APPLICATION DEVELOPMENT INTELLIGENT MARKETPLACE PROPERTY MEMANFAATKAN API CLARIFAI DAN API UCLASSIFY BERBASIS ANDROID

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ABSTRAK

Property is an asset that is important to have everyone in Indonesia. this property It is driven by the basic necessities of human beings, namely boards, food and clothing, one of which is the need for home. With a population of about 262 million people, Indonesia is the world's fourth most populous Country with a population. Over the increase of the population then the need for home growing.

Technological developments bring positive impact for people who need information on buying a home, especially with the internet for mobile usage, then the information can be done by hand without time-consuming. But a search of the House through the medium of the internet is still experiencing constraints because the information provided was still lacking. the community is still difficult to know the information of the House which will be purchased. Based on the results of the questionnaire of the 50 respondents amounted to 54.9% is still the difficulty of getting information from internet media as well as print media, due to the limited information obtained became obstacles when going to buy a House, as it would like to close with important places around the home, this became an obstacle for the people that will buy a house outside the city at a distance far enough off course information is hard to get, whether the location of the flood-prone homes or levels high crime.

The results showed that, in trials to the community get good responses, on the results of testing applications that are built on the android platform against 30 88% of respondents can make it easier to get information at the moment will be buying a home.

Keyword : Clarifai, Uclassify, google place, Rumahpedia, Intelligent Marketplace Property

1. INTRODUCTION

The property now is an important asset to have every person in Indonesia. It is driven by the basic necessities of human beings will Board, food and clothing. Many indicators that can be seen in the community such as the number of home construction and home sales also property rights through print media or the internet. In this modern era many property sale can be done on the site website or mobile application called E-marketplace, E-marketplace itself already mushrooming because being a place that is suitable for the public at large in market goods that will be sold [1].

With a total population of about 262 million people, indonesia is the fourth most populous country with a population in the world. From year to year the growth of the population of indonesia is quite significant. Current growth reached 1.2 percent or about three million people every year [2]. With a population then the more the need for the House as the residence of the society.

Technological developments bring positive impact for people who need information on buying a home, because of the limitations of time and place of the usage of the internet became a place of information for various purposes, the purchase of a home. What's with the internet for mobile usage, then the information can be done by hand without time-consuming. Within 24 hours, information can be obtained easily and accurately.

But a search of the House through the medium of the internet is still experiencing such barriers, ignorance of the community to find out the condition of the House which will be purchased to be difficult to find out information from the environment. Based on the results of the questionnaire of the 50 respondents amounted to 54.9% is still the difficulty of getting information from internet media as well as print media, because of the comfortable residence must also have a secure environment. Community that will buy a House should do a survey first before selecting a home, whether the area is prone to flooding, or congested, whether frequent acts of criminality. Based on the results of the questionnaire of the 50 respondents amounted to 84.3% of the community choose the comfortable residence and security of 62.7% and the public want to have a home on a safe and convenient location of 96.1% However this will become an obstacle for the community will move towards the far enough surely will confiscate a lot of time and effort. With a location far enough, people often do not pay

attention to the location around because ideally a desirable home location is close to the place of work or place of activity. Based on the results of the questionnaire of the 50 respondents amounted to 62.7% wanted close to the location of the work and of 35.3% wanted close to places of work or places of importance.

There is an application that provides a place for the community bought a House for example application Lamudi & Real Estate Property from that application there is no system to find out which environmental conditions and features of the nearest place from the location home to the users as well as the lack of validation when posting houses, because this user may upload any pictures into the system, but such applications provide the facility for users to be able to find out the nearest homes that are being sold in real time.

Based on an issue that has been presented before, then it can be concluded the necessity of building an intelligent software marketplace property on the android platform. By utilizing the Uclassify api as a process to be aware of environmental conditions, and using the google API to find out the place nearest place information, as well as Clarifai api as a process to validate posting home made by users.

Problem Identification

Based on previous background with problems that arise on systems that are running then can be identified several problems that appear as follows:

1. The community is still difficult to know the condition of the security environment of the House which will be purchased.
2. Remote location, making the community often do not pay attention to the location around the House that will be purchased, since the desired home ideally located close to the place of work or other activities.
3. How to make a system that can validate the images when posting photos.

Goal and Purpose

As for the intent of this research was to build an application to facilitate the public in buying the House, which will be implemented into an application, the android platform by utilizing Uclassify api as a process to get information from the State and condition of a place by doing an analysis of the sentiment of twitter. To know the nearest place information, then this application will utilize google place and Clarifai api as a process of how images are used as objects that can display the form tags are processed into information from a pictures.

1. Make it easier for the public to know the information of the security status of the environment at home that will be purchased.
2. Make it easier for the public to know the information of the nearest place from home that will be purchased.
3. Perform validation for the user so that there are no users who do post a photo that does not comply with the system.

Method of data Collection

Data collection methods used in this research are as follows :

a. Literature Review
   Data collection by way of collecting literature, journals, paper and the readings that have to do with the title of research.
b. Observation
   The technique of data collection with the research and review of the problems taken directly against.
c. Questionnaire
   The technique of data collection by means of disseminating to the public, question sheets related to research.

Method of Software Development

Models used in the making of this application is the waterfall model. Paradigm waterfall shown in Figure 1 Waterfall Model.

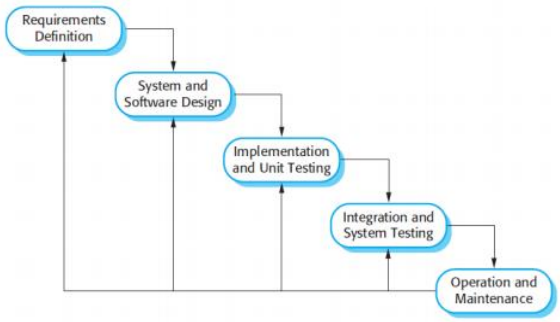


Figure 1. Method of Software Development

In making this application using the waterfall model as the stages of application development, as for the process, among others [11] :

1. *Requirments Definition*
   At this stage of the analysis done everything needed in the development of software that will didefinisakan. Then the needs that have been defined will be analyzed and will then be determined what needs to be met in the development of software.
2. *System and Software Design*
   At this stage, when all the needs in the development of the software has been collected, then the software will be built at akana design first. The design on the software will be divided based on the activities of the sections that have been collected in full at the previous stages.
3. *Integration and Unit Testing*
   At this stage, the result of a design that has been created will be translated into codes or

programming-syntax syntax Figure 1.1 Waterfall Model by using the specified programming language such as java or PHP, JSON android first and program will be directly tested based on units or bagianbagiannya, so that each unit or section on software that is built in accordance with the objectives to be achieved.

4. *Integration and System Testing*

   At this stage the entire unit-unit program that is divided into several parts of the separate program will be merged into a single program or a whole system, then the system that has been created will be tested in order to be run in accordance with the results of the analysis that has been done before.

5. *Operation and Maintenance*

   At this stage, the software or the system that has been created will be done maintenance programs, such as: adjustments or changes to the system. This is done so that the system that has been built up can adapt to the situation and also so that a program or system that has been built up in terms of functionality may be maintained.

2. THE CONTENT OF RESEARCH

2.1 Clarifai API

Clarifai is a tool introduction to pictures and videos which automatically provides tags to objects and categories by taking a pixel as input. Using semantic and visual library for artificial intelligence. The system is based on a neural network, scalable machine learning techniques that can handle large scale visual content that flows through the API. Clarifai also use semantic and visual similarity to compare images uploaded with other images on the library to display the level of similarity on the object [4]. Clarifai work through the analysis of the image to produce a list of the descriptions of the tags from the given image. For each tag in this list, the system also provides the value of the probability. The value of this probability was later to be used as a specific tag on the image. Clarifai API can be accessed as a web service remotely [4]. Clarifai technology work scheme is shown in Figure 2 as follows.

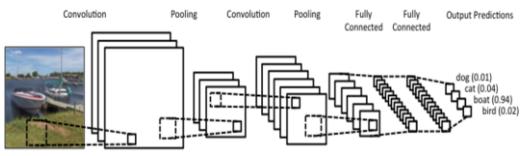


Figure 2. The Working of the API Clarifai

2.2 Uclassify API

Uclassify is a service API that performs many functions such as language detection, text and detect gender age, spam filters, analysis of sentiment, document tagging and can detect emotions. Here is a demo of the uclassify here could make a new classifier. Will be provided a class to specify the words or phrases are negative or positive. By way of conducting training on data or words to be used in the new classifier [5]. Uclassify API can be accessed with a selection of free and paid. Uclassify has been widely developed in the analysis of sentiment especially on social media. Here is an example of the use of the classification of the text on the uclassify shown in Figure 3.

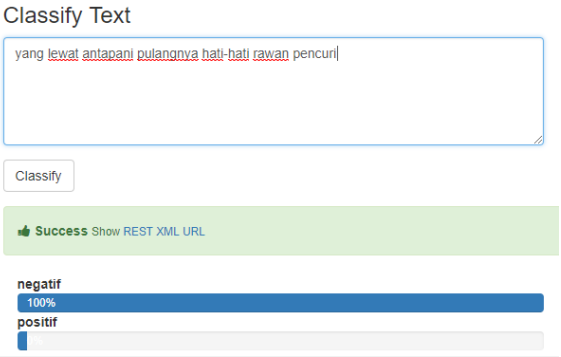


Figure 3. Example Text Classification Uclassify

To be able to do the previous classification, should make the class in advance, on a study using 2 class i.e. positive and negative, here are the positive and negative training data used in the study are shown in table 1.

Table 1. Data Training

Negative	**Positive**
Begal	Aman
Awas	Lancar
Rawan	Ramai
Pencuri	Rekomended
Jambret	Bagus
Bgal	Indah
Begl	Nyaman
Hati-hati	Nyman
Jmbret	Bgus
Macet	Sesuai
Mcet	Tidak ada
Parah	Polisi
Preman	Meringkus
Geng motor	Menangkap
Curanmor	Menahan
Pencurian	Pelaku
Pembegalan	Akhirnya
Penjambretan	Alhamdulillah
Pembunuhan	Selamat
Kriminalitas	Asik
Kriminal	Sudah aman
Takut	Aman dari begal
Waspada	Tidak macet
Bahaya	Diringkus
Bhaya	Ditahan
Tidak	Ditangkap
Korban	Sejuk

Sudah tidak aman	Pembersihan
Pembegal	Dekat
Jahat	Pengamanan
Kejahatan	Teratur

2.3 Analysis of System Architecture

Analysis of system architecture for identifying the architecture to be built on the system. The mobile platform is a system that is used to build the software. The development of these applications will make use of the API (Application Programming Interface). The API is divided into 3 parts namely, api Clarifai to validate against the ad to be posted by a user, API the Uclassify to determine the condition of an environment and API Google Place to find out the nearest place information. The following is an overview of the system architecture to be built is shown in Figure 4.

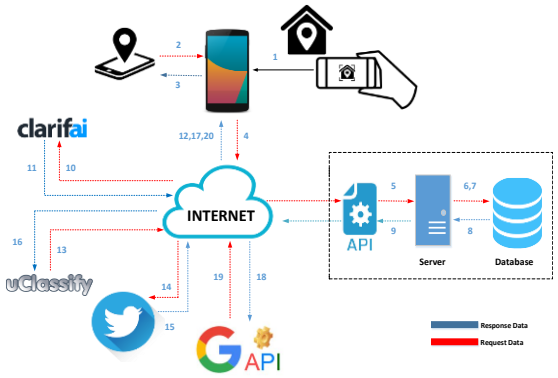


Figure 4. Analysis of System Architecture

The following is a description of Figure 3 analysis of the architecture of the system to be built.

1. The user will then post advertising houses for sale.
2. Send location data posting ads.
3. Receive location data posting ads.
4. The user's device will perform the request to the server as well as Clarifai, a Google Service and Uclassify through API on internet network.
5. The server received the request data from the user's device and determines the type of request that are requested.
6. The server received the request data and the server took an existing data in database.
7. The server receives the shipment data and server will store the data into the database.
8. The server receives the data requested from the database.
9. The server sends the response data requested in JSON form which will then be processed by the user device.
10. Clarifai receives a request from a user device.
11. Clarifai sends a response in the form of JSON and then will be processed by the user device.
12. Device user receives a response from the Server or Clarifai.
13. Uclassify received a request on request from the user's device.
14. Twitter received a request from Uclassify.
15. Twitter sends the appropriate request response Uclassify.
16. Uclassify sends the response in JSON form which will then be processed by the user device.
17. Device user receives a response from the server as well as the Uclassify.
18. Google Service received a request from the server.
19. Google Service sends the response to the server in accordance with the request and will then be forwarded to user devices for processing.
20. Device user receives a response from the server or Google Service.

2.4 Problem Analysis

Analysis of the problem is the stage to explain any problems that existed before the application is built and is aimed at helping people to get home fit the criteria and information from home that will be purchased in the application to be built. This research uses data retrieval by way of disseminating a questionnaire. Results of the questionnaire data were taken from the 50 respondents.

A questionnaire is used to describe a State or phenomenon that occurred and the problems faced by the general public. From the results of the questionnaire, it can be formulated several problems that often occur when intending to buy a House, that became the basis of the results in this study. These problems are as follows:

1. The society is still experiencing difficulties in buying a home because the information obtained is still less through print and electronic media.
2. The community is still difficult to know the condition of the security environment of the House which will be purchased.
3. Communities often do not pay attention to the location around the House that will be purchased, since the desired home criteria is near the place of work or other activity place.

2.5 Analysis of the Built Application Procedures

In searching the home application will take home photos using the camera smartphone, so the image will then be analyzed using Clarifai, and then the image will be sent to the server. The process will be forwarded into the Uclassify and google's service, for more details about the application procedure that is built, can be seen in Figure 5 as follows:

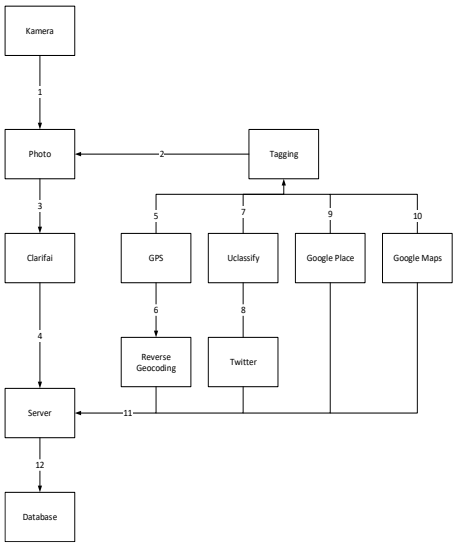


Figure 5. Analysis Of Application Procedures

a. Geotagging Data Retrieval Process

This application will make use of technologies that are already on geotagging camera android smartphone, geotagging data captured is the latitude and longitude. The latitude and longitude data will be used as input data to process the geocoder [6]. Geocoder result is the form of address information place taking pictures. the following picture geotagging data retrieval processes as input to geocoder data storage to the database. The following data retrieval process geotagging on picture 6.

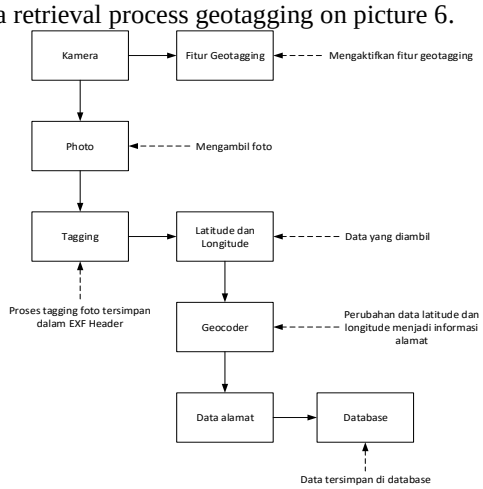


Figure 6. Geotagging Data Retrieval Process

b. Analysis Of Clarifai For Validation System

On the system to be built it will use the clarifai API to perform validation against a House photo taken by the user. This is to anticipate the user who uploaded the photo that does not comply with the system. Here is a request for clarifai API.

```
curl -X POST -H "Authorization: Key c23fa278a5a640d38a03b2d024177733" -H "Content-Type: application/json" -d ' { "inputs": [ { "data": { "image": { "url": "http://www.wauxi.com/wp-content/uploads/2017/08/rumah-dijual-murah.jpg" } } } ] }'
https://api.clarifai.com/v2/models/aaa03c23b3724a16a56b629203edc62c/outputs
```

From the results of the json response is the result of a clarifai tag here is the result on the table tag 2.

Table 2. Tag Hasil Clarifai

No	Tag	Probability
1	Architecture	0.97649837
2	House	0.9717869
3	Daylight	0.9683184
4	Street	0.93639636
5	Family	0.9358329
6	Building	0.9226797
7	No person	0.9226636
8	Outdoors	0.9211111
9	Home	0.91495967
10	Window	0.8961141
11	Pavement	0.8897202
12	Roof	0.8786855
13	Environment	0.87621987
14	Door	0.8747334
15	City	0.84620965
16	Wood	0.8371335
17	Urban	0.80781865
18	Travel	0.80177474
19	Town	0.7408152
20	Road	0.73308825

The results of such a tag will be used as validation of the photos uploaded by users on this research tags taken i.e. the word architecture, home, house, building, and environment tags are used to validate user-uploaded photo at the time of posting the ad House, if such a tag match on the system then the photos will be accepted by the system.

c. Reverse Geocoding

This research will use the Reverse Geocoding is used to convert data coordinates become a location or address that is easy to read. It is used so that one can read the Uclassify site that will be used to perform analysis of the tweets that contain words that location.

d. The Process Of Data Capture Twitter

This application will use the data to tweets on the twitter API. Twitter API gives API Key as verification. Then Web Service calling the Twitter API and changed search results in the form of JSON. After that the Android memparsing the JSON data and display information tweet. Below is a picture of the process of data capture the Twitter API [6]. The following is the process of data capture twitter shown in Figure 7.

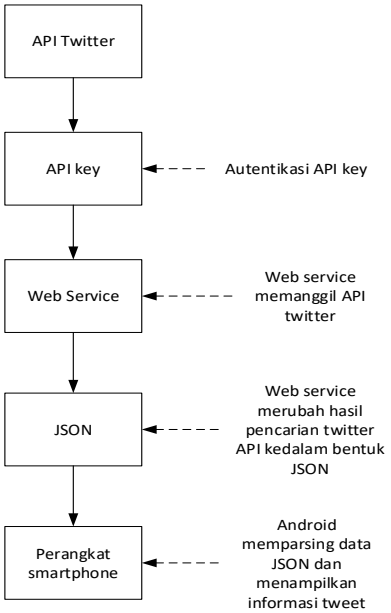


Figure 7. Get The API Of Twitter Analysis

e. Uclassify Analysis Find Out Security Status

The research on using Uclassifiy API to find out the condition of the home location will be purchased as a recommendation. As for stages Uclassify to know the condition of the site can be seen in Figure 8 as follows.



Figure 8. Uclassify Security Status Analysis

On the API of his two earlier Uclassify classifier recently that will be applied to the system to be built. The Classifier has two classes, namely the classes of positive and negative classes. Here is the request made by the device via a URL that will be passed to the API to determine whether Uclassify tweet that tend to be positive or negative. [5] the Uclassify will detect the public sentiment of twitter through tweet. The name of the home location will be a keyword in the search data to tweets containing the name of the location. Here is a sample analysis of sentiment to get information on a location using twitter and api Uclassify can be seen in table 3. Here is a sample tweet results negative and positive sentiment from public locations in the tweet will be results antapani in process using the API Uclassify.

Table 3. Tweet Contains The Name Of The Location

Location Antapani Bandung	
Dcument	Tweet
1	Waspada begal di **antapani**
2	Pembacokan begal **antapani** depan kantor banget
3	Baru tau **antapani** ada begal
4	Asik nih **antapani** gak macet-macet amat
5	Hati-hati kawan yang rumah nya kawasan **antapani** lagi rawan maling

On the API of his two earlier Uclassify classifier recently that will be applied to the system to be built. The Classifier has two classes, namely the classes of positive and negative classes. Here is the request made by the device via a URL that will be passed to the API to determine whether Uclassify tweet that tend to be positive or negative. Following are the results of table 4 tweets that have been analyzed by the region's location about Uclassify antapani.

Table 4. Hasil Uclassify

Tweet	Uclassify Result
Waspada begal di antapani	Positif : 0.00337985
	Negatif : 0.99662
Pembacokan begal antapani depan kantor banget	Positif : 0.00365185
	Negatif : 0.996348
Baru tau antapani ada begal	Positif : 0.999967
	Negatif : 0.0000327286
Asik nih antapani gak macet-macet amat	Positif : 0.997806
	Negatif : 0.00219374
Hati-hati kawan yang rumah nya kawasan antapani lagi rawan maling	Positif : 0.0000639054
	Negatif : 0.999936

Of the five largest value to tweets is on negative class, then a tweet containing that location has a negative value according to public sentiment on twitter.

f. Analysis Of Google Maps Calculate Distance

In this research to get the distance between the start location to the location of the House is using the Google Maps API. The following is an example of the analysis of the Google Maps API to get the distance, can be seen in Figure 9.

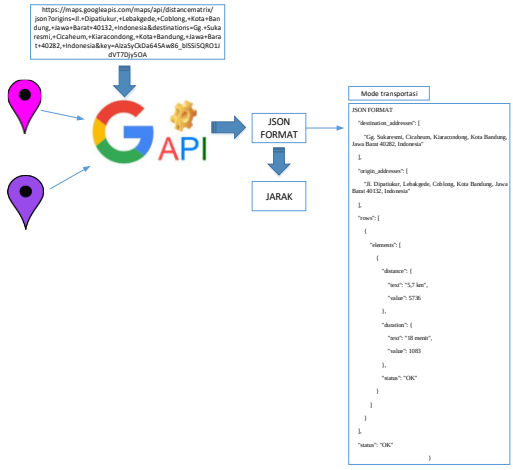


Figure 9. Analysis Of Getting The Distance

The following is an explanation of the figure 8 analysis of the Google Maps API to get the distance

1. Enter the location of the system start and destination location into Google Maps API, by mode of transport.
2. The results of the process in the form of Google Maps API JSON format. Where in the JSON format is no element status, duration, and distance.
3. To get the distance then the system only takes distance element in the JSON. Then the distance between the start location didapatkanlah with the location where the intended [8].

g. Analysis Google Place API

The use of the Google API allows developers to place to cultivate a smartphone device coordinates are then used to search for a place on the coordinates. Google place api is web service that returns information a place by way of mendefinisikankriteria the place into the format of the query API uses the HTTP request.

The use of the Places API on the system that is built by using a Nearby Place request Searches. Each use of a in search of accessible places in the form of HTTP request, and returns the results in either XML or JSON format. All request to the Places API must use https://Protocol, and include an API key [7].

Nearby Search Requests or nearest place search application allows applications to search in a specific area. The search can be done effectively, by including the keyword or include the type of place you're looking for. The following is the format of the Nearby Search Requests: https://maps.googleapis.com/maps/api/place/nearbysearch/output?parameters

The users who will buy a home can know what place that is closest to your location. On penelian this will utilize the google API to find out the place information-information is important, with the nearest distance from home. The following is the source code for showing the nearest place at one location using google place nearby [9].

2.6 The Hardware Implementation

Implemented in hardware to the needs in the development of applications. Here is the hardware device that is used to support a system that goes by will in the process. As for the hardware in the hardware that is implemented on a computer and hardware on the mobile.

Table 5. Implementasi Perangkat Keras

Hardware	Spesification
Prosessor	AMD A6 3400M – 2.4 Ghz (Quad Core)
Memory	6 GB
Harddisk	500 GB
VGA	AMD RADEON 6520G
Keyboard and Mouse	Standard

As for the implementation of the hardware on the android platform, so that the application can run on mobile systems with the following minimum specifications on table 6.

Table 6. Implementation Of Mobile Hardware

Hardware	Spesification
Operating System	Android 4.2.2 Jellybean
Memory	512 MB
Storage	Memory 2GB
Camera	8 MP

2.6 Use Case Diagram

Use case Diagram is one of the diagrams to model aspects of the behavior of the system. From the analysis of the existing application users, here is a use case diagram can be seen in Figure 10 Use Case Diagram.

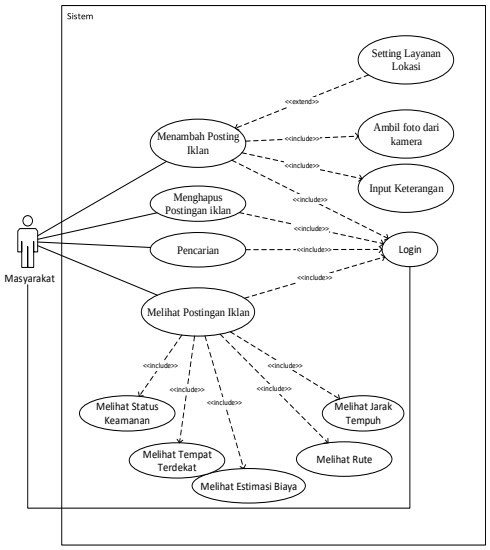


Figure 10. Use Case Diagram

2.6 Activity Diagram

a. Activity Diagram Add Ad Posting

Here is an Activity Diagram of the Add ad Posting in Figure 11, where the clarifai API is used to validate the photos when the user performs ad posting. The validation of the results using the tag clarifai, tag used is a House, Building, Home and Environtment.

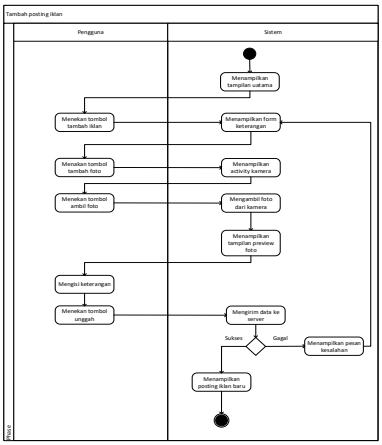


Figure 11. Activity Diagram Add Ad Posting

b. Activity Diagram See Security Status

Here is an Activity Diagram in Figure 12 security status, where API uclassify is used to analyze a security location conditions through the media ssosial by doing an analysis of the sntimen to the name of the location.

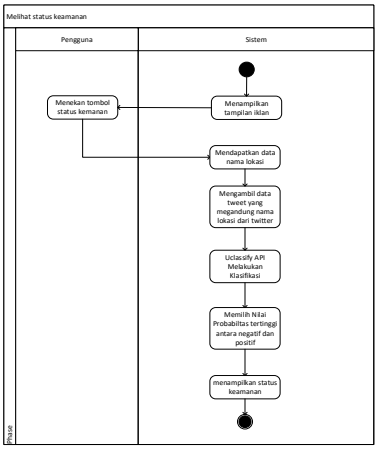


Figure 12. Activity Diagram See Security Status

2.7 Test Result

Acceptance testing is carried out umtuk know the response from users about application rumahpedia on the android platform. There are 5 pertanyaaan submitted to 30 respondents. Assessment and range percentage of each scale of answers given by using Likert scale on each question [10].

1. Questionnaire Questions 1

Does this software already in the help you in knowing the security conditions at home that will be purchased

Table 8. Questionnaire Questions Result 1

Category Answers	Weights	Frequency Answer	Total Value	Percentage Values (%)
Sangat setuju	5	3	15	(122/(30x5)) x 100 = 81%
Setuju	4	26	104	
Ragu-ragu	3	1	3	
Tidak setuju	2	0	0	
Sangat tidak setuju	1	0	0	
total		30	122	

Based on the above calculations, the total score obtained is as much a scale score with 122 categories answers approach agreed. While the result of the value of the respondent's presentation was 81% of the expected value of 100%.

2. Questionnaire Questions 2

Does this software can simplify your present will be looking for a home outside of the city or outside the island, because of limited time and information

Table 9. Questionnaire Questions Result 2

Category Answers	Weights	Frequency Answer	Total Value	Percentage Values (%)
Sangat setuju	5	15	75	(132/(30x5)) x 100 = 88%
Setuju	4	12	48	
Ragu-ragu	3	3	9	
Tidak setuju	2	0	0	
Sangat tidak setuju	1	0	0	
total		30	132	

Based on the above calculations, the total score obtained is as much as 132 score on a scale approaching the answer categories agree. While the result of the value of the respondent's presentation was 88% of the expected value of 100%.

3. Questionnaire Questions 3

Does this software already present information of the nearest places are located on the area of the House which will be purchased

Table 10. Questionnaire Questions Result 3

Category Answers	Weights	Frequency Answer	Total Value	Percentage Values (%)
Sangat setuju	5	3	15	(115/(30x5)) x 100 = 77%
Setuju	4	19	76	
Ragu-ragu	3	8	24	
Tidak setuju	2	0	0	
Sangat tidak setuju	1	0	0	
total		30	115	

Based on the above calculations, the total score obtained is as much a scale score with 115 categories answers approach agreed. While the result of the value of the respondent's presentation is 77% of the expected value of 100%.

4. Questionnaire Questions 4
   This software can simplify your home criteria in looking for

Table 11. Questionnaire Questions Result 4

Category Answers	Weights	Frequency Answer	Total Value	Percentage Values (%)
Sangat setuju	5	2	10	(116/(30x5)) x 100 = 78%
Setuju	4	22	88	
Ragu-ragu	3	6	18	
Tidak setuju	2	0	0	
Sangat tidak setuju	1	0	0	
total		30	116	

Based on the above calculations, the total score obtained is as much as 116 score scale category answers approach agreed. While the result of the value of the presentation of the respondents was 78% of the expected value of 100%.

5. Questionnaire Questions 5
   What is the Rumahpedia application on the android platform is easy to use

Table 12. Questionnaire Questions Result 5

Category Answers	Weights	Frequency Answer	Total Value	Percentage Values (%)
Sangat setuju	5	3	15	(119/(30x5)) x 100 = 79%
Setuju	4	23	92	
Ragu-ragu	3	4	12	
Tidak setuju	2	0	0	
Sangat tidak setuju	1	0	0	
total		30	119	

Based on the above calculations, the total score obtained is as much a scale score 119 categories answers approach agreed. While the result of the value of the respondent's presentation is 79% of the expected value of 100%.

Based on the test results, can be drawn the conclusion that the :

1. Application Rumahpedia 81%, approaching agree can help in knowing the security conditions at home that will be purchased.
2. Application of Rumahpedia 88%, approaching agree can help make it easier to get the information in time will be looking for a home outside of the city or outside the island.
3. Application of Rumahpedia 77%, approaching agree can figure out information on what is nearby in what the House will be purchased.
4. Application of Rumahpedia 78%, approaching agree can help in the search for appropriate criteria home.
5. Rumahpedia application 79% strongly agree, approached easily used on android platform.

3. CLOSING

3.1 Conclusion

Based on the results of the analysis and implementation of obtained in making this final assignment. You can take the conclusion that, from the Rumahpedia application development goal is to give the media marketplace for the sale of a home where this application provides features to know the condition of the home security will be purchased, presenting information important places close to home that would be purchased, and other features. After doing some research in the development of INTELLIGENT APPLICATION DEVELOPMENT MARKETPLACE PROPERTY UTILIZING API CLARIFAI and API UCLASSIFY ANDROID BASED. Following are the results from the Rumahpedia application development goals has been in analysis and in the test so obtained the following results:

1. Rumahpedia application development can provide information security conditions at a location, which is where that location is the House that will be purchased.
2. With the application of the community can figure out information nearest places anything in the

region or location of the home that will be purchased.
3. Rumahpedia software on the android platform is already helping the user in getting home match criteria.
4. Rumahpedia applications can validate the home photos uploaded though users.

3.2 Advice

In building the application rumahpedia it's still a lot of shortcomings, therefore there are some suggestions that can be used as a blend of software development towards a better growth in support of the user and the content on the software rumahpedia. As for the suggestions to the development of software rumapedia are as follows :

1. The addition of push notification can provide notification if there is a home for sale close to users.
2. Develop software in terms of performance and a better display.
3. Develop a platform that can be supported by the software given the current only supports the android platform.

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