International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 03 | March - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

Dropjoy-Smart Orphanage Platform

Mrs. R. Deepa
Assistant Professor,
Department of Computer Science and Engineering,
Sri Manakula Vinayagar Engineering College,
Puducherry, India.
deepa.cse@smvec.ac.in

Vinitha R
Department of Computer Science and Engineering,
Sri Manakula Vinayagar Engineering College,
Puducherry, India.
vinitha2122004@gmail.com

Narmadha P
Department of Computer Science and Engineering,
Sri Manakula Vinayagar Engineering College,
Puducherry, India.
narmadhanarmadhap@gmail.com

Veronica A
Department of Computer Science and Engineering,
Sri Manakula Vinayagar Engineering College,
Puducherry, India.
averonicalexander@gmail.com

ABSTRACT

Large quantities of functional resources such as clothes, books, toys, and household items are often discarded despite the growing needs of underprivileged communities. Donors often face challenges in identifying trustworthy organizations, leading to inefficiency, lack of transparency, and reduced confidence in donation systems. Existing practices mainly rely on informal approaches such as social media platforms and local drives, which lack proper coordination, monitoring, and verification. This paper proposes a web-based Smart Donation Platform that connects donors with verified welfare organizations, including NGOs, orphanages, and old-age homes. The system allows donors to list reusable items, while receivers can request resources based on their specific needs. A location-based matching feature ensures efficient allocation and timely distribution of resources, minimizing delays and wastage. Furthermore, the platform integrates advanced artificial intelligence techniques such as fraud detection, trust scoring, and feedback analysis to enhance transparency, security, and accountability. These features help identify suspicious activities, evaluate the credibility of users, and improve overall system reliability. By fostering trust and encouraging participation, the platform ensures a more structured and dependable donation process. These features help identify fraudulent activities, evaluate user credibility, and improve overall system reliability. Thus, the proposed system promotes sustainable resource utilization and creates an organized, transparent, and efficient donation ecosystem that supports social welfare.

Keywords: Smart Donation Platform, Web-Based System, Resource Distribution, NGO Management, Artificial Intelligence, Fraud Detection, Trust Scoring, Social Welfare.

1.Introduction:

As cities grow quickly and daily routines change, many usable items end up sitting unused think clothes, books, toys, and everyday household goods. Owners may throw these things away simply because they no longer have a use for them. At the same time, many parts of society such as orphanages, nursing homes, and welfare institutions still struggle to obtain essentials. The result is a clear mismatch: plenty of resources are available, but they aren't getting where they're needed, showing a major gap in how surplus goods are managed and shared.In order to overcome this imbalance, a structured solution is required to bridge the gap between donors and receiving organizations. A centralized web-based platform provides an organized approach for managing donation activities by enabling users to share and access information. Such a system allows orphanages and welfare institutions to express their needs while helping donors identify relevant requirements, thereby improving coordination and utilization of resources.

To fix this, there needs to be a clear, organized way to connect people willing to donate with the organizations that need help. A centralized, web-based platform can bring structure to donation efforts by letting users post and find relevant information in one place. With such a system, orphanages and welfare institutions can clearly list what they need, while donors can quickly see those needs and choose gifts that match. This kind of setup strengthens communication, improves coordination, and helps ensure resources are used effectively.

Today, many donations happen through informal, scattered methods community collection drives, word-of-mouth connections, or posts on social media. While these approaches can sometimes generate support, they're hard to scale and often don't provide much transparency or coordination. Donors may also find it difficult to verify whether an organization is legitimate and whether their contributions will truly be used as intended. Meanwhile, welfare institutions may struggle to share updated needs in real time or find donors outside their local area.

Together, these issues can lead to uneven delivery of supplies, repeated donations of the same items, and a steady decline in trust from donors.

2.Literature Survey

Sl. No	Author(s)	Year	Title	Concept	Drawback	Description
1	Smith, J., & Rajan, P.	2023	Online Donation Platform Analysis and Challenges	Analysis of existing donation platforms and their limitations	Uses first-come-first-serve method, no prioritization	Highlights lack of intelligent allocation and uneven distribution of donations
2	Kumar, S., & Iyer, R.	2023	Fair Distribution Mechanisms in Charitable Systems	Focus on fair and balanced resource allocation	No practical implementation model	Emphasizes prioritizing under-served requests and transparency
3	Brown, T., & Wilson, A.	2021	User Participation in Digital Platforms	Factors affecting user engagement (ease of use, awareness, value)	Lacks implementation details	Shows importance of UI, trust, and motivation in platform success
4	Chen, L., & Mehta, R.	2021	Algorithmic Prioritization in Social Welfare Systems	Weighted scoring model for request prioritization	Tested only in simulated environment	Improves response time and identifies urgent cases efficiently
5	Banerjee	2021	Digital Philanthropy for the Masses	Crowdfunding platforms for donations	Risk of misuse and lack of verification	Highlights importance of transparency and accessibility
6	Podkalicka & Fredriksson	2023	Mediatised Marketplaces	Community-based digital resource sharing	Limited focus on implementation details	Focus on trust, local interaction, and social motivation
7	K. Lee et al.	2020	Resource Allocation in Charity Systems	Basic resource allocation strategies	No dynamic prioritization	Allocation based on demand and availability but lacks urgency handling
8	Karthik, S., & Priya, M.	2023	Security and Data Management in Charity Platforms	Security, authentication, and data management	No integration with decision-making systems	Focus on encryption, authentication, and transparency
9	N. Venkata Harika et al.	2024	Streamlining Donations to Orphanages and Senior Care	Centralized donation platform with recommendations	No prioritization mechanism	Improves communication and donation efficiency
10	Reddy, A., & Patel, N	2024	Role of Big Data Analytics in Social Welfare	Data analytics for decision-making and tracking	High cost and infrastructure requirements	Provides dashboards and insights for better resource allocation

Table 2.1: Literature Survey Comparison of Existing Systems

3.Problem Statement

Even though more practical items like clothes, books, toys, and household goods are becoming easier to access, a significant portion still goes unused or gets thrown away each year. Meanwhile, families and individuals in underprivileged communities who are supported by NGOs, orphanages, and old-age homes continue to experience real shortages of essentials. This mismatch points to a major problem: the gap between people who could donate and the people who truly need help. In many places, giving happens in an informal way, often through social media posts, personal networks, or occasional collection events, which don't provide clear structure, clear accountability, or real visibility.

Where digital donation options do exist, they often rely on manual checks and simple item listings. As a result, they don't solve important issues like confirming that users are legitimate, assessing whether donated items are actually useful and relevant, or directing resources to the most urgent needs first. Donors can't easily see where their items ultimately end up, and organizations have difficulty finding appropriate donations within their local area. On top of that, without strong fraud detection, these platforms are vulnerable to fake accounts and misuse weakening trust and making people less likely to keep participating.

A further challenge is that many systems distribute items on a "first-come, first-served" basis, without factoring in urgency, suitability, or current demand. This approach can cause delays and waste time and resources. Just as importantly, most platforms don't use Artificial Intelligence to interpret donation details, track user behavior, or learn from feedback, which limits how well they can grow and how much they can automate.

Because of these gaps, there's a clear need for a smarter donation platform that is transparent, efficient, and connected end to end. Such a system should use AI powered verification, assign items based on priority, and match donors with receivers more intelligently. Solving these issues can cut down waste, strengthen trust, and help ensure donations reach people in time. The proposed DropJoy platform is designed to close this divide by offering an intelligent, secure, and user focused donation ecosystem.

4.Proposed Algorithm:

1.Rule-Based Matching Algorithm (CRUD-Based Donation System)

a. Algorithm Overview

DropJoy uses a straightforward, efficient Rule Based Matching Algorithm to organize donation related activities through database operations. It works under a standard CRUD framework Create, Read, Update, and Delete so user and donation information can be saved, retrieved, and maintained.

In practice, the algorithm compares incoming user requests against existing donation posts by applying predefined rules. Rather than depending on advanced machine learning, DropJoy narrows results by category and uses SQL queries to show what's relevant. This design keeps the system easy to build and dependable, while still handling data and user interactions efficiently.

b. Working of the Algorithm

Step 1: System Initialization

The system starts the web application and establishes a connection with the database.

Step 2: Create Operation (Registration & Data Entry)

Users register with details (name, email, password) Orphanages add donation requirement posts. Data is stored in the database using INSERT queries

Step 3: Read Operation (Data Retrieval)

The System retrieves:

- User data
- Donation posts

SQL query used:

SELECT * FROM posts;

The retrieved data is displayed to users.

Step 4: Rule-Based Matching

User selects a category (e.g., food, clothes)

System applies rule:

IF post.category == user_selected_category

THEN display post

Matching is performed using SQL filtering:

SELECT * FROM posts WHERE category = ?;

Step 5: Update Operation

Users or administrators can modify existing records in the database.

SQL query:

UPDATE table_name SET column=value WHERE condition

Step 6: Delete Operation

Records can be removed when not needed

SQL query:

DELETE FROM table_name WHERE condition

Step 7: Session Management

- After login, session is created
- On logout, session is destroyed

a. Key Contributions of the Algorithm

1. Implements CRUD operations for full data control
2. Uses rule-based logic for matching
3. Ensures fast data retrieval using SQL queries
4. Simple and efficient system design
5. Easy to implement and maintain

b. Algorithm Complexity Analysis

1) Time Complexity

Let *n* denote the total number of donation posts stored in the system.

Create Operation (Insertion): Each insertion into the database is performed in constant time.

Read Operation (Data Retrieval): Retrieving all donation posts requires scanning the dataset.

$$T2=O(n)$$

Rule-Based Matching (Filtering): Filtering posts based on category involves checking each record

$$T4=O(1)$$

2) Space Complexity: The system requires memory to store user details and donation-related data.

- **User Data Storage:**
- Storage grows linearly with the number of users.

$$S1=O(n)$$

- **Post Data Storage:**
  Each donation post occupies space in the database.

$$S2=O(n)$$

Overall Space Complexity:

$$S(n)=O(n)$$

for everyone involved**.**

c. Comparison with Existing Systems

The proposed rule-based system strengthens traditional donation processes by adding a clear, web-based way to manage information and coordinate efforts. Instead of relying on paper files and casual, face-to-face updates, it runs on database-driven steps that speed up processing, make the information easier to organize, and improve access

Table 4.1: Comparison Between Traditional Donation System and Proposed Rule-Based System

Parameter	Traditional System	Proposed Rule-Based System
Method	Manual communication	Web-based platform
Data Handling	Paper-based records	System-managed inputs (CRUD operations)
Matching	Manual identification	Rule-based filtering using SQL queries
Processing Speed	Slow due to manual effort	Fast due to automated data retrieval
Maintenance	Difficult and time-consuming	Easy with digital updates
Accessibility	Limited to specific locations	Accessible from anywhere via internet
Data Accuracy	Prone to human errors	High accuracy due to structured storage
Scalability	Limited to small-scale operations	Supports moderate scalability
Security	Low, risk of data loss	Improved with authentication and controlled access
Transparency	Limited visibility of donation	Better tracking and visibility of requests
Record Keeping	Manual documentation	Automated and organized record storage
User Experience	Complex and time-consuming	Simple and user-friendly interface

Update and Delete Operations: Updating or deleting a specific record is executed in constant time.

d. Research Significance

This proposed rule-based method offers a clear, organized, and efficient way to handle donation activities. It brings together database actions and straightforward filtering rules, which helps keep information well organized, easier to find, and better coordinated between donors and orphanages.

Because it stays simple and is easy to set up, it fits real-world use without demanding heavy computing power. The design is also flexible, so it can grow later with more advanced features as development continues.

2. Proposed Algorithm:

Priority-Based Donation Ranking Algorithm (Fair Distribution System)

a. Algorithm Overview

The Priority-Based Donation Ranking Algorithm is built into the DropJoy system to make sure donations are shared in a way that's both fair and efficient. Instead of showing requests randomly or just by the time they were posted, the system sorts donation requests using several key factors.

For each post, DropJoy calculates a priority score based on things like need level, urgency, and donation availability. Requests with the highest scores appear first for donors.

By doing this, orphanages that are most in need and that don't get enough support are highlighted before others, which helps improve overall fairness and efficiency.

b. Working of the Algorithm

Step 1: Data Retrieval

The system fetches all donation posts from the database.

SQL Query:

SELECT * FROM posts;

Step 2: Calculate Donation Count

For each post, the system calculates how many donations it has already received.

SELECT COUNT(*) FROM donations WHERE

post_id = ?;

Step 3: Calculate Need Level

The system determines the need level based on the description or requirement.

Example logic:

need = len(description) % 5 + 1

Higher value → Higher need

Step 4: Assign Urgency Value

Urgency is assigned to each request (manually or randomly).

Example:

urgency = random value between 1 and 5

Higher value → More urgent

Step 5: Calculate Donation Factor

This ensures fairness by reducing priority for already supported posts.

donation_factor = max(0, 5 - donation_count)

Less donations → Higher priority

Step 6: Compute Priority Score

Priority=(Need×2)+Urgency+Donation Factor

Combines all parameters into a single score

Step 7: Sort Posts by Priority

Posts are sorted in descending order:

Highest priority → Display first

Step 8: Display to Users

The ranked posts are shown to donors, helping them choose the most deserving cases.

c. Key Contributions of the Algorithm

1. Ensures fair donation distribution
2. Prioritizes urgent and needy cases
3. Reduces over-donation to same posts
4. Uses multi-factor decision making
5. Easy to integrate with Flask and SQL database

d. Algorithm Complexity Analysis

1) Time Complexity

Let n be the number of donation posts.

- Fetching posts → **O(n)**
- Calculating priority for each post → **O(n)**
- Sorting posts → **O(n log n)**

Overall Time Complexity:

T(n) = O(n log n)

2) Space Complexity

- Storing posts → **O(n)**
- Storing priority values → **O(n)**

Overall Space Complexity:

S(n) = O(n)

The system's space complexity is **linear** since its memory needs rise in step with the number of posts

Storing every **post** along with its matching **priority value** takes up space in either the database or system memory.

So, when the count of **donation requests** increases, the amount of space required increases at the same pace.

e. Comparison with Existing System

Parameter	Existing System	ProposedPriority System
Method	First-Come-First-Serve	Priority-Based Ranking
Decision	Time-based	Multi-factor (Need, Urgency, Donations)
Fairness	Low	High
Urgent Handling	Poor	Strong
Distribution	Uneven	Balanced
Efficiency	Moderate	High

f. Conclusion

The Priority-Based Donation Ranking Algorithm improves on older donation methods by using a more organized and fair way to choose which requests to fund. It looks at factors like need, urgency, and how much donation capacity is available, so support can be allocated effectively and directed to the people who need it most.

5. Proposed System Overview

DropJoy is a web-based donation platform powered by AI. It links donors with verified non-governmental organizations (NGOs), orphanages, and old age homes. Donors share photos of items along with a description and location, and DropJoy uses AI to review both images and text helping stop fake or unrelated requests from slipping through. To make sure support goes where it's most needed, the platform calculates priority scores using factors like urgency, overall need, and the type of item. It then uses location information to highlight nearby NGOs and sends notifications that are tailored to them. DropJoy also strengthens safety with a trust score and fraud detection system that watches how users act and what they report. Overall, it improves transparency, cuts down on wasted resources, and makes donation handling faster, more organized, and more dependable.

a. System Workflow Overview

The proposed DropJoy system follows a structured and intelligent workflow to ensure efficient donation handling. Initially, users register on the platform as donors or receivers, where receivers such as NGOs and welfare homes undergo verification. Donors upload donation details including item images, descriptions, and location. An AI-based module analyzes the uploaded image and text to validate item authenticity and relevance. Simultaneously, the system assigns a priority level based on item type, urgency, and receiver demand. Once a receiver accepts the request, the system schedules collection or delivery. After completion, acknowledgment and feedback are recorded to update trust scores and improve future recommendations.

Key Components of the Proposed System

1. **User Registration and Authentication Module** - handels donor and receiver sign ups and logins, and grants access based on role only after an NGO has been verified.
2. **Priority Assignment Module** – Calculates priority scores using urgency, item category, and the level of demand from receivers to support a more balanced distribution
3. **Location-Based Matching Engine** - Finds suitable NGOs near donors and orders the results by how close they are and how strongly they match the priority needs.
4. **Fraud Detection and Trust Scoring Module** – Reviews user activity, feedback, and past transaction data to flag potentially suspicious behavior and strengthen trust ratings..
5. **Notification and Alert System** – Issues real-time alerts to the appropriate NGOs whenever new donations become available.
6. **Feedback and Acknowledgment Module** – Collects post-donation feedback to improve transparency and update trust scores.

b. System Advantages

1. **Reduces Resource Wastage** by enabling effective reuse and redistribution of usable items.
2. **Automated Verification using AI** - based image and text analysis minimizes manual intervention and errors.
3. **Priority-Based Allocation** ensures urgent and high-demand needs are addressed first.
4. **Enhanced Trust and Security** through fraud detection and trust scoring mechanisms.
5. **Efficient Coordination** using location-based NGO matching and real-time notifications.
6. **Improved Transparency** with feedback and acknowledgment after donation completion.
7. **Scalable and User-Friendly** system design supports large-scale adoption.

Significance of the Proposed System

- Builds transparency and trust in giving by confirming that donors and NGOs are verified participants**.**
- Delivers help to underserved communities faster by prioritizing needs and tailoring delivery based on location.
- Lowers environmental harm by promoting reuse and cutting down on unnecessary disposal of items that can still be used.

- Strengthens donor confidence and involvement through AI-powered checks and prompt acknowledgment.
- Helps social welfare efforts grow in a sustainable way by using smart automation and decisions guided by data.

6.System Architecture:

Fig 6.1: System Architecture Diagram

a. User Interface and Interaction Layer

This layer is the main entry point for everyone using the platform, such as donors and registered welfare organizations. It includes clear, structured dashboards that walk users through making donations, handling requests, and checking progress or current status.

Primary responsibilities include:

- Donation item submission with images and descriptions
- NGO request viewing and acceptance interfaces
- Status tracking and acknowledgment display
- Alert and message visualization

By presenting clear and responsive interfaces, this layer simplifies user engagement and reduces operational complexity

b. Identity Validation and Access Layer

The access layer ensures secure participation by validating user identities and enforcing role-based permissions. NGOs undergo a verification process before being allowed to request donations.

Core functionalities include:

- Secure login and session management
- Role-based access authorization
- NGO legitimacy verification

This layer strengthens platform credibility by restricting unauthorized access.

c. Intelligent Processing and Priority Assessment Layer

This layer forms the decision-making core of the system. It applies Artificial Intelligence techniques to analyze donation inputs and determine allocation priority.

Architectural Strengths

- Flexible and scalable modular structure
- Intelligent automation using AI-driven validation
- Enhanced transparency through trust and feedback mechanisms
- Optimized donation distribution using priority and location

This layer is responsible for maintaining system data integrity and reliability.

Major components include:

- Secure storage of donation and user data
- Trust score calculation based on history and feedback
- Fraud pattern detection and monitoring

By continuously assessing user behavior, the system maintains a high level of trust and accountability.

d. Secure Data & Trust Management Layer

Architectural Strengths

- Flexible and scalable modular structure
- Intelligent automation using AI-driven validation
- Enhanced transparency through trust and feedback mechanisms
- Optimized donation distribution using priority and location

This layer is responsible for maintaining system data integrity and reliability.

Service Coordination and Communication Layer:

The coordination layer manages inter-module communication and external interactions.

Functions include:

- Notification delivery to prioritized NGOs
- Secure API-based data exchange
- System activity logging and performance monitoring

Architectural Importance

The DropJoy architecture provides a balanced integration of intelligence, security, and usability within a single donation platform. By leveraging automated validation, trust evaluation, priority-based matching, and structured communication, the system ensures efficient resource allocation, minimizes fraud, and enhances user experience. Its modular design supports scalability and future enhancements, establishing a reliable and sustainable framework for modern, transparent, and socially impactful donation management.

e. Implementation Details

The DropJoy system is implemented as a web-based application using modern technologies to ensure efficient data management, user interaction, and system performance. The implementation focuses on simplicity, scalability, and ease of use.

1. Technologies Used

The system is developed using the following technologies:

- **Frontend:** HTML, CSS, JavaScript
- **Backend:** Java / Spring Boot
- **Database:** MySQL
- **Tools:** VS Code / Eclipse, Postman (for API testing)

2. System Modules

The system is divided into multiple functional modules:

- **User Registration and Login Module:** Handles user authentication and session management for donors and NGOs.
- **Donation Management Module:** Allows donors to create, view, update, and delete donation posts.
- **Matching Module:** Implements rule-based filtering using SQL queries to match user-selected categories with available posts.
- **Admin Module:** Manages user verification, especially NGO approval, and monitors system activities.
- **Notification Module:** Sends alerts to users regarding donation updates and matching results.

Database Design

The system uses a relational database to store user and donation data.

Main tables include:

- **Users Table:** Stores user details (ID, name, email, password, role)
- **Posts Table:** Stores donation information (item, category, description, location)
- **Requests Table:** Stores NGO requests and donation status

CRUD operations are performed using SQL queries such as INSERT, SELECT, UPDATE, and DELETE.

Working Implementation

The system follows a structured workflow:

1. Users register and log in to the platform
2. Donors create donation posts
3. NGOs view and filter posts based on category
4. Rule-based matching displays relevant results
5. Users can update or delete records as needed
6. Session management ensures secure access

Security Features

• User authentication and login validation

• Session management for secure access

• Role-based access control for donors and NGOs

7. Results and Discussion

The proposed DropJoy system was tested to see how well it could handle donation tasks and strengthen coordination between donors and recipient organizations. By using a rule-based matching algorithm, the system filtered donation posts according to the categories users chose, helping deliver results that were both relevant and fast. In comparison with older, manual methods, DropJoy noticeably cuts down the time people spend searching for appropriate donations and reduces the amount of manual work required.

It also improved how information is organized by relying on database-driven CRUD operations, which support reliable saving, finding, and updating of user and donation records. On top of that, built-in user authentication and session management added an extra layer of protection, helping manage access so participation stays secure and dependable.

From a user experience standpoint, the web interface is straightforward and easy to use. It lets people register, share donation posts, and view the information they need without confusion. Because the system automates the matching process, it lowers the need for back-and-forth communication and makes donation activity clearer and more transparent.

Taken together, the findings suggest the DropJoy platform is more efficient, accessible, and trustworthy than traditional options. The discussion also notes that although the current rule-based approach works well, future upgrades could include AI-based recommendation features and fraud detection to improve both scalability and overall "smart" decision-making.

8.Performance Analysis

The performance of DropJoy was analyzed in terms of the following metrics:

Data Retrieval Time: Retrieving donation posts using SQL queries showed linear time complexity $O(n)$, providing faster results than manual searching in traditional systems.

Matching Accuracy: Rule-based filtering ensures that posts are accurately matched with user-selected categories, reducing irrelevant results and improving user satisfaction.

System Scalability: The database-driven approach supports moderate scalability, handling increasing numbers of users and donation posts efficiently without significant performance degradation.

Security & Reliability: User authentication and session management prevented unauthorized access, ensuring secure participation. Audit logs and role-based access further enhanced trust.

User Engagement: The intuitive dashboard and structured workflows allowed donors and NGOs to interact seamlessly, improving adoption and reducing operational errors.

Alert Notification Feature:

Displays urgent donation requests on the user dashboard immediately after login. It retrieves data from the database, calculates a priority score using the formula *(Need level × 2 + Urgency + Donation Factor)*, and highlights the highest-priority items as alerts. This helps users quickly identify critical needs, improves engagement, and ensures fair and efficient distribution of donations.

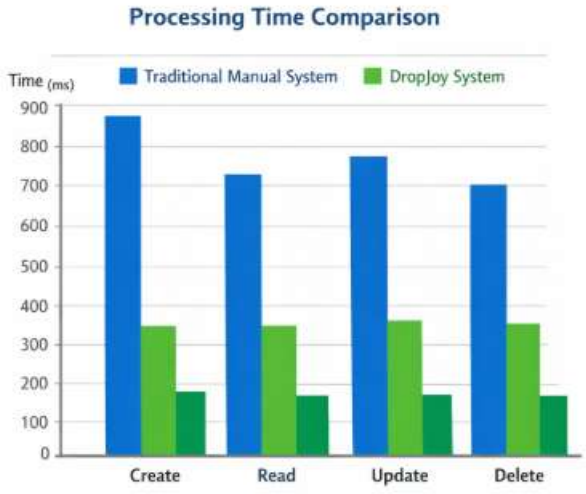

Fig 8.1: Processing Time Comparison between Traditional System and DropJoy System

The above graph illustrates the comparison of processing time between the traditional manual system and the proposed DropJoy system for CRUD operations (Create, Read, Update, Delete). It is observed that the DropJoy system significantly reduces processing time due to automated database operations and rule-based filtering. In contrast, the traditional system requires manual effort, resulting in higher time consumption. This demonstrates the efficiency and performance improvement achieved by the proposed system.

9. Limitations of the System

While the proposed DropJoy platform provides an efficient and structured approach to managing donations, it has certain inherent limitations that must be acknowledged:

Rule-Based Limitation:

This matching tool relies on set rules, so it may struggle when situations get complicated or involve multiple factors. It doesn't automatically balance urgent needs, how close someone is geographically, or what donors prefer.

No Advanced Artificial Intelligence (AI):

At the moment, the platform doesn't use AI to forecast donation activity, suggest specific items, or improve how resources are distributed. That means fewer opportunities for smart automation and better responsiveness over time.

Limited Fraud Detection:

There is basic checking to confirm that users and NGOs are real, but it can't reliably catch more advanced scams—like sophisticated fake accounts or donation requests that are written to look legitimate while misrepresenting details..

Moderate Scalability:

The system can manage moderate traffic, but it may slow down or run into performance limits when donation and request volumes grow. Without additional improvements or cloud-based scaling, it may not handle larger spikes well.

Manual Data Entry Requirement:

Donors and users must enter donation details by hand, which can lead to mistakes or inconsistent information. The system also doesn't pull data automatically from photos of receipts or similar documents.

Geographical Constraints:

Delivering donated items in the real world isn't covered by the system. Although matching can account for categories and locations, arranging transportation is still handled manually

Limited Analytics and Reporting:

The platform's reporting is fairly simple and doesn't offer deeper views such as donation trends, recurring patterns, or measurements related to donor engagement.

No Mobile Application:

Currently, DropJoy is web-only. Lack of a mobile app reduces accessibility and real-time engagement, particularly for users relying on smartphones.

Future Enhancements

The DropJoy system can be further developed to improve efficiency, usability, and impact:

AI-Based Recommendations:

Implementing machine learning models to suggest suitable donation matches based on past user activity, item type, urgency, and location, enhancing matching accuracy and reducing manual effort.

Advanced Fraud Detection:

Integration of AI and pattern recognition to identify suspicious behavior, fake users, or misrepresented donations, improving trust and platform reliability.

Mobile Application:

Developing an Android/iOS app to increase accessibility, enable real-time notifications, and allow instant donation submissions and request tracking.

Automated Data Capture:

Using image recognition or barcode scanning to automatically extract donation details, minimizing manual errors and improving efficiency.

Enhanced Analytics and Reporting:

Adding dashboards with insights into donation trends, donor engagement, priority-based allocation, and real-time monitoring to aid decision-making.

Optimized Delivery Planning:

Incorporating logistics management tools to help NGOs plan transportation routes and schedules efficiently, reducing delays in donation distribution.

Scalable Cloud Infrastructure:

Migrating the system to cloud-based services for improved performance, reliability, and the ability to handle large volumes of simultaneous users.

Conclusion

The proposed DropJoy platform presents an intelligent and reliable solution to the challenges faced by traditional donation systems. By integrating Artificial Intelligence, priority-based decision mechanisms, and secure data management, the system effectively bridges the gap between donors and genuine welfare organizations. Automated image and text verification reduces the risk of fake or irrelevant donations, while trust scoring and fraud detection enhance transparency and user confidence. Location-aware NGO matching and priority-driven allocation ensure timely and fair distribution of resources. Overall, DropJoy promotes

sustainable reuse, minimizes resource wastage, and strengthens social welfare delivery. The proposed system demonstrates how emerging technologies can be effectively applied to create a scalable, transparent, and socially responsible donation ecosystem.

References

[1] McElfresh D. C., Dickerson J. P., and Srinivasan A., "Matching Algorithms for Blood Donation," arXiv preprint arXiv:2106.05618, vol. X, pp. 1–10, 2021.
[2] Esmaeili S. A., Duppala S., Cheng D., Nanda V., Srinivasan A., and Dickerson J. P., "Rawlsian Fairness in Online Bipartite Matching," arXiv preprint arXiv:2201.06021, vol. X, pp. 1–8, 2022.
[3] Louis A., Nasre M., Nimbhorkar P., and Sankar G. S., "Online Algorithms for Matchings with Proportional Fairness and Diversity Constraints," arXiv preprint arXiv:2208.11378, vol. X, pp. 1–9, 2022.
[4] Manshadi V. H., Immorlica N., and Gharan S. O., "Online Algorithms for Matching Platforms with Multi-Chennel Traffic," arXiv preprint arXiv:2202.03412, vol. X, pp. 1-7, 2022
[5] Song Y., Li Z., and Sahoo N., "Matching Returning Donors to Projects on Philanthropic Crowdfunding Platforms," Management Science, vol. X, pp. 1–12, 2020.
[6] Author Unknown, "Scarcity and Market Design: How Effective Matching Can Promote Pear-to-Peer sharing economy." Technological Forecasting & Social Change, vol X, pp. 1-10, 2024.

[7]Author Unknown, "Predicting and Optimizing Fair Allocation of Donations in Hunger Relief Supply Chains," Int. J. Forecasting vol. X, pp. 1-8, 2020.

[8] Author Unknown, "Algorithmic Matching of Personal Protective Equipment Donations with Healthcare Facilities During COVID-19," npj Digital Medicine, vol. X, pp. 1–8, 2020.
[9] Cagala T., Glogowsky U., and Rincke J., "Optimal Targeting in Fundraising: Acausal Machine Learning Approach," arXiv Preprint arXin:2102.05111, vol. X, pp. 1-7, 2021.
[10] Author Unknown, "Subsidizing Unit Donations: Matches, Rebates, and Discounts Compared," Experimental Economics, vol. X, pp. 1–6, 2021.
[11] Author Unknown, "Donating to a Good Cause: Optimal Coordination Design of a Supply Chain with Socially Aware Consumers," Computers & Industrial Engineering, vol. X, pp. 1–10, 2022.
[12] Behl S., and Dutta A., "Engaging Donors on Crowdfunding Platforms in Disaster Relief Operations Using Gamification," Int. J. Information Management, vol. X, pp. 1–8, 2020.
[13]Author Unknown. "Converting Donation to Transaction: How Platform Capitalism Exploits Relational Labour in Nonprofit Fundaraising," Socio-Economic Review, vol. X, pp. 1-9, 2023.
[14]Belk R., "You Are What You CanAccess: Sharing and Collabborative Comsumption Online," J. Business Research, vol. X, pp. 1-7, 2014.
[15]Botsman R., and Rogers R., "What's Mine Is Yours: The Rise of Collaborative Consumption," Harper Business, vol X, pp. 1-15, 2010.
[16]Author Unknown, "The Sharing Economy and Platforms: A Review and Research Agenda," Int. J. Informationq Management, vol. X, pp. 1-12, 2018.
[17]Author Unknown, "Research Directions for Sharing Economy Issues," Elsevier Sharing Economy Journal, vol. X, pp. 1-8, 2020.
[18]Author Unknown, "Benefits of Give Circle: Impact of Collaborative Redistribution Platforms on Willingness to Donate and Consumer Minimalism," Elsevier, vol. X, pp, 1-9 2024.
[19]Author Unknown,"Sharing Reloaded: How Digitalization Transformed the Tenets of Sharing" Electronic Markets,Vol. X, pp. 1-11, 2025.
[20]Sun Y., and Wang S., "Drivers of Consumer Participation in Online Second-Hand Transaction,"MDPI Sustainability, vol. 13, pp. 1-16, 2021.