



Faculty of Computer Science and Information Technology

Android-based Mobile Application Roadside Assistance App (Road-Go)

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Bachelor of Computer Science with Honors (Multimedia Computing)

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Android-based Mobile Application Roadside Assistance App (Road-Go)

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This project is submitted in partial fulfillment of the
requirements for the degree of Bachelor of Computer
Science with Honors

Faculty of Computer Science and Information Technology
UNIVERSITI MALAYSIA SARAWAK 2019

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ABSTRACT

Roadside assistance is a very vital issues and considered as one of the most needed emergency road services among the road users. Typically when a vehicle breaks down, users will seek for a phone call help. They may call their family members or closest friends or even the service center to assist the break down. The biggest concern in this issue is the service required and location. In emergency case, it is important to be able to know the location of the breakdown site and the type of service needed to assist. This is to reduce time consuming looking for the right person to deliver the assistance. Therefore, Road-Go is proposed with emphasizing this two elements where it is expected to help in time efficiency upon request a service.

ABSTRAK

Bantuan jalan raya merupakan antara isu penting dan dianggap sebagai salah satu bantuan kecemasan yang paling diperlukan bagi pengguna jalan raya. Kebiasaannya, apabila sesebuah kenderaan rosak, pemandu lebih gemar mendapatkan bantuan melalui panggilan telefon. Mereka akan menelefon ahli keluarga, rakan terdekat mahupun pusat servis kereta untuk membantu dalam hal kerosakan tersebut. Isu yang perlu dititik beratkan dalam hal ini adalah berkenaan dengan jenis servis yang diperlukan dan lokasi kejadian. Di dalam kes kecemasan seperti ini, ianya amat penting untuk mengetahui lokasi kejadian dan jenis servis yang diperlukan untuk memperbaiki kerosakan tersebut. Kedua-dua perkara ini penting bagi mengurangkan pengambilan masa yang lama dalam mencari orang yang tepat bagi melaksanakan servis tersebut. Oleh hal yang demikian, aplikasi Road-Go telah dicadangkan dengan penekanan dua elemen yang telah diutarakan, di mana ianya diharapkan dapat membantu dalam mempertingkatkan kecekapan masa ketika meminta bantuan servis.

CHAPTER 1 INTRODUCTION

1.1 Introduction

Roadside trouble is an avoidable issues among the society. All vehicles, even the newest ones are prone to typical roadsides issues such as dead batteries and flat tires. This mean, for vehicles that is 10 years and older are four times more likely to encounter a problem serious enough to require a tow to a repair facility (Edmonds, 2018). According to American Automobile Association (AAA) road users are always advised and reminded to have Battery (B), Engine (E) and Tires (T) checked to stay good on the road. This concept is called as B-E-T tips, as these top three are the most common issues that could derail a road trip. Usually, roadside assistance includes a number of service. However, the services will vary between the providers themselves. Some of the most-faced roadside assistance are towing, flat tyre, fuel, battery replacement, jump-start vehicle and other basic fixes.

Roadside assistance is a very vital issues and considered as one of the most needed emergency road services among the road users. Unexpected incidents more likely to happen at road. Over the years, the demand for emergency road services has risen around the world. For example, the rising of road accident cases also has led to emergency medical assistance, from essentially transporting injured person to delivering basic treatment or even advanced life support to patients before they arrive at the hospital.

In time to time, as the years increasing, people are becoming afford to own vehicles. However, a number of people may not know what to do when they are stranded on the road due to a breakdown especially women. Women undoubtedly have shown their ability to handle many things. However, they are bad in fixing and troubleshoot cars. This has been proven true in a survey

by Bosch Automotive Aftermarket, which states that only 1% females in contrast to 48% of male drivers were capable to troubleshoot without help when their car breaks down (Nur Athirah, 2018).

The advancement of computer science world and technology are slowly changing the way of emergency services operates. This is because, the need of efficient roadside emergency services demand the knowledge of accurate information about the user request. This is also in need to reduce the response time of rescuing because the faster the rescue, the high chance to recover from the trouble. For example, Uber taxi is also considered as one of the services offered in time of emergency of needing a transport to certain places. Just a simple click of request, you are able to solve your problem and been rescued from the trouble.

Therefore, this project aims to develop an Android mobile application that will assist the drivers in the time of having roadside emergency. This application is designed to be used by both road users and the mechanics. This app offers roadside assistance where road users are able to raise their request to the available mechanics. On the other hand, the mechanics also able to receive the request and completing the service.

It is a fact of life where vehicles break down sometimes. And when they do, it creates a major hassle. To make that hassle a little less major, Road-Go is proposed and designed to meet the needs and assist in the trouble.

1.2 Problem Statement

Roadside assistance is a form of protection when the car breaks down while on the road. In Malaysia, drivers can get roadside assistance cover when they buy a car insurance with a basic cover. However, the roadside assistance cover makes up to a more comprehensive coverage. Some

insurance companies offer roadside assistance cover on its own too, which means the drivers can purchase it as an add-on.

Typically when a car breaks down, a professional assistance help would be just a phone call away. This current method is obviously is inefficient and ineffective, in a way where could lead to miscommunication between the road users and the helpers. This is because, when communicate verbally, both of them could misinterpret the damage. Besides, it also could be ineffective in term of finding location of the car break down. The helper could have to use navigation apps and key-in the address stated by the road users, where it is an absolutely inefficient, especially if the road users themselves do not know their exact location. This situation could be a massive trouble for both sides as well as time consuming. Besides, the service requested also play a big role here. If the road users even could get a help from their friends, are their friends able to provide the service needed? Are they the right person to be called upon, rescuing the breakdown issue? All of these issues arise are the main concerns that will be covered in the objectives of this project.

1.3 Scope

The scope of this project will be focusing on the roadside assistance that involve two types of users which are the customer and mechanic. The customers are the road users, meanwhile the mechanics can be from a particular small-business mechanic shop or those who do not own a mechanic shop but have the ability to do vehicle maintenance, where can be called as runner. But for a simplicity purpose, it can be concluded as mechanic as well. This project also will focus on the element of service requested and location finding. Although cost service is one of the important element that can be considered as well in this project, the main concern that will be focused is to enable the customers to get connected with the mechanics. Therefore, the cost element here, would

be good to be considered but due to time limitation, it would be less focused on. This project also constrained to only Android-based development.

1.4 Aims and Objectives

- i) To design and develop a roadside assistance application for both customer and mechanic
- ii) To design and provide an estimated measurement of length distance and time for the match requested service
- iii) To provide locations of the available mechanics to the customer

1.5 Brief Methodology

Methodology is the model where pre-set guidelines and descriptions of methods characterized to effectively and efficiently complete the development of a project or research conduct. For this development of mobile app, the rapid application development (RAD) is chosen as this methodology. This is because, the essence of RAD is its flexibility to adapt to changes in requirements throughout the development cycle within the minimal time (Pike, 2018). The duration allocated for Final Year Project is short and estimated time of completion of project is within three months only. Therefore, the main reason to consider RAD is due to the tight deadline.

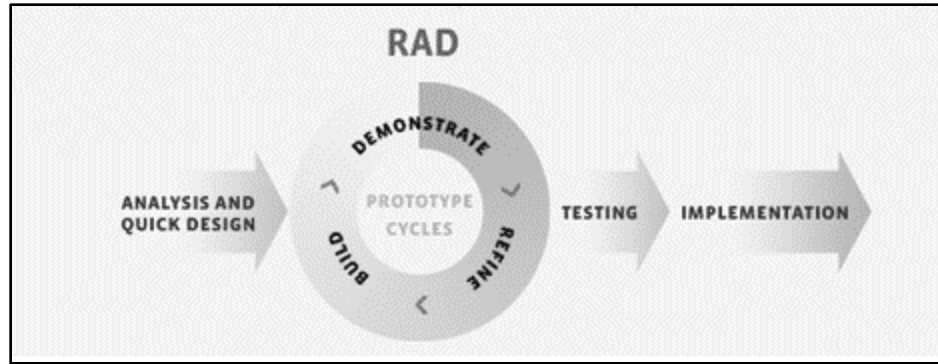


Figure 1.1: Graphic Representation of Rapid Application Development

1.5.1 Analysis and quick design

In this phase, the preliminary requirement analysis will be carried out by querying and gathering information from the users. This phase also combines the elements of system planning and analysis. The users (clients) and the developer agree on the project scope, prominent issues highlighted and application requirements so that the future stages with prototyping can begin. The developer also will work closely with the users to develop prototypes that require all the system processes, inputs and outputs. User feedback is gathered with heavy emphasis on the determining the system architecture. This allows initial modeling and prototypes to be created. This step is repeated as often as necessary as the project evolves. The key of this stage is the process of communication (Stiner, 2016).

1.5.2 Prototype cycles

Once the basic user and system design has begun, this is the step where the construction phase takes place. This phase is the stage where most of the actual application coding, testing and integration takes place. Build the code, demonstrate the prototypes and refining are the three major steps where will be an iterative process along with the user design, as new components are required or alterations are made to meet the needs of the project.

1.5.3 Testing

When the refinement is done excellently, then the project will be tested officially among the users. In this phase, applications are subjected to real world testing by the intended users such as the road users and the mechanics for the apps. This testing also objectively to measure the accuracy, interactivity, attractiveness and acceptability among the tested users. Evaluation also will be conducted along the way focusing on the performance and efficiency of the apps.

1.5.4 Implementation

The implementation phase is the phase where the data conversion, testing and changeover to the new system. This phase allow the development of the project to bring the components to a live production environment, where any necessary full-scale testing take place.

Unlike Waterfall methods, RAD emphasizes working software and user feedback over strict planning and requirements recording (Anderson, 2017). With RAD, this method will break a large project down into smaller task where more achievable pieces gained. Since RAD will have a lot testing conducted along the development, which means this project could receive a constant feedback from users and quickly implement any changes that need to be made before the finished product is presented.

One of the biggest benefit of RAD is the ability to both easily and frequently receive feedback from users who are directly interfacing with the application during development and prototyping. This advantage also means that it is readily visible within the UI/UX components of the system, where iterative design of the user feedback can be at the forefront of the process (Morse, 2016). At the very least, with RAD, the project is able to produce functioning parts of system that might be good enough solutions for the users.

1.6 Significance of Project

This project will give a great benefits for the road users as this type of app is one of the app-on demand (Price, 2018). It could be a great app to have in pocket for such roadside emergency. It could improve the existing way of roadside assistance be conducted. This project is designed to develop a mobile app that allows user to decide who should come to their aid when they are having car trouble. The massive benefit of this project development is to save users' time from the hassle and trouble of finding the person to call in the first place. This project will be a good platform for the road users to get connected easily with the mechanics. Once connected, they would less worry since this project will provide them a real time tracking distance and duration.

1.7 Project Schedule

The Final Year Project 1 initially starts on 17th September 2018 and will be due for full report on Final Submission of Final Year Project 2 on 21th May 2019. Refer to Appendix section for the project schedule in Appendix A.

1.8 Expected Outcome

The main expected outcome of this project is an Android-based mobile application that would be used by both customers and mechanics. This application is expected to capable to record request raised by the customers and connected to the mechanics that have a matched service requested by customers. Besides, it is also expected to be able to display duration and length of distance arrival of the assistance. At the end of this project, this project is expected to provide an easier and quicker platform for customers and mechanics to get connected.

1.9 Thesis Outline

Chapter 1: Introduction

Chapter 1 depicts the introduction of the proposed framework. This chapter includes about the problem statement, objectives of the study, methodology uses, project scope, project significance, project schedule and the expected outcome of the project. The problem statement describes the challenges faced by the current system. The objectives clarifies the project's goals that is expected to be achieved by the end of the project development. Meanwhile, the scope is the limitations set for the project to be developed.

Chapter 2: Literature Review

Chapter 2 discuss about the review conducted on the existing system that is similar to the proposed project. Overall, the study is done based on the reading articles, journals and conference papers. The limitations of the present system and methods of improving is analyzed by presenting a side by side comparison of the features. At the end of the chapter, a brief description on the app and the technology tools utilized for the execution of the project will be documented.

Chapter 3: Requirement Analysis and Design

This chapter evolves around the methodology used for the development of this entire project. The Rapid Application Development methodology will be utilize as the model to develop the proposed apps. This chapter also portrays the methods of acquiring requirements from the future users of the apps. The last aspects of this chapter comprises of use case diagram, data flow diagram (DFD), activity diagram and the user interfaces to express the overall design of the proposed app.

Chapter 4: Implementation

This chapter incorporates the detailed description of the app's implementation. The structure and framework of the app is described in detail and precise using the screenshots of the interface layout as a walk-through, explaining its behavior process and relation to the design.

Chapter 5: Software Testing

This chapter explains about the app testing conducted to determine either it successfully meets the objectives of the project and user needs. The main part that will be covered in this chapter is about the system testing and user acceptance testing. At the end of this chapter, a prototype will be produced.

Chapter 6: Conclusion and Future Work

This chapter is the close up of the entire project designed. This chapter will come out with the limitations possessed, achievement and the lessons learnt all along the project. The future work will be discussed and explained extensively in order to improve the proposed solution.

CHAPTER 2 LITERATURE REVIEW

2.1 Overview

A full thorough of background studies and reviews are required to be conducted in order to ensure the objectives of the project development is able to be achieved. In this chapter, there will be two types of reviews conducted evolving about the similar existing apps and tools/technology used in the app development. These reviews are important as the information gathered are crucial for the proposed developed app. The draw and drawback for every apps reviewed is important to be taken into measure so that the proposed developed app is able to be designed well. Reviewing on tools and technology used for both users and developer's side also conducted to determine the best method acquired to develop the proposed app. It is also needed to be evaluated with rational reasons stated on every particular components used. All of these review and assessment is required to be done thoroughly and meticulously with great considerations and details.

2.2 Review on Similar Existing System

2.2.1 CARPUT

CARPUT (The Battery Shop, 2014) is Malaysia's first and most trusted mobile applications for car breakdowns. It is a roadside assistance mobile applications that available both in Google Play and App Store that connects drivers or the users with trusted roadside professionals who will come and get them and their cars safely back on the road as efficiently as they can. This app has been designed by the core team of Eugene Tan, Ezra Ray, Mark Chew and Mike Kee, who are working in the automotive industry in Malaysia (The Advertiser, 2017). CARPUT enables users to register their details and login using social media such as Facebook, Twitter and Google

Plus. This app also required users to enter their vehicle details before proceeding to raise a service request. The most important thing that is good about CARPUT is, it provides a real time chat platform between the users and the professionals, where they can directly chat. They are also able to pin point their location so they are allowed to see the expected time arrival. Besides, users also able to check the pricing before they confirm the request.

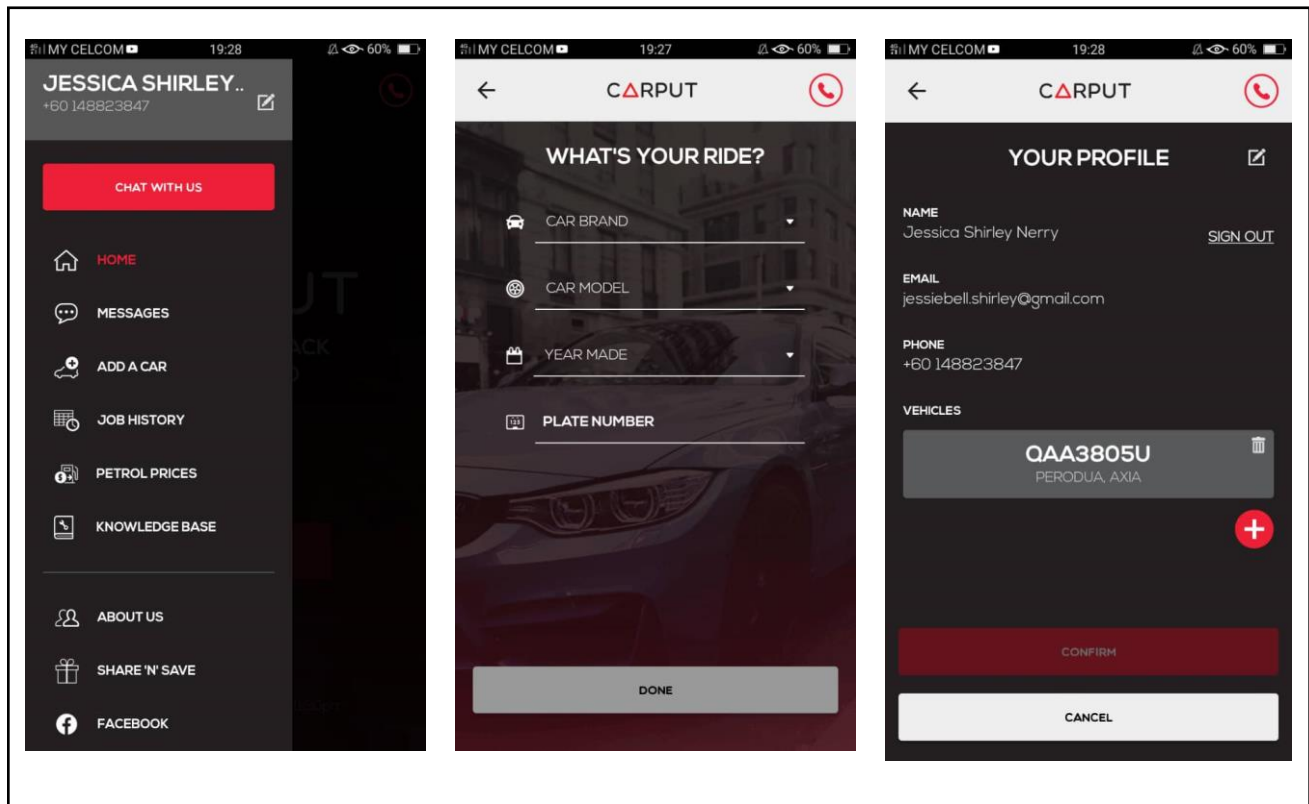


Figure 2.1: Main functions featured in the CARPUT app

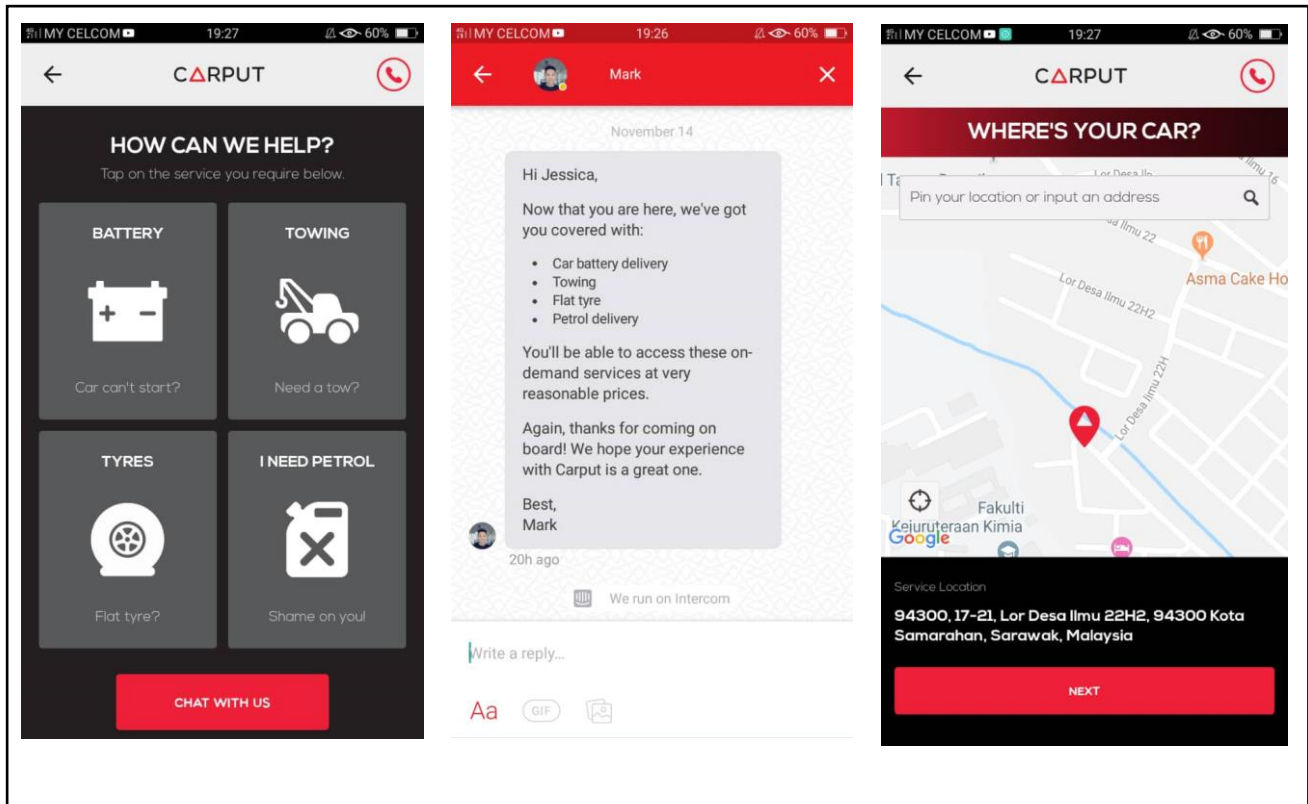


Figure 2.2: Type of services in the CARPUT app

2.2.2 Etiqa Auto Assist

Etiqa Auto Assist (Etiqa, n.d) is an app owned by the Etiqa Insurance and Takaful company that focus on the issue of car insurance. Etiqa Auto Assist initially developed to increase the competition among the insurance providers. It offers an easier way to reach Etiqa using the new Auto Assist mobile application. The app enables the users to receive immediate support by connecting with its 24/7 call centre to request for emergency roadside services. Without having to make calls or wait in queue for service, the app will detect the user's GPS coordinate and transmit it to the nearest available service provider which will then expedite the auto assist service to the location (Wong, 2017). Therefore, there are not much functions featured in the apps. One major different exist in Etiqa Auto Assist is that the users are able to take photos of the emergency, as

shown in the Figure 2.1. The app is simple and it is suitable for users who prefer simplicity in reporting an emergency.

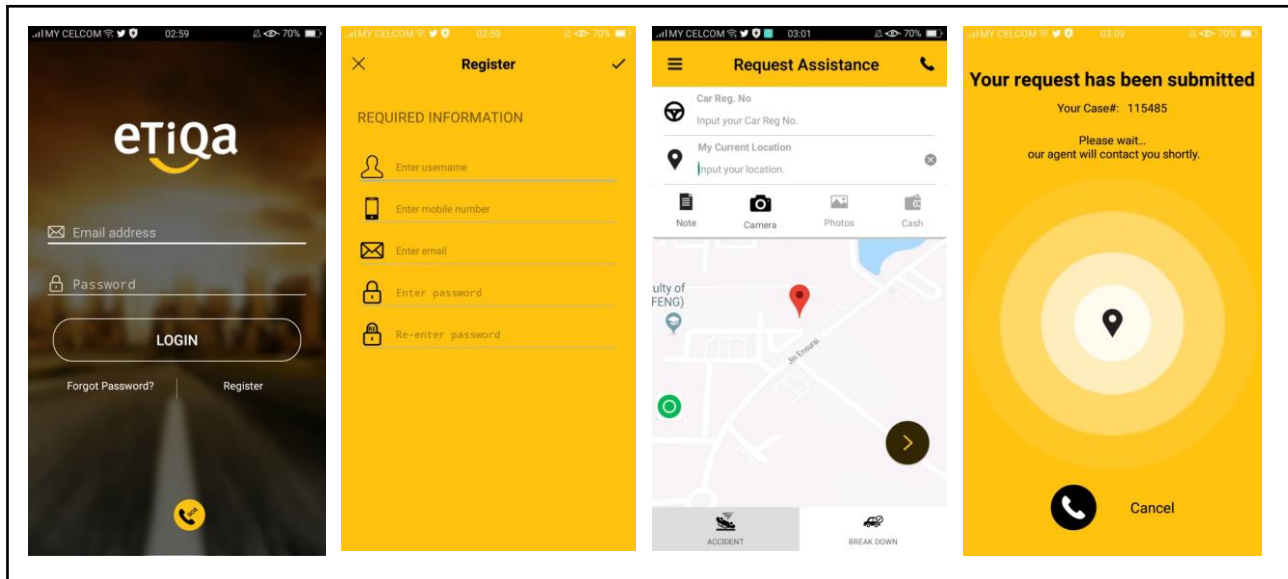


Figure 2.3: Functions featured in Etiqa Auto Assist

2.2.3 RoadPro

RoadPro (RoadPro, 2015) is one of the vehicle road assistance service provider mobile application, which is designed with the latest technical innovation for more efficient service. RoadPro is designed and developed by Erima Global, one of the faster growing firms in service provision, import and export, cosmetics and pharmaceutical supplies (Erima Global, 2018). RoadPro also designed with almost the same feature as in CARPUT app. It has even simpler interface designs and icons. However, they have the same basic features and functions required in roadside assistance app.