Vehicle Logbook verification on the Blockchain

Nigel Cumbo, Frankie Inguanez

Institute of Information & Communication Technology
University College
MCAST, Paola PLA 9032
nigel.cumbo@mcast.edu.mt

Research Questions

The following are some of the objectives that this research will cover:

- Is it possible to improve one's vehicle information to be more reliable and trustworthy by using the Blockchain?
- Are buyers more willing to purchase a vehicle that has its information stored in the Blockchain with the ease of mind that the purchase that they will be making is the correct one?
- What are the Blockchain limitations? Will there be different price charges to verify the correctness of data?

Introduction

This research will explore how to implement and use the Blockchain to store various information on vehicles that are on the road. Furthermore, it will facilitate the viewing of all the vehicles' data through a user-friendly website. From a study carried out by Malta's National Statistics Office (NSO) shows that an average of 68 new vehicles were licensed each day during 2017 [1]. Some of these would be second hand cars from around the world with no knowledge of how the previous owner took care of them. Thus the study would determine whether the Blockchain can improve the trustworthiness and whether it would create ease of mind when an individual goes to purchase a new vehicle from someone or a business which he/she does not know. By using the proposed system we are minimising the chances of any fraud that could be done from the seller/business on the vehicle logbook.

Methodology

A vehicle registration certificate, also known as log- book, contains various fields that identify the vehicle (see figure 1) from any other, some of these fields are: Description of vehicle (make, model, colour, type), unique VIN number, engine specifications, exhaust emissions, number of previous owners and many more. The current owner is also listed to establish who is responsible for the car being on the road.

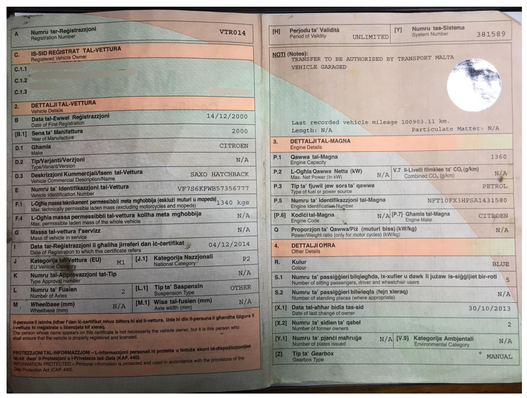

Figure 1: Sample of a Maltese Vehicle Logbook

An ideal scenario for a vehicle logbook should aim to be more accurate by providing valid and frequently updated values. The system which is being proposed consists of a vehicle logbook system which uses Blockchain technology as a means of updating the vehicle mileage. Every person who owns a vehicle will have an account with the system where all the data is stored.
The prototype that was created is based on a decentralised application(DApp) which is a type of software which has front-end code, being a website and back-end code which runs on a decentralised peer-to-peer network.
For it, the front-end will be using a single page application containing all the pages required so as to keep a constant location from where the contracts are sent. The back-end of the system consists of an Ethereum Blockchain network and a smart contract, where the smart contract would contain the code to interact with the Blockchain.
The following software and plugins were required to be able to create and use the DApp system proposed:

- NPM (node.js)
- Truffle
- Ganache
- Metamask

Questionnaire Results

A questionnaire was carried out among a group of people. The points that were highlighted include that all the respondents own a second-hand vehicle. When purchasing a car, they mainly go to auto dealers and mainly use auto dealer's knowledge when purchasing their vehicle. Others responded that they rather do their own research on what's best on the market through local websites like Malta park and treehouse. Others even mentioned the fact that they rely on social media to look up vehicles. Most of the respondents inspect the second-hand car by taking the car to a professional to ensure that they are not being given a faulty car. Around 75% of the respondents had issues within the first month of purchasing their second hand car. Furthermore, another 75% of the respondents, responded that they are aware that odometers can be tempered with. Finally, all the respondents feel safer when the logbook is stored online, rather than the traditional paper logbook.

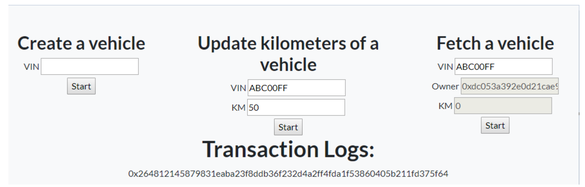

Figure 2: Features implemented in the vehicle logbook prototype

Conclusion

The aim of this project was to create a vehicle logbook using the Blockchain technology which provides a trustworthy source for any future individuals and the results are quite a good start for a research that will continue to expand.
My goals for the dissertation are to improve the prototype that I already have and make it more efficient. This can be done by adding more parameters to the smart contract to make it more look like a vehicle logbook. In terms of security for user, I intend to provide an extra layer of security by creating an authorisation system which does not require the user to install any third party plugins or software.

References

[1] National Statistics Office.
Motor vehicles: Q4/2017, 2018.

Contact Information

- Email: nigel.cumbo.a100581@mcast.edu.mt
- Phone: +356 79676330