DEVICE DOSSIER: AUTHENTICITY, PROTECTION & STORE LOCATOR FOR DEVICES

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Introduction:

In today's fast-growing electronics market, the buying and selling of second-hand devices such as laptops and mobile phones is becoming increasingly common. However, this also leads to a rise in issues like counterfeit sales, stolen device circulation, and a general lack of trust between buyers and sellers. The absence of a centralized system to verify the authenticity and ownership of electronic devices further adds to the problem.

Device Dossier is a web-based solution designed to tackle these challenges. The system allows users to register their devices using a unique serial number, along with key specifications like operating system, memory, and storage. Each device is linked to a user account, creating a traceable and verifiable digital record.

The platform also generates a QR code for each registered device, which can be scanned to check its authenticity. This feature helps second-hand buyers quickly confirm whether a device is genuine, previously owned, or reported as stolen.

In addition to verification, the system allows users to report lost or stolen devices. If a registered device is marked as stolen, the system warns others during a search attempt. This reduces the chance of illegal resale and promotes accountability.

To enhance usability, Device Dossier includes a store locator feature using Google Maps API. This helps users find nearby authorized retailers and service centers.

Overall, the project aims to provide a secure, user-friendly, and scalable platform that improves trust and transparency in the electronics resale market.

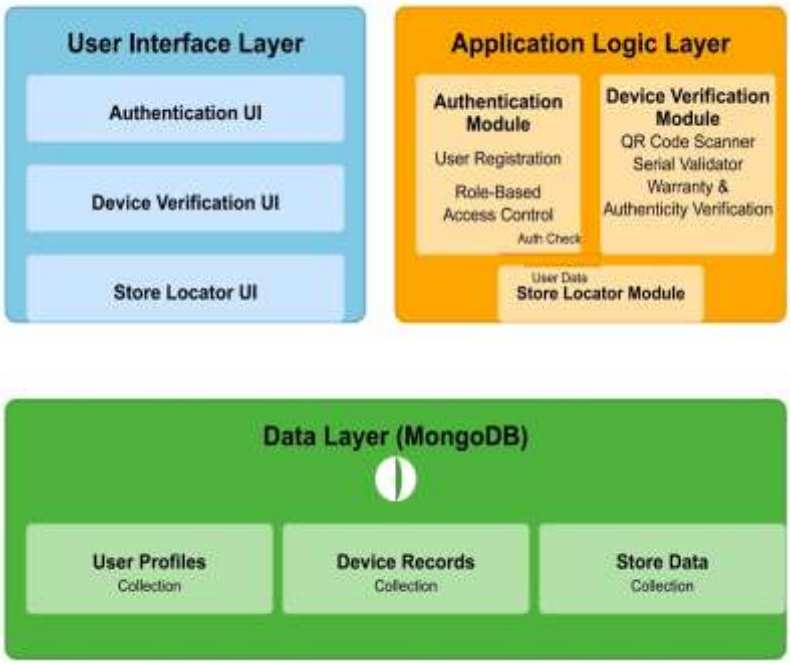

Figure 1: Architecture Diagram

Objectives:

- To help users register their devices online using unique serial numbers.
- To check and verify if a device is original or stolen.
- To show warranty and ownership information for second-hand buyers.
- To alert users and display warnings for counterfeit or stolen devices.
- To generate and scan QR codes for secure device verification.
- To maintain a centralized database of registered devices and owners.
- To provide location-based search for nearby authorized service centers.

- To improve safety, trust, and transparency in the second-hand electronics market.

Methodology:

The project is developed as a web-based system to register, verify, and track electronic devices using serial numbers. The main goal is to ensure that second-hand device transactions are secure and transparent.

The frontend is built using HTML, CSS, and JavaScript to create a simple and user-friendly interface. Users can signup, login, and register their devices through clean forms. During registration, the user provides the serial number along with device specifications like model, operating system, RAM, and storage. There's also an optional comment box to add custom details like color or display size.

The backend is built using Node.js with Express, a lightweight JavaScript web framework that handles routing, form submissions, and user authentication. Express communicates with the MongoDB database to store user information and device records.

Each registered device is assigned a unique QR code, generated using a QR module in the backend. This QR code can later be scanned to verify the device’s status, including whether it's registered, authentic, or flagged as stolen.

Users can check a device’s authenticity by entering the serial number or scanning the QR code. If the device is reported as stolen, the system displays a warning to alert others.

The platform also includes a Store Locator feature built using Leaflet.js, an open-source JavaScript library for interactive maps. It allows users to view and search for nearby authorized retailers or service centers on a dynamic map.

The system uses secure login mechanisms and validation checks to protect data. MongoDB is used to store the information in a flexible document-based format, making it easy to scale.

The platform supports two main user actions — device registration and verification — with additional features like ownership reporting, comment fields, and location services to improve functionality.

Overall, this methodology ensures the system is robust, scalable, and effective for real-world application in tracking and verifying second-hand electronic devices.

Result and Conclusion:

The Device Dossier web application was successfully developed and tested. It allows users to register electronic devices using unique serial numbers and save detailed specifications. The system also generates a unique QR code for each registered device, which can be used for fast and easy verification during resale or transfer.

Users are able to check whether a device is genuine or has been marked as stolen. This increases trust among second-hand buyers and sellers. The QR code feature works reliably and helps reduce the chances of counterfeit or illegal products being circulated.

The project uses a secure login system, and all registered data is stored safely in a MongoDB database. Users can also add custom comments about their devices, which helps in better identification in case of loss or resale.

The Store Locator feature built using Leaflet.js works effectively, allowing users to find nearby service centers or stores on an interactive map. This improves user experience and supports quicker action when needed.

The system is stable, user-friendly, and easy to navigate. All major functionalities such as registration, search, verification, and stolen device alerts perform as expected. Test cases showed smooth flow from registration to verification.

In conclusion, the project meets its main objective of improving transparency and safety in second-hand electronics markets. It provides a reliable solution for both consumers and vendors, reducing risks related to theft and fraud. The project is ready for future upgrades and wider implementation.

Project Outcome and Industry Relevance:

The Device Dossier project has resulted in a functional and user-friendly web platform that helps register, verify, and track electronic devices using serial numbers. It successfully addresses key issues in the second-hand electronics market, such as counterfeit devices, stolen goods, and lack of trust between buyers and sellers.

The system enables secure registration and QR-based verification of devices, and provides a practical solution for second-hand users to validate ownership before making a purchase. The store locator feature using Leaflet.js also adds value by helping users find nearby authorized retailers and service centers.

From an industry perspective, this solution is highly relevant as the demand for second-hand electronics continues to rise. Companies in the electronics retail, service, and e-waste sectors can adopt this system to reduce fraud, improve customer trust, and enhance product traceability.

The project also shows potential for integration with manufacturer APIs and government databases, making it a scalable solution that could support warranty validation and theft reporting at a national level. It promotes responsible resale, safer transactions, and better lifecycle management of electronic devices.

Working Model vs. Simulation/Study:

This project is a Working Model. It is fully developed as a web-based application where users can interact with the system in real-time. All key features such as device registration, QR code generation, verification, stolen device reporting, and the store locator have been implemented and tested successfully.

The platform is live on a local or test server and demonstrates all the functionalities of a complete product. No part of the system is purely theoretical or simulated; all operations are functional and can be used with real data.

Project Outcomes and Learnings:

The project led to the successful development of a web-based system that allows users to register and verify electronic devices using serial numbers. The application includes

features like QR code generation, stolen device alerts, and a location-based store locator using Leaflet.js.

One of the key outcomes is that the system helps reduce the resale of stolen or counterfeit devices by offering transparency and traceability. Users can easily check the authenticity of second-hand products, improving safety and trust in online and offline resale markets.

From a technical perspective, the project team gained hands-on experience in full-stack web development using HTML, CSS, JavaScript, Node.js, and MongoDB. They also learned how to integrate APIs (like Leaflet.js) for map-based features and generate QR codes dynamically.

The team developed a better understanding of secure user authentication, form validation, and database connectivity. Important soft skills such as collaboration, project planning, and problem-solving were also strengthened during the development process.

Overall, the project was a valuable learning experience that combined both technical and real-world problem-solving aspects, offering practical exposure to building meaningful applications.

Future Scope:

The future scope of this project includes:

1. The Device Dossier system has strong potential for future development and scalability. One of the major future enhancements is expanding support beyond laptops to include other devices like smartphones, tablets, smartwatches, and even household electronics.
2. A mobile app version of the system can be developed to allow users to register and verify devices on the go. This would increase convenience and accessibility, especially for second-hand market users.
3. The system can be integrated with brand APIs (like Dell, HP, or Lenovo) to fetch official warranty details and specifications automatically, reducing the chances of incorrect or incomplete data entry.

4. Multilingual support can be added to make the system accessible to users across different regions in India or internationally.
5. Image upload functionality could be introduced so users can add real pictures of their devices for better visual identification, especially when devices are lost or stolen.
6. AI algorithms can be trained to detect fake serial numbers or identify suspicious activity patterns across the database. This would provide automatic fraud detection.
7. Users can be given the option to transfer device ownership through a secure verification process, which will be helpful for sellers and buyers during resale.
8. The system can also provide data analytics dashboards for admin users to monitor trends, track stolen device hotspots, or generate reports for law enforcement support.
9. With these additions, Device Dossier can become a complete digital solution for product registration, verification, resale, and recovery across a wide range of electronic products.