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Smart Product Warranty Tracking System

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***Abstract*—This project designs an e-commerce website with a warranty tracking feature to enable customers to track warranties on products and receive notification alerts before expiration. It captures dates of activation, computes warranty terms, and notifies automatically through SMS or email. Customers can archive invoices and keep track warranties through a user-friendly dashboard. It increases customer convenience, minimizes warranty issues, Companies also gain from product usage insights to improve service planning. Through the combination of automation and intelligent tracking, enhancing brand-customer relationships and overall user satisfaction.**

***Index Terms*— Product sales, Warranty Tracking, Bot integration, Buying Products.**

I. INTRODUCTION

In the current competitive consumer market, it is easy to lose track of product warranties. Most people buy electronic devices, appliances, and other everyday products without properly keeping a record of their warranty duration. Subsequently, they end up missing the deadline, forfeiting free repairs, replacements, or servicing that could have saved them lots of money. To solve this problem, we suggest a Warranty Tracking System, an online solution to assist users in handling product warranties more efficiently.

The Warranty Tracking System is a centralized system where users can capture activation dates, monitor warranty durations, and be reminded before expiration. The system guarantees that users never miss a chance to claim warranty services. The app is developed with React on the frontend for a responsive and interactive user interface. The backend is maintained on Node.js and Express for a scalable and robust server-side setup, with MongoDB being employed for storing data, allowing for secure and structured product and warranty information management.

Key characteristics of the system are storage of invoices, which enables users to upload and store purchase receipts to refer to when claiming warranties easily. The system also has automatic reminders, sending alerts ahead of the expiration date of the warranty so that users can act on time. The other critical characteristic is product categorization, enabling users to classify their products into various categories to track and manage them effectively.

Through this system, users are spared the inconvenience of manually maintaining warranties, thus avoiding financial losses and optimizing the use of after-sales services. This project is intended to promote consumer awareness and convenience, thereby enhancing product lifecycle management.

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II. Literature Survey

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III. Existing System

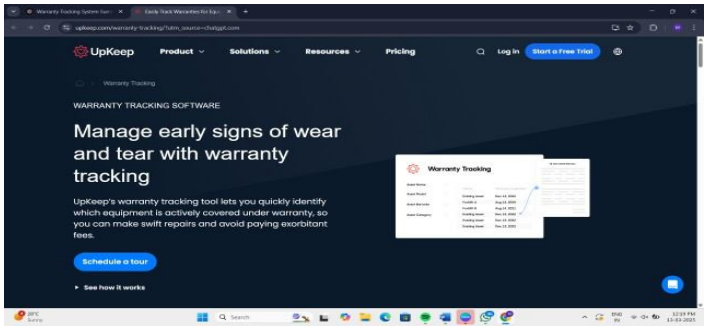

Figure 1: Existing System of Warranty tracking system

https://upkeep.com/warranty-tracking/

IV. Proposed System

The Warranty Tracking System is designed to help users efficiently manage and track the warranty periods of their purchased products. Many consumers struggle to keep track of their warranty expiration dates, often leading to missed opportunities for free repairs or replacements. The proposed system provides a centralized and automated solution to address this issue.

The system enables users to register their products, input the date of purchase, warranty duration, and upload invoices for easy retrieval. It automatically computes the date of warranty expiration and sends reminders in advance of the warranty period expiration. This helps users take required actions, including claiming repairs or replacements, before they lose warranty benefits.

The Invoice Storage Module allows users to upload and save invoices in PDF or image format to avoid losing valuable purchase documents. The system also offers a user-friendly dashboard where users can view, categorize, and manage their registered products according to product type, for example, electronics, appliances, or personal gadgets. For security and convenience, the system has a User Authentication Module, which only allows authorized users to access and manage their warranty information. Secure login mechanisms, such as JWT-based authentication, secure user data.

An Admin Module is integrated to administer users, set up notification options, and track system activity. The admin can also process support requests and ensure that the system runs smoothly. Developed with React for the frontend, Node.js and Express for the backend, and MongoDB for storage, the system proposed here is scalable, efficient, and easy to use. Through automation of warranty tracking and timely reminders, the system prevents the possibility of lost warranty claims and increases consumer convenience and cost savings.

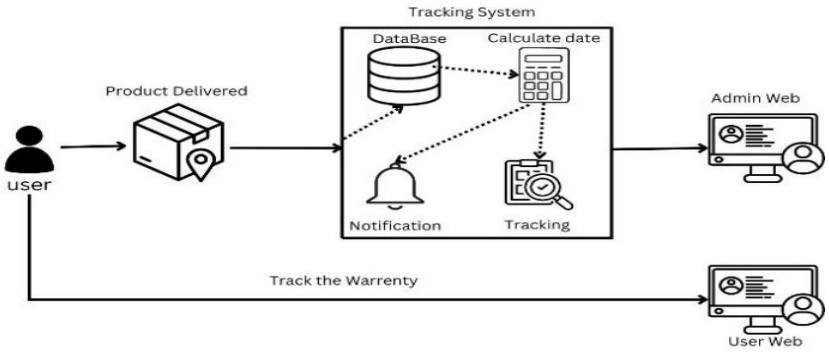

Figure 2: Block Diagram of Smart Product Warranty Tracking System

A. Module Description

- User Authentication Module
- Warranty Tracking and Notification Module
- Invoice Storage Module
- Admin Module

B. User Authentication Module

This module provides secure access to the system through user registration and login management. Users are allowed to create an account through their email and password, which are stored securely with encryption. Authentication is processed through JWT (JSON Web Token) to ensure session security. Password reset, two-factor authentication (optional), and role-based access features allow only authenticated users to view their warranty information.

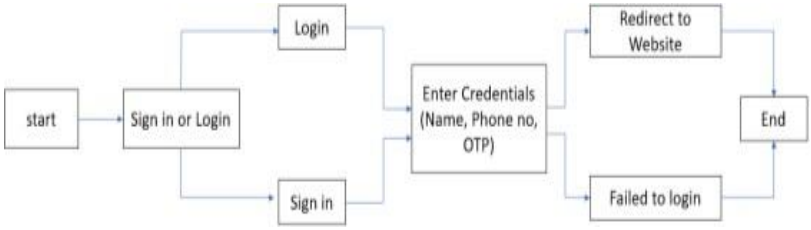

Figure 3: User Authentication Module

C. Warranty Tracking and Notification Module

This module is the central functionality of the system that assists users in tracking their product warranties. The system determines the expiration date using the activation date and warranty period when a user registers a product. The module sends reminders via email or push notifications automatically when the warranty is about to expire, allowing users to claim repairs or replacements within time. Users are also able to see warranty information in an organized manner, so it is simple to monitor multiple products.

Figure 4: Warranty Tracking and Notification Module

D. Invoice Storage Module

This module enables users to upload and save digital versions of purchase invoices as images or PDF documents. Saving invoices securely in the system allows them to easily access them for warranty claims when necessary. The system offers the functionality to download or view an invoice, so users do not lose valuable purchase records.

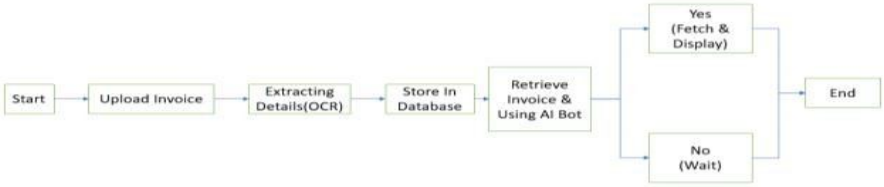

Figure 5: Invoice Storage Module

E. Admin Module

The admin dashboard allows admins to track user activity, manage notifications, and perform troubleshooting. Admins can set notification intervals, maintain user accounts, and guarantee data integrity. This module provides seamless system running and backend control over warranty tracking.

Together, these modules offer a secure, automated, and easy-to-use warranty tracking solution, minimizing the potential for lost warranty claims and enhancing consumer convenience.

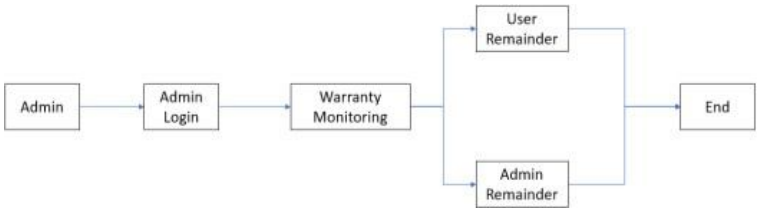

Figure 6: Admin Module

V. Results and Discussion

Effective Warranty Tracking: Various products can be registered, activation dates recorded, and warranty periods tracked with ease. The system calculated the warranty expiration dates accurately from user data.

Reminders on Time: Automated email and push reminders ensured users were timely notified when their warranty was running out, preventing them from losing free replacements or repairs.

Invoice Management: Users can upload, save, and download invoices in PDF or image format to avoid the hassle of lost purchase receipts when availing of warranties.

Secure User Access: The authentication module provided security for information through JWT-based login, which kept unauthorized users from accessing warrant information.

Admin Control: Admin panel efficiently tracked user behavior, controlled notifications, and processed system configurations, making operations seamless. The application of the Warranty Tracking System enhanced the management of the users' warranties significantly. Before, the majority of consumers employed manual tracking methods such as keeping invoices in hard form or setting reminders on handhelds, which were prone to errors and forgetfulness. With this system, warranty management was automated, centralized, and error- free. The users enjoyed the ease of use and simplicity of the interface because of the React- based frontend. The MongoDB-based Node.js backend storage facilitated a scalable and efficient storage management of bulk warranty data.

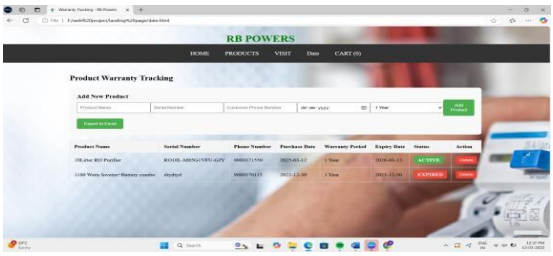

Figure 7: Product Warranty Tracking

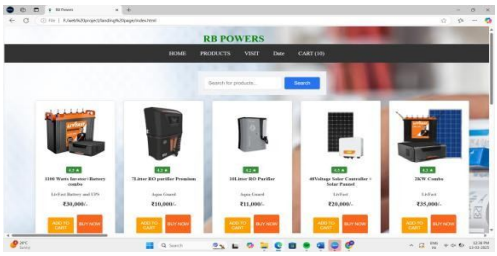

Figure 8: Product Details

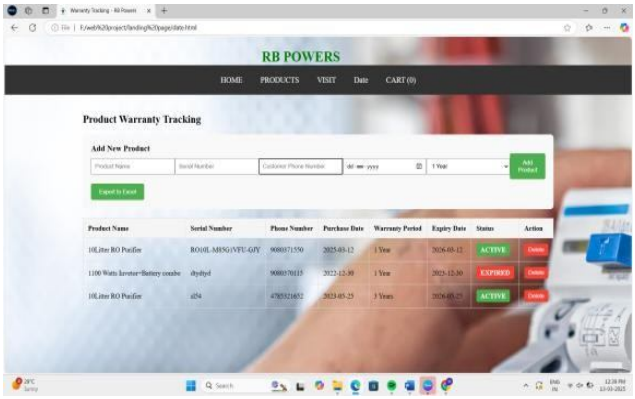

Figure 9: Product Warranty Tracking

VI. Conclusion

The Warranty Tracking System is an effective and automated product warranty management system. Through product registration, invoice storage, and automated reminders, the system never allows the user to miss warranty renewal dates. Scalability and user-friendliness are guaranteed through the use of React, Node.js, and MongoDB. Secure authentication and user-friendliness guarantee easier use and data security. In comparison to manual tracking, this system is a centralized, error-free, and hassle-free solution. Overall, it guarantees increased consumer awareness, cost savings, and warranty utilization, and it is an effective tool in managing product lifecycles.

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