Project Report

Car Mileage Tracker System

Hyperledger Fabric

COMP 4300 Computer Networks

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Project Objective:

Odometer rollback has been one of the most significant issues in the used car market and insurance companies over decades. Both traditional and digital odometers can be easily tampered and are difficult for a non-professional car engineer to detect. Research from CARFAX indicates that nearly 200,000 cars have their odometer rolled back each year, and there are currently about 1.8 million vehicles on the road with rolled-back odometers [1]. Our goal is to eliminate this problem by using blockchain technology

Benefits of Using Blockchain

- ***Increase buyer trust***
    - Buyers are more confident in purchasing used cars and can be reassured when conducting transactions.
- ***Promoting the development of the market***
    - As more buyers come into the market, the value of used cars can be an increase
- ***Drive innovation in the second-hand car industry***
    - Traditional methods of recording car mileage may have flaws, but using blockchain technology can solve this problem and bring better user experiences

Project Overview:

In this project, we have developed three components

1. ***Gas Station Server***

    - In this module, we assume that each car is installed with an IoT device that automatically uploads its car information such as Vin number, Make, Milage, etc., to the gas station, and we simulate the action that cars arrive at the gas station. The gas station will receive the data and invoke the smart contract to upload it on the blockchain, which is done by a random timer.

2. ***Insurance Web Interface***

- A separate Client-Server based website that is used by insurance companies to register new cars into the system, and update and query information from the blockchain. We also assume that every car is initially added to the network before it visits the gas station.

3. ***Smart Contract***

- A smart contract that is deployed on the Hyperledger Fabric network. Provides the functionality for the gas station server and insurance website.

Technical Components

The main components of this project have used Vue.js, IBM blockchain platform VS Code Plugin, Axios, and many other libraries such as Element UI, Router, Fabric network, etc. To run our project, these components must be installed.

Instruction to run the code

GitHub: https://github.com/vmsaif/blockChainCarMilageTracker

YouTube: Blockchain Car Milage Tracker project demo. https://youtu.be/1oREroBu1y8

IBM Blockchain Platform

1. Clone the GitHub repository and open it with VS Code.
2. Install the IBM Blockchain Platform in the VS Code Extension, which this step will require downloading Docker and other essential components.
3. Open on the left where you see a symbol of block which is the IBM platform extension.
4. Create the network by clicking on the + button if there is no default network. Select 1 org 1 peer 1CA.
5. Start the network and gateway.
6. Add only the Chaincode folder into the workspace and package it by clicking the … beside SMART CONTRACT in the IBM platform. Choose tar.gz format when packing
7. Deploy it on the network.

To run: On a terminal, cd to the project root directory.

Client

1. Cd to the webInterface/client folder
2. Run “npm install” command, without the quotes.
3. Run “npm run serve -- --port:8000”, without the quotes. (Note: it does not require specific port, as long as it is not running on port 8001, since that port will be interacting with the server)

Server

1. Cd to the webInterface/server folder
2. Run “npm install” command, without the quotes.
3. Run “npm start” command, without the quotes.

Gas Station Server

1. Cd to the gasStationServer folder
2. Run “npm install” command, without the quotes.
3. Run “npm start” command, without the quotes.

**** The detailed instruction to run the code is demonstrated in the YouTube video.***

Conclusion

Overall, our project successfully achieved its aim of developing a system for securely storing and managing information about cars on a blockchain network. The gas station server, insurance web interface, and smart contract all worked together seamlessly to provide a robust and efficient solution for managing car information on the blockchain. In the future, we believe that this system could be further expanded and improved upon. For example, we could develop additional features for the insurance web interface, such as the ability

to generate reports or perform data analysis on the car information stored on the blockchain.

Reference

[1] https://www.carfax.com/press/resources/odometer