MOBILE APPLICATION ARCHITECTURE GUIDELINES FOR CITY TOURISTS AND TOUR RECOMMENDATIONS AND CULINARY IN BANDUNG USING SIMPLE ADDITIVE WEIGHTING (SAW)

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ABSTRACT

Bandung is the largest metropolitan city in West Java province, as well as the provincial capital. In addition the city of Bandung also known as a shopping town, with malls and factory outlets are widely spread in the city, and is now gradually Bandung is also a culinary tourism. However, with the rapid development of tourism in the city of Bandung making tourists and people in Bandung confusion in determining tourist destinations in the city of Bandung, as well as the owners of Business Travel who have difficulty in advertising or promoting Places its due to lack of land to advertise Places owned Business Owners. So we need an application that can provide recommendations to the community sites or tourists who come to the city of Bandung and the ground for the Travel Business Owners to promote and advertise their businesses.

Simple Additive weighting can be used to obtain information in the form of recommendations, both on the old and new recommendations. To find out the recommendations of the travel and culinary, then the weighting of each of the characteristics such as price, distance, type and Culinary Tourism, facilities, and vehicle access.

Based on test results from the calculation method linkert can be concluded that 88.8% tourists and the public expressed this application help to find information and promo events in the city of Bandung, and 92% of Business Owners travel this application can help promote tourism and culinary Own Enterprises have.

Key Words : Simple Additive Weighting, Recommendations, Bandung, Google Maps API

1. INTRODUCTION

Bandung is the largest metropolitan city in West Java province, and became the capital of the province. The city is located 140 km southeast of Jakarta, and is the third largest city in Indonesia after Jakarta and Surabaya by population. In addition, the city of Bandung is also the biggest town in the southern part of the island of Java. The city flower is the other term for this town, because in ancient times the city was judged very pretty with many trees and flowers that grow there. In addition, Bandung was called Parijs van Java also with due to its beauty. In addition the city of Bandung, also known as the city, with shopping malls and factory outlets that are widely scattered in the city, and is now gradually Bandung also became a city of culinary tourism. and in 2007, the British Council make Bandung as a pilot project of the city terkreatif se-East Asia. The current Bandung city is one of the major tourism destinations and education. [1]

Lately lots of tourists as well as the community of bandung which lack references or recommendations of culinary tours and in the city of Bandung, based on population data of 70 people who fill out the questionnaire obtained that 70% or 49 people community and Tourists have difficulty in getting recommendations of culinary tours and in the city of Bandung, in addition also 80% or 56 people public or tourists who come to the city of Bandung, the difficulty of finding information events or promos in Bandung also look for the navigation destination place appropriately.

Another case with a culinary tourist and business owners, upon the results of the interviews to 30 people of culinary tourist and business owners in the city of Bandung, 23 of the 30 States that are experiencing difficulty in publicizing the promo or event from his business just by doing promotional brochures to spread due to lack of media to do a promo or publication of the show so that not all prospective buyers of tourists as well as the community know of any promo or event in the culinary or tourist attractions. Other barriers, namely cost that is expensive to create a promo or event publication in electronic media as well as print media.

*Therefore, to be able to address the problem,-he had to do a "**Mobile Application Architecture Guidelines For City tourists and Tour Recommendations and culinary in Bandung Using Simple Additive Weighting (SAW)".***

A method of Simple Additive Weighting (SAW) was chosen as the method of culinary attractions and recommendations in karenakan ZAG method is often used as a decision-making support system

which is often used in determining recommendations.

1.2 Purpose and Objectives

Based on the issues examined, then the point of writing this final task is to build the applications that make it easy for tourists to get information and ongoing promo in Bandung and give tours and culinary perekomendasian in Bandung using SAW.
As for the purpose of this research is:
1. Make it easy for the public and tourists get information events and promos in Bandung.
2. Help the community and tourists get recommendations of culinary tourist and Bandung.
3. Make it easy for business owners and culinary tours in the city of Bandung in promoting and informing his efforts.

2. The CONTENT of PAPERS

2.1 Android

Android is an operating system for linux-based mobile devices that includes an operating system, middleware and applications. Android provides an open platform for developers to create their applications. Initially, Google Inc. bought Android Inc. that is a newcomer that makes software for mobile phones/smartphones. Then to develop Android, an Open Handset Alliance which is a consortium of 34 corporations hardware, software, and telecommunications, including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and Nvidia. At the time of the release of Prime Android, November 5, 2007, along with the Open Handset Alliance Android States support the development of open source on mobile devices [4].

2.2 Fuzzy multiple-Attribute Decision Making (FMADM)

Fuzzy Multiple Attribute Decision Making (FMADM) is a method used to find the optimal alternative of a number of alternatives with certain criteria. The core of the FMADM is determining the value weights for each attribute, then proceed with the process of perankingan that will be selecting an alternative that is already given. Basically, there are three approaches to finding the value of attribute weighting, i.e. a subjective approach, approach the objective and subjective approaches to integration between & objectively. Masingmasing approaches have advantages and disadvantages. On the subjective approach, weighting value is determined based on the from of the decision makers, so some of the factors in the process of perankingan alternative be determined freely. While on approach, the objective value of the weights calculated mathematically so ignore from from decision makers. [11]

2.3 Simple Additive Weighting (SAW)

ZAG method is often also known the term weighted summation method. The basic concept of the method is to find a weighted summation of the SAW of rating performance on any alternative on all attributes. The method of matrix the normalization process requires SAW decision (X) to a scale that can be compared with all the alternative rating. Broadly speaking, the SAW is used to perform the weighting on data venues culinary tourism and so mempunyasi the ultimate outcome of the recommendations of the sights and culinary in Bandung.

2.4 Step solution to a Simple Additive Weighting (SAW)

The settlement SAW the step as follows:
1. Determine the criteria that will be used as reference in decision-making, that Ci.
2. Determine the suitability of each alternative rating on each criterion.
3. making decisions based on criteria matrix (Ci), then do the normalization based on matrix equations are tailored to the type of the attribute (attribute attribute or benefit cost) so that the matrix obtained ternormalisasi R.
4. The final result is obtained from the perankingan process that is the summation of the matrix multiplication ternormalisasi R with the vector of weights so that obtained the greatest value that was chosen as the best alternative (Ai) as a solution.
Formula for doing normalization are:
Rij = $\frac{X\ ij}{Max\ X\ ij}$ *If J is the attribute of the advantages (benefits)*
Rij = $\frac{Min\ X\ ij}{X\ ij}$ *If J is the attribute costs (cost)*
Where:
• Rij = ternormalisasi performance rating
• Max Xij = the maximum value of each row and column
• Min = minimum value of the Xij each row and column
• Xij = rows and columns of a matrix
With a performance rating of ternormalisasi rij is the alternative of Ai on the attributes of Cj; I = 1,2, ... m and j = 1,2, ..., n.

The value of the preference for each alternative (Vi) is given as:

$$Vi = \sum_{j=i}^{n} Wj\ rij$$ Equation *1*

Where:
Vi = final value of alternative
WJ = Weights have been determined
rij = Normalisation matrix
The values Vi larger alternative Ai indicated that more elected.

2.5 Discussion

Mobile application architecture Guidelines For City tourists and Tour Recommendations and culinary in Bandung Using Simple Additive Weighting (SAW) is a media delivery of information to the public in the form of events and promotions are taking place in the city of Bandung, as well as search for culinary tours and recommendations. However in the application there are still some problems. These issues include:

1. The community and the tourists ' difficulty in finding information or event promo about the sights and culinary place in Bandung.

2. The community and the difficulty in getting recommendations Tourists Attractions and culinary place in Bandung.

3. the culinary tourist and business owners the difficulty in promoting its business place just by doing word of mouth promotion due to the absence of the media to do promotion so that not all the community and Tourists aware of any promotions at the place of business.

2.6 Modeling

System architecture analysis aims to identify the architecture to be built based on two subsystems web and mobile.

1. Web

Web platform is one of the subsystems were selected for the development of this software. Users of the software platform is to take office, tourist attractions, and event organizers. Here is a picture of the 2.4 software architecture on the Web Platform. This image illustrates the overall architecture of the system on a web platform.

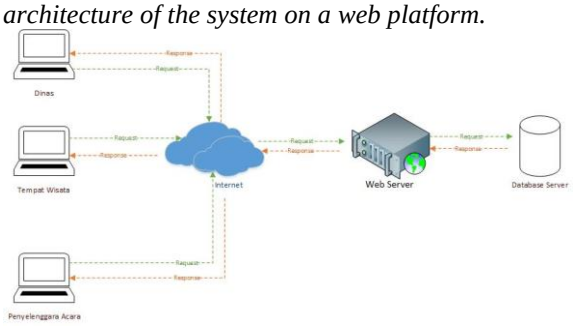


Figure.1 *Architectural Software On Web Platform*

The following is a description of the image of architecture 2.4 software on Web Platform:

a. Web Service, tourist attractions, and event organizers did request data to the web server.

b. Web server receives the request and determines the type of request data that is requested.

c. when the web server receives a request data then it will directly take the data that exists on the database server.

d. After the web server receives the requested data, the data will be returned via the internet to computer network service, tourist attractions, the organizers of the event.

1. Mobile

The mobile platform is one of the subsystems were selected for the development of this software. Software architecture on mobile platforms describe how interacting software such as illustrated in Figure 2 software architecture on Mobile platforms. The image illustrates the overall architecture of the system on a mobile platform.

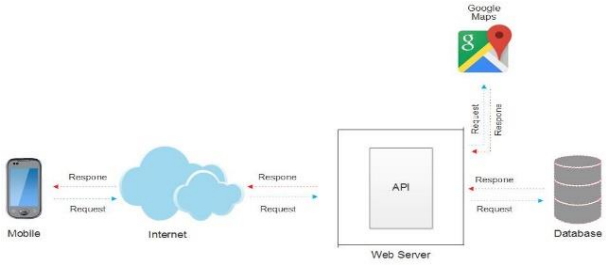


Figure.2 *Architectural Software On Mobile Platform*

The following is a description of the image software architecture at 3.10 Mobile platforms:

a. mobile device users request data to the web server via the API.

b. Web server receives the request and determines the type of request data that is requested.

c. when the web server receives a request that server location Google Maps URL of invoke to get the coordinates.

d. Google Maps sends the results of the respone to the server.

e. If the web server receives a request data then the web server will take the existing data in the database.

After the web server receives the requested data, the data will be returned in the form of JSON for processing mobile device users.

2.7 calculation of distance matrix

Based on the results of a questionnaire that had been done to 70 tourists and the community of Bandung city found the percentage weighting of results, namely:

Weighting Of:

a) price: 24.3%

b) ease of transportation: 25.7%

c) distance: 12.9%

d) Rating: 25.7%

e) facility: 11.4%

2.7.1 criteria for Mobile Users

As for the criteria that the user entered to display the recommendations i.e. type of food, the maximum price, ease of transportation, maximum distance, rating, and facilities such as in the table.1

Table.1 *Chart Data table Example User Criteria*

price Max (RP)	*Ease Of Transportation*	*Distance Max (KM)*	*Rating*	*Facilities*

100.000	*8*	*10*	*2*	*8*

2.7.2 Data Menu of culinary tour

1. The following is an example of a data table that are owned by the Department of tourism and culture as in the table of 3.70. An existing attribute in the table,, made the criteria for making the decision matrix.

***Table.2** Chart Data table example of culinary tourism*

Name	*price Max (RP)*	*Ease Of Transportation*	*Distance Max (KM)*	*Rating*	*Faciliti es*
Bakso	*100000*	*5*	*10*	*2*	*5*
Nasi Goreng	*77000*	*6*	*2*	*3*	*8*
Sandwich	*52000*	*2*	*8*	*4*	*3*
Ayam Bakar	*33000*	*4*	*4*	*5*	*2*
Pizza	*20000*	*8*	*6*	*1*	*7*

2. Then make a decision based on criteria matrix (Ci), then do the normalization based on matrix equations are tailored to the type of the attribute (attribute attribute or benefit bia

Harga :

$$\frac{Min\{100.000;77.000;52.000;33.000;20.000\}}{Harga} =$$

$$R11=\frac{Min\{100.000;77.000;52.000;33.000;20.000\}}{100.000}=\frac{20.000}{100.000}=0,2$$

$$R12=\frac{Min\{100.000;77.000;52.000;33.000;20.000\}}{77.000}=\frac{20.000}{77.000}=0,260$$

$$R13=\frac{Min\{100.000;77.000;52.000;33.000;20.000\}}{52.000}=\frac{20.000}{52.000}=0,385$$

$$R14=\frac{Min\{100.000;77.000;52.000;33.000;20.000\}}{33000}=\frac{20.000}{33.000}=0,606$$

$$R15=\frac{Min\{100.000;77.000;52.000;33.000;20.000\}}{20.000}=\frac{20.000}{20.000}=1$$

Kemudahan Transportasi :

$$\frac{Kemudahan\ Transportasi}{Max\{5;6;2;4;8\}}$$

$$R21=\frac{5}{Max\{5;6;2;4;8\}}=\frac{5}{8}=0,625$$

$$R22=\frac{6}{Max\{5;6;2;4;8\}}=\frac{6}{8}=0,750$$

$$R23=\frac{2}{Max\{5;6;2;4;8\}}=\frac{2}{8}=0,250$$

$$R24=\frac{4}{Max\{5;6;2;4;8\}}=\frac{4}{8}=0,5$$

$$R25=\frac{8}{Max\{5;6;2;4;8\}}=\frac{8}{8}=1$$

Jarak :

$$\frac{Min\{10;2;8;4;6\}}{Jarak}$$

$$R31=\frac{Min\{10;2;8;4;6\}}{10}=\frac{2}{10}=0,2$$

$$R32=\frac{Min\{10;2;8;4;6\}}{2}=\frac{2}{2}=1$$

$$R33=\frac{Min\{10;2;8;4;6\}}{8}=\frac{2}{8}=0,25$$

$$R34=\frac{Min\{10;2;8;4;6\}}{4}=\frac{2}{4}=0,5$$

$$R35=\frac{Min\{10;2;8;4;6\}}{6}=\frac{2}{6}=0,33$$

Rating :

$$\frac{Rating}{Max\{2;3;4;5;1\}}$$

$$R41=\frac{2}{Max\{2;3;4;5;1\}}=\frac{2}{5}=0,4$$

$$R42=\frac{3}{Max\{2;3;4;5;1\}}=\frac{3}{5}=0,6$$

$$R43=\frac{4}{Max\{2;3;4;5;1\}}=\frac{4}{5}=0,8$$

$$R44=\frac{5}{Max\{2;3;4;5;1\}}=\frac{5}{5}=1$$

$$R45=\frac{1}{Max\{2;3;4;5;1\}}=\frac{1}{5}=0,2$$

Fasilitas :

$$\frac{Fasilitas}{Max\{5;8;3;2;7\}}$$

$$R51=\frac{5}{Max\{5;8;3;2;7\}}=\frac{5}{8}=0,625$$

$$R52=\frac{8}{Max\{5;8;3;2;7\}}=\frac{5}{8}=1$$

$$R53=\frac{3}{Max\{5;8;3;2;7\}}=\frac{5}{8}=0,375$$

$$R54=\frac{2}{Max\{5;8;3;2;7\}}=\frac{5}{8}=0,250$$

$$R55=\frac{7}{Max\{5;8;3;2;7\}}=\frac{5}{8}=0,875$$

3. *after knowing the criteria as it is on the table next 3.70 create matrix of decisions based on these criteria, and then do the normalization of a matrix as shown in table.3*

Tabel.3 *Data Table Example Culinary Results Normalization*

Name	*price Max (RP)*	*Ease Of Transportation*	*Distance Max (KM)*	*Rating*	*Facilities*
Bakso	*0,2*	*0,625*	*0,2*	*0,4*	*0,625*
Nasi Goreng	*0,26*	*0,75*	*1*	*0,6*	*1*
Sandwich	*0,385*	*0,25*	*0,25*	*0,8*	*0,375*
Ayam Bakar	*0,606*	*0,5*	*0,5*	*1*	*0,25*
Pizza	*1*	*1*	*0,333*	*0,2*	*0,875*

4. After making a decision matrix based on criteria and then do weighting on matrix ternormalisasi as in tables 4

Table.4 *The results of Tourism Data table normalization of weighting are multiplied*

Name	*price Max (RP)*	*Ease Of Transportation*	*Distance Max (KM)*	*Rating*	*Facilitie*
Bakso	*0,2 * 0,243*	*0,625 * 0,257*	*0,2 * 0,129*	*0,4 * 0,257*	*0,625 * 0,114*
Nasi Goreng	*0,26 * 0,243*	*0,75 * 0,257*	*1 * 0,129*	*0,6 * 0,257*	*1 * 0,11*
Sandwich	*0,385 * 0,243*	*0,25 * 0,257*	*0,25 * 0,129*	*0,8 * 0,257*	*0,375 * 0,114*
Ayam Bakar	*0,606 * 0,243*	*0,5 * 0,257*	*0,5 * 0,129*	*1 * 0,257*	*0,25 * 0,114*
Pizza	*1 * 0,243*	*1 * 0,257*	*0,333 * 0,129*	*0,2 * 0,257*	*0,875 * 0,114*

5. Once done weighting towards the matrix ternormalisasi obtained the results of automated calculation on the table such as 5

Tabel.5 *Tour Data tables Results weighting*

Name	*price Max (RP)*	*Ease Of Transportation*	*Distance Max (KM)*	*Rating*	*Facilities*	*Total*
Bakso	*0,049*	*0,161*	*0,026*	*0,103*	*0,071*	*0,409*
Nasi Goreng	*0,063*	*0,193*	*0,129*	*0,154*	*0,114*	*0,653*
Sandwich	*0,093*	*0,064*	*0,032*	*0,206*	*0,043*	*0,438*
Ayam Bakar	*0,147*	*0,129*	*0,065*	*0,257*	*0,029*	*0,626*
Pizza	*0,243*	*0,257*	*0,043*	*0,051*	*0,100*	*0,694*

3. The results of the Total Weighting :

Bakso : 0,409 #5
Nasi Goreng : 0,653 #2
Sandwich : 0,438 #4
Ayam Bakar : 0,626 #3
Pizza : 0,694 #1

Based on the user input the desired criteria and do a comparison with the data menu of culinary tour then get a menu of Pizzas made the recommendation because it has the most results approaching the desired criteria of mobile users.

2.8 Use Case Diagram

Use Case Diagram is a construction to describe relationships that occur between actors with activities that are present in the system. From the analysis of the existing application users then use case diagram mobile platforms can be seen in Figure 3 Use Case diagrams.

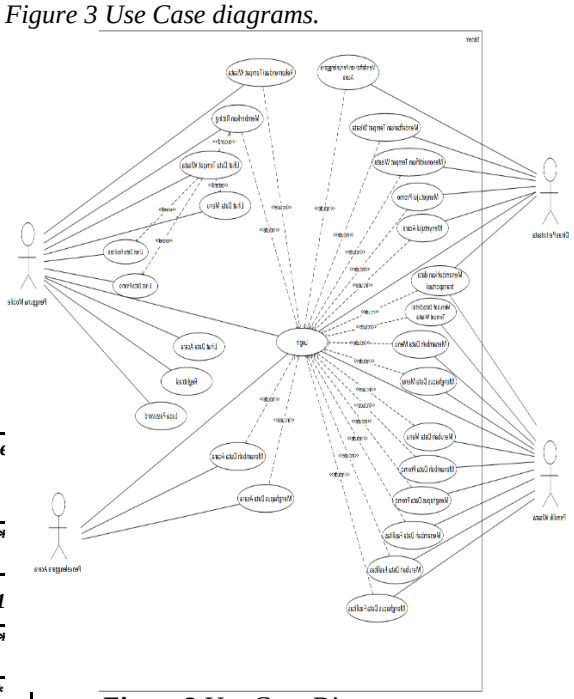


Figure.3 *Use Case Diagram*

2.9 Scheme Relation

The partnership scheme is a series of relationships between two or more tables in a database system. A series of data bases on the application described in Figure 4.

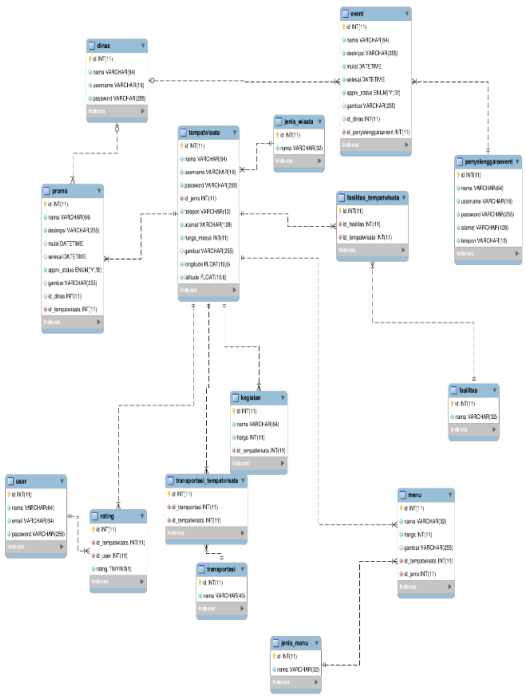
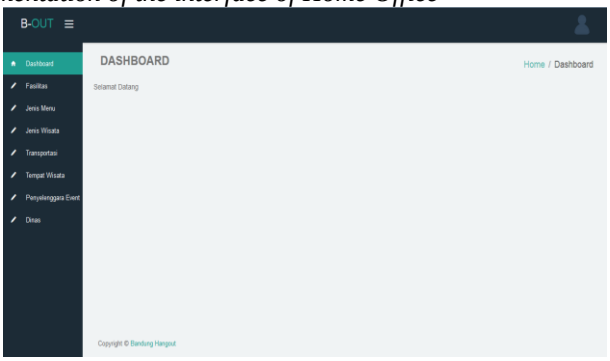


Figure.4 *Schema Relation*

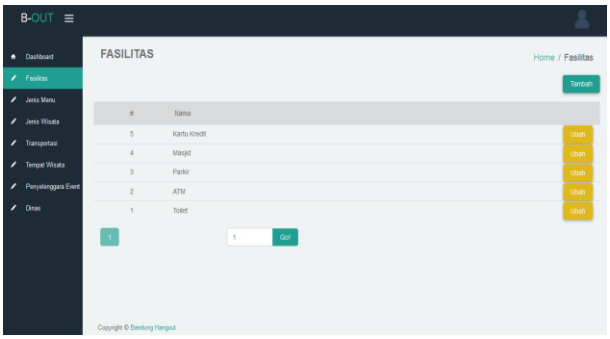
2.10 Implementation Interface

Following is the display of the interface of the system will be built:

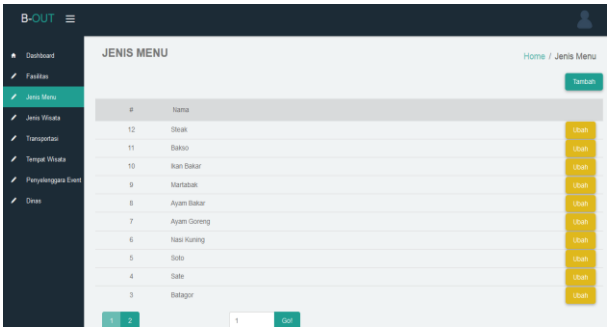
1. Implementation of the interface of Home Office



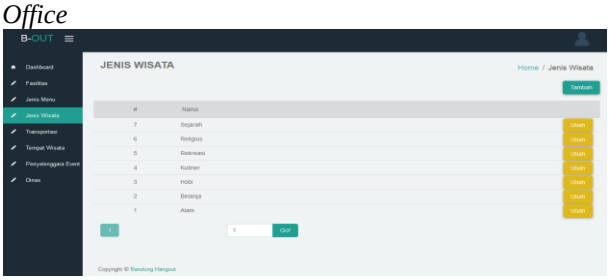
2. Implementation of Interface Facilities Department



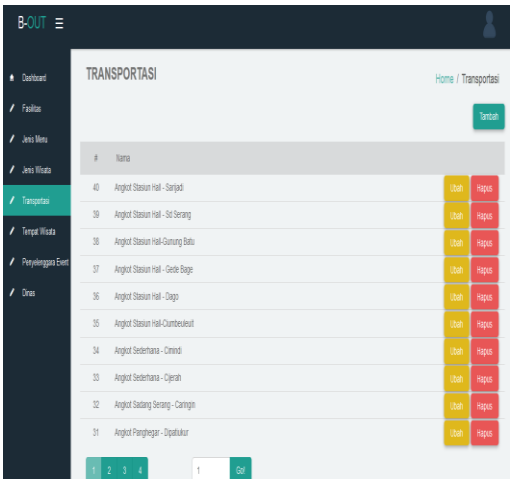
3. Implementation of the interface type of Service Menu



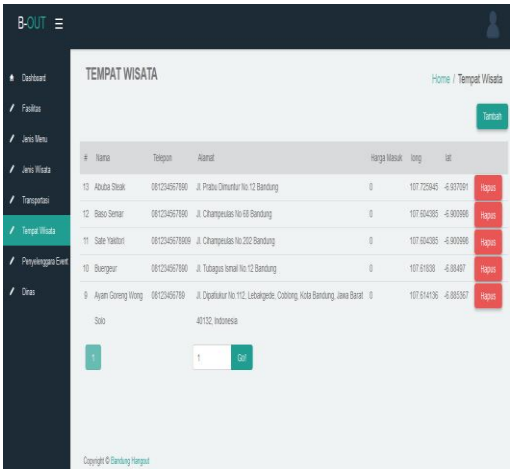
4. Implementation of the interface type of the Tourism Office



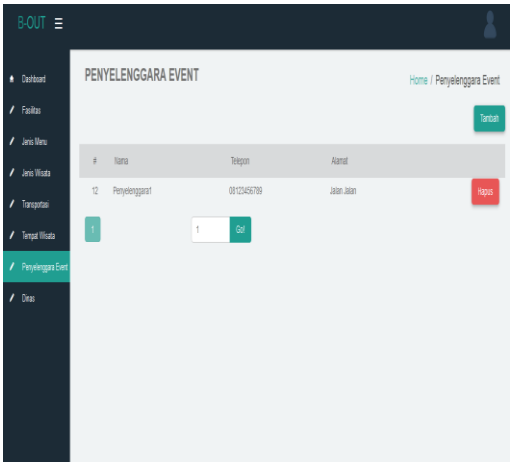
5. *Transport Service Interface Implementation*



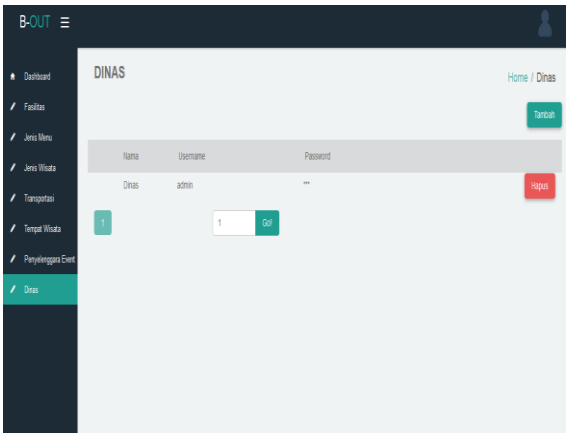
6. *Implementation of the interface of the attractions Duty*



7. *Implementation of the organizers of the Event Service*



8. *Implementation of the organizers of the Event Service*



3. CLOSING

The conclusion that can be drawn from the results of the design application is this app very helpful Tourist Community in search of a dam and get recommendations for tourist attractions, is also very helpful to business owners in the megiklankan and promoting tourist attractions. The final result of the design of the form application for a culinary tour and recommendation guidelines in Bandung on Android Mobile that can help travelers to find vacation places more easily.

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