

Smart Donation System

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Abstract:

The Smart Donation System is a full-stack web-based application developed using the MERN stack to address inefficiencies in traditional donation processes. Despite the availability of surplus resources such as food, clothes, and books, a significant portion of the underprivileged population lacks access to these essentials due to unorganized donation mechanisms, lack of transparency, and poor coordination between donors and non-governmental organizations (NGOs). Existing systems often rely on manual processes or informal communication channels, which result in delayed distribution, resource wastage, and limited accountability.

To overcome these challenges, the proposed system provides a centralized and structured platform that connects donors, NGOs, and volunteers through clearly defined modules. The Donor module enables users to register, upload donation details, and monitor the real-time status of their contributions. The NGO/Volunteer module allows NGOs to browse available donations, apply location-based filtering using city and pincode, accept suitable donations, and coordinate pickup and delivery operations with volunteers. This location-aware approach significantly improves efficiency by ensuring timely and practical distribution of donated items. The Admin module oversees all system activities thereby enhancing transparency and trust.

The Smart Donation System promotes efficient resource utilization by reducing wastage, improving coordination among stakeholders, and ensuring that donations reach genuine beneficiaries.

The proposed approach demonstrates how digital platforms can strengthen social welfare initiatives and improve the effectiveness of donation ecosystems.

Keywords- *Smart Donation System; MERN Stack; Location-Based Filtering; Web based application, NGOs; Donor*

I. INTRODUCTION

Donation plays a vital role in reducing resource wastage and supporting underprivileged communities. However, the existing donation process is largely unorganized and inefficient. Although many people are willing to donate usable items such as food, clothes, and books, they often lack a reliable and structured platform to reach the right beneficiaries. At the same time, NGOs and volunteers working at the grassroots level face difficulties in identifying donors at the right time and location, which leads to delays in distribution and missed opportunities to help those in need.

The Smart Donation System addresses these challenges by providing a centralized web-based platform that effectively connects donors, NGOs, and volunteers. The system enables donors to register and upload details of items they wish to donate, making these donations visible to nearby NGOs. NGOs can browse available donations, apply location-based filtering using city and pincode, and accept suitable items for distribution. Volunteers then assist NGOs in the pickup and delivery process, ensuring timely and efficient donation handling.

To ensure practical usability, the platform focuses on location-based matching, which helps NGOs view nearby donations and avoid impractical long-distance collection. The system is organized into three main modules. The Donor module allows users to upload donations, track real-time donation status,

and maintain transparency throughout the process. The NGO/Volunteer module enables NGOs to accept donations, coordinate with volunteers, and mark donations as successfully completed. The Admin module monitors all activities, verifies users, manages records, and prevents misuse of the system, ensuring fairness and accountability.

By integrating all stakeholders into a single MERN-based platform, the Smart Donation System minimizes wastage, improves coordination, and enhances transparency in the donation process. Overall, the system provides a seamless, location-aware, and socially impactful solution that strengthens the donation ecosystem and ensures resources reach genuine beneficiaries efficiently.

II. LITERATURE SURVEY

Several studies have emphasized the importance of adopting digital platforms to improve the efficiency, transparency, and coordination of donation systems. Traditional donation methods are largely manual and unstructured, which often results in delays, lack of accountability, and misuse of donated resources. Research conducted by Shelar et al. highlights that manual donation handling increases the risk of fraud and communication gaps between donors and NGOs, and suggests that centralized online systems can significantly improve donation management and transparency [1].

Recent studies have focused on developing web-based donation management systems to streamline interactions between donors and charitable organizations. De Silva et al. proposed a centralized donation management system that enables donors and NGOs to interact through a digital platform, improving accessibility and tracking of donations [2]. However, their study also indicates challenges related to scalability and real-time coordination when location-based matching is limited.

Location awareness has been identified as a critical factor in improving donation efficiency. Pazhanivel and NanthaKumar demonstrated that real-time location-based systems reduce food wastage by ensuring timely pickup and delivery through better donor-NGO coordination [3]. Their findings support the need for integrating location filtering techniques such as city or pincode-based matching in donation platforms.

Additionally, mobile and web-based donation systems have shown increased user engagement and transparency. Jade and Babar emphasized that digital donation platforms with real-time tracking and administrative monitoring help build trust among users and ensure accountability [4]. However, many existing systems focus either on mobile or web platforms and lack integrated volunteer coordination and administrative oversight.

Based on the reviewed literature, it is evident that a unified, location-aware, and transparent platform integrating donors, NGOs, volunteers, and administrators is still required. The Smart Donation System aims to address these gaps by leveraging MERN stack technology and incorporating real-time tracking, location-based filtering, and centralized monitoring.

III. OBJECTIVES

The main objective of the Smart Donation System is to develop a centralized, transparent, and location-based web platform that efficiently connects donors, NGOs, and volunteers for the donation of essential items such as food, clothes, and books. The system aims to simplify the donation process by allowing donors to easily register, upload donation details, and track the status of their contributions in real time.

Another objective is to enable NGOs to quickly identify and accept nearby donations using location-based filtering based on city and pincode, thereby reducing delays and transportation challenges. The system also aims to improve coordination between NGOs and volunteers to ensure timely pickup and delivery of donated items to genuine beneficiaries.

Additionally, the project seeks to maintain transparency and accountability by providing an Admin module that monitors all activities, verifies users, prevents misuse, and maintains proper records of donations. By integrating all stakeholders into a single MERN-based platform, the Smart Donation System aims to reduce resource wastage, enhance trust among users, and

improve the overall efficiency and social impact of the donation ecosystem.

IV. METHODOLOGY

The Smart Donation System is developed using the MERN stack, which includes MongoDB, Express.js, React.js, and Node.js, to ensure a scalable and efficient full-stack web application. The methodology begins with requirement analysis, where the roles and functionalities of donors, NGOs, volunteers, and administrators are clearly defined. Based on these requirements, the system architecture is designed using a modular approach to separate frontend, backend, and database operations.

The frontend of the system is developed using React.js and Tailwind CSS to create a responsive and user-friendly interface. This layer allows users to register, log in, upload donation details, browse available donations, and track donation status in real time. The backend is implemented using Node.js and Express.js, which handles user authentication, donation management, role-based access, and API communication between the frontend and database.

MongoDB is used as the database to store user profiles, donation records, location details, and status updates in a flexible document-oriented format. Location-based filtering using city and pincode is applied to match donors and NGOs within nearby regions, improving collection efficiency. An Admin module is implemented to monitor activities, verify users, and prevent misuse of the system.

Finally, the system is tested for functionality, data accuracy, and performance to ensure reliable operation. This methodology ensures transparency, efficient coordination, and effective management of donations through a centralized platform.

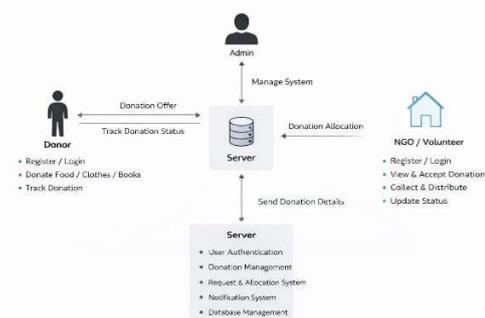


Fig.1. Architecture diagram

V. DISCUSSION

The Smart Donation System demonstrates how a centralized, technology-driven platform can significantly improve the efficiency and transparency of donation management. By integrating donors, NGOs, volunteers, and administrators into a single web-based system, the platform reduces the communication gaps and delays commonly observed in traditional donation methods. The use of a modular architecture ensures that each stakeholder has clearly defined responsibilities, which improves coordination and accountability.

One of the key strengths of the system is the implementation of location-based filtering using city and pincode. This feature enables NGOs to identify nearby donations quickly, reducing transportation challenges and ensuring timely pickup and delivery. As a result, resource wastage is minimized, and donations reach beneficiaries more effectively. Real-time status tracking further enhances transparency by allowing donors to monitor the progress of their contributions, thereby increasing trust in the system.

The Admin module plays a crucial role in maintaining system reliability by monitoring activities, verifying users, and preventing misuse. This oversight helps ensure fair usage of the platform and strengthens user confidence. Although the system effectively manages donations of physical items such as food, clothes, and books, its functionality is currently limited to internet-accessible users.

Overall, the Smart Donation System provides a practical and scalable solution for improving donation processes and highlights the potential of full-stack web technologies in addressing social welfare challenges.



Fig. 2. Landing page

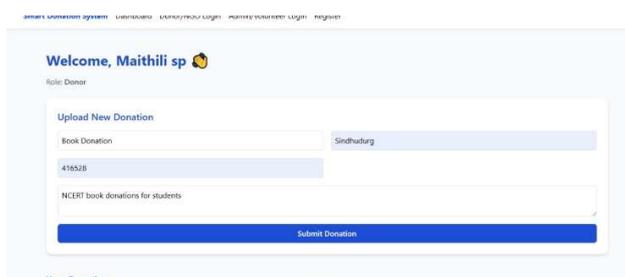


Fig. 3. Donor dashboard

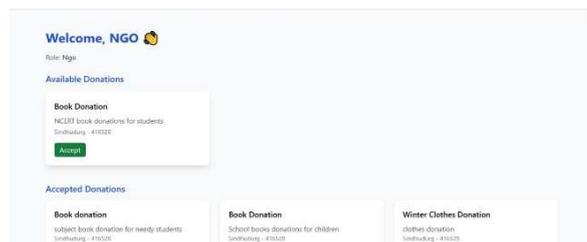


Fig. 4. NGO dashboard

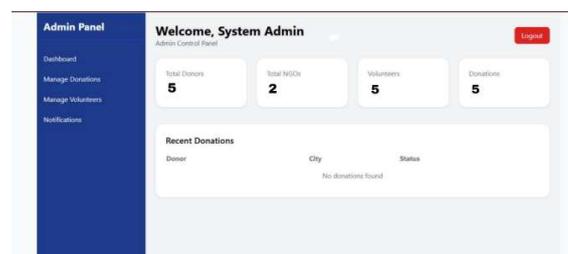


Fig. 5. Admin dashboard

VI. FUTURE SCOPE

The Smart Donation System can be further enhanced by incorporating additional features and advanced technologies to improve usability and scalability. In the future, the system can be extended to include mobile applications for Android and iOS platforms, allowing users to access the platform more conveniently. Integration of GPS-based location tracking can improve accuracy in matching nearby donors and NGOs and optimize pickup routes. The platform can also be expanded to support additional donation categories such as medical supplies, educational resources, and emergency relief items. Automated notifications through email or SMS can be introduced to keep users informed about donation status updates. Advanced security features such as role-based authentication, data encryption, and secure data storage can further strengthen system reliability. Additionally, data analytics and reporting tools can be used to analyze donation trends, identify high-demand areas, and support better decision-making. With these enhancements, the system can evolve into a scalable and intelligent donation management platform.

VII. LIMITATIONS

Despite its advantages, the Smart Donation System has certain limitations. The platform requires a stable internet connection, which may restrict access for users in rural or low-connectivity areas. The effectiveness of the system also depends

on active participation from NGOs and volunteers; limited volunteer availability may cause delays in donation pickup and delivery. Currently, the system supports only physical item donations such as food, clothes, and books, excluding monetary or blood donations. Location-based filtering relies on manually entered city and pincode information, which may lead to inaccuracies if incorrect data is provided. Additionally, the system requires continuous administrative monitoring to prevent misuse and maintain data accuracy, which can be time-consuming.

VIII. CONCLUSION

The Smart Donation System provides an efficient and transparent digital solution for managing the donation of essential items such as food, clothes, and books. By integrating donors, NGOs, volunteers, and administrators into a single MERN-based platform, the system reduces resource wastage and improves coordination. Location-based filtering and real-time tracking enhance timely distribution and build trust among users. Overall, the system demonstrates how modern web technologies can be effectively used to strengthen social welfare initiatives and improve the donation ecosystem.

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