APPLICATION ARCHITECTURE PUBLIC TRANSPORT ROUTES CIANJUR ANDROID BASED

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ABSTRACT

Public transport which has always made the choices for the community on some general him especially for those who do not have private transportation to travel from a places that want to land on. Recently the route using public transportation in the territory of the city of Cianjur was do it engineering line new paths for urban transport and public transport. Dishub the city of Cianjur also implement traffic engineering management review so there is some road of his made one direction, which was originally a 14-track transportation public, now made 10 line only. The system will be made on the application of information system of city transport routes in Cianjur is Android based. In this scholarly works used Algorithm Best-Path Planning for Public Transportation Systems to do the find public transport routes. Application made need peng-input-an original site and the destination site the search location obtained in the database to search the nearest transport routes and the transition matrix to determine the merger route or nodes that already specified place. On the application of this system determines and displays the map on Google using Google Maps API function to calculate the distance between the destination location to the position where the searchers are so searchers can find out when the searcher is already close to the destination location. The existence of this application the searcher can find out or helped to search public transport routes in the city of Cianjur.

Keywords: : Routes , Best-Path Planning Algorithms, matrix of Transition, the city of Cianjur.

1. INTRODUCTION

City or transit transportation public is one of the tools of public transport, which has an important role in the life of the community. Dishub the city of Cianjur also implement traffic engineering management review so there is some road ofhis made one direction, which was originally a 14-track transportation public, now made 10 line only. This is complicate his community to access transportation to go to the place of destination, in addition also Cianjur still confused to get the transportation public routes to destinations on the go. While this information can indeed found in various social media like instagram, facebook or other social media. But it may not get by all the communities in Cianjur, especially for older people who don't have a social media account.

Information about the city of Cianjur transport is crucial to provide information to the public. These applications help the community Cianjur to get access information can be packaged in a single platform. In this application has also provided information regarding the route the transportation public that operates in the city of Cianjur. Not only does society Cianjur can use this application, outside the city of Cianjur can also use this application to help find information about transport routes of the city of Cianjur. Besides communities Cianjur can also access important numbers such as the police, ambulance and fire brigade are already available in this application. With this application it is expected the Government of Cianjur can increase quality of service to society Cianjur. Based on these problems the author will make the information system into the mobile android in order to make more effective use.

With purpose the intention of providing information system and transport Routes of the city which is in the city of Cianjur. With the aim of research to provide the following benefits:
1. Help make it easier to get information to Cianjur residents routes and transportation that is in the city of Cianjur.
2. Simplify DISHUB to inform the community about transportation in Cianjur.

2. THE CONTENT OF RESEARCH

2.1 Research Methodology

Research methodology used in this research is descriptive research methods combined with quantitative approach. Descriptive research method is a method which aims to give an overview of the research object of systematically.
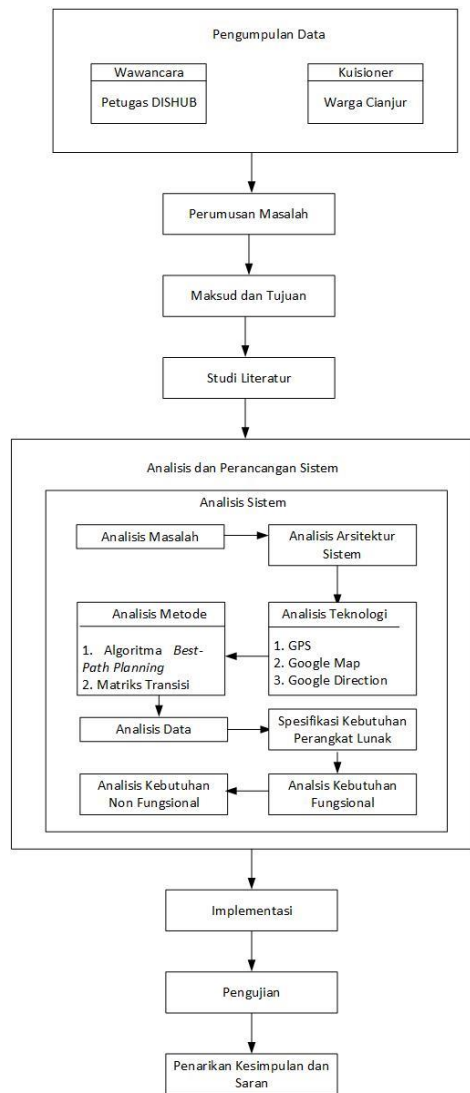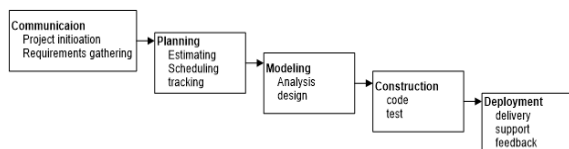
Figure 1. Research Methods

2.2 Methods Of Software Development

System development method that is used is to use a system development life cycle approach (System Development Life Cycle/SDLC) model waterfall. Phases in the model waterfall as seen is as follows.

Source of image: software engineering (practitioner's Approach) (2013) [8].

Figure 2 . Stages Of Development Of The Software..

a. Communication

The search process and the determination of the principal problems occurred.

b. Planning

Determination of process planning solution of problems and the steps that are performed based on the principal problems occurred.

c. Modeling

Process modeling is doing-making modeling system using system modeling diagrams such as the Unified Modelling Diagrams (UML), Entity Relationship Diagram (ERD), the design of the table structure and the design of the user interaface system.

d. Construction

Construction is the process of creating a system of programming code by using the PHP programming language Framework for search admin and java android for applications used by customers. After encoding is finished it will do testing of the system that has been created. Testing the system using standard methods of Blackbox testing.

e. Deployment

Process of implementation of the system to the system so that searchers can be collected responses from the search system.

2.3 The Cornerstone Of The Theory

2.3.1 Application

The application is a computer software that is composed of a set of instructions or statements (statement) so that the computer can process the insert into the output. Based on the large Indonesian Language Dictionary, an application is a computer program that is built to work out, implement and facilitate the specific tasks of the searchers.

2.3.2 Google Maps

Google Maps is a service for web-based virtual world map provided by google. Google Maps can also be tag client a map that can be moved (panned), enlarged (zoom in), minimized (zoom out), the signposts of an object map to the other object, and also search a place or location.

2.3.3 Best-Path Planning Algorithm

In this system the technology used to determine the route of wearing the Best-Path Planning algorithms which algorithm is used to find the route that's available from one place to another with the amount of transfer routes that as little as possible.

Because the data for determining such a big, then on this application the amount of transfer is limited.

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Algorthm

Let o and d denote the numbers assigned to the origin and destination, respectively.

1. *Trivial cases: if o = d, show an appropriate message and return a null plan.*
2. *Direct: if Qo,d = 1, return any service in DService(o, d).*
3. *One transfer: if Qo,d = 2, there must be a location m such that Qo,m = 1 and Qm,d = 1. Combine any route in DService(o;m) and any route in DService(m, d) to obtain a one-transfer plan.*
4. *Two transfers: if Qo,d = 3, there must be different locations m1 and m2 such that Qo;m1 = 1, Qm1,m2 = 1, and Qm2,d = 1. Combine one route from each of DService(o,m1), DService(m1,m2), and DService(m2, d) to obtain a two transfer plan.*
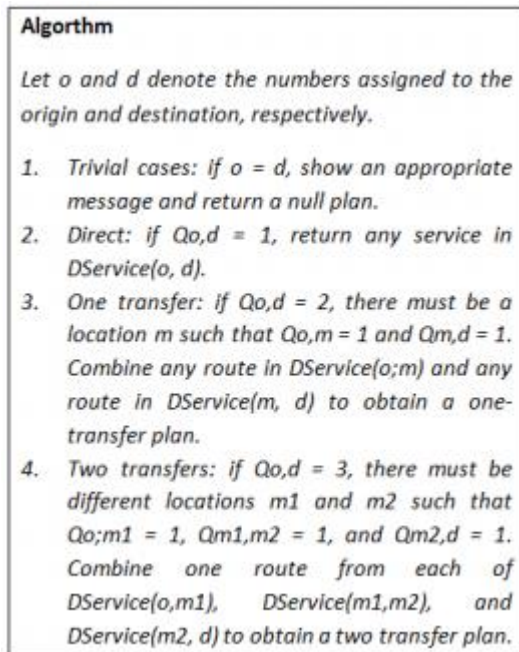
Figure 2. Best-Path Planning Algorithm.

Figure 3 is the Best-Path Planning algorithm is used as in the making of this application [13]. This algorithm is directly taken from the paper Best-Path Planning for Public Transportation System. This algorithm check stages in order to experience the stages of the journey can be done using only 1 transportation public only. If not, then do some checking into the next stage with a one time transfer, and so did the next until the maximum possible with public transport just 3 or by 2 times the transfer only.

To find the route twice the transfer could be doing with finding 2 meeting point of origin and destination. E.g. Qo, d = 2, then there must be a different location m1. Where m1 is the meeting point between a direct route from the origin and a transfer route first, then find the point of intersection is m2 and will find the routes final destination [10]. Search do course for the possibility of transfer of the route will all be centered to the transition matrix. Because it serves to transition matrix determinant of transfer routes to transfer routes that may be intended.

2.3.4 Coordinate Data

To calculate the distance between the position of seeker with the destination location as well as to determine the location of the nearest then needed a database that contains the coordinates of all coordinate-route that passed by the existing public transport in the city of Cianjur.

In the specify the matrix T, T2, and T3 have already obtained, the trio is then processed and will be combined so as to form a new matrix that is used for this application. On the values of the Matrix element consists of 0, 1, 2, and 3.

2.3.5 The Transition Matrix

The making of this application leverages the transition matrix is used to know the number of transfer route required from one place to another place.

2.4 Analysis And Design Of The System

Recently the route using public transportation in the region of Cianjur much change for the path line engineering of urban transportation (transportation public) and public transportation. Dishub the city of Cianjur also implement traffic engineering management review so there is some path segment is created in one direction, which was originally a 14-track transportation public, now made 10 line only. Each of the routes marked with colors, numbers and the names of the routes of different routes. So that its citizens make it difficult to access the transportation to go to the place of destination.

2.4.1 Analysis Of System Architecture

The purpose of architecture analysis to identify the system architecture to be built based on the subsystem mobile. The mobile platform is one of the selected subsystem in the development of this application, the software architecture on mobile platforms describes how interacting software. The picture below will explain the architecture on mobile platforms.
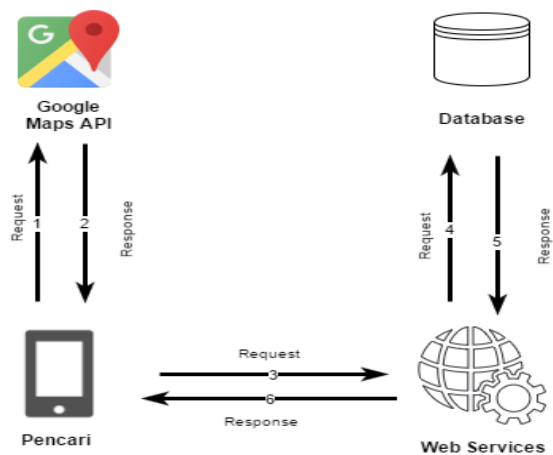

Figure 3. Architectural Design.

2.4.2 Use Case Diagram

Use Case Diagram is one of the model diagram, UML (Unified Modeling Language) that serves to illustrate the functional agreement expected from a system. Here is a use case diagram from a functionality agreement will be created on the system.
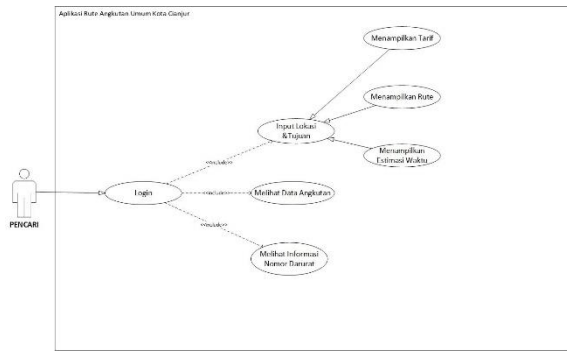
Figure 4. Use Case Diagram.

2.4.3 Scheme of relations

Scheme of relations is the relationships between the tables that are used in the database will be used. The following is an overview of the relation scheme used.
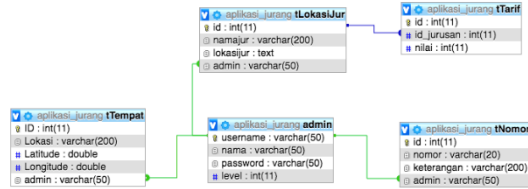

Figure 5. Scheme of relations.

2.4.4 Matrix Analysis

In the table there are 10 Matrix data that will be used as sample data.

Table 1. The Transition Matrix

Kode	Matriks									
F1	0	1	1	2	0	2	2	2	2	2
F2	0	0	1	2	2	2	2	2	2	2
F3	2	0	0	0	2	2	2	2	2	2
F4	1	1	1	0	1	2	1	2	1	2
F5	1	1	2	1	0	2	2	1	2	1
F6	1	2	2	3	3	0	3	3	3	3
F7	2	2	2	1	1	2	0	2	1	2
F8	2	2	2	2	1	3	2	0	2	1
F9	2	2	2	2	1	3	0	2	0	2
F10	2	2	2	2	1	3	2	1	2	0

2.4.4.1 Data nodes and Coordinates

On the road in the data tables table 2. There are 38 data that will be used as the sample data in this application where the the construction of the can still do the addition in the process.

Table 2. Data nodes and Coordinates

ID	Nama Node	Koordinat	
		Latitude	Longitude
F1	Adi Sucipta	-6.824991	107.138225
F2	Amalia Rubini	-6.8268193	107.1393231
F3	Aria Cikondang	-6.827642	107.137956
F4	Arif Rachman Hakim	-6.814864	107.148422
F5	Arya Wiratanudatar	-6.788584	107.167771
F6	Awilarangan	-6.817452	107.087580
F7	Barisan Banteng	-6.814787	107.146377
F8	Baros	-6.7956934	107.154173
F9	Caringin	-6.9437189	107.5760516
F10	Cibeureum	-7.0400632	106.9866942
F11	Didi Prawirakusumah	-6.8207352	107.1580258
F12	Dr Muwardi	-6.8152965	107.1326465
F13	Gasol	-6.804973	107.0901447
F14	Gatot Mangkupraja	-6.8288929	107.114469

2.4.4.2 Route Data

The data contains the name of the transportation public routes along each route, using public transportation the city of Cianjur has 10 routes operating in Cianjur town centre where they have a code on each routes L1, L2 to L10. Can be seen in table 3. is the transportation public and each route that was spent.

Table 3. Route Data

Kode	Trayek
L1	Jl. Terminal Pasirhayam => Jl. Siliwangi => Jl. Siti Jenab => Jl. Otto Iskandar => Jl. Taifur Yusuf => Jl. Suroso => Jl. KH Ashari => Mayor Harun Kabir => Jl. Barisan Banteng => Jl. Arif Rahman Hakim=> Jl. Prof Moh Yamin=> Jl. Perintis Kemerdekaan => Jl. Terminal Pasirhayam
L2	Jl.Terminal Pasirhayam => Jl. Perintis Kemerdekaan => Jl. Prof Moch Yamin => Jl. KH Hasyim Ashari => Jl. Suroso => Jl. Taifur Yusuf => Jl. Otista II => Jl. Siliwangi => Jl. Adi Sucipta => Aria Cikondang => Jl. Siliwangi => Jl.Terminal Pasirhayam
L3	Jl.Terminal Rawabango => Jl. Raya Bandung => Jl. Arif Rahman Hakim => Jl. Barisan Banteng => Jl. Pasar Baru Ruko Ramayana => Jl. Dr Muwardi => Jl. Ir. H. Djuanda => Jl. Rawey => Jl.Caringin=> Jl.Pangeran Hidayatullah => Jl. Siliwangi => Jl. Siti Jenab => Jl. Ir. H Djuanda => Jl. Arya Wiratanudatar => Jl. Pramuka => Jl.Terminal Rawanbago.
L4	Jl.Terminal Rawabango => Jl. Raya Bandung => Jl. Arif Rahman Hakim => Jl. Prof Moch Yamin => Jl. Amalia Rubini => Jl. Aria Cikondang => Jl. Siliwangi => Jl. Gatot Mangkupraja => Jl. KH Abdulah Bin Nuh => Jl. Pangeran Hidayatullah => Jl.Rawey => Jl. dr Muwardi => Jl. Raya Bandung => Jl.Rawabango.
L5	Jl.Terminal Rawabango => Jl. Halte Maleber => Jl. KH Opo Mustofa => Jl. Didi Prawirakusumah => Jl. Prof Moch Yamin => Jl. Raya Bandung => Jl.Rawabango
L6	Jl.Terminal Rawabango => Jl. Raya Bandung => Jl. Pramuka => Jl. Aria Wiratanudatar => Jl. Gunteng => Jl. Raya Bandung => Jl. Arif Rahman Hakim => Jl. KH Hasyim Ashari => Jl. Suroso => Jl. Taifur Yusuf => Jl. Otista => Jl. Siti Jenab => Jl. Siliwangi => Jl. Adi Sucipta => Jl. Amalia Rubini => Jl. Prof Moch Yamin => Jl. Didi Prawirakusuma => Jl. Halte Maleber => Jl.Terminal Rawa Bango
L7	Jl.Terminal Pasir Hayam => Jl. Siliwangi => Jl. Gatot Mangkupraja => Jl.Nagrak => Jl.Awi Larangan.
L8	Jl.Pasir Hayam => Jl. KH. Abdullah Bin Nuh => Jl. Ir H Djuanda => Jl.Tangkil => Jl.Cibeureum.
L9	Jl.Terminal Rawabango => Jl. Lingkar Timur => Jl.Terminal Pasir Hayam.
L10	Jl.Terminal Rawabango => Jl. Raya Bandung => Jl.Pramuka => Jl. Aria Wiratanudatar=> Jl.Baros => Jl. Cibeureum => Jl.Baros => Jl. Aria Wiratanudatar=> Jl. Simpang Dishub => Jl. Raya Bandung => Jl.Terminal Rawa Bango

2.4.5 Transportation public Route Direct Analysis Method

In the case study as an example of the application of the algorithm is best path planning against the direct route search, researchers took a point by position of the node (F29) JL. Prof Moch Yamin with the goal node (F3) JL. Cikondang Aria:

1. Lookout point to the Start Point (i) namely nodes (F29) JL. Prof Moch Jamin
2. And look for the point End Point (j) on a node (F3) as JL. Aria Cikondang
3. If the search point i = j then no route planning service because it is on a single location.
4. If i travel to j = 1 where search conditions get one alternative line then continue search.
5. Looking for a Start emphasis Point Ln has i = JL. Prof Moch Yamin and Ln emphasis End Point that has j = JL. Aria Cikondang.
6. Check the entire Ln obtained, if the Start point of the Fn = 1 Point is worth 1 point and End Point Fn = j value 1 then obtained a direct route to one of the shuttles.

To simplify the complexity of algorithms to calculate the route using public transportation without following the transfer, given the example path route transportation public along the road of was spent nodes. can be seen in Figure 3.5 below.
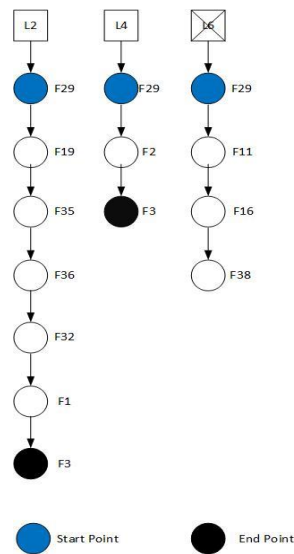

Figure 7. Analytical Methods Direct Transportation public.

2.4.6 Transportation public Route Analysis Method One Time Transfer

Transportation public route stages once this transfer means determine the route directly using two transportation public. In the case of a one-time transfer where at that point Start Point is at (F30) JL. Raweuy with destination nodes (F15) JL. Gunteng:

1. Looking for the Search Start point of Point (i) node (F30) JL. Raweuy
2. And look for the point End Point (j) node (F15) JL. Gunteng

3. Check if the point i, j = 1 otherwise
4. Check point i, j = 2 If yes then look for the Start Point Ln emphasis has i = JL. Raweuy and Dn emphasis End Point that has j = JL. Gunteng. Check the entire Ln obtained, if the Start point
5. Fn = 1 point is worth 1 point and End Point Fn = j value 1, if not invalidated, then search the m1 or point Transfers as a connecting transportation public used on JL. Raweuy with transportation public to be used into JL. Gunteng.
6. Determine i, j = 2 with a search for Ti, m1 = 1 and j = 1, Tm1 from Ln obtained from Start Point Location on JL. JL. Raweuy.
7. After gained away from the m1 as a transfer point in node (F31) JL. Bandung Raya, then next
8. Define Ln that is used at the beginning with Ti, m1 = 1 as a transit point from JL. Kingdom of Bandung and obtained L6 as transportation public with point Start Point Towards the m1 or point transfers i.e. JL. Raya, Bandung.
9. After transit use Ln gained from End Point points Tm1, j = 1 as a starting point, where the starting point to the End Point is the point transfer m1 i.e. JL. Raya, Bandung towards the End Point points i.e. JL. Gunteng.

To make it easier to calculate the complexity of algorithms route transportation public 1 following the transfer, given the example path route transportation public along the road of was spent nodes. can be seen in Figure 3.6 below.
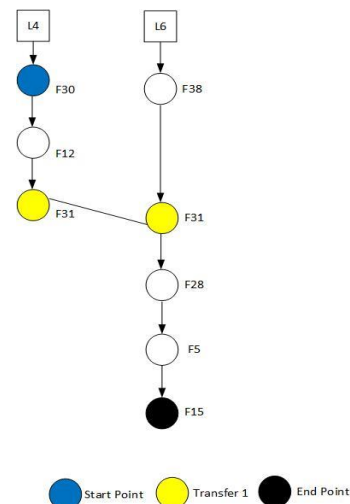

Figure 8. A one-time Transfer Of Analytical Methods.

2.4.7 Methods Of Analysis Of Routes Transportation public Transfer Twice

Transportation public route stages once this transfer means determine the route directly using two transportation public. In the case of a one-time transfer to the Start point at the diama Point is at (F11) JL. Didi Prawirakusuma with destination nodes (F6) JL. Awilarangan:

1. Looking for the Search Start point of Point (i) node (F30) namely JL. Didi Prawirakusuma

2. And look for the point End Point (j) node (F15) JL. Awilarangan
3. Check if the point i, j = 1 otherwise
4. Check point i, j = 2 if not then
5. Check point i, j = 3 If yes then
6. Looking for a Start emphasis Point Ln has i = Jl. Didi Prawirakusuma and Dn emphasis End Point that has j = JL. Awilarangan.
7. Check the entire Ln obtained, if the Start point of the Fn = 1 Point is worth 1 point and End Point Fn = j value 1, if not invalidated, then search the m1 or point Transfers as a connecting transportation public used on JL. Didi Prawirakusuma with using public transportation that will be used to Jl. Awilarangan.
8. Determine i, j = 2 with a search for Ti, m1 = 1 and j = 1, Tm1 from Ln obtained from Start Point Location on JL. Didi Prawirakusuma.
9. After the obtained point m1 as a transfer point on the first node (F38) JL. Rawabango, then the next
10. Specify the End point location again by searching for it, m2 = 1 and j = 1, Tm2 from Ln obtained from Start Point Location on JL. Rawabango
11. After the obtained point m1 as a point of transfer during the second node (F32) JL. Siliwangi, then next
12. Define Ln that is used at the beginning with Ti, m1 = 1 as a transit point from JL. Rawabango earned transportation public L4 and Ti, m2 = 1 as a point of transit both from JL. Siliwangi was then obtained L7 as a transportation public with point Start Point towards the m1 and m2 or point transfers i.e. JL. Siliwangi and JL. Rawabango
13. After transit use Ln gained from End Point points Tm1, Tm2 and j = 1, j = 1 as a starting point, where the starting point to the End Point is the transfer point m2 i.e. JL. Siliwangi towards the End Point points i.e. JL. Awilarangan.

To make it easier to calculate the complexity of algorithms using public transportation route 2 transfer, here given the example path route transportation public along the road of was spent nodes. can be seen in Figure 3.6 below.
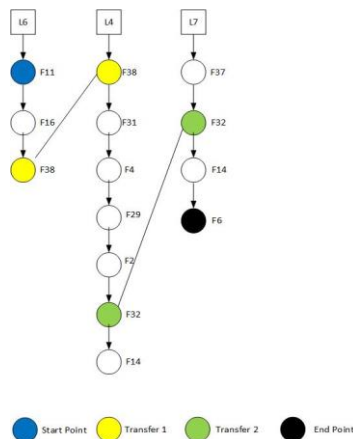

Figure 9. Methods Of Analysis Of Twice The Transfer.

2.4.8 Implementation and Testing System Implementasi Sistem

System implementation is the stage of the implementation of the outcome of the design that has been made towards a system that will be built as well as the application software that is built on the real environment, so that the system can be used. The implementation in this research include implementation of hardware, software implementation and implementation of the database interface.

2.4.8.1 The Hardware Implementation

Implementation is hardware specifications hardware that is used in implementing the systems built. As for the hardware that will be used for the system.

Table 4. Implmentasi Hardware

No	Component	Specifications
1	Layar	4 icnh
2	Processor	Dual Core
3	RAM	2 GB
4	ROM	16 GB

2.4.8.2 Software Implementation

Software implementation is the specification of the software used in implementing a system to be built. In this case the software in question is operation system used by searchers. As for the software that will be used for the system.

Table 5. Software Implementation

No	Component	Specifications
1	Android operating system	Loliipop 5.0
2	Network	4G LTE

2.4.9 Implementation Of Interface

Interface is the one that provides the operating system as a means of interaction between the searcher with the operating system. The interface is the operating system components that come into contact directly with the Finder. Implementation of the interface that is built can be seen in the following figure 10.
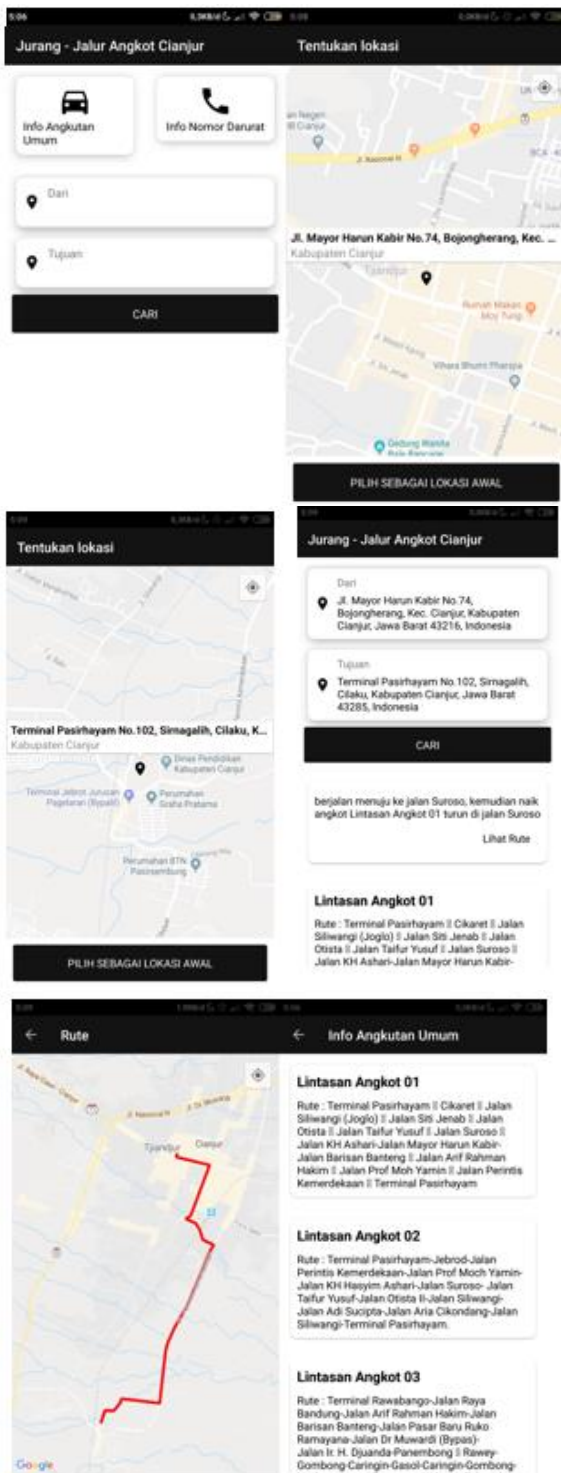
Figure 10. Implementation Of Interface.

3. Conclusion

3.1 Conclusion

Based on the research that's been done, these are the conclusions of the study results:

1. DISHUB no longer need to worry about the information in Cianjur town transport because the public already knows that on this application.

2. With this application it is expected the Government of Cianjur can increase quality of service to society Cianjur.

3.2 Suggestion

Suggestion that can be given of the construction of a system that has been created for further system development, namely:

1. On the application there are still deficiencies in determining his route, in order to make better use of other algorithms that can combine between routes with other routes.

2. Can be developed on a platform other than android so that many more can use the application search routes public transport.

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