

APPLICATION DEVELOPMENT OF TRAVEL BOOKING AND CAR RENTAL AND CAR MONITORING ANDROID BASED (CASE STUDY OF DUTA TRANS)

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ABSTRACT

Duta Trans is a company engaged in travel and car rental services supported to advance professional transportation services with good service and the latest fleet. At present, travel and car rental booking activities at Duta Trans can only be done by coming directly to the place or by telephone only. This is less efficient, because time and costs will be wasted if the travel seat reservations are fully charged and car rental reservations. There are also complaints from travel customers because drivers often speeding while on their way. a mobile application is needed that can be used for booking travel and car rental for Duta Trans in order to facilitate customers and be more practical in performing services, and can monitor the fleet of travel cars so drivers do not speed. With the design of the mobile application that will be made, customers can book travel, rent a rental car, see the latest info & promos announced and report complaints and suggestions. While the company's admin can monitor the location and speed of the travel fleet in order to maintain passenger safety and comfort. And the travel driver will send the location and speed of the travel fleet that is operating through his smartphone to be monitored by the admin. The above activities, can be done directly through an android smartphone. Based on the results of the BlackBox testing and Beta testing that has been done, it can be concluded that the functionality of the entire process in the DutaTrans Application can help the problems that exist in DutaTrans.

Keywords: Smartphone, Application, DutaTrans, Booking, Monitoring.

1. INTRODUCTION

The most significant development of technology today is the development of communication that can even provide social change in society. Here it can be said that communication technology is an application of science to solve problems related to communication [1]. At present, the need for transportation services continues to increase. Competition between companies in this line of business is very tight. In order to make ends meet in

this endeavor, every company continues to innovate and improve services to its customers.

One company that is engaged in this field is Duta Trans. Where Duta Trans is a company engaged in travel and car rental services that is committed to advancing transportation services in a professional manner with good service and the latest fleet.

The research resource was directly with Mr. Andri Rian Hidayat as Director of the Duta Trans Kuningan. Some facts are obtained: At present, travel and car rental booking activities at Duta Trans can only be done by coming directly to the place or via telephone only. This is less efficient, because time and costs will be wasted if the travel seat reservations are fully loaded and car rental reservations, where the desired car is already ordered, so that it will cause customers to turn to competitors engaged in the same field. There are also complaints from travel customers because drivers often speeding while on their way, making customers uncomfortable on their trips. This can not be followed up by the company, because what is conveyed by the customer cannot be ascertained.

Based on this system the company feels that the system does not provide convenience to customers. So companies need an application that makes it easy for customers to place orders directly via smartphone [2]. The application can be used for travel bookings and car rental Duta Trans in order to facilitate customers and be more practical in performing services, and can monitor the fleet of travel cars so drivers do not speeding. With the design of the mobile application that will be made, customers can book travel, rent a rental car, see the latest info & promos announced and report complaints and suggestions. While the company's admin can monitor the location and speed of the travel fleet in order to maintain passenger safety and comfort. And the travel driver will send the location and speed of the travel fleet that is operating through his smartphone to be monitored by the admin.

The above activities, can be done directly through an android smartphone. This method is more efficient and easier to use, because it makes it easier for customers to make travel bookings or rent a rental car at any time without having to call or come directly to the place, making it more cost

effective, time and energy. And the company can confirm travel bookings and car rentals and can monitor the travel fleet that is operating.

The purpose of this study is as follows:

1. Providing convenience in the process of booking travel and rental car data trans to the customers.
2. Providing convenience in the process of booking travel and rental car data trans to the customers.

2. RESEARCH

2.1 Software Development Methods

The software development method used by researchers is the waterfall method [3] :

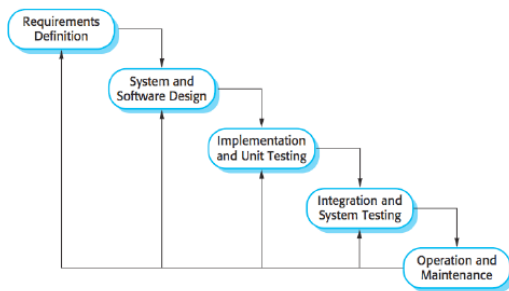


Figure 1. Waterfall Model

Image source : Sommerville, Ian. 2011. "Design and Implementation" [3]

Following is an explanation of the initial stages of system development from the requirements definition stage to the final stages of system development, namely the operation and maintenance stages as follows:

1. **Requirements Definition**
This stage includes determining the boundaries and objectives of making the system and also determining the features that will have the software, what data are needed to build the system and the minimum hardware specifications that will be used. Definisi Kebutuhan (Requirements Definition)
2. **System and Software Design**
At this stage there will be a design stage of the system interface that will appear.
3. **Implementation and Unit Testing**
At this stage the application development stage will occur according to a predetermined design that is also in accordance with the requirements by coding. Unit testing verifies that each unit has met its specifications.
4. **Integration and System Testing**
The stage where testing for errors in coding and performance of units that have been combined.
5. **Operation and Maintenance**
The stage where the application is complete and can be used without problems, can also be done to repair the system error, and also improve system services if there are new needs,

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 platform for developers to create their applications. Initially Google Inc. buy Android Inc. which is a newcomer who makes software for cellphones / smartphones. Then to develop Android, an Open Handset Alliance was formed, a consortium of 34 hardware, software, telecommunications companies, including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and Nvidia.

At the time of the inaugural release of Android, November 5, 2007, Android together with the Open Handset Alliance said it supports the development of open source on mobile devices. On the other hand, Google released Android codes under the Apache license, a software license and open platform for mobile devices [4].

In this world there are two types of distributors of the Android operating system. The first is to get full support from Google or Google Mail Services (GMS) and the second is that it is completely free of distribution without Google's direct support or known as Open Handset Distribution (OHD).

At this time most smartphone vendors have produced Android-based smartphones, those include HTC, Motorola, Samsung, LG, HKC, Huawei, Archos, Camangi Webstations, Dell, Nexus, SciPhone, WayteQ, Sony Ericsson, LG, Acer, Philips, T-Mobile, Nexian, IMO, Asus and many more smartphone vendors in the world that produce Android. This is because Android is an open source operating system so that it is freely distributed and used by any vendor.

2.3 Java

Java is a new object-oriented language that has received wide attention from industry and academia. Java was developed by James Gosling and his team at Sun Microsystems in California. This language is based on C and C++ and was originally intended to write programs that control consumer equipment such as toasters, microwaves, ovens, and others. The language was first called Oak, named after the oak tree outside Gosling's office, but the name was already taken, so the team named it Java.

Java is often described as a web programming language because of its use in writing programs called applets that run in a web browser. Web browser to execute Java applets. Applets allow for more dynamic and flexible internet, and this feature alone makes Java an interesting language to learn. However, we are not limited to writing applets in Java. We can also write Java applications. Java application is a complete program that stands alone does not require a Web Browser. Java applications are analogous to programs that we write in other programming languages [5].

2.4 Location Based Service (LBS)

Location services can be defined as services that integrate the location or position of a mobile device with other information so as to provide added value for users. [6] Location Service has a long tradition. Since the 1970s, the U.S. Department of Defense has operated a global positioning system (GPS), a satellite infrastructure that serves the positioning of people and objects.

Initially, GPS was understood for military purposes, but the U.S. government decided in the 1980s to make system positioning data freely available to other industries throughout the world. Since then, many industries have taken the opportunity to access position data via GPS and are now using it to improve their products and services.

For example, the automotive industry has integrated navigation systems into cars for some time. [7] In traditional positioning systems, location information is usually passed down by the device and with the help of a satellite system (for example, GPS receivers).

However, widespread interest in location-based services (LBS) and the underlying technology as discussed in this book really began to develop only in the late 1990s, when new types of localization technology and new market interest in data services were triggered by cellular network operators.

2.5 Global Positioning System (GPS)

GPS is an application that must wait for requests from users. This application provides positioning accuracy ranging from 100 meters (95% of the time), up to 5 to 10 meters, also to relative accuracy at the submeter, and even at the subcentimeter level. In general, the higher accuracy produced will require a more sophisticated infrastructure and of course related to costs [8].

2.6 Modeling Theory and UML

According to Rosa A & Saladin in his book that modeling is a picture of a simple reality and set forth in the form of mapping with certain rules. One of the most widely used modeling is UML. Unified Modeling Language (UML) is a standard language that is widely used in the industrial world to define requirements, make analysis & design, and describe architecture in object-oriented programming [9].

Physically, UML is a set of specifications issued by OMG (Object Management Group). The latest UML is UML 2.3 which consists of 4 types of specifications, namely Interchange Specification Diagram, UML Infrastructure, UML Superstructure, and Object Constraint Language (OCL). All of these specifications can be accessed on the website <http://www.omg.org>.

2.7 Analysis System to be built

In the analysis of the system to be built it will involve 3 users namely Customers, Admins and

Drivers, Here is a flowchart of the system to be built for Customers :

a. Booking Travel :

1. Customers log in, (if you haven't registered yet, do the registration first).
2. customers press the travel booking menu.
3. customers fill in the required data.
4. The customer presses the message button, (then the system will display the order number and the amount of money that must be transferred and the data trans account number).
5. customers make payments according to the nominal stated at the time of booking through ATM / M-banking / Internet Banking / directly at the bank, (maximum 2 hours after making an order). Customers will get proof of transaction after the order is confirmed by admin.

b. Booking Rent Car :

1. Customers log in, (if you haven't registered yet, do the registration first).
2. The customer presses the car rental booking menu.
3. customers fill in the required data.
4. The customer presses the message button, (then the system will display the order number and the amount of money that must be transferred and the data trans account number).
5. customers make payments according to the nominal stated at the time of booking through ATM / M-banking / Internet Banking / directly at the bank, (maximum 2 hours after making an order).
6. Customers will get proof of transaction after the order is confirmed by admin.

Analysis System that will be built for Admin :

a. Travel Booking / Car Rental Confirmation :

1. Admin does the login.
2. Admin pressing the confirmation menu for travel / car rental reservations.
3. Admin sees incoming orders.
4. Admin checks whether the requested transfer has entered or not.
5. Admin presses the Order Confirmation button.

b. Monitoring Car Travel :

1. Admin does the login. Admin presses the Travel Car Monitoring menu. Admin sees and checks whether the travel car is in its lane and checks the speed of the car, (if the car goes beyond the speed that has been set, then the admin must immediately contact the driver to be reprimanded).

Analysis System that will be built for Driver :

a. Send the latest Location and speed based on GPS data :

1. Travel Driver login.

2. Travel driver chooses menu sen location and speed.
3. The Travel Driver presses the send location and speed button..

2.8 Analysis of System Architecture

In this research the system architecture to be built consists of 2 parts, namely the Mobile system architecture for the Fleet Monitoring System and the Mobile system architecture for the Travel Booking and Car Rental System :

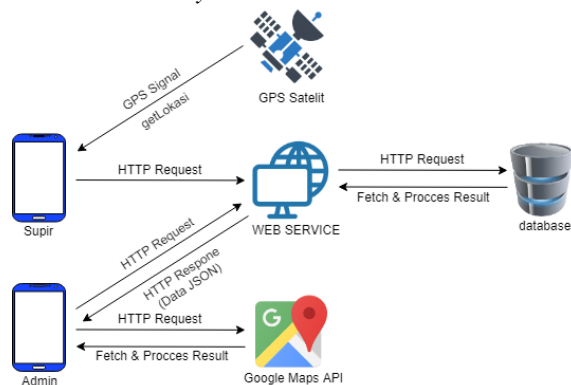


Figure 2. Architectural Analysis of Mobile Travel Fleet Monitoring System

The following is an explanation of the Analysis of Architecture of the Mobile Fleet Monitoring System :

1. Driver's mobile device activates the gps and gets the user's location through the GPS signal.
2. Driver's mobile device makes a request to the web service
3. Service receives data requests from the driver's mobile device and processes the type of request requested to the database
4. Mobile Admin devices make requests to web services
5. Service receives data requests from mobile Admin devices and processes the type of request requested to the database
6. The database displays the results of the process and service data retrieve data from the database
7. Service sends the requested response data in the form of JSON to the Admin mobile device for later processing of the Admin mobile device
8. Admin mobile device requests travel fleet location data and the application displays a map of the travel fleet location.
9. Google Service sends requests according to mobile device requests to Google Services via the API.

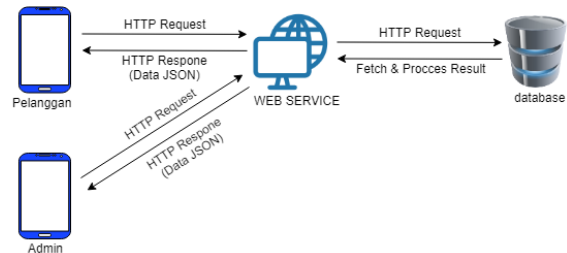


Figure 3 Architectural Analysis of Mobile Systems Travel and Car Rental Booking Systems

The following is an explanation of the Architectural Analysis of the Mobile Travel Booking System and Car Rental:

1. Customers' mobile devices make requests to the web service
2. Service receives data requests from Customer's mobile devices and processes the types of requests requested to the database
3. The database displays data from the process and the service takes data from the database
4. The service sends the requested response data in the form of JSON to the Customer's mobile device for later processing of the Customer's mobile device.
5. Mobile Admin devices make requests to web services
6. Service receives data requests from mobile Admin devices and processes the type of request requested to the database
7. The database displays data from the process and service to retrieve data from the database
8. Service sends the requested response data in the form of JSON to the Admin mobile device for later processing of the Admin mobile device.

2.9 User Analysis

User analysis on systems consisting of Customers, Admins and Drivers for Mobile application users. A description of the user can be seen in the table below.

Table 1. Mobile User Analysis

Actor	Description
Customer	People who will make travel and car rental reservations, have access rights to make travel bookings, car rental reservations, view travel information, view rental car listings, make complaints, get notification of transaction evidence.
Admin	People on duty and have access rights to confirm travel bookings, confirm car rental reservations, monitor cars, see customer complaints.
Driver	People who will send location and speed data, based on the GPS data of his smartphone.

2.10 Software Requirements Specifications

The following is an explanation of the specifications of the software that will be built in this study, can be seen in the table below.

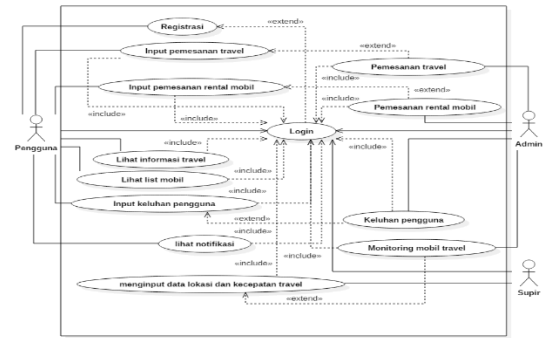
Table 2. Specifications for Mobile Software Requirements

Code SKPL	Specifications for Mobile Software Requirements
SKPL-F-M-001	The mobile system provides facilities for customers to log in
SKPL-F-M-002	The mobile system provides facilities for customers to register
SKPL-F-M-003	The mobile system provides facilities for the Admin to login
SKPL-F-M-004	The mobile system provides facilities for customers to make travel bookings
SKPL-F-M-005	The mobile system provides facilities for customers to make car rental reservations
SKPL-F-M-006	The mobile system provides facilities for customers to view information about travel
SKPL-F-M-007	The mobile system provides facilities for customers to see the list of cars that can be ordered
SKPL-F-M-008	The mobile system provides facilities for customers to provide complaints
SKPL-F-M-009	The mobile system provides a facility for Customers to view incoming message notifications
SKPL-F-M-0010	The mobile system provides facilities for admins to confirm incoming travel orders
SKPL-F-M-011	The mobile system provides facilities for admins to confirm car rental orders that have been entered
SKPL-F-M-012	The mobile system provides facilities for administrators to monitor travel cars that are operating
SKPL-F-M-013	The mobile system provides facilities for the Admin to see customer complaints
SKPL-F-M-014	The mobile system provides facilities for drivers to log in
SKPL-F-M-015	The mobile system provides the facility for drivers to send location and speed data to drivers, based on the driver's smartphone GPS data.

2.11 Functional Requirements Analysis of Mobile Applications

2.11.1 Use Case Diagram

The following is the use case diagram in Figure 4 :



Gambar4. Use Case Diagram

2.11.2 Use Case Scenario

Use Case This scenario will illustrate more clearly the interaction of actors with the system to be created [10].

Table 3. Use Case Scenario - Customer Registration

Actor Actions	System Reaction
Normal Scenario	
1. Enter your username, password, name, no. hp and address	
	2. Check the validity of data entry by checking into the customer table
	3. Display a message of saved data, please login!
	4. Enter the main menu
Scenario Alternatif	
1. Enter your username, password, name, no. hp and address	
	2. Check whether the data is valid or not
	3. Display an empty message field
4. Enter your username, password, name, no. hp and address	
	5. Check whether the data is valid or not
	6. Enter the main menu

2.11.3 Activity Diagram

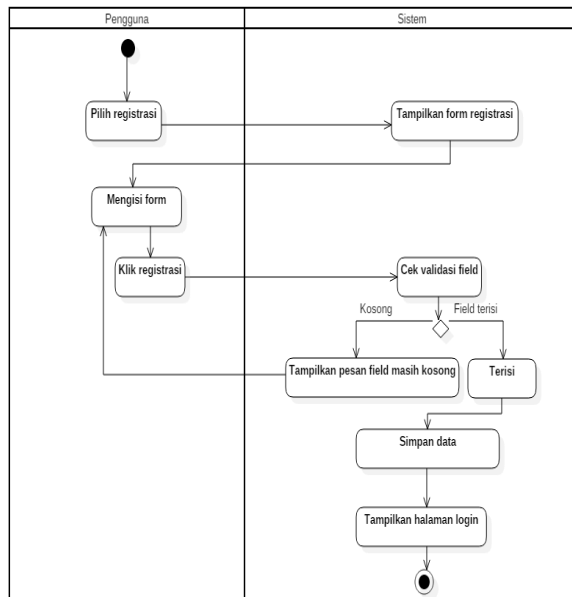


Figure 5. Activity Diagram – Customer Registration

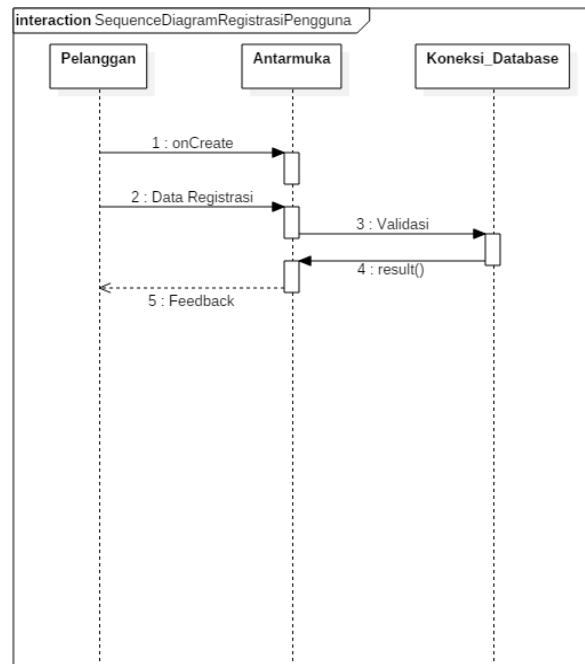


Figure 7.Sequence Diagram

2.11.4 Class Diagram

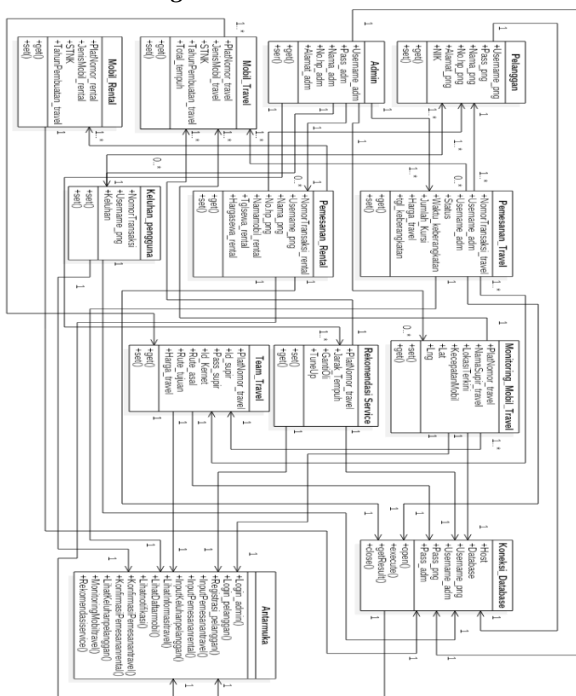


Figure 6.Class Diagram

2.11.5 Sequence Diagram

Sequence Diagram is a diagram that illustrates the interaction of objects in a class [10]. The following is an example sequence diagram for Customer Registration.

2.12 System Design

2.12.1 Scema Relation

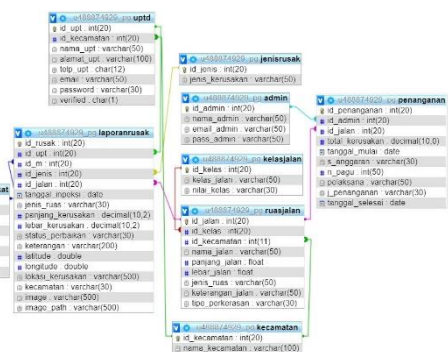


Figure 8. Scema Relation

2.13 Implementation and Testing

2.13.1 Implementation of Teknologi GPS

Table 4. Implementation GPS

Cek Permission Location

```
if (ActivityCompat.checkSelfPermission(getActivity(), Manifest.permission.ACCESS_FINE_LOCATION) != PackageManager.PERMISSION_GRANTED && ActivityCompat.checkSelfPermission(getActivity(), Manifest.permission.ACCESS_COARSE_LOCATION) != PackageManager.PERMISSION_GRANTED) {return;}
```

SRV101001, {retain,}
Enable Object Location

```
@Override
public void onMapReady(GoogleMap
googleMap) {
```

```

if
(ActivityCompat.checkSelfPermission (getAc
tivity(), Manifest.permission.
ACCESS_FINE_LOCATION)
!=PackageManager.PERMISSION_GRANTED &&
ActivityCompat.checkSelfPermission (getAc
tivity(),Manifest.permission.
ACCESS_COARSE_LOCATION)
!=PackageManager.PERMISSION_
GRANTED) { return;}
this.googleMap = googleMap;

for(int i=0;i<6;i++){
googleMap.addMarker(new
MarkerOptions()
.position(LocationList.get(i).getCoord())
.title(LocationList.get(i).getName()))
.setIcon(BitmapDescriptorFactory.fromReso
urce(R.mipmap.markerdutatrans));
googleMap.addCircle(new CircleOptions()
.center(new
LatLng(LocationList.get(i).getCoord().lat
itude,LocationList.get(i).getCoord().long
itude))
.radius(GEOFENCE_RADIUS_IN_METERS)
.strokeColor(Color.RED)
.strokeWidth(4f));
}
googleMap.moveCamera(CameraUpdateFactory.
newLatLng(LocationList.get(0).getCoord())
);
googleMap.animateCamera(CameraUpdateFacto
ry.zoomTo(10.0f));

googleMap.setMyLocationEnabled(true);

```

2.13.2 Interface Implementation

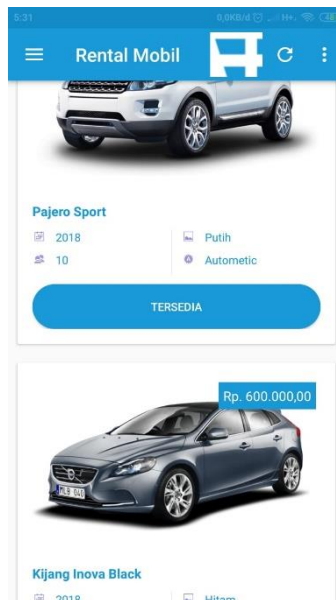


Figure 9.Interface Implementation of rent car booking

2.13.3 Test result

Table 7. Customer Mobile Application Testing Results

NO	Pertanyaan	Skor				
		5	4	3	2	1
		SS	S	CS	KS	TS
1	Apakah aplikasi ini dapat memudahkan untuk memesan travel di duta trans ?	5	21	4		
2	Apakah Aplikasi ini dapat memudahkan untuk merental mobil di duta trans?	13	14	3		

3. CLOSING

3.1 Conclusions

Based on the results of DutaTrans software testing on the android platform, the following conclusions are obtained:

1. With the DutaTrans application you can help customers to order car and travel rentals in a convenient and practical way.
2. With the DutaTrans application can help companies to monitor the ongoing travel fleet so that customers feel safe and comfortable.

3.2 Suggestions

The suggestions for software development are as follows :

1. Improve the quality of the User Interface on the Dutatrans application so that users are more comfortable using it.
2. Conduct research on User Experience for users to be applied to the next application version.
3. Perform Technology Development according to the needs of the Duta Trans Kuningan who can be applied to the next application version.

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