THE OVERVIEW OF INDONESIAN MINISTRY OF TRANSPORTATION'S MOBILE GEOGRAPHIC INFORMATION SYSTEM APLICATION

Bambang Istiyanto
Jurusan Manajemen Keselamatan Transportasi Jalan
Politeknik Keselamatan Transportasi Jalan
Jalan Semeru No 3 Tegal
Telp. (0283) 351061
istiyanto1773@yahoo.com

Yan El Rizal U.D.
Pusat Penelitian dan Pengabdian Kepada Masyarakat (P3M)
Politeknik Keselamatan Transportasi Jalan
Jalan Semeru No 3 Tegal
Telp. (0283) 351061
yan_rizqi@yahoo.com

Mouli De Rizka D.
GIS Specialist, Perum Jasa Tirta II, Purwakarta
Jalan Lurah Kawi No. 1 Jatiluhur Purwakarta
Telp. (0264) 201972
derizkadewantoro@yahoo.com

Dani F. Brilianti
Jurusan Manajemen Keselamatan Transportasi Jalan
Politeknik Keselamatan Transportasi Jalan
Jalan Semeru No 3 Tegal
Telp. (0283) 351061
fia.brilianti@ymail.com

Abstract

Traffic information is an important necessity for humans. Advances in technology make various facilities. The use of smart phone is already very common thing. The use of smart phones, especially development based on open source license is very favorable. Any individual or organization can create applications that can be accessed by many people. There are various applications on smart phone device that is associated with the map -based transportation. Staring from the application issued by government agencies to the application made by the individual. One of the legal application based map application issued by the agency is MoT GIS or known as "GIS KEMENHUB". This application issued by the Ministry of Transportation. Problem for user is the limitations of information that can be obtained from the features. Applications are found to be the maximum that is less attractive to users. The purpose of this study was to determine how the advantages and disadvantages of the user application. Advantages and disadvantages which were known from the user side could be input for the development of better applications. This study contained the discussion of the current state of the application. Object current application was the basis for the development of applications, input from external users who were not part of the developer to add a new angle in the subsequent development. The use of applications generated by government agencies were legally expected to reduce mistrust users to use the data including map data. Legal institutions were expected to generate data in accordance with clear standards. This application is not directly related to the system or management of transportation, however the use of application based on the appropriate map can asses the transportation easily.

***Keyword**: Design, Optimization, Mobile Application, MoT GIS*

Abstrak

Informasi lalulintas merupakan kebutuhan yang sangat penting bagi manusia. Kemajuan teknologi menjadikan berbagai kemudahan. Penggunaan ponsel pintar atau biasa disebut *smart phone* merupakan hal yang sudah sangat biasa. Penggunaan ponsel pintar terutama yang berbasi opensource sangat menguntungkan. Setiap individu maupun organisasi dapat membuat aplikasi yang bisa diakses oleh banyak orang. Tersedia berbagai aplikasi pada perangkat ponsel pintar yang berhubungan dengan transportasi berbasis peta. Mulai dari aplikasi yang dikeluarkan oleh instansi pemerintah hingga aplikasi yang dibuat oleh perseorangan. Salah satu aplikasi legal berbasis peta yang dikeluarkan oleh instansi adalah aplikasi "GIS KEMENHUB". Aplikasi ini dikeluarkan oleh kementerian perhubungan. Keterbatasan informasi yang dapat diperoleh dari penggunaan aplikasi ini menjadi masalah bagi pengguna. Aplikasi dirasa tidak maksimal sehingga kurang menarik bagi pengguna. Penelitian ini memiliki tujuan untuk mengetahui bagaimana kelebihan serta kekurangan aplikasi dari sisi pengguna. Kelebihan dan kekurangan yang diketahui dari sisi pengguna dapat menjadi masukan bagi pengembangan aplikasi yang lebih baik. Penelitian ini berisi mengenai pembahasan dari keadaan aplikasi tersebut saat ini. Keadan aplikasi saat ini merupakan dasar bagi pengembangan aplikasi, masukan dari pengguna eksternal yang tidak menjadi bagian dari pengembang dapat

menambah sudut pandang baru dalam pengembangan selanjutnya. Penggunaan aplikasi yang dihasilkan oleh instansi pemerintah yang legal diharapkan mengurangi ketidak percayaan pengguna terhadap penggunaan suatu data termasuk data peta. Instansi yang legal diharapkan dapat menghasilkan data yang sesuai dengan standar yang jelas.Aplikasi ini tidak terkait langsung dengan transportasi, tetapi diharapkan penggunaan aplikasi transportasi berbasis peta yang baik dapat mempermudah akses dan memperlancar transportasi barang dan jasa.

Kata Kunci: *Desain, Optimaliasi, Aplikasi, GIS KEMENHUB*

INTRODUCTION

Nowadays, the improvement of technology and the use of map on a smart device later becomes the common thing. Map has become a very popular thing for many people around the world. The development of road growth in Indonesia often claimed as inversely proportional to the development of road user. The length of the road is mentioned that this condition do not correspond to the number of motorcycles which always increase rapidly. Ease of purchase of having motorcycles could be facilitating many people to acquire their own vehicles, because of this condition the road consequently will reduce the effectiveness of the road using.

Reduction in the effectiveness of the road using is shown by there is a lack of ability of the road to accommodate the number of vehicles to face the good mobility perform. The number of road vehicles using are getting increase and the road is not getting wide or even increased, so the result would be hazard road congestion. These factors make the road traffic management system becomes very important to do to minimize the congestion problems. Traffic management is not expected to inhibit the mobilization of the road users. Furthermore, it did not make the level of congestion is getting worse.

Road traffic management had been carried out by using field data analysis that utilizing the tabular analysis. Spatial approaches by maximizing the use of maps and geographic information system have not been widely used by many people. The use of spatial data actually allows to use because road is a factor that related to the phenomenon of spatial form of human movement. Everyday human movement is certainly a movement that originated coming from one location to the destination, this is a phenomenon of the movement or the movement of people which called a spatial phenomenon. Spatial approach will certainly help in the implementation of road traffic management.

Background of the Study

An application of GIS – Geographic Information System technology is used for policy maker occurred in the State of Miami, Kansas (Roche, 2000). At least, there are 12 fatal incidents in 11 months on the two-lane road along 20 miles of U.S. Highway 169. Chief of police very concerned about a fatal incident in the street and asked for the Land Information Management Office (LIMO) to create GIS maps that show the location of the accident and the attributes related to the accident which can be accessed by the Governor and an authorized officer so they can quickly analyze situations and make decisions where the accident occurred due to significant errors when the driver left the vehicle after passing the road. After looking at the map, the Governor asked to wide along the road. The police

chief on that area then focuses to reduce the next accidents that would be happened by using crash data analysis on the other roads based on GIS (Brush, 1999).

Bob Thomson wrote the statement of the head of the traffic safety bureau who said that, "GIS is a strategic revolution that could potentially improve the effectiveness of employment for police and policy makers in all parts of the State". This potential strategy only needs to be explored more by using the utilization of GIS dynamic maps. The future of GIS to improve efficiency in every job with safety advantages of human life become a potential asset (Roche, 2000).

The previous explanation mentioned showed that how to explore GIS technology in developed countries have started to be considered ranging from about 1 decade ago. It makes the use of GIS technology and the advancement of information systems also used in Indonesia until now, and the most of the people movement use highway.

Geographic Information Systems (GIS)

GIS is a computer-based system that has the ability to handle the data based on the geographic review i.e. data entry, data management, manipulation and data analysis, and the output as the final result (Aronoff, 1989). In another words, (Burrough, 1986), defined GIS (Geographic Information System) as a computer-based system that is used to enter, store, manage, analyze and re-enable data that have the spatial reference for variety of purposes related to mapping and planning system. In the next step, GIS would form and store it in the rational tables at once connecting these elements and their attributes. As such attributes could be accessed through the site map elements, and vice versa map elements could be accessed based on its attributes (Borrough, 1986).

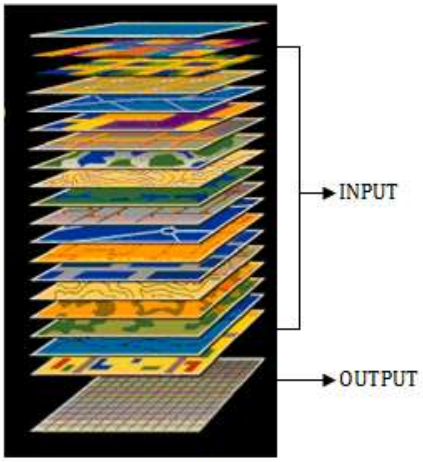

Figure 1. Basic Concept of Opera-Geographic Systems (Dewantoro, 2013)

Mobile GIS for Transportation Applications

Application of GIS for transportation on smart phones are very numerous and very varied. Almost every software maker vendor in the world has a map application that is used for transportation. For example, Google with google map, nokia with ovi maps, and another

similar application. Moreover, the other the basis of application that uses google map which has been developed by the software makers around the world. The software presents the most of view for navigation. Simple features are possessed definite by the application is searching the route from the beginning of the trip and the trip desired destination point.

Trends in the application of GIS for transportation which based on the smart phone is growing more than just finding the location and route simulation. One application of GIS to the latest smart phone is waze application, this application shows how the level of road congestion based on data from waze user community that uses smart devices on their way. Vehicle speed of all members of the community will be a reference of how the level of congestion happened on the road.

GIS for Transportation (GIS - T)

Geographic Information Systems for Transportation/Geographic Information Systems for Transportation (GIS - T) can be the center of a new environmental policy -maker for using land and public transportation by using the appropriate coverage information and integrated based on the location or spatial. GIS - T is a holistic approach that implemented on the complex land use and transportation issues. GIS - T can also be used to reduce the lack of connectivity between analysis and communication, makes great suggestions into public policy analysis such as data selection, model assumption, and formulation of scenarios (By Harvey J. Miller and Shih - Lung Shaw, 2001).

Transportation security systems, including services such as highway traffic safety systems and automatic location detection on the traffic system is a part of the purpose of integration between Geographic Information Systems (GIS) and communications technology to develop this type of transportation services (Souleyrette and Straus, 1999). In this time, there are several types of highway traffic management that are applied in various cities in Indonesia. The implementation of highway traffic management samples are one-way streets, and 3 in 1 or a car with a minimum of three passengers who may pass through a lane. This traffic management have the same goals which are to decompose the road congestion and maximize the function of the road itself so it does not cause such kind of problem such as congestion.

Geographic information system (GIS) for transportation is a system that has the relationship between hardware, software, data, operators, organizations, and institutions to collect, describe, analyze, and communicate various kinds of information about the earth. Types of those information are the transportation system and the region affected by the system (Fletcher, 2000).

Roche in his research on the used of premises GIS spatial data did the analysis of road accidents associated with the bar or place location to drink the alcoholic liquid around the area of the accidents. This linkage was used to analyze the relationship between the effect of alcohol on the driver and his accident level. In addition, besides analyzing the influence of alcohol on the driver and the accident rate, his study also analyzed and presented a map of the accident that occurred at the traffic lights. The map which presented the result was showing the location and number of accidents caused by road users who broke the rules when the traffic lights showed red.

The second analysis conducted by Roche showed how the benefits of spatial data or Geographic Information Systems (GIS) could be used for transportation safety. The following figure showed how maps could be generated with GIS and connected with other phenomena related to accidents or road users. This could be combined with the level of road congestion, where accidents tend to affect the congestion.

METHODOLOGY

This study used multiple stages of research. The first stage of the study consisted of an overview or learns how existing applications were conducted. Based on the results of the study, it should be found the benefits and weaknesses. The next step was to formulate the goal of optimizing the application and how the procedures suggested in the optimization of the application.

Tool and Material

The tool which used in this research was the smart phone software. Application mapping or Geographic Information Systems (GIS) for Android-based smart phones. This software was used to perform the state of the data visualization with spatial data. This visualization generated a map that showed the appearance of spatial volume.

Material used in this study was based on android smart phone device that is used for the software overview. On other operating systems were also available for third-party applications could be used in android application usage, but this was not done by considering various things. The first consideration was the computer desktop would be different with the cell phone, the next was different speed of internet connection, and the last one was the difference in hardware capabilities on computer desktop and mobile phone.

The flows of Research

The flow of research started from examining how the ability of MoT GIS applications applied on the smart phone. Application performance when it ran on smart devices had become important factors for the users. The information contained and could be accessed by the users so it makes an application could be judged freely as the good or bad application by the user. The application of MoT GIS is an application which managed by the Ministry of Transportation should be a standard application benchmark with a level of good information.

The research was not done to create or modify the MoT GIS software. This study only used to conduct to analyze the application on the real life. The results of the study would be the material to formulate suggestions and advices in the operational management. Management suggestions could be made using the data and how the group or organization who would be involved. Operationally suggestion was how the technical process the data so the application could be said to be better and more optimized so that the benefit of users

can be done in the next study. This study was limited to providing advices as input, do not fix or change the application of the research object.

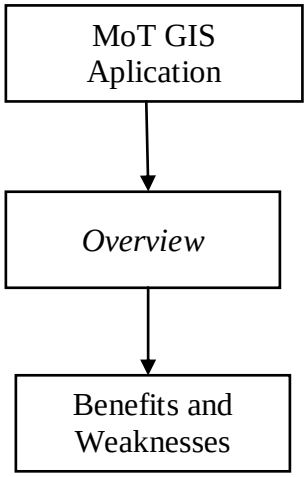

Figure 2. Flowchart of the Study

RESULT AND DISCUSSION

MoT GIS Application Overview

Applications that would be assessed in this study was MoT GIS application that was downloaded freely on Google Play Store. This application was capable and acceptable in all android based smart phones. It could be downloaded for free and could be used by all android smart phones users. Though this application was downloaded for free, but not all the features could be used by the users. Application of smart phones usually had limited features in the free version and the full-featured for paid version also it was displayed in the list of applications with two different types, usually distinguished by the words "free" and "pro".

The difference between this application with other application on the smart phone features is in the use of feature. Application of MoT GIS only has one on the list of applications and there is no paid application at all. The differences features found only after the users start using the application. The users who want to use all the features of the application have to register as the administrator of that application. It means that the regulation required by application developers which this application is an application made by a legal institution that is the Ministry of Transportation.

Figure 3. The Basic View MoT GIS for Android Application

Figure 3 showed how the basic display applications showing a logo tab of the Ministry of Transportation and entrance application. This showed that the application was managed and developed by the Ministry of Transportation as the Indonesian government legal agency.

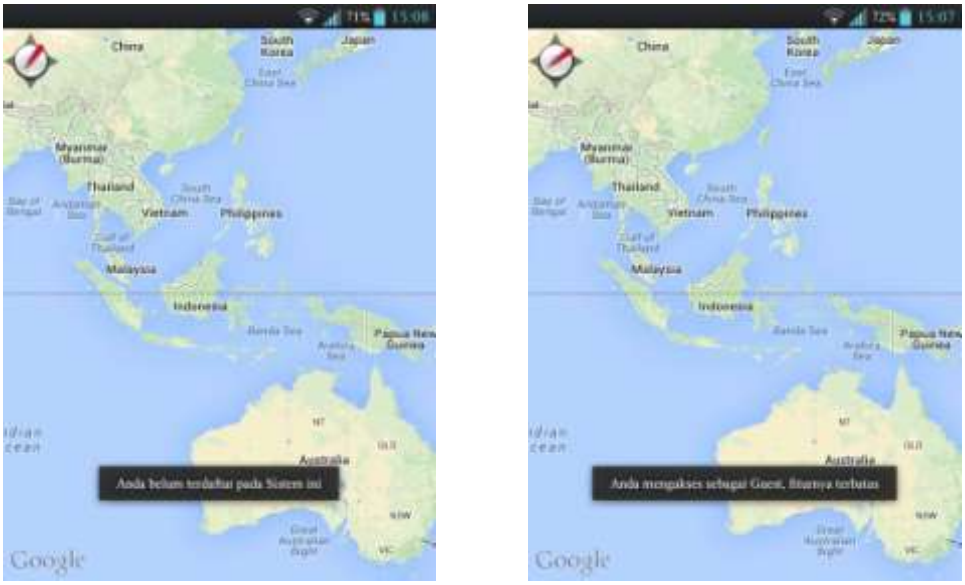

Figure 4. The display after Login to the Application

Figure 4 presented the information after the user entered the application. From the pictures displayed known that the application presented the information for the user who had not registered on the system and the user's information accessed as a guest user. This showed a pretty good security system in which users would enjoy the full range of features to go through the procedures specified by the application developer.

Figure 5. The Display Features Application

Figure 5 was presenting the information about some of the features that could be utilized by the user. There were search, direction, layer, my location, and import KML. Most were the standard features were becoming common in the use of map navigation application on smart phone devices, a feature that looked different was layer arrangement and import KML which requires users registered in advance.

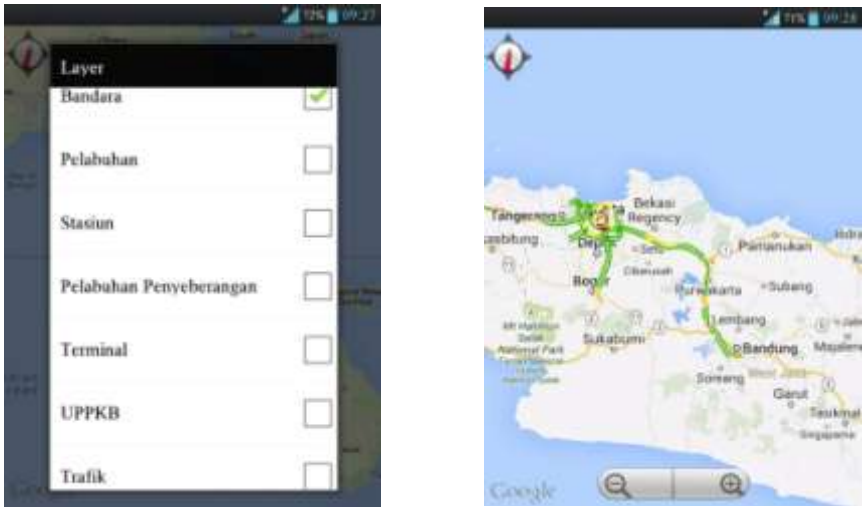

Figure 6. User Applications Features Display As Guest

Figure 6 would show a feature after entering into the layer feature. There were several layer options that could be displayed. Choosing a background map used in the form of a map or image was a basic feature. Based on the application usage as a guest, which features could be used only limit to the traffic. It provided information about the state of the traffic volume or the road density. Unfortunately, there is only limited information about the traffic information along the condition of Jakarta and Jakarta-Bandung toll.

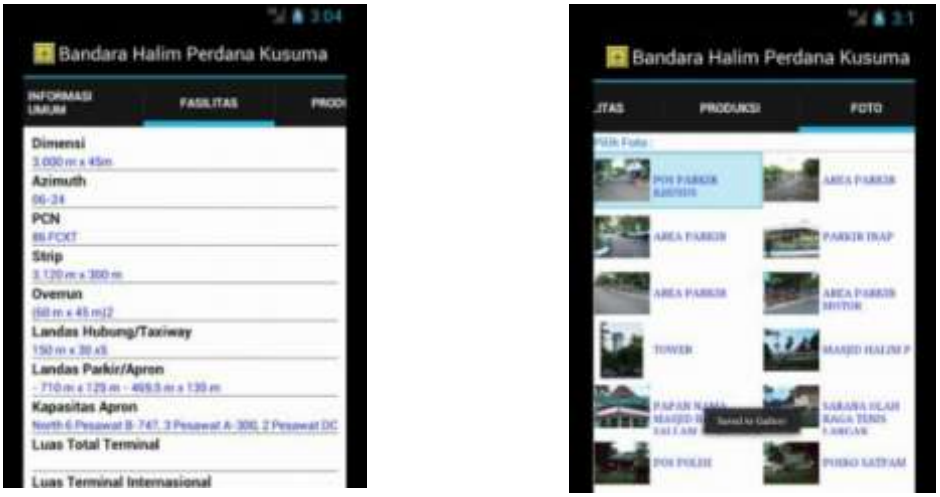

Figure 7. Display Features as the Registered User Applications

Figure 7 as the view of the application fiture before the user downloading the specific application items.The views contained in the center of application offered to the application users. There was information that was presented in the form of the existing infrastructure at the Halim Perdana Kusumah airport. The information displayed was very interesting and complete, however this application was only proven by the registered users and vice versa.

Discussion of the Application (Guest Version)

MoT GIS application was studied in this research was a very interesting application. This became an interesting application developed by the Ministry of Transportation due to an official ministry who had the authority to provide information on the nexus and transportation. The information that would be used automatically provided clearer and more specific. It shown by there was the display of application of existing transport infrastructure in Indonesia.

The interesting feature when a user would download the application. Information shown in Figure 7 after users downloading the application, users obtained the information that the user was not registered, the user only as a guest. The feature as a guest was presented was very limited. Features that appear when pre- downloaded could not be accessed by users. The interesting features for the user were layer and import KML also could not be accessed by users who had not registered.

The information was presented to users who had not registered only a limited traffic information. Ironically it could be used only for users in the Jakarta and Jakarta to Bandung toll road users. It should be added on traffic information in other areas so that the information can be used more widely. The additional information should be made to maximize the use and utilization of the application. If there were only the features of traffic that could be presented to the user who had not registered, then it should be better to give more information about specific and various roads that informed to the users. It could

combine this study with the previous research conducted by the authors. Information on the volume of traffic in Tegal, Central Java.

Figure 6. Traffic of Tegal Map in Year of 2012 (Dewantoro , 2013)

The map showed the traffic information in Tegal. If there was only information about the traffic that could be accessed by users who had not registered, so it required more complete data traffic information. The existence of transportation agencies in all regions in Indonesia could be the data suppliers that presented in the application. Besides the transportation agencies in Indonesia, there were other institutions that observed the information about traffic as the data supporters. NTMC POLRI or The National Traffic Management Centre was owned by the Indonesian police agencies. They were be an ideal collaboration to support the data traffic in Indonesia.

NTMC POLRI used cameras in the field to obtain information about the traffic situation in various regions in Indonesia. NTMC supported by the RTMC (Regional Traffic Management Center) located in different regions of Indonesia. The information obtained from the RTMC and NTMC could be used as the data presented in the application of MoT GIS, besides the general information from the minister of transportation in Indonesian local area.So, the completed data dan the easy access in this aplication system can be used as a good source for the users especially focusd on the safety transportation.

CONCLUSION AND RECOMMENDATION

This study presents an overview of information about the software applications based on the android that assessed by the smart phone. The application shows how information is presented when the users have not downloaded that application is difference with the users who can downloaded the application. The overview of the application when the users have not downloaded the application shows information about the complete infrastructure of transportation in Indonesia, in this case it is the airport. Such information is also presented in the description of the application, but it does not distinguish about the information that can be accessed by users who registered and unregistered.

This application is an application based on the vendors that emphasized to provide information about infrastructure of transportation. Information about infrastructure can be seen only for users who registered in the system. The information can be used by users who have not registered only information about traffic. The traffic which is presented in this application only limit to DKI Jakarta and Jakarta to Bandung toll. This makes the description of the interesting application overview for the users does not match to the expectations of the application users. The suggestion to this application is to add the traffic information that can be accessed by users who have not registered with the maximum area of wider traffic information.

Users feel interested in using the application because it is an application developed by a legal institution, namely the Ministry of Transportation. This makes the application has high expectations, standards are maintained an accurate information. So, it is better if in the beginning of launching it should be made clear information about the features that can be used for the user as a "guest" and the registered users, and the clear requirements for users who want to be registered on the system.

The Further Study

Additional studies are expected to provide more detailed feedback based on this research. This study was only limited to the overview of the software application, which aimed to find out the advantages and disadvantages of the application of the users, in case of the users out of developers who were not registered in the system. The next application can provide input how information management can be applied to applications and developers. Management of the design can be done by using the flow of data and how groups or organizations who will be involved. Last but not least, the operational suggestion is how technical data processing so that the applications can bemaximally used in the implementation as the facility for making the Indoensian transport users easy to acces.

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