Self-Driving Cars Using Combination Of Ai And Blockchain

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Abstract

IntegrationofAI and blockchain means a mixture of two technologies, AI and blockchain. These are becoming very popular technologies in now days. A revolution can be made using these technologies combination. Complication is reduced in process of automatic driving cars and blockchain is used to distribute the experience. Driver less car are trained like this, that they will stop when nearer to an entity. In starting car will drive till it collides with that object. All the actions done by car get stored in memory and after some more hits, car learns that it have to when it reaches too close to an object. The present scenario is that, individually all cars are trained until they get to know that at how much distance they should stop. The purpose of this paper is to link all cars with a distributed pubic ledger on which data is shared by one car to all other for learning the tasks like when to from the other's experiences this will eliminate heavy work of teaching each car individually. Blockchain Technology can be used for carrying out this integrated learning.

Keywords: AI, Blockchain, Public ledger (blockchain), Driver less cars, Self driving cars, Information Imparting.

1. INTRODUCTION

In today's world Blockchain and AI trending right and becoming very famous. Applications of both technologies are highly advanced that's why researchers are combining them to find new efficientresults. Blockchain is immutable, used to store data that is encrypted and decentralized. Where AI collects the data and does some analysis and takes decisions. When embedded with each other a wide scope can be explored. Usually people link it to crypto currency, which is very popular. Passing of information to others is an application of blockchain. Shared public ledger is used by blockchain if any node does some activity it gets stored in ledger. Every node has same copy of ledger. Hence, if any node does any transaction it will be visible to every node. For distributing the information blockchain uses its decentralized behavior. This makes it powerful. The idea is to reduce training process of driverless cars by using a car blockchain network which is embedded by AI. This paper proposes a technique in which there is need to train every single car and others cars will be trained from the information and experience shared by that single car.

2. LITERATURE SURVEY

Different regions are discussed in this literature survey. This will explore different current processes used to train cars that will drive automatically. It may also pop some more good ideas.

JelenaFrtunikj ,Qing Rao [1] in "Deep Learning for Self-Driving Cars: Chances and Challenges" this paper shows that how deep learning is used in many industries to bring automation in vehicles.

Jing Wang, Shuai Wang , TianyuQiu ,Xiao Wang [2] in a paper "Blockchain Powered Parallel Healthcare Systems Based on the ACP approach" shows that in hospitals blockchain is used to share data. The paper elaborates decentralized logbook of blockchain is used for tracking activities.

Rahul A. R. [3] in a paper "AI in Blockchain Technology: The possibilities of integrating AI with Blockchain" describeshow integration of these domains will provide different opportunities.

Shruti Dhavalikar, Ruturaj Kulkarni, Sonal Bangar[5]"Traffic Light Detection and Recognition for Self Driving Cars Using Deep Learning", shows how to find and identify traffic lights using transfer learning and deep neural network.

After manyresearches we got some current training techniques which need further improvement. Blockchain technology is key to simplify the training.

3. CURRENT METHOD

Every car is trained individually in existing method to make them driverless and they gain enough experience to avoid accidents. To dive cars its own many deep learning algorithms are being used. Through reinforcement learning vehicle leans how to respond in every situation. But the main drawback is training of every single car each time. Lots of human efforts and resources are required. In this technique, no. of time you carry out this procedure is equal to no. of autonomous cars produced, which is very time taking. If we see this from industry point of view, production is done in huge amount like thousand cars, this becomes very difficult and time taking task[6 7]. With increasing speed of advanced technology that day is not so far when roads are frequent with driverless cars. Going through above discussion, shows that it can be made simpler and by adding some more modularity to this procedure can speed it up and increases its efficiency.

4. PROPOSED SYSTEM

To eliminate above drawbacks of existing method, a simplified training process is proposed. This system has capacity to train large no. of cars at once instead of training the cars individually. This system includes integration of AI and Blockchain technology. Blockchain technology uses public ledger,all transactions done by the nodes in a network are saved in logs. All other nodes can see the transactions made by any node in the network. Issues that discussed above can be solved using concept of shared public ledger. Aim of this system is to train large no. of vehicles with the help of experience of one trained vehicle and using blockchain, information is shared among all others cars.

A. Working of blockchain?

In blockchain, like registers and log books all the transactions happening between the nodes are saved in shared digital ledger. Ledgers are very powerful objects for sharing data.
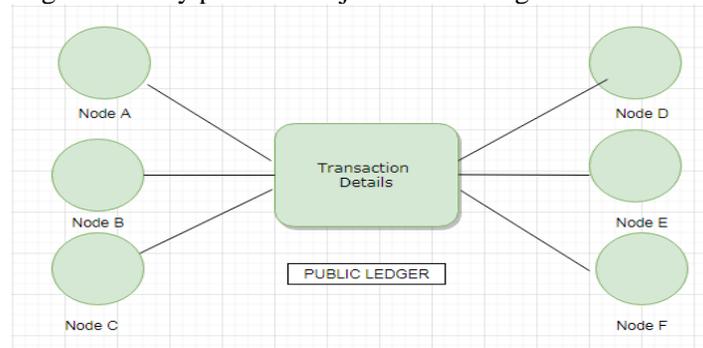
Figure(a)public ledger

Figure(a) shows blockchain's public ledger where all the details of each transaction are kept. An individual copy is made of this ledger. Changes done by any node in network will be updated in all nodes' ledger.
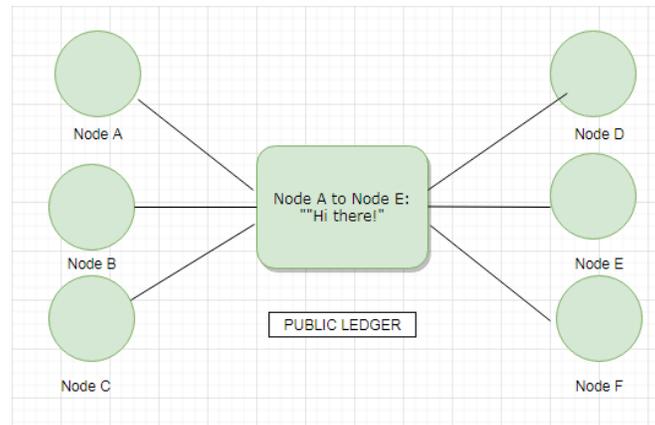
Figure(b) Recording Transactions

Figure(b) presents a phase in which node "A" is sending "Hi there!" message to node "E", at that instance public ledger is updated with this transaction. This diagram is about how information is get updated during transactions. Here comes the decentralized nature of blockchain, where all other nodes get information of the transaction and changes done by it, whether they are involved in this or not.

B. How cars are trained using blockchain?

In this proposed system we generate a blockchain of a no. of self-driving cars and then using AI algorithms and reinforcement learning we will train a single car. For example assume that to avoid accident the task is to apply breaks when it come closer to wall. We make a blockchain network of cars having one trained car. Trained car learns how to complete the task using its experience. Then public ledger is updated by this car stating "stop if dist<=10 m else you'll hit the wall". This public ledger is shared to others cars in network andthey get information about training that "they have to apply breaks if dist<=10 m else they'll hit the wall". Thus, single car's experience and shared information is used to train other many cars.
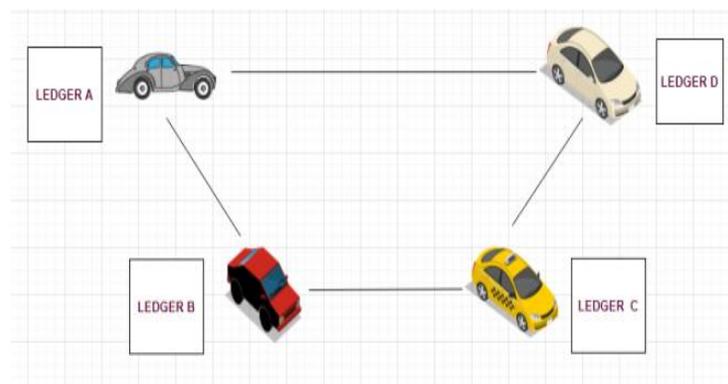

Figure (c) Network of cars using blockchain

Figure (c) shows that each self-driving car has 1 copy of public ledger.
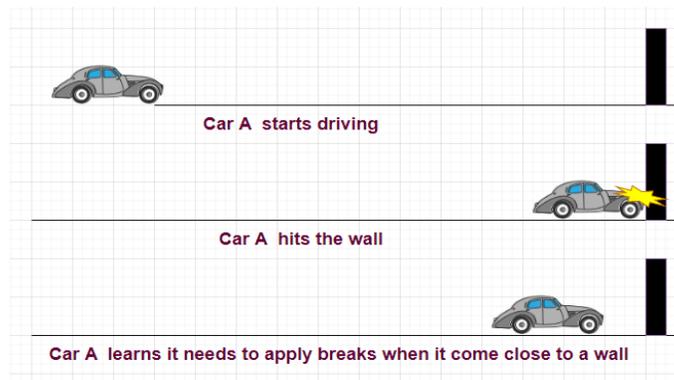
Figure (d) Single car training

Figure (d) shows single car training procedure using reinforcement learning. By using machine learning algorithms the car learns that at how much it should stop to avoid collision from its experience.
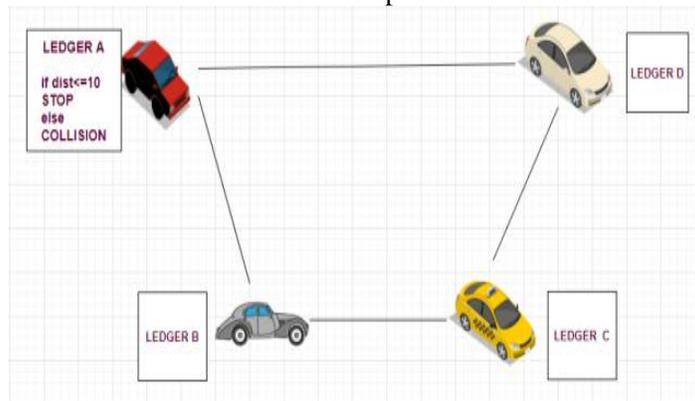

Figure (e)Ledger updated of Car "A"

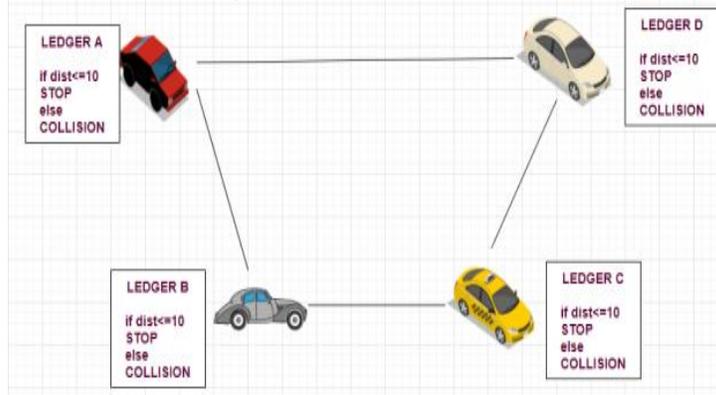Figure (e) Shows updation of car "A" ledger states that "If distance<=10m STOP else COLLISION".

Figure (f)All other ledgers get updated automatically

Figure(f) Shows decentralization and transparency of blockchains as other ledgers are also gets updated. Each car's memory gets updated with this experience. Thus, car "B", "C" and "D" automatically get training when car "A" is being trained.

C. Modularity addition

Decreasing the training process from no. of times to one is not only the advantage of proposed system.Instead this will give a wide scope of modularity make it flexible. All cars have single storage

which is shared among each other, we can train different cars for different tasks and they will learn various tasks at same. For example we can train one car "to halt when coming closer to an object" and at the same time another car is trained "to apply breaks when it is read in traffic signal and another car is trained "how to respond when driving with other vehicles to maintain distance". All these experiences get saved in common memory and learn all these three tasks simultaneously. This feature reduces the complexities. An intelligent inter-system communication is built without involvement of human. It is like cars are talking in an intelligent way.

6. CONCLUSION

By using a single car many no. of cars leans the tasks from experience. The implementation of training process reduces from many times (equivalent to no. of cars that are to be trained) to just one time. Earlier the complexity was "n" (n is no. of cars) and now complexity is reduced to "1". This system refines the old system by: Eliminating individual car training. Thousands of cars can communicate with each other, share their learned information, time, human efforts and money are also saved. Blockchain is embedded with training processes and the modularity in this system make it more simple and less time Thus, by integrating blockchain with training method make it very efficient.

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