International Journal of Computer Applications Technology and Research
Volume 8–Issue 09, 348-352, 2019, ISSN:-2319–8656

The “Promotion” and “Call for Service” Features in the Android-Based Motorcycle Repair Shop Marketplace

Ketut Wahyu Kartika Nugraha
Department of Information Technology
Faculty of Engineering
Udayana University
Badung, Bali, Indonesia

I Made Sukarsa
Department of Information Technology
Faculty of Engineering
Udayana University
Badung, Bali, Indonesia

Ni Putu Sutramiani
Department of Information Technology
Faculty of Engineering
Udayana University
Badung, Bali, Indonesia

Abstract: The existence of the motorcycle repair shop business continues to grow, along with the developments of motorcycle riders in Indonesia. However, the majority of riders do not know the existence of the repair shop, especially in the remote location or in the area where they have never visited before. This problem can make that business do not last long. The Motorcycle Repair Shop Information System Application is useful for answering problems related to motorcycle repair shops. "Call for Service" and "Promotion" are two main features of the application which implement E-CRM. The "Call for Service" feature is used to make emergency calls to the nearest repair shop if there is an unexpected situation on the road. The "Promotion" feature is used as a medium to attract as many customers as possible and to increase customer loyalty by providing attractive promotions to the application users. The implementation process uses computers with React Native software, SQLyog, XAMPP, Visual Studio Code and Android smartphones. The Black Box Test in the application reveals that the users can use the “Call for Service” and “Promotion” features from it. The results of data development analysis in the application shows that it only requires a storage space of 73,746 MegaBytes within a year, if there are 25 new data every day.

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Keywords: E-CRM; mobile application; emergency call; promotion; customer loyalty.

1. INTRODUCTION

The development of motorcycle riders throughout Indonesia has increased by an average of 7.5 million vehicles per year, calculated from 2010 to 2017 [1]. The developing use of motorcycle in Indonesia has opened up opportunities to open repair shop businesses in both small and medium-sized businesses. Motorcycle riders are often faced with difficult situations, for example, sudden flat tire, the engine is not starting, sudden breakdown and so on. The riders are usually not aware of the existence of the nearest small repair shop business. The lack of promotion media for that business also makes it possible that their business will not last long.

The solution created is in the form of an Android-based Motorcycle Repair Shop Information System application aimed at motorcycle riders, and to the owners of the repair shop. The application feature "Call for Service" is intended to overcome the problems experienced by the riders in emergency situations, and the "Promotion" feature will help the repair shop owners to attract as many customers as possible. Both of these features are the implementation of E-CRM in the application in order to maintain good relations between the repair shops and the users of the Android application.

2. LITERATURE REVIEW

A research conducted by Amrapali Dabhade, K.V. Kale and Yogesh Gedam discussed an application that can determine the closest direction to a hospital. The study was used as a reference in the “Call for Service” feature on the Motorcycle Repair Shop application to find the shortest route to a motorcycle rider [2].

A research conducted by Mwangala Mwiya, Jackson Phiri and Gift Lyoko performed a similar study of using GIS (Geographic Information System) technology to report criminal acts to the Zambian police. The research was used in implementing the “Call for Service” feature in the application to provide the location of the user's position [3].

A research conducted by Trinh Le Tan explains the success factor of implementing E-CRM in e-commerce companies. The study was used as a reference for implementing E-CRM on the promotional features contained in the application [4].

3. RESEARCH METHODS

There are four steps in conducting the research. The first one is analyzing the needs from both of the repair shop and the customer. The analysis step is carried out to determine the design of the application, therefore it can answer the needs of both parties. The second step is designing the system workflow. The design of it is done in order to know if the system can perform according to the procedures that have been specified. The third step is to create a system, for both an Android application and a web service which aimed at the admin in managing data. The fourth step is testing the system. The application that have been made will be tested to find out the errors contained in the system, and if there are many errors or malfunctions in the system, a redesign of the workflow will be done to fix the system errors.

3.1 General Overview of the System

The research applications for Android-based Motorcycle Repair Shop Information Systems have a general overview that can be seen in Figure1.

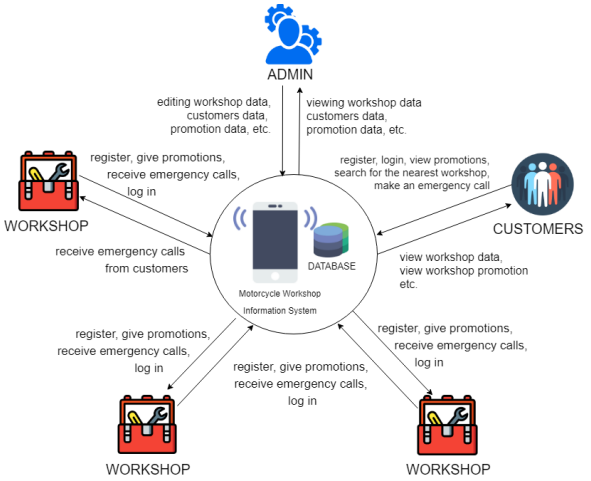


Figure. 1 General Overview of the System

The Motorbike Repair Shop Information System is connected to the database whose data is managed by the admin. These data as if motorcycle repair data, application user data, motorcycle repair shop location data, transaction data and so on. The customer of the application can use it to register as a user, log in to the application, search for the nearest repair shop, view data of all the repair shop, call a repair shop technician using the "Call for Service" feature by using the help of Geographic Information System (GIS), view promotions on the applications and so on. The repair shop can use this application to register their business into the application, login and see the emergency call notifications sent from users, giving promotions and others. The user and the repair shop are connected with the application by using the help of geographic information systems (GIS) mapping.

4. CONCEPTS AND THEORIES

This section contains concepts and theories that support in conducting the research. They are including Android, GIS (Geographic Information System), Google Maps API, Customer Loyalty and E-CRM. It will be discussed as follows.

4.1 Android

Android is a Linux-based operating system used for cellular phones (mobile) such as smartphones and tablet computers (PDAs). It provides an open platform for developers to create their own applications that are used by various mobile devices [5]. Its appearance on March 9th, 2009 introduces an Android version 1.1 and up to the last version 9.0 Pie that has been produced in 2018. Android has been used in everyday life, and moves into all areas of life. It can facilitate transaction activities, for example, in the culinary field, a transaction in a restaurant can now be done only from an Android Smartphone [6]. Game Explore Bali is an application that is engaged in education to educate children about culture in Bali [7].

4.2 GIS (Geographic Information System)

GIS (Geographic Information System) or in Indonesian Language called as *Sistem Informasi Georafis* is an information system that is designed to work by using data that has spatial information (spatial reference). It works by capturing, checking, integrating, manipulating, analyzing, and displaying data that spatially refer to the condition of the earth. The main function of GIS is to conduct spatial data analysis. From the point of view of geographic data processing, GIS is not a new invention. The geographic data processing has been carried out a long time ago by various fields of science, the only difference is that from the use of digital data [8].

4.3 Google Maps API

Google Maps provides an API, it is a provider of digital map services that are popular nowadays. The Google Maps API can be implemented on a web or on an Android / iOS application and provides a map service that can display real images of the earth from satellites, provides a navigation system for travel routes and to find registered places such as business places, recreation areas and so on [9]. The map and navigation system on Google Maps has begun to be developed in the form of augmented reality. The use of augmented reality is intended, therefore the users can improve their driving safety because they can still see the road with a smartphone camera while using maps to navigate routes [10].

4.4 Customer Loyalty

Customer Loyalty or *Loyalitas Pelanggan* is the desire of customers to continue their relationship with a particular company for a long time, it is because the loyal customers are those who buy goods / services of the company from time to time. Loyalty can be interpreted as a customer's desire; a willingness to be a regular customer for a long time; buy and use goods from the selected company and recommending them to friends and colleagues. It is an evidence of the consumers who are always becoming customers, who have the strength and positive attitude towards the company. Each of the customers has a different basis of the loyalty and it depends on their perspective views [11].

4.5 E-CRM

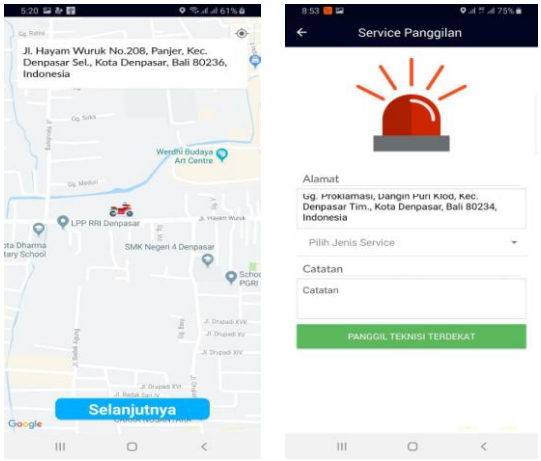
E-CRM is a CRM (Customer Relationship Management) which is implemented electronically by using a web browser, internet, and other electronic media such as e-mail, call centers, and personalization. It is a technique for the companies which is done by online to strengthen the relationship between the company and its customers, where it aims to increase customer satisfaction and gain loyalty from consumers. Also, it has a definition of using digital communication technology to maximize customer sales and encourage the use of online services [12].

5. RESULT AND DISCUSSION

The results and discussion of the Motorcycle Repair Shop Information System application contains the results of testing the system directly, the results of Black Box testing and the results of the analysis of data development. These three results will be discussed as follows.

5.1 System Testing

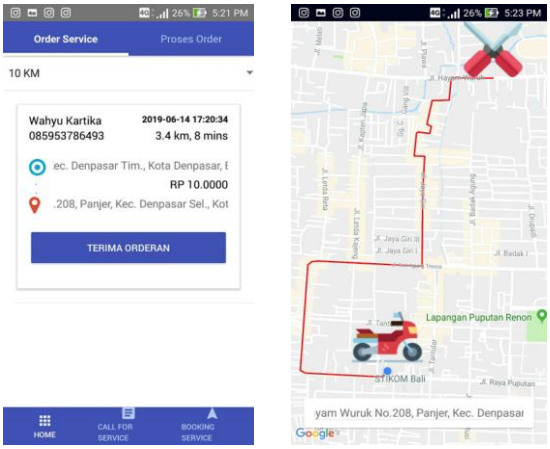
The customer can make emergency calls to nearby repair shops, and the repair shop can also receive emergency calls made by the application user. Testing this system is done directly by using the Motorcycle Repair Shop Information System application. The call from the customer to the nearest repair shop, is displayed in Figure 2.



(a) (b)

Figure. 2 "Call For Service" Feature

Figure 2 shows the step of selecting a customer's location before making an emergency call from the customer's application. This location selection is intended in order to be more accurate towards the customer location. Figure 2(a) is the step of displaying a map in order to select the location of the customers when making emergency calls. In Figure 2(b), the customer is asked to choose one type of the damage and can include notes for the repair shop technician. The display of "Call for Service" from the repair shop application point of view is displayed in Figure 3.



(a) (b)

Figure. 3 "Call for Service" Feature

Figure 3(a) is a display of incoming emergency calls from the repair shop's application. The repair shop can receive the call by pressing the "*TERIMA ORDERAN*" button, or ignore the call if they do not want to receive it. Figure 3(b) is a navigation display of directions to the customer's location who make emergency calls. A research conducted by Yuli Fauziah, Heru Cahya Rustamaji and Rihadina Ramadhan created an application that can predict the arrival of Trans Jogja buses by broadcasting locations to passengers, therefore the estimated arrival time can be predicted [13]. A research conducted by Made Yudha Putra Mahendra, I Nyoman Piarsa and Dwi Putra Githa produced a public complaint application by using the Geographic Information System to record the location of a complaint, and the admin could read all the community complaints and find out the location of it [14]. Both of the studies are used as references to predict the mechanic's arrival time to the customer and to find out the customer's location in the Motorcycle Repair Shop Information System application.

5.2 Black Box Testing Analysis

The black box testing or referred as functional testing, is a testing technique regarding to the function of a system based on a particular test case. The people who perform black box testing do not have direct access to the application source code, but they only focus on the output produced as a response to the input chosen by the examiner and the execution conditions of the system [14]. The table of black box testing can be seen in Table 1.

Table 1. Black Box Testing Analysis

Testing Activity	The Expected Realization	Testing Result	Result
Adding repair shop promotions	The added promotion data successfully appears in the repair shop's application promotion menu	New promotion data has been successfully added and appears in the repair shop's application	[x] Accepted [ ] Rejected
Changing repair shop promotion data	The promotion data successfully changed in the repair shop's application	The repair shop promotion data successfully changed	[x] Accepted [ ] Rejected
Removing repair shop promotion	The promotion data that want to be deleted, successfully deleted in the application promotion menu	The deleted promotion data is disappear from the promotion menu in the repair shop's application	[x] Accepted [ ] Rejected
Looking at a list of repair shops that have promotions from customer's applications	The repair shops that have promotions are marked with a green indicator which means "Promotion"	There is an indicator in green which means "Promotion" at a repair shop that has a promotion	[x] Accepted [ ] Rejected
Spotting promotions from the Promotions menu through the customer's application	An added list of promotion provided by repair shop to their application appears	A list of promotion data provided by the repair shop appears	[x] Accepted [ ] Rejected
Booking a service from certain promotions	The customers successfully book a	The booking service was successfully made, but	[x] Accepted

	service with certain promotions	the promotion calendar system has not functioned properly	[ ] Rejected
Making an emergency call to the nearest technician through the customer's application	The customers can choose their location, fill out a complaint about their vehicles and find the nearest repair shop from their locations.	The customer successfully chooses their location, includes their complaints and makes an emergency call.	[x] Accepted [ ] Rejected
Receiving emergency calls from customers through repair shop's application	The technicians can notice emergency calls from the customers and can receive them.	The technicians successfully see the emergency call from the customers and successfully receive it.	[x] Accepted [ ] Rejected
Reviewing the list of emergency calls from the repair shop's application	The repair shop can see all of the received emergency calls, along with the status of the call.	The repair shop can see all of the received emergency calls, but cannot see the status of that call.	[x] Accepted [ ] Rejected
Navigating the customer's location from the repair shop's application	The technicians can navigate the direction of customer locations through digital maps.	The technicians can navigate the direction of customer's location in a digital map.	[x] Accepted [ ] Rejected
Tracking the location of the technician from the customer's application	The customer can monitor the presence of the technician who receives emergency calls that has been made in real-time.	The customer cannot monitor the presence of the technician.	[x] Accepted [ ] Rejected
Looking at an emergency call transaction history from the customer's application.	The customer can see an emergency call transaction history that has been made, along with the total price charged.	The customer cannot see an emergency call transaction history that has been made.	[x] Accepted [ ] Rejected
Looking at an emergency call transaction history from the repair shop's application.	The repair shop can see an emergency call transaction history that has been received, and show the services that they have performed, along with the total price charged.	The repair shop can see a history list of emergency call transactions that has been received, but cannot see the services that they have performed, along with the total price charged.	[x] Accepted [ ] Rejected

The black box test results in Table 1 indicates that the repair shop can create a new promotion data that will be provided to the customers. They can change the promotion data that already exists in their promotion data. Also, they can delete it in the menu from their application. The customer can see a list of the repair shop that provides promotion from their application, both from the repair shop list menu or when they book a service in the booking menu. They can see various promotion lists that appear in the Promotions menu from their application. In addition, they can directly order services based on the certain promotions on the Promotion menu. The customer can make an emergency call to the nearest repair shop technician and track them. The transaction history of an emergency call also can be seen by the customer. The repair shop can receive an emergency call from the customer and navigate the direction to their location through the digital maps. They also can see the status and the history of the received emergency call.

5.3 Data Growth Analysis

This section will tell an explanation of the estimated system data storage space requirements in the database. That estimations are used to predict the database's ability to store data. The analysis is done by calculating the type of storage space requirements based on the data of each table which is required on the system. The tables in the Motorcycle Repair Shop Information System database are classified into 2 groups, such as the Transaction Table and the Master Table. The analysis of data growth from both of the groups can be seen in Table 2.

Table 2. Data Growth Analysis

		Master Table	Transaction Table
The Number of Table		4	8
1 Row Data Storage Requirement (*Kilo Bytes*)		2	8,849
The Amount of Data Per Day		25	25
The Estimated Storage Space Requirement (*Kilo Bytes*)	1 Day	55	221,225
	30 Days	1.652,25	6.636,75
	365 Days	20.102,39	73.746,133

Table 2 shows an analysis of data growth from the Master Table and Transaction Table groups, with the assumption there are 25 data per day. The results reveal that the Master Table requires a storage space of 55 kilobytes for a day; 1,652.25 kilobytes for 30 days; and 20,102.39 kilobytes for 365 days. In other hand, the Transaction Table requires storage space of 221,225 kilobytes for a day; 6,636.75 kilobytes for 30 days; and 73,746,133 kilobytes for 365 days.

6. CONCLUSION

The Motorcycle Repair Shop Information System Application is an Android-based marketplace application that aims to improve the economic level of repair shop business, and help the riders in everywhere and at any time by implementing E-CRM on the "Call for Service" feature through the application. The Black Box Testing in the application shows that the user can use the "Call For Service" feature, and reveals that the application has successfully implemented E-CRM in that feature in order to make an emergency call. In testing data development analysis, it shows that the Motor Repair Shop Information System application only requires a storage space of 73,746,133 kiloBytes (73,746 MegaBytes) for 365 days, if it is assumed that there are 25 new data per day. In the future, the application can still be developed both in terms of display and new features, such as a "live chat" feature with the mechanics when the customers use the "Call for Service" feature in order to make it easier to communicate with both parties.

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