Car Trading Using Blockchain & Artificial Intelligence

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Abstract— **Due to the increase in demand for buying and selling of used vehicles, people face the problem of trading. Hence, there is a need to cut out the mediator from the process and ease it by creating a virtual interface. Sometimes buying a used vehicle does not meet our expectations of price, color, model, customization, etc. The paper aims to provide an overall system for users that will ease the process of buying and selling which will indirectly make seamless verifications through registration authorities. This paper provides an overview of how such an interface will help people to meet the above expectations, along with estimating the cost of vehicles being sold. This interface is a combination of technologies like Artificial intelligence and Blockchain. The dataset with parameters like selling price, kilometres driven, mileage, etc was used. Redundant and missing values are removed during data processing. The model is trained using K-Nearest Neighbours supervised learning algorithm and the selling price of the vehicle is predicted with an accuracy of 95% approximately. Data security is very important here, so to ensure this, the proposed project is implemented using Blockchain which also maintains data transparency. It is like an immutable ledger that increases data reliability.**

Keywords— Artificial Intelligence, Machine Learning, Natural Language Processing, Blockchain, MetaMask, Nearest-Neighbours, Cosine, ReactJS, Flask, React-Router, Cors, Hardhat, Ethers, Solidity, Smart Contracts, Web3, Remix-IDE, Visual Studio Code, Jupyter Notebook, Python, Tailwind CSS, ChatBot, Sentiment Analyis

I. INTRODUCTION

In today's flourishing era, due to the emergence of various technologies like Artificial Intelligence, Machine Learning, Blockchain etc. people receive assistance in performing various day-to-day complex and time-consuming tasks. These technologies are getting implemented in various sectors like healthcare, education, defence, automation, fintech, etc. Along with these sectors, the above-mentioned technologies can be used in order to solve various problems in vehicle trading of used cars.

The automotive industry is a constantly evolving sector that plays a significant role in the global economy. The growth of this industry is driven by the increasing demand for vehicles, as well as technological advancements in the design and production of cars. The trading of vehicles is a crucial aspect of the automotive industry, as it allows for the distribution and exchange of vehicles between manufacturers, dealers, and consumers. This research paper aims to explore the current state of the vehicle trading industry, including trends, challenges, and opportunities. The current problem of over saturation in the car trading industry is that there are too many dealerships and car trading websites offering similar services in many markets. This has led to intense competition, which has negatively impacted the profitability of many businesses in the industry. The paper will also examine the impact of technological advancements and other external factors on the vehicle trading market. Through a thorough analysis of existing literature and data, this research paper will provide valuable insights into the vehicle trading industry and its potential future developments.

There have also been numerous prior studies conducted in the areas of land registry document verification, certificate verification, etc. The same can be implemented in car trading through which ownership and transfer of vehicles can be recorded in secure and tamper-proof digital ledger.

The main intention is to combine the above-mentioned technologies in a way to ease the trading of vehicles and makes solutions more sustainable and scalable.

II. RELATED WORK AND COMPARISON

The development of online marketplaces like CarDekho, Quikr, Carwale, Cars24 and many others have enabled the requirement for both the buyer and the seller to be more knowledgeable about the trends and patterns that define the value of the used automobile on the market.

There are several ways in which the mentioned technologies have been implemented. Some of these implementations in Artificial Intelligence include Price Prediction System, Sentiment Analysis and Recommendation System. The Price prediction model is mainly trained by using the supervised machine learning algorithms such as linear-regression, KNN, Random Forest, XG boost and Decision tree but in this proposed research the price prediction is implemented by using artififcail neural networks which will be beneficial to improve its accuracy.

The proposed solution is different from existing solutions in the market as it combines the above-mentioned implementations which are developed using different technologies.

Similarly, the Blockchain technology has various implementations for providing security related to data and transactions. Also, the data that is present in blockchain

remains transparent and is tamper-proof. It is an ever-growing chain of blocks that contains data and also the timestamp of the interaction with that specific block which provides traceability to the data and the transactions. It is only used to store critical data. There is no central database within the network that can be used to access anyone's information. Every person can own his/her data.

III. IMPLEMENTATION

From the user's point of view, this project can be divided into three sections: buy, sell, and customize. Any user accessing the web interface for the first time must log in using one of the authentication options. Any of the various authentication methods, such as MetaMask, can be employed in this situation because blockchain technology is being used in this project. MetaMask is to be connected to the web interface by users to perform various operations related to transactions. In addition to the fact that blockchain is a new and rapidly developing technology, a chatbot has been deployed to improve the user experience and make it easier for users to navigate the website.

It is a convenient way to access the functionalities that the website or the web interface is providing.

(A) Buy: When a user chooses to buy a vehicle, he or she can add characteristics that meet their requirements. Content-based recommendation systems provide car recommendations to users based on the qualities they have entered. The content-based recommendation system is implemented using the technique of nearest neighbors with cosine distance. The sentiment analysis is used for the automated process of understanding the sentiment or opinion from the review of customers. NLP is used for the analysis of sentiments from reviews.
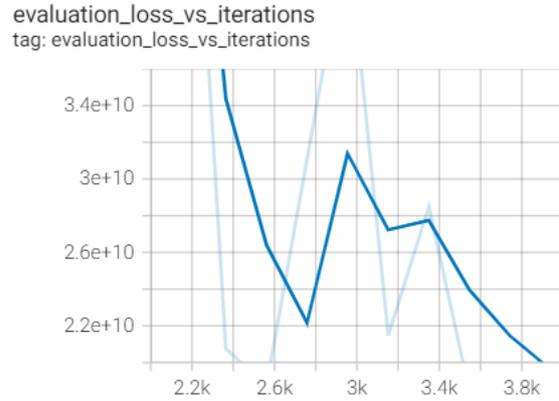

Fig. 2. Evaluation loss vs iteration graph

(C) Customize: When a user selects the option to personalize a vehicle, the user is free to tell the application whatever characteristics he or she wants to add to the vehicle. Based on the user's location the application creates a connection between the user and the nearby garage company for customizations based on his/her need.

(D) ChatBot: An Artificial Intelligence-based chatbot is provided on the interface as a support to the user. It helps to understand customers' queries and responds to them accordingly, simulating human conversation. There is an intent and target-based text file based on which the chatbot answers the common questions asked by the users. As discussed earlier, the project is divided into 3 parts i.e., Blockchain, Web Interface, and Artificial Intelligence.
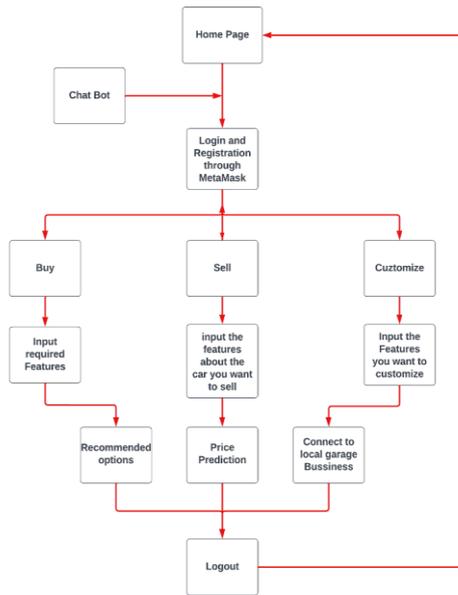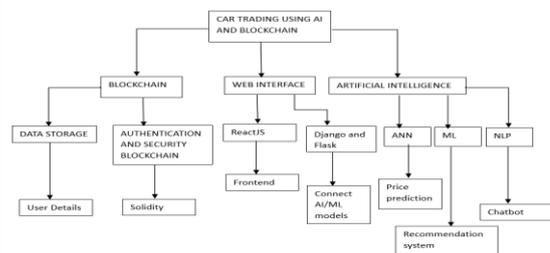

Fig. 1. Flow Diagram

(B) Sell: When a user chooses the option to sell an automobile, the user is allowed to add characteristics, and the price of the car is estimated based on those features. In this study, the artificial neural networks with higher than 95% prediction accuracy are used to perform price prediction of the car with particular specifications .

Fig. 3. Technologies used

1) Web Interface or the Website is implemented using ReactJS for the frontend and similarly NodeJS, ExpressJS and also Flask for the backend. To carry out the frontend we need to install various npm packages or dependencies like react-router. etc. On the other hand, Flask is used for connection with the AI models that have been separately built.

2) Artificial Intelligence: This includes a model for the Prediction of car price trained using an artificial neural network. Content-based recommendation system is implemented using the nearest neighbors (Lazy learner) algorithm with a cosine distance strategy. The sentiment analysis will be done using NLP. Along with this, one AI-based Chatbot will be there to provide customer support.

3) Blockchain: The usage of blockchain can be divided into 2 types i.e. for data storage and the other for authentication and security. As discussed earlier, only specific crucial data is stored on blockchain hence user details are stored so that the previous history of used vehicles is retained throughout and can be accessed as and when required. This helps to reduce fraudulent activity related to the trading of vehicles while transferring. Secondly, smart contracts are built in order to facilitate the functioning of buying and selling of vehicles. In order to write the smart contract a special programming language is used named as Solidity.

To make car trading more efficient this project uses the integration of various technologies like AI/ML, Blockchain and Web Technologies as mentioned in Fig.2.

IV. CONCLUSION

The growth in the automobile industry increases the demand for vehicle production. So, trading (distribution of vehicles) of cars plays an important role. Online trading of vehicles has grown explosively over the years due to the convenience, flexibility, and assurance it offers. The use of Artificial Intelligence and Blockchain can make it easier for buyers and sellers to research different varieties of vehicles, and compare them to other vehicles in the same category which can give them more clarity about the vehicle and assure that they are buying suitable vehicles for them according to their needs. It also makes it easier to purchase the vehicles remotely from the comfort of their home. This also makes it easier for private sellers and second-hand sellers to reach a wider audience and sell their vehicles at a faster pace. The use of Blockchain and AI has the potential to revolutionize the trading of the automobile sector by increasing transparency, security, and efficiency. Blockchain provides us with an immutable and decentralized ledger for ownership of a vehicle. AI is used to improve the recommendation process according to individual needs, as well as predict market trends and optimize price prediction.

Overall, the use of Blockchain and AI in car trading has the potential to bring significant benefits.

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