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Vehicle Ownership Transfer With Criminal Case Assurance

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Abstract: The proposed web application aims to streamline the vehicle ownership transfer process and vehicle fitness certificate management by integrating the Regional Transport Office (RTO) and police departments. This integration will enhance security, transparency, and efficiency, leveraging modern encryption techniques and cloud storage solutions. The application will automate vehicle ownership transfers, providing a seamless process that links the RTO and police departments. A user-friendly interface will allow users to initiate and track transfer requests, ensuring secure document management and storage.The system will also automate the creation of vehicle fitness certificates in PDF format, encrypting them before storage in AWS S3. Users and authorities can verify the authenticity of these certificates.

Keywords: AES Encryption, PDF File, AWS S3, Data Security, RTO, Police Department.

I. INTRODUCTION

There may be several reasons why one may need to transfer their vehicle ownership to another person. The predominant reason is selling it to another person. If the buyer and seller are both from the same state, Get Forms 29 and 30 from the relevant state's Regional Transport Office (RTO). Fill out Forms 29 and 30 with the vehicle's seller's signature. Submit the filled-up forms and the registration certificate, insurance certificate, pollution under control (PUC) certificate, and address proof of both the buyer and seller to the RTO. Pay the fee for the transfer of ownership. The Vehicle ownership transfer process & vehicle fitness certificate is not highly secure way, chance of corruption/fake document submit, misuse of power & so on. We propose automation of vehicle ownership with RTO under AWS S3 service. Build SwiftFit, a decentralized vehicle passport framework that enables second-hand vehicle buyers fill the form & submit to RTO officer for Vehicle ownership exchange under AWS S3 Service.

II. RELATED WORK

1. Digital Vehicle Registration Systems:
Various countries have implemented digital vehicle registration systems to simplify the ownership transfer process. For instance, the UK's DVLA (Driver and Vehicle Licensing Agency) has an online service that allows users to transfer vehicle ownership electronically. However, these systems often lack integration with law enforcement agencies, which our proposed solution addresses by linking the RTO and police departments.

2. Blockchain for Vehicle Management:
Blockchain technology has been explored for managing vehicle-related documents. Projects like the "Blockchain in Transport Alliance" (BiTA) focus on using blockchain to create a transparent and immutable record of vehicle transactions. Our approach incorporates similar principles of transparency and security but extends it with encryption techniques and cloud storage for document security.

3. Cloud-Based Document Management:
The use of cloud services like AWS S3 for storing sensitive documents is well-established in various industries. For example, healthcare systems use encrypted cloud storage to protect patient records. Our application leverages AWS S3 for storing encrypted vehicle documents, ensuring secure and reliable access.

4. **Secure Digital Signatures:**
Digital signatures are widely used to authenticate documents and prevent forgery. The eIDAS regulation in the European Union standardizes the use of digital signatures for electronic transactions. By incorporating secure digital signatures, our application ensures the authenticity and integrity of vehicle-related documents.

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5. **Vehicle Fitness Certificate Systems:**
Some regions have automated systems for generating vehicle fitness certificates. For example, India's Vahan system automates vehicle registration and fitness certification. However, these systems might not employ advanced encryption techniques or integration with law enforcement, which are key features of our proposed solution.

III. EXISTING SYSTEM

In the existing system, the vehicle ownership transfer process and the vehicle fitness certificate system involve paperwork and are partially automated. The RTO department needs to manually verify the records of vehicle ownership transfer and document authenticity, leading to a chance of fake document submissions, corruption, or misuse of power. The process is time-consuming and may result in difficulties managing a large volume of data.
There is an increased chance of misuse of certificates.

DRAWBACKS

· **Manual Verification:**

- The RTO department manually verifies the records of vehicle ownership transfers and document authenticity.
- This manual process is prone to human errors, fake document submissions, and corruption.
-

· **Data Management Challenges:**

- Handling a large volume of data manually is cumbersome and prone to mismanagement.
- Paper documents are difficult to track, store, and retrieve when needed.

· **Risk of Certificate Misuse:**

- There is a significant risk of misuse and forgery of vehicle fitness certificates.
- Lack of proper security measures makes it easier for unauthorized individuals to create and use fake certificates.

IV. PROPOSED SYSTEM

The proposed system aims to develop a web application that automates the vehicle ownership transfer process and the vehicle fitness certificate system. The application involves managing vehicle ownership transfers, securing vehicle-related documents using encryption techniques, and storing them in AWS S3 services.

The proposed system establishes a direct link between the RTO department and the police department to automate the vehicle ownership transfer system within a single application. Vehicle fitness certificates are generated in PDF format and encrypted using encryption algorithms. The encrypted files are stored in AWS S3, preventing corruption and securing vehicle-related documents against fake submissions.

The system prioritizes privacy and security, preventing unauthorized third-party access. Automatically notify relevant authorities about any police case associated with a particular vehicle.

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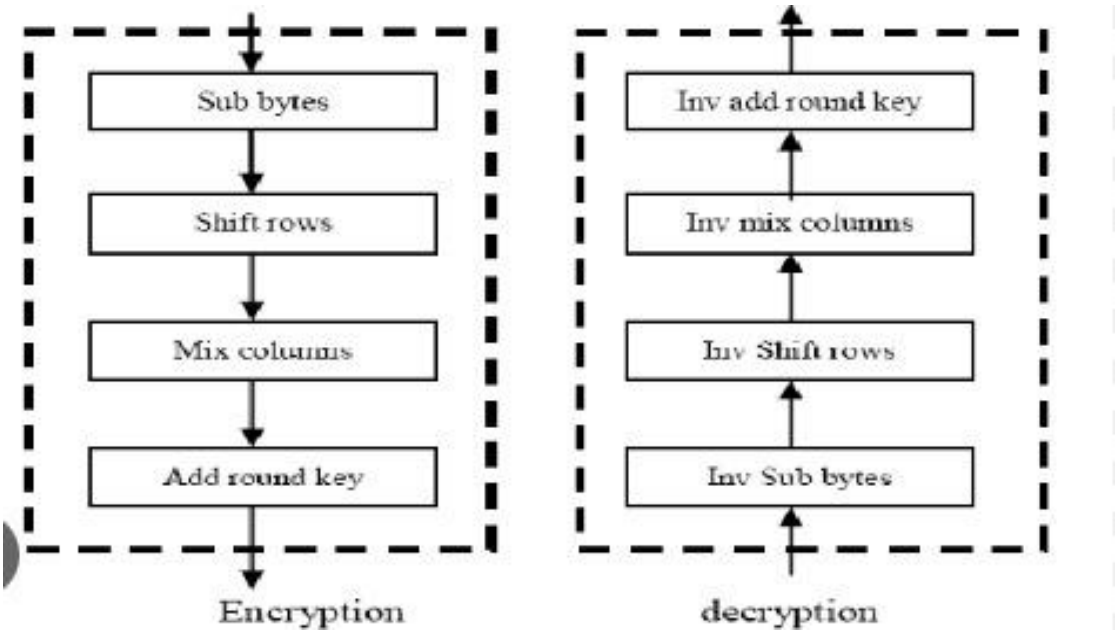
V. ALGORITHM



Encryption:
Sub Bytes: This step involves applying a non-linear substitution box (S-box) to each byte of the data block. This substitution is designed to make the relationship between the input and output bytes complex and difficult to analyze.

Shift Rows: In this step, the bytes in each row of the data block are cyclically shifted to the left. The number of positions shifted depends on the row. This step helps to diffuse the data within the block.

Mix Columns: This step operates on each column of the data block independently. It performs a linear transformation on the bytes in each column, further diffusing the data and obscuring the relationship between the input and output bytes.

Add Round Key: This step involves XORing (bitwise exclusive OR) the current data block with a round key. The round key is derived from the main encryption key using a key schedule. This step introduces the key material into the encryption process.

Decryption
Inv Add Round Key: This step is the inverse of the "Add Round Key" step in encryption. It involves XORing the current data block with the round key to remove the key material.

Inv Sub Bytes: This step is the inverse of the "Sub Bytes" step in encryption. It applies the inverse of the S-box to each byte of the data block to recover the original byte values.

Inv Shift Rows: This step is the inverse of the "Shift Rows" step in encryption. It cyclically shifts the bytes in each row of the data block to the right, undoing the shifting performed during encryption.

Inv Mix Columns: This step is the inverse of the "Mix Columns" step in encryption. It performs the inverse linear transformation on each column of the data block, undoing the mixing performed during encryption.

VI. CONCLUSION

The proposed web application for managing vehicle ownership transfers and vehicle fitness certificate issuance addresses several critical issues in the current system. By integrating the RTO (Regional Transport Office) and Police departments, the application aims to streamline the vehicle ownership transfer process, ensuring efficiency, transparency, and security.

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The use of encryption techniques for securing vehicle-related documents and storing them in AWS S3 adds an additional layer of protection, preventing unauthorized access and reducing the risk of corruption and fake document submissions. The encryption of fitness certificates and their secure storage ensures that these important documents are both accessible and protected from tampering. Overall, the application promises to enhance the integrity and efficiency of vehicle-related transactions, providing a trustworthy and secure platform for all stakeholders involved.

VII. FUTURE ENHANCEMENT

1.Integration with Additional Agencies:
Expand the integration to include insurance companies and financial institutions, allowing for seamless processing of vehicle insurance and financing documents within the same application.

2.Mobile Application Development:
Develop a mobile version of the application to increase accessibility and convenience for users, allowing them to manage vehicle-related processes on-the-go.

3.User-Friendly Interface:
Continuously improve the user interface to ensure it is intuitive and user-friendly, catering to users with varying levels of technical proficiency.

4.Continuous Security Updates:
Regularly update encryption algorithms and security protocols to protect against emerging cyber threats, ensuring the long-term security of the application.

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