CAREMYCAR: A VEHICLE MANAGEMENT APPLICATION

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CERTIFICATE OF APPROVAL

This special problem, entitled "CareMyCar: A Vehicle Management Application" prepared and submitted by Hil Harry N. Malumay, in partial fulfillment of the requirements for the Degree of Bachelor of Science in Computer Science, is hereby accepted.

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ABSTRACT

The main purpose of this study is to develop a mobile application that provides the user to track and share their vehicles maintenance records to help the owner and mechanic correctly diagnose the problem of the owner's vehicle and lessen the time of the mechanic giving the proper repairs that the vehicle needs. Vehicle maintenance is a problem for anyone, especially to someone who doesn't have background or have enough time to tinker around their vehicle. Proper maintenance of a vehicle relies on the cooperation of the owner and its mechanic, keeping track of its usage, previous maintenance records, and diligently checking the application if it notifies the owner to go to a trip to the repair shop.

The application was developed using the Agile Development approach wherein there is an initial planning and analysis phase and series of iterations that includes analysis, designing, developing, and testing. The application is called CareMyCar. Ionic and Angular was used in developing the application. This application allows the vehicle owners to keep track their vehicle maintenance records, allows vehicle owners to share their maintenance records to their mechanic, track the trips they make with the vehicle, and gives the user the ability to use a third-party hardware (On-Board Diagnostics or OBD) to check its internals for them.

ACKNOWLEDGEMENT

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

In the fast-paced life that people lead in this generation having 8 am – 11 pm jobs and technology that's keeps on getting better and better, one remains constant: transportation. The 2019 LTO registration reports shows a grand total of 12,725,305 registered vehicles all over the Philippines. This includes cars, SUVs, trucks, buses, motorcycles/tricycles, and non-conventional motorcycles. 4,133,443 of this population is composed private and public utility cars, SUVs, and UVs. Why is there a vast number of cars compared to buses? Because of comfort, privacy, and security.

The average life span of cars is 8 years. But with proper care and maintenance, it can be extended for another 2 to 7 years. Lessening the need to buy a new one and risks of having any kind of accidents that may occur on and off the road. A study was made by the National Highway Traffic Safety Administration in the US that there's an average of 45,000 accidents per year due to vehicle malfunctioning. And every year, there are over 25 million tons of materials that are recycled because of junked cars.

An average car owner has little knowledge in handling and taking care vehicles. It would be easier if there's a centralized database in which repairmen can access the records and see the past diagnostics of the car of their customer, making it easier for the repair man to have a diagnosis on the vehicle. A properly maintained vehicle can reduce the accidents that occurs per year due to the negligence in keeping their vehicle in good condition. Having a properly working vehicle for a longer time and minimal spending on accidents, injuries and replacing parts leads to a lesser need to replace their current vehicle. Resulting to less junk per year, less vehicles being used, and lesser carbon footprint for the environment to handle.

1.2 Statement of the problem

Common problem of car owners is that they don't usually notice what's happening in the inside of their car. There might be need of repairing or replacement sometimes noticed way too late. Having a car repaired or a part getting replaced usually costs more than having a proper maintenance.

This study will primarily determine/suggest if the owner needs to go and get a trip to a repair shop basing on their usage and the vehicles past records.

1.3 Objectives

The general objective of this Special Problem is to create a mobile application that can help the user/owner keep their vehicle in tip top shape. Specifically, the mobile application should

- Provide a way to store their past, current and future maintenance data.
- Give the user option to share their data with their repairmen.
- An option to track their vehicle usage if they want to.
- Saves time for repairment to give a diagnosis by looking at their previous maintenance trips.
- Gives notifications if maintenance date is near.
- Displays the data and usage of the trips they made with their vehicle.
- Allows the user to use and ODB for their own checking.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The first ever automobile that is capable of transporting people from one place to another was created at the year 1769. Since then, automobile was evolving. From being powered by internal combustion engine in the year 1885 to a gasoline powered engine in the year 1893. Nowadays, because of the rising environmental issues, vehicles are now electric powered or solar powered no reduce the effect on the environment. A lot of changes had already happened but only one thing remains the same, the requirement of the car to be maintained. In the past, people need to learn the skill manually and expose their own cars and themselves to danger to enhance their skill and knowledge in maintaining their automobile. It has significantly changed today where everything can now be searched on the internet.

There are numerous applications related for car maintenance. Every application has their own functionalities that caters parts management, vehicle usage geo-mapping, and fuel tracking. There is no perfect application. Some applications have functionalities that others lack.

2.1 Budget Applications

Honk, an Android and iOS application, which helps car owners to find the nearest repair shops or towing services in the area. It gets the user's current location using GPS. Then scans the area around the to find the nearest available repair shop that can cater the user. The application will then let the user pick any of the available repair shops and displays the estimated time of arrival of the repair shops mechanic. (HONK Technologies, Inc (2016). Honk (version 2.1.1). Retrieved from http://www.honkforhelp.com)

Drivvo boasts a wide range of data handlings. It keeps information about the user's car, mode, and its parts. It requires the user to initially input when the last maintenance of their unit was and notifies the user of the next maintenance schedule. It also records fuel expenses and suggests which station have the cheaper price. (CTN Cardoso (2016). Drivvo (version 5.18). Retrieved from http://www.drivvo.com)

On-board Diagnostics or ODB, has been implemented on cars since 1996. ODB is a tool that helps mechanics and users to know that if a car has a problem before it can be seen physically. This prevents the unit to suffer further damage. OBD Car Doctor used this technology to make it easier for people who doesn't have knowledge about cars to understand if their vehicle is having a problem. OBD flashes a sign on your dashboard if there is a problem. But with OBD Car Doctor and an OBD Bluetooth device, the information can be translated and gives the users options on how to solve it.(PNN Soft (2016). OBD Car Doctor (version 5.5.1). Retrieved from http://www.incardoc.com/)

MyCarFax accommodates repair shops that is near the user. It requires the user to determine the problem they are experiencing with their unit with the given choices for each part of the vehicle. It then searches nearby repair shops that can accommodate that problem and how much would the repair cost. It can also store up to five cars with different information. When the user has a history with a certain store, the app retrieves it, analyzes it, and suggests a store with cheaper services. (CARFAX, Inc (2016). MyCarFax(version 1.31.0). Retrieved from https://www.mycarfax.com/)

Car Trouble can help cars that doesn't have ODB. This application helps users for simple problems, like how to change the tire, oil, or water in the engine. Car trouble helps the user by accepting input that is familiar to the user. This application is not user-friendly as it requires a certain familiarity on fixing a vehicle. GPS Stone GPX, an app exclusively for iOS, records the path you have taken and records it on the map. The application records information of when the trip is made, trail, speed, and the altitudes of the path they are taking. (ObviousIdea Sarl(2012). GPS Stone GPX (version 2.2.0). Retrieved from http://www.itunes.apple.com)

CHAPTER 3

MATERIALS AND METHODS

3.1 Tools and Requirements

3.1.1 Ionic 4

Ionic uses web technologies like HTML, CSS, and TypeScript. Ionic is built with Capacitor which allows it to turn HTML/CSS/TypeScript components to run on mobile and desktop devices and uses APIs to access native functionality. It caters to both Android and IOS devices

3.1.2 Angular 8

Angular is a structural framework for dynamic web apps. Allows the user to extend HTML's syntax to express your application's components clearly and succinctly and let the user use HTML as the template language. AngularJS eliminates much of the code you would otherwise have to write using AngularJS's data binding and dependency.

3.1.3 Google Maps API

A JavaScript library that allows you to display different parts of the world, track a path on the map and insert on an HTML's element. It provides GPS coordinates which is used to track a user's data.

3.1.4 Firebase

Firebase is a Backend-as-a-Service, that provides tools and services and stores data on their servers. It's as a NoSQL database which stores data in JSON form. With the clouds services and data, it enables the developer in creating, retrieving, updating and deleting data from the database.

3.2 Design and Implementation

The application is developed using Ionic framework. The development and testing are conducted on a computer with Intel Pentium G4560 processor and 4GB RAM. The method used in the development of the application is agile development with iterations every two weeks with their own set of requirements and objectives.

Angular 8, TypeScript and CSS are used in the development of the application. Angular which is used in binding data from its controller to html view or file. Firebase is used in handling database storage and queries. It is also responsible for the back end while Ionic gives the front-end UI kit as the backbone for the user interface and experience. Ionics default project, Ionic blank is used as the base of the application. Google Maps API and Libraries gives the users map location, GPS data and provides functions for proper viewing of GPS coordinates via the use of the Polylines library.

The application is developed using an incremental and iterative approach that is checked every two weeks. There will be a total of 5 iterations.

3.3 Testing

The application's functionalities are tested on a web browser and an android phone Xiaomi Mi A2, a 2.2 GHz octa-core processor and 4 GB RAM. The application will depend on a server to retrieve and display all the data to be able to access the data in the database. Time, date, and GPS coordinates will be used for testing data. Adding, editing, and deleting data is repeatedly done to make sure that it yields the same output every time.

CHAPTER 4

CHAPTER 5