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A Survey on Resale of Automobiles Using Emerging Technology: Blockchain

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***Abstract—** Block chain technology has been encircled with multiple growing industries, includes: healthcare, Banks, hospitality, travels, CPG and Retail. The salient features of Blockchain being decentralized and transparent has led it be used in digital recording of events in day to day life. Automobile sale is one such event where there is constant growth in the figure, in which re-sale being a major part. The Paper work is emphasized more in transferring the ownership in resale of automobiles and is complicated. The reliable and convenient services brought by Blockchain efficiently overcome the challenges in resale of automobiles in current scenario. Blockchain has already made its success impact in many industries, the unique challenges in automobile resale is a topic we need to bring a light on.*

***KEYWORDS:** Blockchain, automobile resale, ownership transfer.*

I. INTRODUCTION

Over the past decades, there is increase in the buying figure of automobiles, like cars, scooters, bikes, trucks etc. Use of Blockchain in automotive industry is still an emerging research, where automobile selling-ownership, vehicle history, the maintenance records, the insurance records, accidents-damage history and repairs are taped and securely stored in Blockchain system. Any purchase of automobiles represents data exchange process which will be digitally recorded in Blockchain ecosystem, which ensures that data stored are correct and cent percent accurate, so that any further buyers of used vehicles will have history about the vehicle taped in finger tips. When buying the used vehicles, one should have view on the history of vehicle, such as mileage, insurance record, repairs undergone and many related information to make sure that he/she has not made a choice of wrong purchase.

Buying used vehicles could be through any of these three means: 1) Individual seller: Here the selling and purchase of vehicle is one to one(owner to buyer) and one could sell vehicle at more profitable deal as there is no middle party intervention but invoice would not be provided for the purchase. 2) Vehicle Company: All the vehicle company will have an outlet to sell their used vehicles, where the deal is safe here and company provides warranty, service and invoice, however the seller is not more profitable compared to individual seller. 3) Used vehicle dealers: The dealer would cut down paper work and would sell it to parties based on certain commission. The above three ways of resale does not provide accurate maintenance history of vehicle to the buyer, and engages middle man or paper work to be done which is not cost effective and simple.

Block chain is basically a digital book where events of real world are regularly recorded in related to business or financial aspects in decentralized environment involving multiple actors. The resilient and Immutable features of Block chain sets it apart from getting exposed to any major attacks or change in the recorded events. The key feature of Blockchain, where in the recorded events can be accessed by multiple users makes it a distributed system. Blockchain is a concept which integrates cryptography, mathematics, consensus algorithm and peer to peer network to effectively overcome the demerits in using the traditional ways of centralized recording of transactions, which is less profitable and more complicated. Bringing the technique of Blockchain as a light on automotive resale would make the buying and selling quick, as the well maintained cars are sold at higher rate and profitable by phasing out the requirement of middle party and other related costs.

A. Blockchain technique and its working

Present online transactions depend on certain secured institutions. Nevertheless, these third party sources can be hacked, manipulated or insecure. Thus, dependable secure schemes are needed. In 2008, Nakamoto Satoshi invented the Blockchain technology to crack the problem of insecure transactions. They clarify electronic cash which is working in peer-to-peer network so that direct transactions can be made among the two parties without involving a third trusted institution. A Blockchain is basically a public ledger that is run and shared among participants. Once the information has been updated into the block, it is impossible to forge or manipulate the data. If a malicious user attempts to update, change or delete a block, it must also modify all earlier blocks as well as the block at that spot in time. Figure 1 shows an example of an online transaction using Blockchain.

Figure: Example of how blockchain work

Distributed ledger is accessible for every person in the network to ensure the blocks and the transactions within. However, the participants stay unidentified, they only identified by their public key as an identity. Moreover, the business is encrypted. Unsound transactions are rejected and are not added in the blocks. Malicious attempt to modify transactions will require repeated computation of the proof of work for the attached block and all the blocks following.

II. EXISTING SYSTEM FOR RE-SALE OF AUTOMOBILE

The seller has to undergo procedures to give a profitable value to his used vehicle.

1. A record of purchase: the bill.
2. Maintenance record: to ensure there is proper maintenance of vehicle.
3. Release of liability form (NRL): to ensure that the seller is not liable for any damage to vehicle or any violation of traffic rules after the vehicle is sold
4. Documents for Warranty: These documents tell whether the used vehicle is still under the manufacturer's warranty or extended warranty. If the warranty is expired, the seller has to take responsibility of any damage to vehicle, at the time of selling; this should be entered in bill of sell.
5. Registration Certificate: This certificate should be shown to buyers or middle parties involved in the sale to ensure that the owner is authorized user of vehicle. RC should also be transferred to buyer name once it is sold.
6. Insurance policy: This document tells that the vehicle is insured up-to-date and this policy should also be transferred to buyer after the vehicle is sold.

The Seller should provide the above mentioned history of the vehicle to the middle party or buyer to do a beneficial resale business.

Buying a used car needs precautionary decisions to be made, which assures that the buyer has made a right decision of purchase. The buyer on the other hand has to make a vehicle choice among the list of resale automobiles and should know the history of vehicle before purchasing it. Get the vehicle checked and screen the documents to ensure that the documents are valid, is a tedious work. The documents like RC, Insurance policy and NRL should be transferred to the buyer name after the sale. The third party intervention in such a resale business would take care of paper work and warrant the vehicle, but that catches a more price as a charge for the commission.

III. RESALE OF AUTOMOBILES USING BLOCKCHAIN

Individuals and organizations maintain digital identities that can be used for digital agreements, digital assets and transactions that are validated and recorded in blockchain. Whenever a new car is purchased, and sold by first owner a distributed ledger provides the proof of sale. This enables the tracking and tracing of the cars sold from multiple owners.

A blockchain dependent solution gives an end-to-end supply chain way out to enable automotive organizations to seamlessly buy or sell, track and pay for automobiles and their parts in connected supplychain. Documentation can be viewed, updated, created or verified by parties on the blockchain. Money transactions can also be started flawlessly between parties throughout the course based upon agreements (e.g. between owner and customs authorities, owner and shipping company and between owner and buyer). As a wing, connected IoT sensors and smart devices can measure the condition of automobile parts and other document information that are recorded on the blockchain and notify final settlements e.g. if automobiles are damaged.

A blockchain way out solution accounts dealer and customer purchases and gives loyalty points that can be redeemed and used as a currency within the network. For example, the dealer could add-on purchase of parts with customer-redeemed loyalty points at a discount. Once the loyalty points are redeemed, the dealer's account will be added for participants on the network to view.

A blockchain for automobile resale firmly updates, stores, traces and shares transaction data (including telematics) across network in real time. The vehicle ledger could include the storage of an automobile's maintenance and ownership history and would enable original equipment manufacturers and other authorized parties to view and update the automobile data to the blockchain. Sellers will be able to receive payment through the global ledger for selling used automobiles and for other services rendered, e.g. repairing, purchasing and selling or purchasing and selling of the vehicle data to third parties (autonomous vehicle data). This technology replaces the physical log book.

IV. CONCLUSION AND FUTURE DIRECTIONS

In this paper, I have put a light on automobile resale using Blockchain. In order to provide secure sale or purchase of used automobiles, the manual entry in the log book or third party institution involvement is insecure and expensive. In addition, using Blockchain technology, appropriate tracing and tracking of transaction history can be generated. In future, one can work on implementing it efficiently by using technique to reduce the size of block data, and solve the problem of accumulating data size of existing Blockchain. However, in the proposed system, there are still remains a challenge that needs to be addressed. It is possible for a particular attacker to pretend to have claim that the automobile is new. Therefore, when validating a block, an attacker can send a lot of messages that block is not valid. In such a case, the block may not be added to the chain, even if the block is valid, according to the principle of a block chain. Therefore, I intend to further study more techniques to address this problem as future research course.

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