken based on the percentage of security level (%).

Tingkat Keamanan	Status Keamanan
0 - 25%	Tidak Aman
26 – 50%	Kurang Aman
51 – 75%	Aman
76 – 100%	Sangat Aman

Tabel 1. Status Keamanan Lingkungan

- Fasilitas sekitar rumah
  - ✓ Pendidikan +/- 4 KM
  - ✓ ATM Center +/- 2 KM
  - ✓ Mini market +/- 5 KM
  - ✓ Rumah sakit +/- 2 KM
  - ✓ Terminal +/- 10 KM
  - ✓ Tempat ibadah +/- 500 M
  - ✓ Kantor polisi +/- 2 KM
  - ✓ Pom bensin +/- 2 KM
  - ✓ Kantor pemerintahan +/- 500 M
  - ✓ Bank +/- 5 KM

Each of the above facilities is set at 3 points per facility, if there are 5 facilities around the existing house then the number of facilities multiplied by points per facility is then divided by 100.
Example (3 x 5: 100 = 0.15 x 100 = 15%) The process of calculating the increase in property prices: Selling price + (environmental condition x selling price) + (facility around x selling price) = increase in property prices per yearContoh kasus :
Dijual rumah minimalis 2 lantai di Dago Giri. Dago

, Bandung

With price Rp. 810jt

Then : 810jt + (10% x 810jt) + (15% x 810jt)

= 810jt + 81jt + 121,5jt

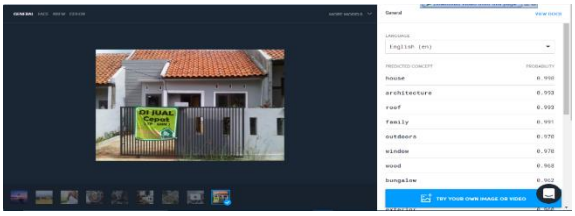
= 1.012.500.000

2.8 Clarifai API

Clarifai is an image and video recognition tool that automatically tags objects and categories taking a pixel as input, using semantic and visual libraries for artificial intelligence. In this system is based on artificial neural networks, scalable machine learning techniques that can handle large-scale visual content that flows through the API. Clarifai also uses semantic and visual similarities to compare images uploaded with other images in the library to display the level of similarity in objects [5].

2.9 Model Clarifai

Images taken first will be marked using the model. A model of a trained classifier that can recognize what is in an image. The home model analyzes the image and probability scores returning the possibility that images contain house tags and other architectures related to images [5]. Here is a picture 2. an example of a tag obtained by clarifai using a general model.

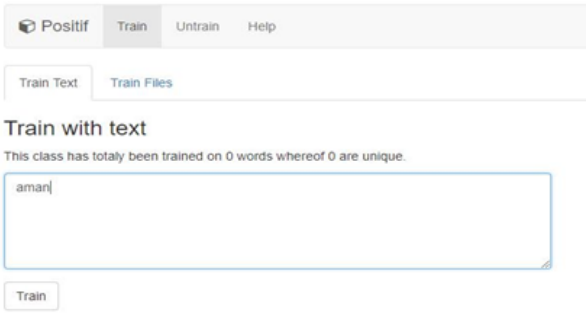


Gambar 2. Tag Clarifai

2.10 Uclassify API

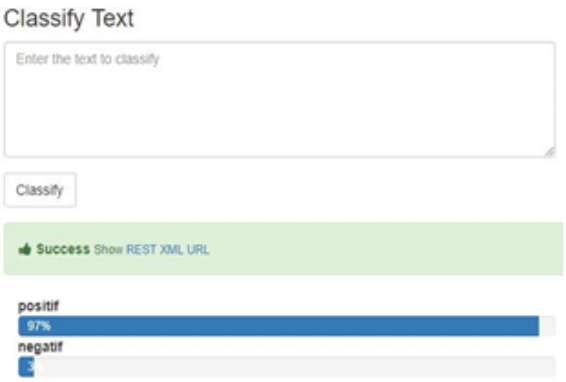
Uclassify is an API service that performs many functions such as language detection, gender text and detect age, spam filters, sentiment analysis, document tagging and can detect emotions. Here is a demo from uclassify here to create a new classifier. A class will be provided which is to determine words or sentences that are negative or positive. By training the data or words that will be used in the new classifier [6]. The Uclassify API can be accessed with free and paid options. Uclassify has been developed in the analysis of sentiments, especially on social media. Following is the process of creating a new classifier on the WEB API Uclassify [6].

Create training data before classifying can begin to categorize text into classes, then need to create training data that will be used in the classification process.



Gambar 3. Membuat Data Latih

After creating training data, the classifier can then be used to classify text after that.



Gambar 4. Contoh Klasifikasi

2.11 Training Data

The classification process in Uclassify is using training data in the form of words that have negative and positive classes. These words will later be used to analyze sentiments on the environmental conditions of a region through public tweets on twitter.

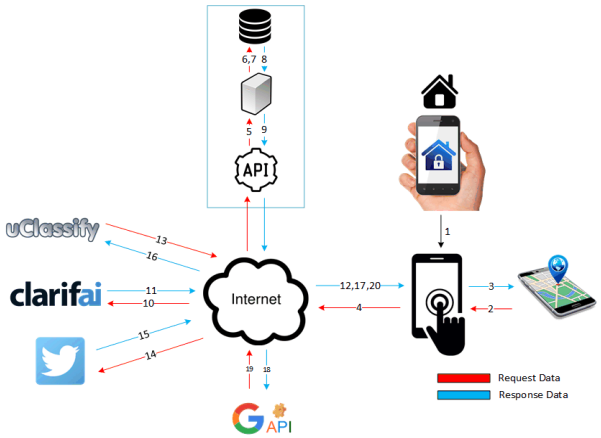
2.12Problem Analysis

Problem analysis is a stage to explain what problems exist before this application is built and aims to help the community to get the house according to the criteria and information from the house to be purchased in the application to be built. In this study using data collection techniques by distributing questionnaires. Data from the questionnaire were taken from 50 respondents. Questionnaires are used to explain the circumstances or phenomena that occur and common problems faced by the community. From the results of the questionnaire, it can be formulated a number of problems that often arise when trying to buy a house, these results are the basis of this study. These problems are as follows:

1. People still experience difficulties in buying a house because the information obtained is still lacking through print and electronic media.
2. The community still has difficulties in knowing the environmental safety conditions of the house to be purchased.
3. The community often does not pay attention to the location around the house to be purchased, because the criteria for the desired house are close to the workplace or other activities.

2.13Analysis of System Architecture

System architecture analysis to identify the architecture that is built on the system. The mobile platform is the system used to build this software. On the construction of this application will utilize the API (Application Programming Interface). The API is divided into 3 parts, namely Clarifai API to validate advertisements that will be posted by the user, Uclassify API to determine the condition of an environment and Google Place API to find out the nearest location information below. Figure 3.2 is a description of the system architecture to be built.



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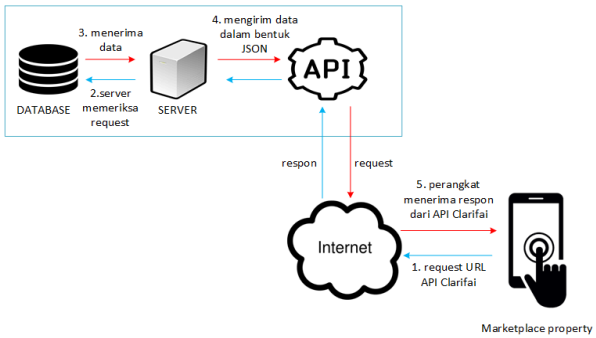
Gambar 5. Arsitektur Sistem

The following is a description of the figure 5. Architecture analysis of the system to be built.

1. Users will post advertisements for homes that will be sold.
2. Send location data for ad posts.
3. Receive location data for ad posts.
4. The user device will make requests to the server as well as Clarifai, Uclassify and Google Service through an API on the internet network.
5. The server receives data requests from the user's device and determines the type of request requested.
6. The server receives data requests and the server retrieves the data that is in the database.
7. The server receives data submissions and the server will save data to the database.
8. The server receives the requested data from the database.
9. The server sends the requested data response in the form of JSON which will then be processed by the user's device.
10. Clarifai receives a request from the user's device.
11. Clarifai sends a response in the form of JSON and will then be processed by the user's device.
12. User devices receive responses from servers and Clarifai.
13. Uclassify accepts requests according to requests from user devices.
14. Twitter received a request from Uclassify.
15. Twitter sends a response according to Uclassify request.
16. Uclassify sends a response in the form of JSON which will then be processed by the user's device.
17. The user device receives the response from the server and Uclassify.
18. Google Service receives requests from the server.
19. The Google Service sends a response to the server according to the request and will then be forwarded to the user's device for processing.
20. User devices receive responses from servers and Google Service.

2.14Analysis of Architecture Getting the Uclassify API

Following is the architecture analysis to get the Clarifai API shown in Figure 6:



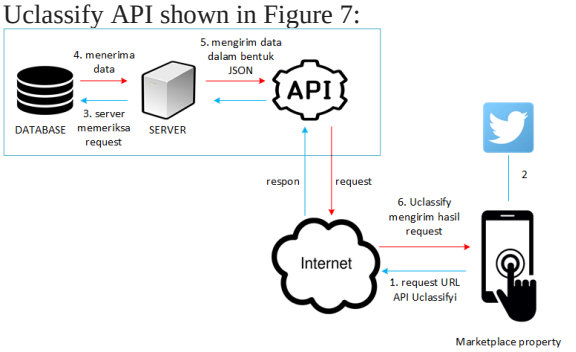
Gambar 6 Arsitektur Mendapatkan API Clarifai

The following is a description of Figure 6. Architecture for Getting the Clarifai API:

1. The mobile user device requests the Clarifai API URL
2. The server receives data requests from the user's device.
3. The request will be processed using the Clarifai API and forwarded to the server.
4. The server will receive the requested data and the data is returned in JSON form which will be forwarded to the user's device.
5. The application processes the results of requests from the server on the user's device.

2.15 Analysis of Architecture Getting the Uclassify API

Following is the architecture analysis to get the Uclassify API shown in Figure 7:



Gambar 7. Arsitektur Mendapatkan API Uclassify

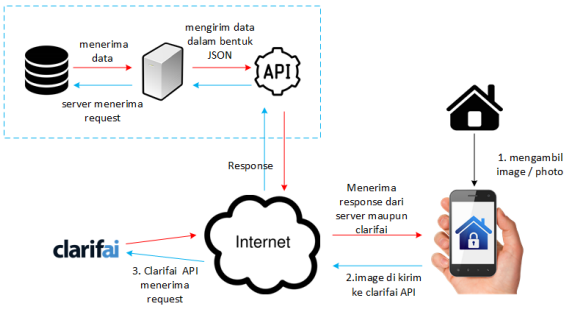
Here is a description of Figure 7. Architecture to get the Uclassify API:

1. The application will make a request to the Uclassify API using HTTP requests via the internet.
2. The Uclassify API web server will accept the request, and will carry out the process of analyzing twitter, where twitter is a data tweet of public sentiments containing the words of the location or area of the house to be sold.
3. The database server provides a response to the results of twitter data analysis to the web server
4. Data will be received by the server and will be forwarded to the API.
5. The server will receive the requested data and the data is returned in JSON form which will be forwarded to the user's device.
6. The application processes the results of requests from the server on the user's device.

2.16 Clarifai Analysis for Validation in the System

there is a system that will be built, it will use the Clarifai API to validate photos of homes taken by the user. This is to anticipate users who upload photos that are not in accordance with the following system are requests for the Clarifai APIRequest HTTP clarifai API :

```
curl -X POST -H
"Authorization: Key
c23fa278a5a640d38a0
3b2d024177733" -H
"Content-Type:
```



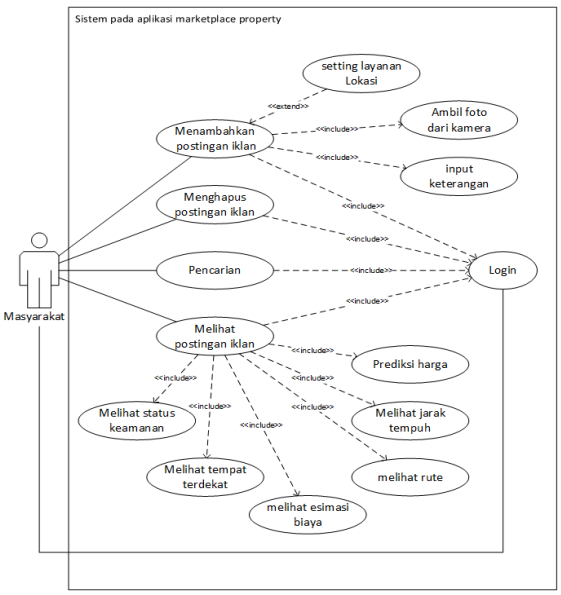
Gambar 8. Validasi Clarifai API

The following is a description of the clarifai API validation process:

1. Users take pictures from a smartphone camera
2. The image is sent to the API clarifai
3. Clarifai accepts requests from user devices
4. The response results from the clarifai API are continued in JSON form and the results will be used to validate
5. Warakat users receive responses from clarifai in JSON form and from the results of the JSON response there is a tag of the results from the clarifai.
6. The tag results will be used as a validation of the image uploaded by the user.

2.17 Use Case Diagram

Use case Diagram is one diagram to model aspects of system behavior. From the analysis of existing application users, the following is a use case diagram which can be seen in Figure 9.

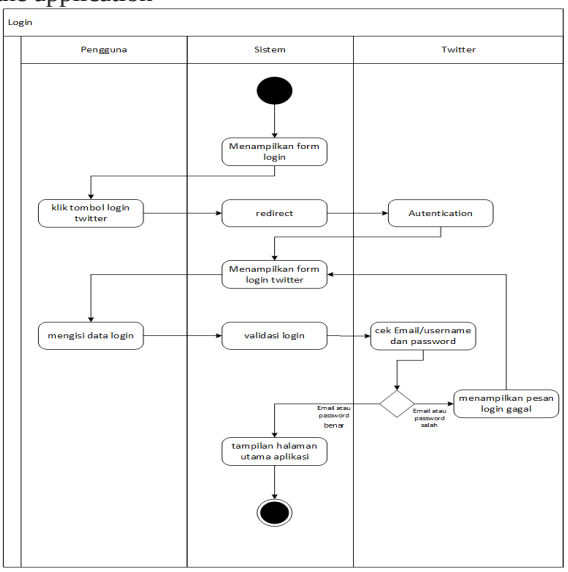


Gambar 9. Use Case Diagram

2.18Activity Diagram

Activity diagrams are techniques for describing procedural logic, business processes and work lines.Login Activity Diagram

The following is a picture 10. activity Login Diagram that models workflow or workflow from the process sequence for users to be able to access into the application



Gambar 10. Activity Diagram Login

2.17Conclusion of Test Results

Based on the test results, it can be concluded that:

1. Rumahpedia application 81%, approaching agree can help in knowing the security conditions in the house to be purchased.
2. Rumahpedia 88% application, approaching agree can help in facilitating getting information when looking for a house outside the city or outside the island.
3. Rumahpedia application 77%, approaching agree to be able to find out the information of the nearest place in the location of the house to be purchased.
4. Rumahpedia application 78%, approaching agree can help in finding a house according to criteria.
5. Rumahpedia application 79%, close to very agreeable easy to use on the android platform.

3. PENUTUP

3.1 Conclusion

Based on the results of the analysis and implementation obtained after conducting research in the development of "DEVELOPMENT OF MARKETPLACE PROPERTY APPLICATION WITH PRICE FORECASTING FEATURES USING LOCATION BASED SERVICE ON ANDROID SMARTPHONE". Then the conclusion of the Rumahpedia application development objectives was analyzed and tested so that the following results were obtained:

1. The construction of the rumahpedia application can provide information on the condition of the level of security in a location, where the location is the house that will be purchased.
2. With the application rumahpedia community can find out all information about places or public facilities that are close to the area or location of the house to be purchased.
3. Rumahpedia software on the android platform has helped users to get a house according to the expected criteria.
4. This application can validate photos of houses uploaded by users to the application.
5. This application can estimate or predict the price increase of a property.

3.2 Suggestions

Rumahpedia application is built to make it easier for people to find information on the house to be purchased, find information on the level of security of the house that will be purchased and help people get a house according to the desired criteria, but there are still many shortcomings in the rumahpedia application. Therefore there are several suggestions that can be used as software development guides towards a better direction to support user growth and content on this rumahpedia software. The suggestions are as follows;

1. Adding push notifications that can provide notifications or notifications if there is a house that will be sold or that has just been sold is close to the user.
2. Application development on other platforms, considering that currently the application only supports the Android platform.

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