BUILD AND DESIGN
COST ORIENTED TRIP PLANNING
CASE STUDY OF CIANJUR DISTRICT BASED ANDROID

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ABSTRAK

The number of tourist arrivals in Cianjur in 2015 decreased [1]. It got a response from the government of Cianjur Regency by running an accelerated development program which, if not supported by the surrounding environment, would not be obtained quickly [2]. Community backpacker in Indonesia increasingly in demand. Backpacker has in common the fundamental principle of getting as much fun with the cost of at least [3].

This app is a trip planning app that runs on an Android platform that uses multiple technologies. The technology used to support the running of applications built is GPS technology that is utilized to get the point coordinates of the smartphone users. Another technology is Google Maps Direction API technology is used to get route services in two coordinate points and used to get the calculation of distance and duration. Furthermore, there is Google Places API technology that is used to get places nearby with tourist attractions such as atm etc. Then Geocoding technology is used to change the address into coordinate points and Google Distance Matrix API is used for determining the distance from the user location to the tourist attractions.

Based on the test results using blackbox and acceptance method can be concluded that the application of cost-oriented tourism planning has helped Disparpora Kab. Cianjur in promoting tourism Kab. Cianjur as well as helping tourists, especially backpackers in planning their trip in terms of cost.

Keywords: Trip, Backpacker, Planning, Cost, Android, API.

1. PRELIMINARY

In 2015, the number of local and foreign tourists visit in Cianjur has decreased. Based on data from the Department of Tourism Youth and Sports Cianjur, the number of tourists visiting during 2015 reached 857,986 people, while in 2014 as many as 875,667 people [1]. This is unfortunate because of the decline and predicted to continue if there is no support from the government or the surrounding environment. The problem has received a response from the Regent of Cianjur Regency, Mr. H. Irvan Rivano Muchtar, S.Ip, SH, M.Si by making changes. The change is shown by the implementation of the accelerated development program that began in 2017 [2]. This program of course needs support from the surrounding environment in order to run smoothly and can meet the target as expected.

Based on data from the questionnaire published online by researchers states that 59% have trouble error estimation of travel expenses. This has become a focus always thought of by a Backpacker. Backpacker has in common the fundamental principle, which is to get as much fun with spending as little as possible [3].

The backpacker principle invites the question of whether they have actually planned their trip or not. Good travel planning will minimize expenses incurred during the trip. This is sometimes the thing that is less attention so that problems arise when the trip like running out of funds and expenditures that are beyond estimates. Based on the results of questionnaires that have been spread online by researchers states 59% of the problems faced by respondents when the tour is not done tour planning in terms of costs that cause error estimates travel expenses. 25.6% problem doubts about tourist destinations and 15.4% time outreach issues in some tourist destinations in an area.

Based on the above problems it is needed an application that can support the acceleration of development programs Cianjur Government in the tourism sector and handling the problem of tourism planning in terms of cost. Therefore an Android app that can provide guidance or recommendation of tourist attractions in accordance with the costs that have for tourism planning can be organized better can be a solution. On the other hand this application will also help promote Cianjur further to the people of Indonesia in the tourism sector that aims to support the accelerated development program. The application will be built with 2 main features ie travel planning with private vehicles that will calculate the cost of fuel, ticket costs as well as tourism facilities and planning with public transportation that will calculate the cost of public transport (angkot) and the cost of tickets and tourist facilities.

Based on the problems that have been presented, it can be concluded the need to build a travel planning application on the mobile platform. The platform used for applications built is Android. Based on data from a marketing bureau called Waiwai Marketing, the total Android smartphone platform users are 41 million or 94% of the market share while smartphone platform ios users are at 1.5 million or 6% market share [4]. With the construction of this application is expected to help tourists, especially backpacker in planning tours as well as help Disparpora Kab. Cianjur in promoting tourism Kab. Cianjur.

2. RESEARCH CONTENTS

2.1 Backpacker

Backpacker is someone who has a travel style independently. That is, a backpacker is those who travel without getting involved in a travel agent. Backpacker has in common the fundamental principle, which is to get as much fun with spending as little as possible [3]. It can be concluded that a backpacker is the way a person or group travels independently with the goal of getting as much fun as possible at least cost.

2.2 Android

Android is an operating system for linux-based mobile devices that includes operating systems, middleware and applications. With the presence of Android, the developers can become more flexible in building an application for a mobile platform is good and renewable. This operating system became very popular in Indonesia with the share of the smartphone market in Indonesia sebnayak 94% [4].

2.3 *API*

API (Application Programming Interface) is an interface that is used to access a service from another application. API allows developers to use the existing functionality of other apps so there is no need to recreate from scratch. In the web context, APIs are function calls via Hyper Text Transfer Protocol (HTTP) and get response in the form of Extensible Markup Language (XML) or JavaScript Object Notation (JSON) [5].

2.4 System Architecture Analysis

Analysis of system architecture aims to identify the existing architecture on a system that will be built based on 2 sub web and mobile systems.

1. Website Sub System Architecture

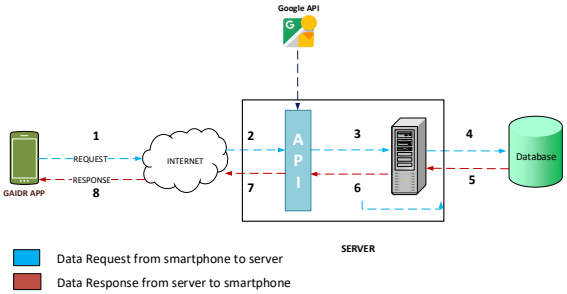
In this website system there is 1 user that is administrator. The administrator has the task to process the data used on the application.

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Picture 1. Website Sub System Architecture

2. Mobile Sub System Architecture

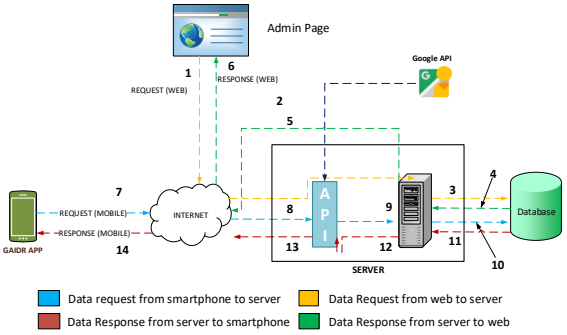
The mobile sub-system architecture will illustrate how the software interacts with the mobile sub-system. On the mobile sub-system the user using the application will request the request data to the server via an API.



Picture 2. Mobile Sub System Architecture

3. Overall System Architecture

The overall architecture will illustrate how the software interacts with the system as a whole.



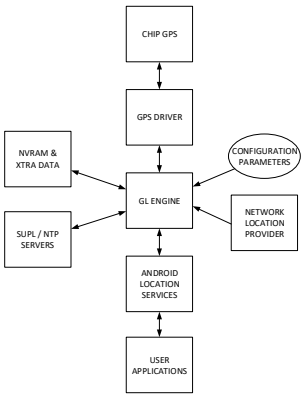
Picture 3. Overall System Architecture

2.5 Analysis of Technology Inside App

Technological analysis aims to know what technology will be used in a system built Sub Web System Architecture.

1. GPS A-GPS

The technology used in built applications is GPS technology with type A-GPS. This technology will determine the position of the smartphone with high accuracy. Utilization of A-GPS in built applications is useful to get smartphone location faster because it is supported by telecommunication operators used in smartphones.



Picture 4. Utilization of A-GPS

2. Google Maps Android API

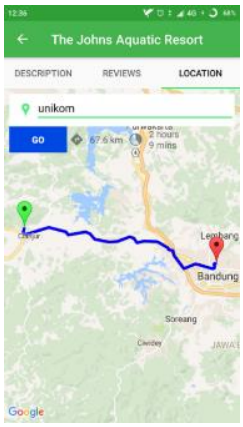
API (Application Programming Interface) that Google will be used in built systems. Usefulness of this API is to get the digital map service that will be used in the application.



Picture 5. Google Maps Android API Utilization

3. Google Maps Direction API

Google's API technology used in built applications is Google Maps Direction API technology. This API technology will provide services in the form of determining the route from a point location to another location point as well as calculation of fuel costs from the distance obtained.



Picture 6. Google Direction API Utilization

4. Google Places API

The next technology utilized in applications built is Google Places API. The Google Places API is used to discover nearby attractions such as the nearest atm, the closest mosque to a radius that users can dynamically manage.



Picture 7. Google Places API Utilization

5. Geocoding

Geocoding is a technology used in applications built in technical terms. Utilization of geocoding on the built system lies in the way the user declares the location where he is located. Users will only enter the address and the system will translate the address into the latitude and longitude coordinate points for the application functionality requirements.

6. Google Distance Matrix API

The Google Distance Matrix API is a service from Google to be able to calculate the distance from one place to another. But the difference is that this API can calculate from a point coordinates to several coordinate points at once.

2.4 Data Used in Application

Data used in this app such as travel data and route data and public transportation fares obtained from the Department of Youth and Sports of Cianjur and the Department of Transportation of Cianjur. Tour data obtained in the form of data accompanied by the price of admission and facilities therein. Meanwhile, the public transportation route data obtained from the Department of Transportation Kab. Cianjur in the form of route data along with the tariff of each public transportation in Kab. Cianjur.

2.4 Sample Case

The following below will describe how case scenarios might occur in the built application:

1. Planning tours with personal vehicles.

In planning tours with personal vehicles, the estimated cost involved is the cost of fuel and ticket costs and tourist facilities that the user wants.

Planning with scenarios using private vehicles is a feature that utilizes Google Maps Direction API technology to get the mileage that will be used to calculate the fuel cost later based on fuel consumption of kilometers / liter.

With this mode of planning, users will always get information on the estimated fuel costs that may be incurred based on vehicle consumption that is used specifically from brand to type of vehicle.

Tabel 1. Table Plan With Personal Vehicles

User Plan			
Cost	Rp. 500.000		
Departure date	June 7 2017		
Number of days	1		
Number of people	3		
Location Depart	Unikom		
Destinations	The Johns Aquatic Resort		
Facilities desired	Facilities	amount	
	1. Dragon Swimming Pool	3	
	2. ATV	3	
	3. Boat	3	
Car/motorcycle	Car		
Brand	Nissan		
Type	Grand Livina 1.5 LV		
Fuel Consumption	13 Km/l		
Type of fuel	Premium (Rp. 6450)		
Ticket Cost Calculation			
Ticket Price	Rp. 5.000		
Amount of people	3		
Sub total ticket price	Rp. 15.000		
Facility Cost Calculation			
Facility	Qty	Price	Total
Dragon Swimming Pool	3	30.000	90.000
ATV	3	50.000	150.000
Boat	3	50.000	150.000
Sub Total			390.000
Fuel Cost Calculation			
Location Depart	Unikom		
Destination	The Johns Aquatic Resort		
Mileage	67,6 Km		
Mileage (round trip)	67,6 Km x 2 = 135,2 Km		
Fuel Cost	(6450 * 135,2)/13 = 67.080		
Estimated Total Cost Calculation			
Sub total ticket cost	Rp. 15.000		
Sub total facility cost	Rp. 390.000		
Sub total fuel	Rp. 67.080		
Total cost	Rp. 472.080		
Status Planning			
Cost	Rp. 500.000		
Total Cost	Rp. 472.080		
planning			
Status	Cost enough		
Margin	Rp. 27.920		

2. Planning tours with public transportation

In planning tours with private vehicles, the estimated cost involved is the cost of transportation (public transportation Cianjur) as well as the cost of tickets and tourist facilities that the user wants. Planning with scenarios using public transport is a feature that will calculate the estimated cost of public transportation transportation in Kab Cianjur as superior.

By planning with this mode users will always get information on angkot routes that can be suggested system to get to the sights along with the estimated cost. There is a determination of starting point as the user initiate start the journey by using angkot in Cianjr. This starting point will be recommended system according to the direction of user entry into Cianjur region. To enter the region Cianjur there are 3 directions in the direction of the direction of Bandung, Bogor and Sukabumi. Here is a stop point based on the incoming directions :

Tabel 2. Tabel Rencana Kendaraan Umum

Datang dari arah	Titik pemberhentian
Bandung	Temrinal Rawabango
Bogor	Simpang Hypermart
Sukabumi	Terminal Pasir Hayam

After getting the stop point which is also the starting point of determining the angkot route, hereinafter will be described how the planning scenario that happened using the feature:

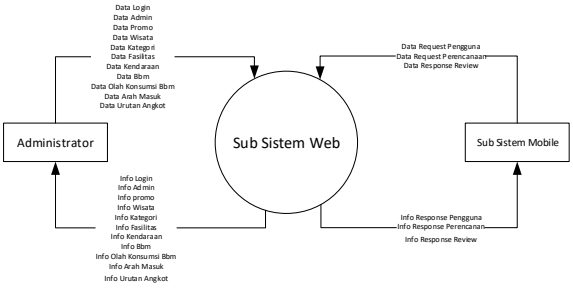
Tabel 3. Table Plan With Public Vehicles

User Plan			
Cost	Rp. 500.000		
Departure date	07 Juni 2017		
Number of days	1		
Number of people	3		
Location Depart	Unikom		
Destinations	The Johns Aquatic Resort		
Facilities desired	Fasilitas	Jumlah	
	1. Dragon Swimming Pool	3	
	2. ATV	3	
	3. Boat	3	
Ticket Cost Calculation			
Ticket Price	Rp.5.000		
Amount of people	3		
Sub total ticket price	15.000		
Facility Cost Calculation			
Facility	Qty	Price	Total
Dragon Swimming Pool	3	30.000	90.000
ATV	3	50.000	150.000
Boat	3	50.000	150.000

Sub Total				390.000
Transportation Cost to Cianjur				
Vehicle		Public Transportation		
Come to cianjur from		Bandung		
Estimated cost of transport to cianjur (for 1 person)		Rp. 30.000		
Amount of people		3		
Sub transport cost to cianjur		Rp. 30.000 x 3 = Rp. 90.000		
Sub transport costs round trip Bandung - Cianjur		Rp. 90.000 x 2 = Rp. 180.000		
Calculation of Angkot Cost in Cianjur				
Location Depart		Unikom (Bandung)		
Stop in Cianjur		Rawabango Terminal		
Angkot route	Route	Cost	Qty	Total
	1. Angkot 05A	3000	3	9000
	2. Get off at Simpang Hypermart	-	3	-
	3. Angkot Cianjur-Cipanas	3000	3	9000
	4. Get off at GGM ride motorcycles to the location or on foot	-	3	-
Sub Total Cost of Angkot		Rp. 18.000		
Estimated Total Cost Calculation				
Sub total ticket cost		Rp. 15.000		
Sub total facility cost		Rp. 390.000		
Sub total of transport cost to Cianjur		Rp. 180.000		
Sub total cost of Angkot		Rp. 18.000		
Total Cost		Rp. 603.000		
Status Plan				
Cost		Rp. 500.000		
Total Cost planning		Rp. 603.000		
Status		Cost not enough		
Margin		Rp. -103.000		

2.6 Web Functional Requirement Analysis

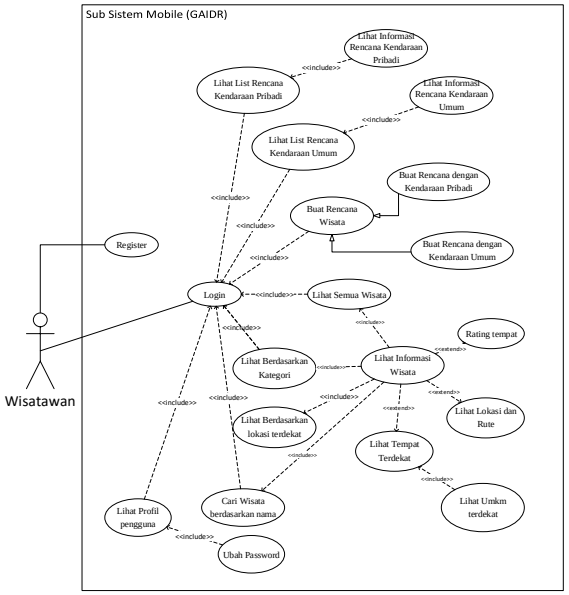
The method of analysis used in the development of web sub system is structured analysis. Through this structured analysis functional requirements are performed using the Context Diagram as a general overview.



Picture 8. Context Diagram

2.6 Mobile Functional Requirement Analysis

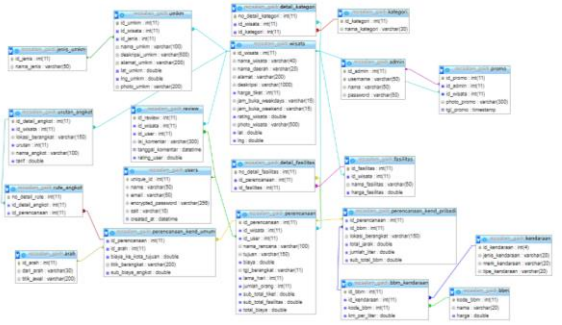
The method of analysis used in the development of web sub system is object-oriented Analysis. Through this structured analysis functional requirements are performed using the Use Case Diagram as a general overview.



Picture 9. Use Case Diagram

2.7 Data Design

Here is the design of data performed on applications built using relationship diagrams.



Picture 10. Relation Diagram

2.8 System Implementation

Implementation system is a translation phase based on the results of analysis and system design that has been done into a particular pemorgraman language and the application of systems built in the real environment

1. Hardware Impementation

In Table 4 hardware requirements for system implementation are built as follows:

Tabel 4. Table of hardware requirements

Website Sub System		
No	Hardware	Spesification
1	Processor	Intel Core i5 2.0 Ghz
2	Harddisk	480 GB
3	RAM	8 GB
4	VGA	2 GB
5	Monitor	1336 x 768 pixel
Mobile Sub System		
No	Hardware	Spesification
1	Processor	Quadcore 1,4 Ghz
2	RAM	2 GB
3	ROM	16 GB
4	LCD	IPS 720p HD
5	Network	4G LTE Cat 4 150/50 Mbps
6	GPS	A-GPS

2. Software Implementation

In Table 5 software requirements for system implementation are built as follows:

Tabel 5. Table of software requirements

Web Sub System		
No	Software	Spesification
1	OS	Windows 10 Home Single Language
2	Browser	Google Chrome
3	XAMPP	Versi 3.2.2
Mobile Sub System		
No	Software	Spesification
1	OS	Android 6.0 Marshmallow

2.6 System Testing

In the testing phase of the system, the test is divided into 3 parts:

1. Testing Plan

Testing is done in two stages. The first stage is the stage where testing focuses on the functionality of the built system. The test is done by blackbox method. The last stage is the stage where testing will focus on the user's assessment of the built system. The test is done by kuesione spread method with Likert scale to 30 respondents.

2. Functioanlity Testing Results

The results of functionality testing is divided into two, namely the results of mobile sub-system functionality testing and web sub-system.

a. Web Sub System

Tabel 6. Table test results web functionality

Test Class	Status
Log in	*Valid*
Module Tourism Data	*Valid*
Module data category	*Valid*
Module Data Facility	*Valid*
Module Data Vehicle	*Valid*
Module Data fuel	*Valid*
Module Data fuel consumption	*Valid*
Module Data heading from	*Valid*
Module Data route	*Valid*
Module Data Umkm	*Valid*
Module Data Promo	*Valid*
Module Data Admin	*Valid*
Module Data User	*Valid*

b. Mobile Sub System

Tabel 7. Table of mobile functionality test results

Test Class	Status
Log in	*Valid*
Register	*Valid*
Create a Tour Plan	*Valid*
Create a Plan With Personal Vehicles	*Valid*
Create a Plan With a Public Vehicle	*Valid*
View Personal Vehicle Plan List	*Valid*
View List of General Vehicle Plans	*Valid*
View Personal Vehicle Plan Info	*Valid*
View General Vehicle Plan Info	*Valid*
View All Tours	*Valid*
View By Category	*Valid*
View by Nearby Locations	*Valid*
Find Tours by Name	*Valid*
View Tour Information	*Valid*
View Nearest Places	*Valid*
View Nearest Umkm	*Valid*
Place Rating	*Valid*
View Locations and Routes	*Valid*
View User Profile	*Valid*
Change Password	*Valid*

3. Beta Test Results

In Table 8 the result of beta test used is using Likert scale method. Here are the results of beta testing:

Tabel 8. Table of beta test results

Goal 1			
Goal	Helping	Disparpora	District

	Cianjur to promote the tourism of Cianjur	
Questions	P1	Applications built can help Disparpora Cianjur in promoting tourism Cianjur.
	P2	With the application built predicted to increase the number of tourists in Cianjur
Average	P1 = 4,07 P2 = 4,3	
Score	4,18	
Goal 2		
Goal	Helping backpackers in estimating the cost of tourism to Cianjur.	
Questions	P3	This built application can help estimate fuel costs for plans with private vehicles or public transportation costs for plans by public transport along with guidance of public transportation routes to sights
	P4	This built application can help estimate the cost of traveling to Cianjur.
Average	P3 = 4,27 P4 = 4,43	
Score	4,35	
Tujuan 3		
Goal	Easing backpacker in getting information about tours and facilities along with the costs incurred in a trip to Cianjur.	
Questions	P5	This built application can provide information on nearby places of tourist attractions such as ATMs etc.
	P6	This built application can make it easier to get information about tourist attractions and facilities in it so as to estimate the cost of traveling to the place.
Average	P5 = 4,3 P6 = 4,37	
Score	4,33	

Based on the test results in Table 8, it can be concluded that:

1. From the first objective obtained response from the respondents namely the Disparpora Kab. Cianjur felt helped by the application built in promoting tourism Kab. Cianjur further into a mobile app with a score of 4.18.
2. From the second goal obtained response dai respondents that users feel helped by the application built to estimate the cost of travel to the District. Cianjur with a score of 4.35.
3. From the third objective obtained response from the respondents that users feel helped by the application built to obtain interesting and informative information from tourism cianjur as well as the estimated cost and tourism facilities in it with a score of 4.33.

3. CLOSING

Based on the test results on the application built it can be obtained conclusion as follows:

1. Application dibangu can help the Department of Tourism Youth and Sports Cianjur District in promoting tourism Cianjur regency.
2. Applications built to help tourists, especially backpacker in estimating the cost of travel to the District Cianjur.
3. Applications built to facilitate tourists, especially backpacker in getting information about tourist attractions and facilities in it so that it can know the cost to be incurred when traveling.

THANK'S NOTE

The authors would like to thank the related parties in supporting the development of this application, among others the Department of Tourism Youth and Sports Kab. Cianjur and the Department of Transportation Kab. Cianjur related data used in the application and all parties who have assisted the author in conducting this research. Not to forget the authors also say many thanks to the relevant institutions of the University Computer Indonesia which has provided a container for me to develop themselves in the field of science Informatics so as to make a research based on this mobile technology.

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