Prototype Design of Android Based Bus Maintenance System in PT. Sumber Jaya Trans Tangerang

Fifit Alfiah[1], Turki Salim[2], Syihabudin Alawi[3] and Yudi Sulaeman[4]

[1,2,3]Faculty Of Informatics Engineering, Raharja University, Tangerang, Indonesia
[4]Faculty Of Computer System, Raharja University, Tangerang, Indonesia
* syihabudin.alawi@raharja.info

Abstract - Tourism transportation companies such as the Sumber Jaya Trans bus are a means used to facilitate an agency or company in conducting tourism trips. With the use of a means of transportation, maintenance is definitely needed for the continued use of the vehicle in the long term. At PT. Sumber Jaya Trans Tangerang has a problem, namely regarding the reporting of vehicle maintenance data that still uses the web, mechanics who have repaired bus vehicles fill out maintenance reports on a web so that it takes a very long time. With the existing problems, the authors propose an Android-based bus maintenance system. Using the PIECES analysis method. The system design uses object-oriented analysis method with Unified Modeling Language (UML), programming language for Web Service using PHP with Laravel framework, programming language for Android using Dart with Flutter framework. Android was chosen because of its popularity among Indonesians as a mobile operating system capable of replacing computer jobs. Therefore we need an Android-based system that can assist in reporting vehicle maintenance data to make it more effective and efficient.

Index of Terms — **Android Bus Maintenance System, tour bus, Flutter, Android.**

I. INTRODUCTION

The development of science and information technology is currently growing rapidly, making information have an important role in efforts to create progress in all areas of human life [1]. The presence of computers provides many benefits for humans in completing jobs - both light and complex jobs. Mobile technology has become a very basic need for humans because mobile can lighten human jobs. With the development of mobile technology today, people are required to open their horizons and master current technology.

The existence of mobile is very helpful in solving problems, especially in terms of data processing. The use of mobile can also be used as a tool to achieve goals and find convenience in carrying out a work process, especially those involving a lot of data and parties. Almost all agencies, both public and private, use the mobile system, even small and medium enterprises have taken advantage of the mobile system.

The data processing system implemented at PT. Sumber Jaya Trans Tangerang, who still uses this web system, is still not optimal, because it still uses the web system to send

damage reports to vehicles when mechanics manage data and damage information which takes a long time for superiors to see / check data. Therefore, it takes a software design or software that compiles and summarizes the amount of data that is easily accessible to support the performance of the related mechanics [2].

At PT. Sumber Jaya Trans Tangerang has problems, namely regarding the management of vehicle maintenance data that still uses the web, mechanics who have repaired bus vehicles fill out a maintenance report on a web where so much data must be written, starting from vehicle engine maintenance data such as vehicle parts, engine maintenance tune-ups, checking vehicle interiors, from benches to windows, and bus cleanliness, to checking vehicle exteriors, such as vehicle bodyparts, are less effective and efficient.

II. RESEARCH METHODS

A. Throw Away

The method used in this research is the Throw - Away Prototype method. The stages in this method consist of planning, analysis, design and implementation. At the stage of Analysis, Design and Implementation [3,4], a looping process occurs, namely at the time of making the prototype.

In the analysis stage, a condition occurs where the prototype is checked whether it is sufficient for the system to be built or not. If not, the looping process is repeated to recreate the prototype [5]. If it is deemed appropriate, then proceed with designing the final system. A dashed line upwards in the image indicates that the process is not allowed to go back to the previous process.
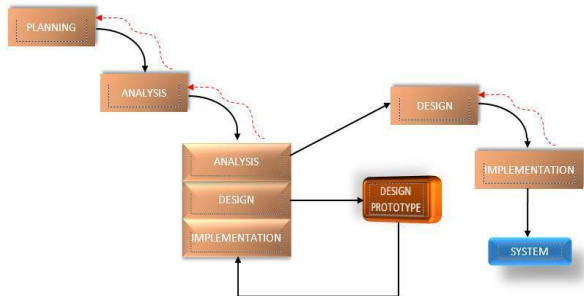

Fig 1. Throw-Away Prototype

B. *Literature Review*

1. Christine Dewi and Kumala Nindya Pramono in JNTETI Journal, Vol. 4, No. 4, November 2015. This research entitled "Pembuatan Aplikasi Pencatatan Service Mobil di PT. Armada Internasional Motor Berbasis Android Platform", in the form of: ineffective registration of new customers for new services because with desktop-based applications the customer has to come to the office first, he does not know directly the need for service data and a Workshop Work Order by the Team Head or Checker because he is in desktop system located in the office, as well as the Service Advisor (SA) cannot know immediately if the service is complete because the Checker has to notify the SA manually. From these problems, a portable and efficient recording system with mobile technology is needed. The result of this research is a car service recording application for SA and Checker. This car service recording system uses Google Cloud Messaging (GCM) technology to make it easier to send notifications to SAs and Checkers[6].

2. Arief Budiman and Joko Triono in Journal Ilmiah Ilmu – ilmu Teknik Volume 1 Number 1 March 2016. This research is entitled "Sistem Parkir Kendaraan Bermotor Berbasis Android", in the form of: Applications developed using the waterfall methodology and implemented in smartphones with the Android operating system, and utilize QR Code technology to read parking input data [7].

3. Research conducted by Riyan Hidayatullah (2017) entitled "Perancangan Dan Implementasi Aplikasi Service Kendaraan Sepeda Motor Berbasis Android (Studi Kasus : Bengkel Honda AHASS Subur Motor Jakarta)", in the form of: an android-based software that deals with periodic maintenance administration. motor vehicle. This software has features that can assist users or motorized vehicle owners in carrying out the administrative process at authorized motorized vehicle repair shops. This software will provide features to make booking services that make users or motorized vehicle owners do not need to queue first to carry out periodic maintenance. In addition, in this software, users or motorized vehicle owners can view the history of periodic maintenance of registered motor vehicles. With this software, it is hoped that it can facilitate the administrative process at the official motor vehicle repair shop. In addition, it is also hoped that this software can make it easier for official motor vehicle workshops to collect data on consumers who carry out periodic maintenance at these official workshops[8].

4. Research conducted by Deryan Thimoti Yudianto, Agustinus Noertjahyana and Justinus Andjarwirawan in the Journal of Infra Vol. 5, No. 1 2017. This research is entitled "Pembuatan Aplikasi Manajemen Kendaraan Berbasis Android", in the form of: This application was created using the Java programming language and using the Android Studio application. The appearance of this application uses Material Design. The Backup and Restore feature uses Google Drive and Dropbox as online storage. The Reminder feature uses Google Calendar as a medium for recording events. The end result of this application is that application users can monitor their expenses on vehicle use. In addition, application users can also store data on online storage without having to pay first[9].

5. The research was conducted by Alam Rahmatullah, Heni Sulastri and Rizal Nugroho in JNTETI Journal, Vol. 7, No. 2, May 2018. This research is entitled "Keamanan RESTful Web Service Menggunakan JSON Web Token (JWT) HMAC SHA-512", in the form of: Currently Web Service (WS) is a solution in system integration because regardless of platform, architecture or programming language. used by different sources. However, in WS, the existing security is still lacking. The implementation of JSON Web Token (JWT) on WS is very influential in terms of data security. JWT is an authentication mechanism in WS, but the implementation of standard JWT with HMAC SHA-256 algorithm is still not optimal, so this paper discusses JWT security optimization with HMAC SHA-512 algorithm, which according to some research this algorithm will be better than SHA-256 if compiled on 64-bit architecture. The results showed that using SHA-512 resulted in 1% better time compared to SHA-256. However, in terms of the size of the token produced, SHA-512 is 2% larger than SHA-256. The table is displayed clearly (not in the form of a picture) with the title above the table. The source table can be listed at the bottom of the table aligned to the left with 11pt font size. Table numbering starts from number 1 onwards[10].

III. SIMULATION RESULT AND DISCUSSION

A. PIECES analysis

To identify problems, an analysis of performance, information, economy, application security, efficiency and services must be carried out. This guide is known as PIECES (Performance, Information, Economy, Control, Efficiency, Services) Analysis. From this analysis, usually what appears is not the main problem, but only the symptoms of the main problem.

1. Performance

Performance problems occur when the business tasks that are carried out do not achieve the goals, namely:

a) The maintenance report process is carried out using the web.

b) Requires a long time in inputting data.

c) Inefficient and ineffective because you have to use a computer to open the web.

2. Information

Information is a crucial commodity for end users. Evaluation of the ability of information systems to produce useful information needs to be done to address opportunities and deal with problems that arise. In this case, increasing the quality of information does not increase the amount of information, because too much information will create new problems. Situations that require increased information such as:

a) The accuracy of the information provided because only managers can see it after inputting the data.

3. Economy

Economic reasons are perhaps the most common motivation for a project. Economic and opportunity issues are related to cost issues. The things that need to be considered are as follows:

a) The costs required to use the web such as the hardware.

4. Control

Control analysis is used to determine the performance of the system based on the ease and accuracy of the data being processed and is very necessary to maintain the confidentiality of data in the system.

a) The absence of system control so that it cannot detect errors that occur in the process.

5. Efficiency

The following are indications that a system can be said to be inefficient:

a) It still takes a long time to generate maintenance reports.

b) Based on the current system, maintenance reports are still using the web so that it is not efficient.

6. Services

The following are some of the assessment criteria where the quality of a system can be said to be poor:

a) Requires a lot of system changes, namely changing the web system to an Android system, especially in the bus vehicle maintenance system.

B. Application design
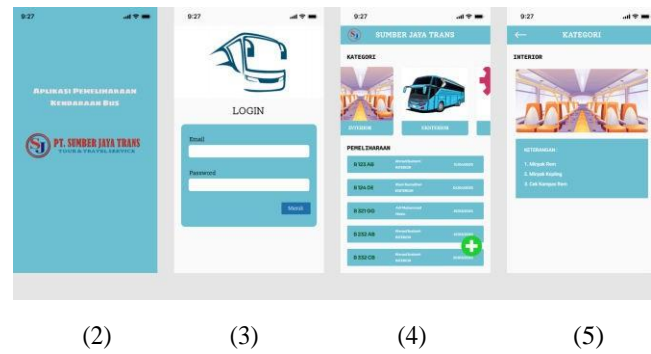

(2)   (3)   (4)   (5)

Fig. 2 - 5 Application design

1. Fig 2 (Splashscreen page)

The Fig 2 shows the splashscreen page display, there is a logo and name of the Bus Vehicle Maintenance Application.

2. Fig 3 (Login page)

The Fig above shows the login page display, where the mechanic must enter the email and password first in order to use this Bus Vehicle Maintenance Application.

3. Fig 4 (Homepage)

The Fig above shows the main view of the Bus Vehicle Maintenance application. There is a Maintenance Category menu, a list of buses that have been repaired and a menu to add bus maintenance data.

4. Fig 5 (Category page)

The Fig above shows a category view, there is a description according to the bus vehicle maintenance category.

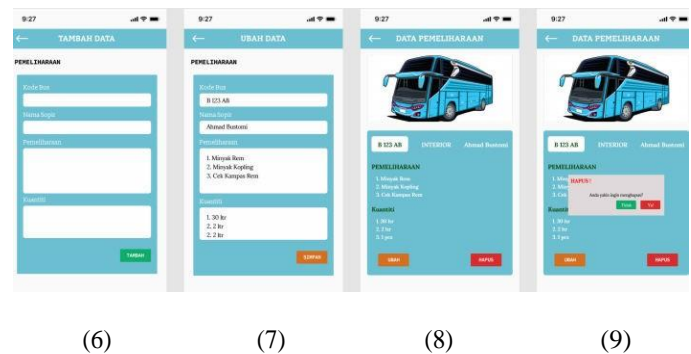

(6)   (7)   (8)   (9)

Fig. 6 - 9 Application design

5. Fig 6 (Add Maintenance Data page)

The Fig 6 Add maintenance data page to add maintenance data. It must be filled with bus code, driver name, repair and quantity.

6. Fig 7 (Maintenance Data Edit page)

The Fig above shows the display of the maintenance data edit page so that it can change the bus maintenance data.

7. Fig 8 (Maintenance Data page)

The Fig above displays bus maintenance data, such as bus code, driver name, any repairs and their

quantity.

8. Fig 9 (Delete Maintenance Data page)

The Fig above shows the display of the clear maintenance data page so that it can delete the bus maintenance data.

IV. CONCLUSION

With the creation of this Bus Vehicle Maintenance Application, it will make it easier for mechanics to report bus vehicle maintenance data. Because it can be accessed easily via an Android smartphone and it doesn't take long to input bus maintenance data. Of course this application will greatly help bus companies to be able to control the condition of each bus, so that in the Industrial 4.0 era, all parties will also enjoy the impact.

The application created is of course not completely perfect but it has gone through the trial and error stages so that if it is further developed by further research.

In future research, it is hoped that this application can be further developed and applied more widely so that it can conduct further surveys if there are deficiencies in this application and research, therefore researchers really hope this application is used and tested on several bus pools.

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