Blockchain in Automotive Industry

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Genesis Convergence is Subject Matter Expert in Blockchain and Cryptocurrency.

We offer Crypto Development/Consulting services covering solution architecture refinement, customization, integration, transformation, visualization, and analytics to uncover insights hidden within data and enhance data exploration.

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OBJECTIVE

It's not surprising that the automotive industry is facing a wide range of challenges. Complex supply chains, a multistage manufacturing process, monitoring compliance, car agreement networks, and aftersales services –are some of the aspects that require strong practices and solutions to prevent possible failures. The difficulty of the sector is further intensified by emerging trends such as electric and autonomous vehicles. In a blockchain, manufacturers have an influential new tool that can help them cut costs, optimize procedures, and improve supply chain management and liability.

In this document, Let's examine some of the ways in which the technology can advantage the sector

BLOCKCHAIN THE FUTURISTIC APPROACH

- In simple terms, a blockchain is a peer-to-peer distributed ledger that stores information and keeps track of transactions.
- Each and every member of the blockchain community has its own copy of the information.
- The information is recorded subsequently into units called blocks and protected by strong cryptography, creating a chain of data.
- Changes to blocks are not permitted by the blockchain system architecture, so every action and event could be traced to its origins.
- A blockchain could store data on agreements between the parties, their credentials, transactions, and any other information presented in a digital form.
- Since this information is distributed and highly secured, any attempt at a fraudulent activity can be seen by the members of the blockchain community.
- This creates trust and transparency for any type of ecosystem that the blockchain is integrated into.

Blockchain Functioning

Blockchain is a platform that ensures the integrity of the information stored and maintains interactions between the members of the ecosystem. Here's a high-level overview of the way it works:

- Each member maintains their own blockchain node with the full history of all the events and data appended to the network, including credentials, identities, certificates, etc.
- Every update to the network entails the creation of a new block at the end of the chain. A blockchain protocol dictates how these blocks are recorded, validated, and distributed.

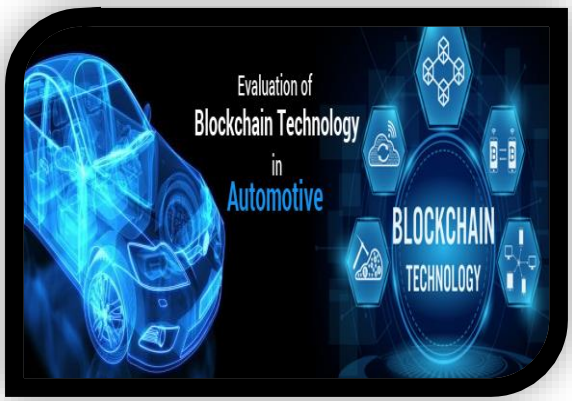
- A consensus mechanism is employed to verify each created block where members of the blockchain network decide if it's valid to be added to the chain.
- Once a block is created and confirmed, it cannot be revoked. All entries on the blockchain are permanent and securely stored. This allows for members of the community to trace the full history of transactions and any other modifications in the7i blockchain.
- Smart contracts are a special type of agreement between the members of the network that have the conditions programmed into them, making sure that they are met before each party receives what was agreed upon. Smart contracts eliminate the need for third parties and middlemen to be involved in agreement resolution.
- Transactions in cryptocurrency play a very important part in the blockchain ecosystem, providing the incentive for all members of the community to make valuable contributions and participate in the development of the system as a whole.

These key pillars of blockchain technology lay the foundation for its uses throughout different industries, including in education. It has the potential to create a global environment where learning materials, publications, student credits, and transcripts are easily accessible. It can also introduce new and innovative ways for accountability, incentivization, and communication between teachers, students, and other participants.

BLOCKCHAIN BOLSTERING THE AUTOMOTIVE INDUSTRY

Vehicles are gradually evolving into far more than just modes of mobility.

- Cars in the twenty-first century are mobile data centers with integrated sensors and computers that collect data about the vehicle.
- Blockchain can increase trust and collaboration among organizations, consumers, and even cars by providing more secure, traceable transactions and better access to and openness of information.
- While blockchain has the potential to disrupt the status quo on its own, when combined with the IoT, artificial intelligence, and big data, it has much more potential (AI).
- As the automotive industry moves toward self-driving, connected, and electrified vehicles, blockchain may provide another way to maximize the benefits of these technologies.
- The most appropriate use cases appear to be supply chain, financial services, and the safe, secure sharing of driver or rider data.



BLOCKCHAIN'S DIVE IN THE AUTOMOTIVE SECTOR

The automotive industry comprises a wide range of companies and organizations involved in the design, development, manufacturing, marketing, and selling of motor vehicles. It is one of the world's largest industries by revenue. It is also the industry with the highest spending on research & development.

BLOCKCHAIN REDEFINING AUTOMOTIVE INDUSTRY - USE CASES

While the financial sector has been using the blockchain for a couple of years, automotive businesses are only discovering new advantages of this technology. The auto industry is entering a new age of digitization that will significantly change everything we are used to with blockchain technology revolutionizing the automotive industry.

There are many ways the automotive industry can use the blockchain. Most of them are based on the main advantages of this technology:

- ✓ **Immutability:** no records in the chain can be modified.
- ✓ **Transparency:** all transactions in the chain are fully monitorable.
- ✓ **Permanence:** as long as the public ledger remains operative, its records are safe.
- ✓ **No intermediation:** due to the decentralized system, network members can interact with each other directly.
- ✓ **High speed of operations:** the speed of transactions is higher than in centrally controlled systems.
- ✓ **Data safety:** since all network members have a full copy of the registry, data loss is hardly possible.
- ✓ **Data security:** all records in the ledger are encrypted through cryptography.

Let's consider each use case in detail.

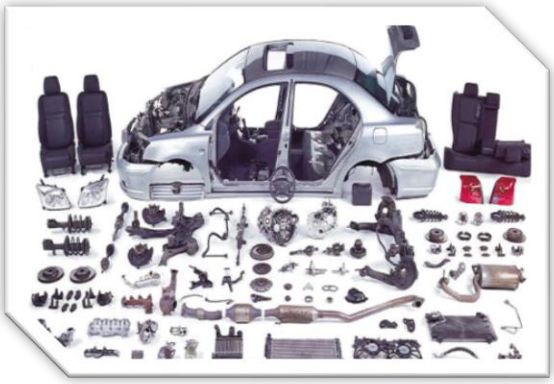
- Car sales and leasing
- Eliminating counterfeit car parts
- Auto insurance
- Cargo shipping
- Speeding up self-driving car development
- Smart Contracts for Leasing / Financing
- Manufacturing Transparency
- Automating Maintenance
- Smart Contracts for Insurance
- Theft Prevention

Car sales and leasing

- When buying a second-hand car, customers often face the problem of compromising odometer data.
- You might have bought a car that has driven many more miles than you think. This is where blockchain can come in handy. Since blockchain data is immutable, you will always be able to compare what the seller claims with the true information stored in the blockchain.

- In fact, you will be able to check any information about the car:
  - mileage,
  - accidents,
  - repair history, or any other data that will help customers avoid the wrong purchase.
- The advantages of the blockchain for automotive are obvious. In 2015, **DocuSign**, a transaction management startup, partnered with Visa to create a blockchain-based proof-of-concept project that allows customers to lease cars in an extremely simple way, in three stages:
  - **Choosing the desired car:** the system records the transaction in the blockchain's public ledger.
  - **Signing a smart contract from the driver's seat:** the contract contains an insurance policy and lease agreement.
  - **Driving.**

Eliminating counterfeit car parts



- At the beginning of 2017, Abu Dhabi officials confiscated more than 500,000 counterfeit auto spare parts worth about $4 million in a single day. It took more than 20 hours to calculate all the fake pieces. It's hard to imagine how big a market for fake car parts is. According to Nissan's representatives, the car manufacturer loses about $60 million in the Arab Emirates alone, annually, due to counterfeit car parts.
- The world obviously needs a convenient countermeasure. Besides stealing money from car manufacturers and their official partners, as well as reducing jobs, fake pieces can also compromise human lives, especially when it comes to airbags.
- By using unique radio-frequency identification (RFID) tags, car manufacturers can ensure proof of provenance for their spare auto parts and track the location of a particular car in their supply chain, while all the information about a car will be stored in the public ledger.
- Matthew Jones from IBM states that those automotive businesses that will use the blockchain to prove the provenance of their auto spare parts will be able to significantly reduce their expenses related to recall activities.

Auto insurance

- The blockchain can bring significant benefits to insurance companies.

- Both the technology's immutability principle and proof of provenance concept will help businesses to effectively leverage their operating activities.
- When a car insurer receives fraudulent information via false claims or any other channel, smart contracts can help a company to validate the submission.
- With the blockchain, insurers would be able to check whether a car needs serious repairs before the accident, which could be caused by a vehicle's technical issues, or verify any other information provided by the submitter.

Cargo shipping

- The implementation of blockchain technology in automotive can also bring various benefits to shipping companies.
- Today's shipping industry remains complex because of its tremendous volume of point-to-point communication between transportation providers, freight forwarders, customs brokers, governments, ports, and warehouses.
- All data about shipping a particular cargo is stored in the shipping company's silos, which makes it unavailable to clients. Maersk, a worldwide cargo shipper, has partnered with IBM to use blockchain to ensure trust and transparency in its supply chain, and make shipment data accessible to all supply chain members at any time.
- The blockchain offers a secure data exchange and a tamper-proof repository for cargo documents and shipping events.
- This technology can significantly reduce the number of delays and fraud while saving millions of dollars for shipping companies.

Speeding up self-driving car development

- Though Tesla has started selling its cars with a built-in autopilot function, self-driving cars remain imperfect. They seriously depend on the quality of road markings and the readability of road signs.
- To accelerate the development of driverless cars, vehicle manufacturers have to collect and process extremely large amounts of data.
- Due to the blockchain, autonomous cars will appear on our roads sooner, rather than later.
- Distributed ledgers and blockchains can allow for the transfer of necessary data between vehicle owners, researchers, and manufacturers.
- As a result, car manufacturers will be able to collect needed data faster, to start producing fully autonomous electric vehicles.

Smart Contracts for Leasing / Financing

- Smart vehicles are broaching the realm of autonomy, and this means they generate an unprecedented amount of data that must be stored, shared, and sold.
- A self-driving vehicle can generate as much as 1 gigabyte of data per second, and all of it will be put to use by somebody. It's possible that by 2020, car manufacturers will make a greater profit selling vehicle-derived data than from selling the vehicles themselves.
- Our vehicles are already collecting immense stores of data that will only grow larger.
- That data must be secured, and the blockchain is an ideal candidate for use as a storage and transfer system for vehicle-derived data.
- Additionally, utilizing blockchain technology may prove a way to allow users greater oversight into exactly who is accessing their data, and grant the user more leverage when it comes to consent on how their data is used.

Manufacturing Transparency

- As is the case with any supply chain, blockchain ledgers allow for better oversight and cooperation between members of a chain, increasing efficiency and the ability to nail down the source of a flawed shipment of mufflers or a fixable choke point in the supply line.

- Blockchain can be used in the supply chain to verify the source of materials used in the manufacturing of a car, all the way back to the raw material as soon as it is retrieved from the mine.
- A blockchain is a digital ledger of transactions that are distributed across a network of connected computer systems.
- It is a system of recording data in a way that makes it difficult to change or cheat the network. It also makes the data available to everyone at any time, so that all transactions are transparent.

Automating Maintenance

- It isn't particularly expensive to maintain your vehicle if you know what you're doing. An oil and filter change runs anywhere from $20–$100, a tire rotation is generally $20–$50, and a multipoint inspection won't break the bank for most.

- But that's only if you know how to maintain your car, assess warning lights, and so on. Continuing to drive a car that requires a checkup is a recipe for larger, more expensive problems.
- The blockchain's interoperability promises to connect the many sub-sectors that constitute the automotive industry, enhancing convenience within each.
- Connecting mechanics to your car's data from a remote location could save you time and money. Speeding tickets could be managed with a decentralized record containing all the driver's information that an officer needs to register a fine for a traffic violation.
- There are several applications utilizing blockchain technology that will reduce the headaches associated with driving.

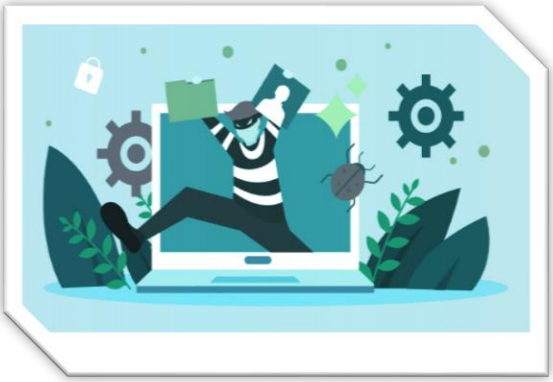
Smart Contracts for Insurance

- Between 2005 and 2015, there was an average of 5,808,272 vehicle crashes per year. This amounts to 15,913 accidents per day. That means there are a lot of insurance exchanges, processed claims, and related investigations and transactions happening nearly all the time.
- Those who seek to use blockchain technology for auto insurance purposes see the benefits of immediate storage of information like policy numbers and driver IDs on an interoperable ledger as a major benefit, whether it is for the sake of drivers, insurers, or the police.

- Additionally, there may be the possibility for a claim to execute at or just after the time of an accident, quickly paying out at least part of a claim so that a driver can be on the road more quickly.
- The smart contract aspect of blockchain technology could also prove a valuable cost- and time-saver in adjusting rates, gaining consent from the parties involved in an accident, and other unforeseen applications.

Theft Prevention

- Stealing vehicles has never been so easy.
- According to The Telegraph, nine out of ten car thieves in England aren't caught, and keyless technologies have only made the problem worse.
- In fact, 77 percent of vehicle theft cases in the country are closed without a suspect ever even being identified. In some places (and during certain cold seasons), finding a car to nab can be as easy as waiting in the parking lot on a chilly night
- Blockchain has the power to provide next-level authentication, and it's not implausible to project that identity-specific benefit being tailored to vehicle security.



- There are schools of thought that propose identity-specific unlocking mechanisms facilitated by blockchain-secured biometric data to prevent break-ins as the result of key theft.

COMPANIES WORKING ON AUTOMOTIVE BLOCKCHAIN TECHNOLOGY

- ARXUM – Supply Chain Management
- VINchain – Smart Auto Insurance
- BitCar – Peer-To-Peer (P2P) Sharing Economy
- Cube – Automotive Security & Privacy
- AMO
- The Auto Block
- ATX
- carVertical
- DAV

ARXUM – Supply Chain Management

- Automotive manufacturers face several challenges along the supply chain.
- These include counterfeit parts, defective parts, and tracing these parts back to their original suppliers. Blockchain startups facilitate a way to track and monitor vehicles or parts throughout the manufacturing life cycle. This improves counterfeit detection and transparency.
- German startup ARXUM provides blockchain-based solutions for the supply chain of automotive parts, enabling its customers to track parts to manufacturers. They also provide data about various sub-parts and processes used to manufacture a certain part. This helps manufacturers to analyze and optimize production in real-time.

VINchain – Smart Auto Insurance

- VINchain, a US-based startup, provides solutions that integrate blockchain with usage-based insurance plans.
- Their products, including VINchain Vehicle Passport and VINchain Data Verifier, allow insurance companies to access information about vehicles and driver history using a unique number.
- These products streamline the insurance process as the vehicle information is stored on a blockchain network, making data securely accessible from anywhere.

BitCar – Peer-To-Peer (P2P) Sharing Economy

- Singaporean startup BitCar develops a blockchain-based platform that sells fractional ownership of exotic cars through live auctions on their P2P trading platform.
- Their platform provides tokens to its users which represent their fraction of the ownership.
- The value of these tokens varies according to the demand for a particular vehicle, like the stock prices of vehicle companies.
- Additionally, users can trade their tokens and claim full ownership of a car.

Cube – Automotive Security & Privacy

- London-based startup Cube develops autonomous vehicle technologies based on the blockchain.
- Their platform SYNAPSE secures vehicle data, such as the personal information of users and GPS coordinates, for autonomous and connected cars.
- The platform verifies external sources and exchanges data only when the source and network can be trusted with the information.

AMO

- A blockchain platform connecting cars, people, and service providers through an integrated database.
- With just a click, users can monetize their weekend drives or other trips.

The Auto Block

Gives users a new way to buy and sell cars via its ecosystem built on the blockchain.

ATX

A single solution for dealers and lenders through which a more robust vehicle history report is created and being offered to consumers at a fraction of the cost.

carVertical

A startup working on a blockchain-based solution solving the problem of nonexisting transparency about car usage histories.

DAV

Develops a blockchain-based transportation protocol enabling a decentralized, peer-to-peer transportation network.

CONCLUSION

The blockchain, a technology used in many financial organizations, is ready for exploration by car manufacturers, resellers, and insurers; however, few companies have proclaimed their readiness to research and implement their abilities in their business.

In the long-term perspective, distributed ledgers can allow automotive companies to reduce their expenses on document workflows, reduce fraud, boost their production, and ensure security for their digital ecosystem.

Due to using blockchain in the automotive industry, it will be easier for corresponding companies to be compliant with regulatory requirements. With the blockchain, the automotive sector can become more efficient and trustworthy. The technology is highly promising, though not fully mature yet. It prepares vehicles for the upcoming environment where they will interact with each other and with the environment itself, in brand new ways.

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