Jurnal Ilmiah Komputer dan Informatika (KOMPUTA)
Edisi, .. Volume, .., Bulan 20.. ISSN : 2089-9033

DEVELOPMENT OF TRAVELLING GUIDE APLICATION IN CIREBON CITY USING PUBLIC TRANSPORTATION

Abdul Aziz

Teknik Informatika – Universitas Komputer Indonesia
Jl. Dipatiukur 112-114 Bandung
E-mail : Azizmuzlan51@gmail.com

ABSTRACT

Cirebon located on northern coastal area of Java island at large 37.54 km2 city for back and forth of northerm coast traffic lane, west java. Cultural city, Cirebon is so strategic to be manage as well as possible on purepose of tour, both culinary, historical, and financial. Discussing about tourism sites certainly involves public transportation required by tourist backpaker to travel. Standing on poor information media in the city, tourists are constrained on seeking for information around hotels, culinary sites, travel, and public transpotation used as another selection to destinations in Cirebon.

According the elaboration above, it is needed a system assisting tourists backpaker to get information over tour and tranportation in the city easily. Cirebon tour guide is mobile application based on android that will be built to be the solution of the problems outlined above. Applications Cirebon travel guides, besides using LBS method, used as searching media for available information over Cirebon, then also using best-path planning algorithms as a search algorithm to obtain these public transportation routes and the least that could be as source recommending available public tranportation.

With the research result consisting on functional and beta experiment, it is concluded that mobile application of cirebon tourism guide has simplified tourist to get information about hotels, culinary spots, tourism sites, travel, and recommended tranportation to travel in Cirebon city.

Keywods:LBS, Best-Path Planning, Android, Tranportation, Public Tranportation

1. PREFACE

Cirebon city still has some complex issues, where the development of good information on the tourism sector, and transportation is still not optimal.

After the observation, by conducting interviews with some tourists backpaker ever travel by using public transportation in the city of Cirebon. There are few tourists transportation problems faced when trying to travel by public transportation, one of the common problems faced by tourists is, the absence of public transportation route path information and hotel info, culinary, tourism and travel in the city of Cirebon.

With still very minimal in the delivery of tourism information and means of transportation in the city of Cirebon, resulting in less menggeliatnya tourism sector in the city of Cirebon. From the data Institution Performance Accountability Report Cirebon City. tourist arrivals in the first semester 2015 to the city of Cirebon, occurred penururunan approximately 32.2 percent compared to last year in the same period, where a decline of 295 183 into 200.027 tourists visiting the city of Cirebon. Because the infrastructure has not supported the spread of tourism and transport information more efisen. therefore necessary supporting media for the dissemination of information about the facilities and infrastructure of tourism and transportation in the city of Cirebon. [1]

By looking at a very rapid advances in information technology. give an idea on the author to be able to open up opportunities to further promote communication and information systems in the city of Cirebon. One way to build an application to provide more complete information better tourism information, culinary, and transportation-based andorid which is easily accessible by anyone, anytime, anywhere..

2. CONTENTS OF RESEARCH

2.1 Information System

The information system is a set of elements that work together either manually or computer-based in which there is the collection, processing, processing and storage of data for mengasilkan useful information for decision-making processes.

2.2 Android

Android is an operating system for Linux-based mobile devices that includes an operating system, middleware and applications. Android provides an open operating system for developers to create Android applications launched to the public in the fall of 2008. Android is growing rapidly in the industry because of two main aspects that are opensource and arsitekturya models. As a project that is opensource, allowing Android to be fully understood and analyzed the features, the completion of the program to a hardware bug.

2.3 LBS

Location based services is a service that is used to find the technology of Global Positioning Service (GPS) and Google's Cell-based Location. Map and *location-based services* using latitude and longitude to determine the geographic location, but as our users require the address or real time positioning us not the value of latitude and longitude. Android provides a Geocoder that supports *forward* and *reverse* geocoding. Using Geocoder, you can mengkorversi value of latitude and longitude into the real world address or vice versa.

2.4 Global Positioning System (GPS) and Assisted Global Positioning System (A-GPS)

Global Positioning System, or what we are familiar with GPS is a system that can help determine the position where we are today [9]. By transmitting a signal from a satellite to a GPS device, then didapatlah accurate data. How it works is by receiving GPS signals from satellites. GPS device determines the location of at least 3 satellites that form a triangle with looking logitude, latitude, and other necessary data

2.5 *Best-Path Planning* Algorithm

In this final project uses best path planning algorithm which algorithm is used to find a route that is available from one place to another with the least possible amount of transfer

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 1. Algoritma *Best-Path Planning*

Because the data is so large and limited resource devices owned, then the application is limited to the amount of transfer 1 time transfer or a solution using two public transportation.

2.6 Transition matrix

Making these applications take advantage of the transition matrix that is used to determine the required number of transfers from one place to another, Let the number of places traversed by public transport is n. Then used a transition matrix with size nx n. Furthermore, given the value of the cell Ti, j of the transition matrix T is the number of direct route possible for a person to travel from place to place i j. Automatic Ti.i value is 0.
Experts have proved that the rank n of T is the number of routes that can be taken from location i to j with (n - 1) time transfer, for n ≥ 2. Standard definition of rank n dar T is:

$$T_{i,j}^{n} = \sum_k T_{i,j}^{n-1} T_{k,j} \quad \ldots (1)$$

It can be assumed that the $T_{i,j}^{n-1}$ is the number of routes that can be done for a trip from i to j with (n - 2) transfer, which is valid for the case n = 2. Then the first statement of peersamaan above $T_{i,j}^{n-1}$is the number of routes that may be made to travel from i to a location connecting k with (n - 2) times the transfer, and the second statement is a direct route it might be possible to travel from k to j. By shifting the two results will produce two results will generate a total of berpergiaan route from i to j and k transfer in particular with (n - 1) times the transfer. Thus, summing all k that might result in the total number of routes to travel from i to j with (n - 1) times the transfer.The following table matrix N to N and Angkot to N.

Table matrix N to N

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

Table matrix Angkot to N

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
D1	1	0	0	1	0	0	0	1	1	1
D2	1	1	0	1	0	1	0	1	1	1
D3	1	1	0	0	0	1	0	0	0	0
D4	1	0	1	1	0	1	0	0	1	1
D5	0	1	0	0	0	0	0	0	0	1
D6	0	0	0	0	0	0	0	0	0	1
D7	1	0	0	0	0	1	0	0	0	1
D8	0	0	0	0	0	0	0	0	0	1
D9	0	0	0	0	0	1	0	0	0	0
D10	0	0	1	1	1	1	0	0	0	0

2.6 Input Data Analysis

Table 1. The road name data and coordinates

Node	Nama Jalan	Koordinat
F1	Jl. Jendral A Yani	-6.741976,108.564152
F2	Jl. Ariodinoto	-6.724307,108.571536
F3	Jl. Bahagia	-6.713440,108.564595
F4	Jl. Benteng	-6.716883,108.569406
F5	Jl. Bima Stadion	-6.730686,108.536079
F6	Jl. Dharsono, Hr, Briga	-6.724701,108.538284
F7	Jl. Dawuan	-6.694260,108.527023
F8	Jl. Cemara	-6.709384,108.562527
F9	Jl. Diponegoro	-6.698107,108.554776
F10	Jl. Dr. Wahidin Sudiro H	-6.706862,108.551073
F11	Jl. Dukuh Semar	-6.739943,108.553566
F12	Jl. Elang Raya	-6.737602,108.559841
F13	Jl. Evakuasi	-6.742026,108.541775
F14	Jl. Dokter Cipto Mangunkusumo	-6.724372,108.550323
F15	Jl. Jagasatru	-6.726402,108.567467

Tabel 2. Data Nama Tempat dan Koordinat

Node	Nama Tempat	Koordinat
F67	Aston Hotel Cirebon	-6.722063, 108.539582
F68	Hotel Swiss-Bell Hotel Cirebon	-6.717962, 108.549651
F69	Hotel Santika Hotel Cirebon	-6.705702, 108.550425
F70	Hotel Amaris Hotel Cirebon	-6.705398, 108.557217
F71	Hotel Grage Hotel Cirebon	-6.712707, 108.552756
F72	Hotel Apita Hotel Cirebon	-6.710817, 108.536008
F73	Hotel Bentani Hotel Cirebon	-6.703174, 108.556724
F74	Hotel Prima Hotel Cirebon	-6.705894, 108.559008
F75	Hotel Grand Tryas Hotel	-6.714328, 108.552078
F76	Hotel Patra Jasa Hotel	-6.711605, 108.533759
F77	Hotel Metland Hotel Cirebon	-6.702418, 108.556476
F78	Hotel Sidodadi Cirebon	-6.707655, 108.558208
F79	Hotel Aurora cirebon	-6.704511, 108.556560
F80	Hotel Cirebon Plaza Hotel	-6.711664, 108.555859
F81	Hotel Priangan Cirebon	-6.711068, 108.560276

In Table Data Path and there are 153 places Above data to be used as sample data in this application pembangunanan which still can be increased in the process.

2.7 Route Data

The data contains the name of the public transportation along the route each, public transportation cirebon city has 10 routes, operating in Cirebon city center where everything has a code on each trayeknya D1, D2 to D10. Can be seen in Table 3. is public transportation and each route in its path.

Tabel 3. Data Rute

Kode	Trayek
D1	Jl. Dukuh Semar => Jl. Elang Raya => Jl. Rajawali Raya => Jl. Jendral A Yani => Jl. Kesunean => Jl. Yos Sudarso => Jl. Cemara => Jl. RA. Kartini => Jl. Dr. Wahidin Sudiro H => Jl. Diponegoro => Jl. Sisingamangaraja => Jl.Kesunean => Jl. Jendral A Yani => Jl. Perumnas => Jl.Dukuh Semar
D2	Jl. Dukuh Semar => Jl. Kesambi raya => Jl. Pulasaren => Jl. Merdeka => Jl. Benteng => Jl. Sisingamangaraja => Jl. Diponegoro => Jl. Dr. Wahidin Sudiro H => Jl. Tuparev => Jl. Dharsono, Hr, Brigad => Jl. Perjuangan => Jl. Majasem => Jl. Kalitanjung => Jl. Kanggraksan => Jl. Jendral A Yani => Jl. Dukuh Semar
D3	Jl. Dukuh Semar => Jl. Elang Raya => Jl. Rajawali Raya => Jl. Jendral A Yani => Jl. Kanggraksan => Jl. Kalitanjung => Jl. Majasem => Jl. Perjuangan => Jl. Dharsono, Hr, Brigad => Jl. Pemuda => Jl. Dokter Cipto Mangunkusumo => Jl. RA. Kartini => Jl. Karanggetas => Jl. Kesambi raya => Jl. Dukuh Semar
D4	Jl. Dukuh Semar => Jl. Elang Raya => Jl. Rajawali Raya => Jl. Jendral A Yani => Jl. Kanggraksan => Jl. Evakuasi => Jl. Dharsono, Hr, Brigad => Jl. Tuparev => Jl. Dr. Wahidin Sudiro H => Jl. Diponegoro => Jl. Sisingamangaraja => Jl. Benteng => Jl. Kesambi raya => Jl. Dukuh Semar
D5	Jl. Dukuh Semar => Jl. Elang Raya => Jl. Rajawali Raya => Jl. Perumnas => Jl. Rajawali Raya => Jl. Jagasatru => Jl. Merdeka => Jl. Pekalangan => Jl. Karanggetas => Jl. Siliwangi => Jl. Dr. Wahidin Sudiro H => Jl. Dokter Cipto Mangunkusumo => Jl. Dukuh Semar
D6	Jl. Dukuh Semar => Jl. Kesambi raya => Jl. Dr. Wahidin Sudiro H => Jl. Siliwangi => Jl. Karanggetas => Jl. Kesambi raya => Jl. Pangeran Drajat => Jl. Rajawali Raya => Jl. Perumnas => Jl. Rajawali Raya => Jl. Elang Raya => Jl. Dukuh Semar
D7	Jl. Dukuh Semar => Jl. Pangeran Drajat => Jl. Jagasatru => Jl. Karanggetas => Jl. RA. Kartini => Jl. Dr. Wahidin Sudiro H => Jl. Pilang Raya => Jl. Tuparev => Jl. Dokter Cipto Mangunkusumo => Jl. Pemuda => Jl. Jendral A Yani => Jl. Dukuh Semar
D8	Jl. Dukuh Semar => Jl. Dokter Cipto Mangunkusumo => Jl. Tuparev => Jl. Pilang Raya => Jl. Dr. Wahidin Sudiro H => Jl. RA. Kartini => Jl. Karanggetas => Jl. Jagasatru => Jl. Elang Raya => Jl. Dukuh Semar
D9	Jl. Dukuh Semar => Jl. Kesambi raya => Jl. Dokter Cipto Mangunkusumo => Jl. Tuparev => Jl. Dharsono, Hr,

Kode	Trayek
	Brigad => Jl. Evakuasi => Jl. Penggung Raya => Jl. Dukuh Semar
D10	Jl. Dukuh Semar => Jl. Penggung Raya => Jl. Evakuasi => Jl. Majasem => Jl. Perjuangan => Jl. Bima Stadion => Jl. Pemuda => Jl. Dokter Cipto Mangunkusumo => Jl. Benteng => Jl. Pekalangan => Jl. Dokter Cipto Mangunkusumo => Jl. Pemuda => Jl. Bima Stadion => Jl. Perjuangan => Jl. Majasem => Jl. Evakuasi => Jl. Penggung Raya => Jl. Dukuh Semar

2.8 Analysis methods of direct public transportation

In the case study as an example of best path planning algorithms to search the direct route, researchers took a point by position of the node (F64) Jl. Siliwangi cirebon city with the aim of Santika Hotel Cirebon. :

Without public transportation a.Algoritma Transfer

1. Finding the point of Start Point (i) is node (F64) Jl. Siliwangi
2. lookout point End Point (j) the node (F68) as the Santika Hotel Cirebon.
3. If the search point i = j then there is no route planning services because they are in one location.
4. If the trip i to j = 1 where the search term to get an alternate path then continue the search.
5. Looking Dn dititik Start Point which has i = Jl.Siliwangi and Dn dititik End Point which has j = Santika Hotel Cirebon
6. Check all Dn are obtained, if the point of Start Point Fn = 1 is 1 and the point End Point Fn = j is 1 then obtained direct route of the transport

To ease the complexity of the algorithms calculate routes public transportation without a transfer, the following are given examples of public transportation along the path node diewatinya roads. can be seen in Figure 3.6 below.

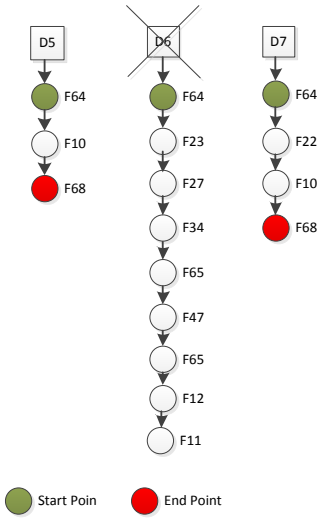


Figure 2. Analysis These Direct public transportation

Complexity is obtained by a direct method in which the solution obtained when determining public transportation or Dn passing through the point i = Start point at Jl. Siliwangi is D5, D6, and D7. Then search the point j = End Point is Santika Hotel Cirebon, in this case there is a point where there Dn Selection Start Point End Point but did not have such D6 public transportation that does not have j = end point then the lines fall and can not be an alternative, then To where public transportation to get the main alternatives which have been the main alternative when public transportation These have little nodes are skipped until the end point and in this case has a 3 node D5 and D7 has 4 node, the main alternative is public transportation D5 and D7 become into alternative 2

2.9 Analysis method of public transportation one transfer

Stages one transfer route public transportation this point is to determine the direct route using two public transportation. In the case of One-time transfer Diama at point Start Point is at Jl. Siliwangi (F64) and End Point in ASTON Hotel Cirebon (F66):

a.Algortima One time transfer.

1. Search Search point Start Point (i) node (F64) is Jl. Siliwangi
2. lookout point End Point (j) node (F66) as ASTON Hotel Cirebon
3. Check whether the point i, j = 1 if not
4. Check the point i, j = 2 if yes then
5. Looking Dn dititik Start Point which has i = Jl.Siliwangi and Dn dititik End Point which has j = Santika Hotel Cirebon
6. Check all Dn are obtained, if the point of Start Point Fn = 1 is 1 and the point End Point Fn = j is 1, if not obtained then find m1 or transfer as a liaison point of public transportation used at Jl. Siliwangi with public transportation that will be used to location ASTON Hotel Cirebon
7. Determine i, j = 2 by finding T1, and TM1 m1 = 1, j = 1 from Dn obtained from Start Point location at Jl. Siliwangi.
8. Having obtained the dot m1 as the transfer point is at the node (F14) jl.Cipto Mangunkusomo, then the next
9. Determine Dn Used At the beginning of the Ti, m1 = 1 as a transit point, namely from jl. Cipto Mangunkusumo and obtained D5 as public transportation with the Start Point Toward m1 point or

a transfer point of Jl. Cipto Mangunkusumo.

10. After transit use Dn End Point gained from the point of TM1, j = 1 as the starting point, where the starting point to End Point is the transfer point m1 is Jl.Dokter Cipto Mangunkusumo to the point End Point is ASTON Hotel Cirebon is located on Jl. Dharsono, Hr, Brigadarsono.

To ease the complexity of the algorithms calculate routes public transportation without a transfer, the following are given examples of public transportation along the path node diewatinya roads. can be seen in Figure 3.6 below.

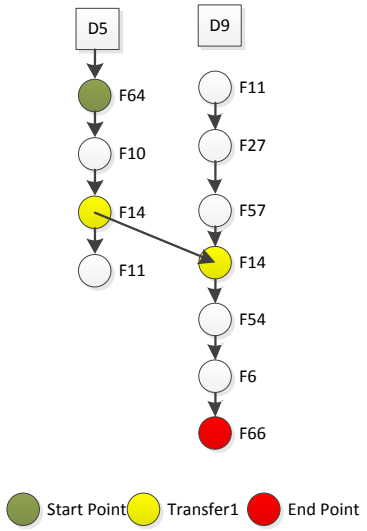


Figure 3. Algorithm One-time Transfer

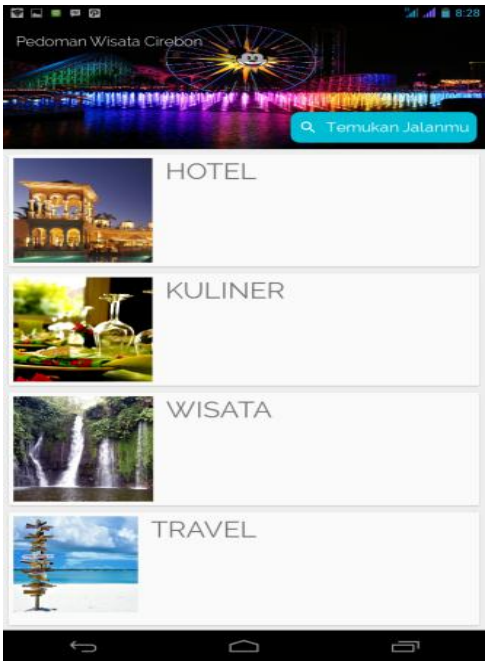
From the steps above process produced a selection of public transportation available from the point of Start Point at Jl. Siliwangi and End Point in ASTON Hotel Cirebon is the starting point and end point is not located on the same route or route public transportation there is another path that can be taken to continue. In this case in the can Jl. Siliwangi as a start point node points with code F64 with alternative public transportation that can be used is D5, later search Guide as a line connecting m1 point where it has gained a point m1 is Jl.Dokter Cipto Mangunkusumo with code F14 node which is the node part of the public transportation These D5, then seek Dn from the point m1 is jl.Dokter Cipto Mangunkusumo heading to the point End Point is ASTON Hotel Cirebon where it has gained public transportation D9 has a node m1 directly to end Point public transportation From Jalan Siliwangi is D5 and D9 to come by public transportation as public transportation with m1 point or points transit in Jl. Doctors Cipto Mangunkusumo to go End Point in ASTON Hotel Cirebon.

2.10. Implementation and Testing

Once the system is analyzed and designed in detail, then the next will be towards the implementation phase, the goal is to confirm the implementation of the program module design on the perpetrators of the system so that the user can provide input to the system builder

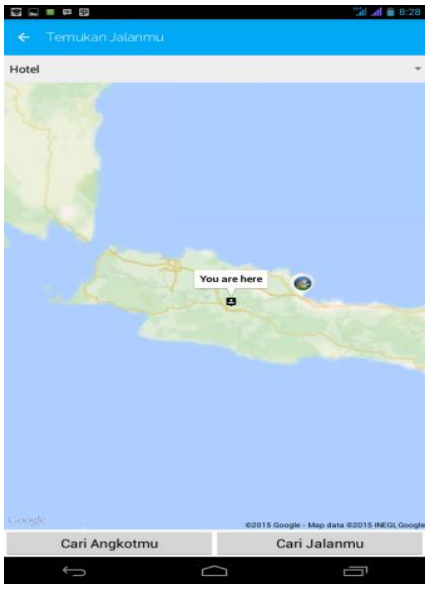
2.11 Interface Implementation

2.11.1 Main Menu page



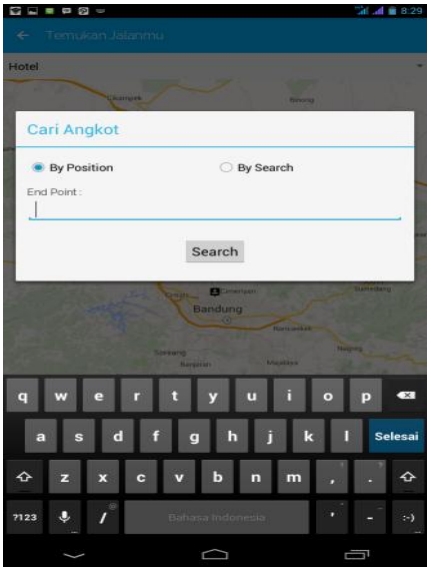
On the Implementation of the main menu page provided search features public transportation and hotel information search feature, where culinary, tourist and travel in the city of Cirebon.

2.11.2. Find Your Way Home Page

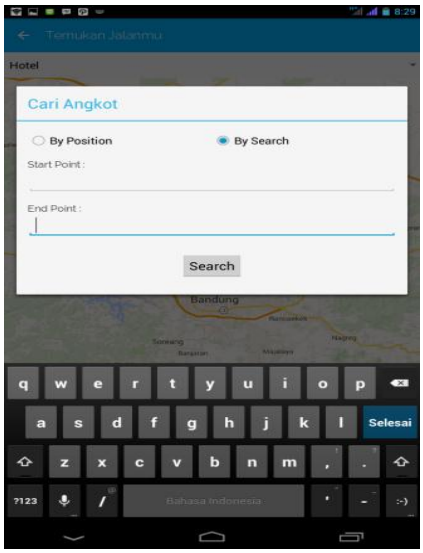


On page find jalanmu there are two menu options for tourists are:
Search Search angkotmu and jalanmu.

2.12. Search mode
2.12.1 Searching By Position

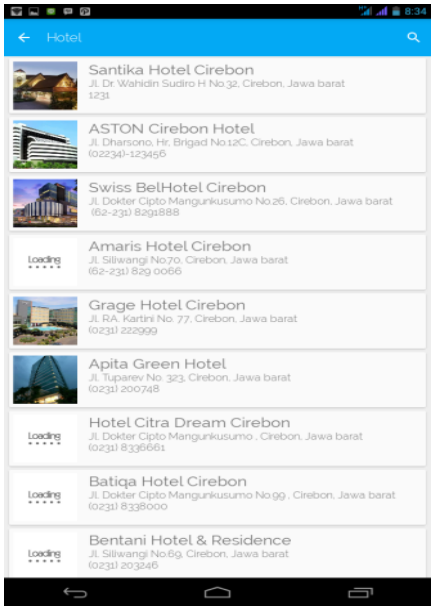


2.12.2 Searching By Search



In the search of public transportation angkotmu and jalanmu, there are two options the first choice of search modes namely: By the search mode position where the user only needs to input data endpoints that you want to visit, while the search mode By Search user is required to enter the data Start Point and End Point for yielding a solution.

2.12.4 List Informasi Hotel



Display a list of hotels which could be a reference to tourists to stay in the city of Cirebon.

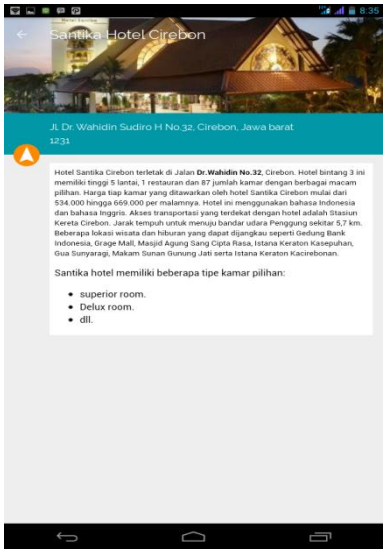
2.13 Search Results

2.13.1 Public transportation Search Results



Generate messages recommendation and alternatives Maps and routes of public transportation that can be used

2.13.2 Details List Hotels



On this page displays information about the hotel ranging from price, web booking and navigation features to know where the hotel is located.

3. Conclusion

After doing the analysis, design, and testing, it can be concluded as follows:

1. This application helps travelers get hotel information, where to eat, tourism, and travel in the city of Cirebon.
2. This application can help travelers to get public transportation that can be used to lead the way or point of Travelers.
3. This application can help tourists get on public transportation in the city of Cirebon is easy and can access anywhere and anytime.
4. This application can help travelers to get a map of the location of the hotel, where, dining, travel and tourism places in town cirebon

REFERENCES

[1] Laporan Akuntabilitas Kinerja Instansi Pemerintah Kota Cirebon tahun 2014.

[2] Moh, Ali Mustofa "Pencarian Lokasi Hotel Berbasis Android Menggunakan Mmetode Location Based Service (Studi Kasus Kota Semarang)"

[3] Pratiwi. Rizki "aplikasi mobile pencarian rute transportasi umum dengan mengunakan algoritma best-path planning pada platform android" 2012

[4] S. dan N. , “Perancangan dan Pembuatan Website E-Gov Studi Kasus Kabupaten Pamekasan,” Surabaya

[5] N. S. H, pemrograman Aplikasi Mobile Smartphone dan Tabelt PC Berbasis Android, Informatika Bandung, 2011.

[6] S. Hashimi, S. Komatineni dan D. MacLean, Pro Android 2, New York: Apress, 2010

[7] Burnette, Hello, Android : Introducing Google's Mobile Development Platform, Pragmatic Bookshelf, 2009

[8] “Introducing JSON,” [Online]. Available: http://json.org/. [Diakses 3 maret 2015].

[9] "API (Application Program Interface) Bab 6. Layanan dan Antarmuka,” Masyarakat Digital Gotong Royong, [Online]. Available: http://bebas.vlsm.org/v06/Kuliah/SistemOperasi/BUKU/SistemOperasi-4.X-1/ch06s05.html. [Diakses 1 April 2015].

[10] Chao.Lin. Liu "Best-Path Planning for Public Transportation Systems"

[11] M. Fowler, UML Distilled: A Brief Guide to the Standard Object Modeling Language, Addison-Wesley Professional, 2004

[12] Madcoms. (2008). *PHP dan MySQL* untuk pemula. Yogyakarta: Andi

[13] Singarimbun, Masri.1995. *Metode Penelitian Survei*. LP3S, Jakarta

[14] *Warsito*, Hermawan. 1992. Pengantar Metodologi Penelitian. Jakarta: Gramedia.

[15] Sommervile, I. (2011). Software Enginering Ninth Edition. Massachusetts: Addison wesley.