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Donify: An Expandable Method for Accountable and Open Community Contributions

Prabhat Mishra[1], Manyata Soni[2], Anshika[3], Anuj Singh[4], Shubham Kumar[5]
Dept. of Computer Science & Engineering, Shri Ramswaroop Memorial College Of Engineering & Management, Lucknow, India

Abstract: ***This study explores the digital era challenges faced by charitable donation platforms. These include burdensome lack of clarity, resource misallocation and beneficiary/donor questions of who gets what to what purpose. In traditional forms of site, people often have no detailed knowledge about where their donations are spent. The impact of this shortage has been a trust crisis on the part donors and a situation where resources cannot be used efficiently. Also, but for these reasons there is no super-local awareness, and consequently lack of real-time communication or knowledge in a place which may affect just one farmer, for example. Direct charity transfers between the recipient and the donor, micro matching with local charity organizations, traceable impact. Therefore, this study calls for a decentralized and transparent donation system that involves point-to-point feedback from donors to recipients; matching funds at the local level; carrying out an impact audit.***
Keywords: AI-Driven Donor Profiling, Predictive Donation Modelling, Cloud-Native Donation Infrastructure, Federated Data Management, Secure Data Provenance Tracking, Ethical AI Governance Protocol.

I. INTRODUCTION

The evolution of digital philanthropy has been profoundly altered by the rise of cloud infrastructures, socially conscious service models, and intelligent computational systems. These days, donation platforms are more than just simple online payment portals; they function as dynamic, data-aware ecosystems that can manage a variety of charity interactions. These platforms are increasingly implementing cloud-native, modular, and API-driven architectures that facilitate smooth data exchange, multi-platform accessibility, secure authentication, and flexible integration with third-party applications in order to improve interoperability, scalability, and operational efficiency across different non-profit networks [1]. Donation systems can extend to accommodate growing user bases and operational demands without sacrificing performance or dependability thanks to this architectural progression.

Additionally, the philanthropy ecosystem has gained a crucial degree of transparency and confidence thanks to blockchain-enabled transaction ledgers. Blockchain lowers the risk of fraud, guarantees fund allocation clarity, and boosts donor confidence in the use of their donations by documenting each transaction as a secure and unchangeable entry [2]. This change represents a larger trend away from conventional manual and paper-based philanthropic processes and towards automated, verifiable, and user-centred digital contribution environments where each stakeholder may independently assess the impact and validity of gift flows.

Mobile and web-based donation platforms increasingly include location-based services, real-time notification systems, adaptable user interface designs, and personalisation options to further boost accessibility and involvement [3]. By streamlining the contribution process, recommending causes that correspond with user interests, and offering immediate feedback on charity outcomes, these features aid in engaging donors. Nonetheless, issues including donor retention, treating sensitive data ethically, and guaranteeing clear proof of actual impact across dispersed beneficiary networks continue to plague the digital contribution ecosystem [1], [3]. Researchers are increasingly incorporating machine learning and predictive analytics into philanthropy systems in order to address these issues. These sophisticated models are able to assess donor behaviour patterns, predict donation trends, suggest campaigns based on user sentiment, and connect contributors with organisations that align with their values [4]. Adopting IoT-driven frameworks for resource coordination has also proven beneficial for organising non-cash gifts, especially when it comes to delivering food, clothing, and medical supplies. By using sensors, real-time tracking, and automated logistics updates, these systems increase the effectiveness of the supply chain, cut down on waste, and guarantee that vital supplies are delivered to people in need as soon as possible [5].

The rise of decentralised and participative charity models has changed the philanthropic paradigm towards community-led decision-making, which goes beyond operational efficiency. By enabling donors and recipients to jointly impact the allocation of funds, these frameworks strengthen equity, shared accountability, and collective governance [6]. In the background, by customising messages, narratives, and impact stories to align with individual beliefs and emotional triggers, emotion-aware engagement systems and AI-driven persuasive communication models enhance donor motivation and sustained involvement [7].

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Donify is intended to be a next-generation, all-encompassing digital contribution ecosystem that integrates these technology advancements into a single, smooth platform. Donify hopes to establish a safe, welcoming, and flexible charitable environment by combining cloud computing for scalability, blockchain for transparency and traceability, and artificial intelligence for personalisation and effective resource allocation. In addition to facilitating donations, the platform aims to foster meaningful relationships between donors and recipients, increase accountability in non-profit operations, and support long-term, sustainable social impact. Donify aims to transform charity giving into a transparent, egalitarian, and community-driven experience powered by intelligent digital technologies through this all-encompassing and technologically advanced paradigm.

II. LITERATURE SURVEY

According to studies conducted on open-source fundraising platforms such as Opencollective, the majority of donations are made by individuals and are often modest ($5–$10). The majority of projects receive less than $50,000, while just roughly 26.61% receive donations. Donations have a short-term positive impact on project development, but they have little long-term effect on sustainability and community involvement. Effectiveness is further diminished by problems including exorbitant prices, a lack of transparency, and restricted management capabilities [8].

Ouhbi et al. examined Android-based, donor-search orientated, and lacked features like recommendations and notifications. The results help developers improve their apps and increase voluntary donations [9].In paper, the authors found donation-based crowdfunding on Leetchi, specifically how project presentation and Twitter engagement influence fundraising success. The scientists used data mining and graph analysis on 1,415 projects and 50,119 tweets to analyse 70 parameters related to social strategies and communication patterns.

The findings highlight crucial metrics and effective social media methods for increasing fundraising outcomes on donation platforms[10].In paper, the authors introduce SeVa, a mobile application that links users with excess food from nearby eateries, shops, and distribution hubs in an effort to combat food waste and famine[11]. In order to make it easier for people to donate goods to charitable institutions, a Malaysian study developed an Android donation app. The researchers used a quantitative methodology and the RAD model to gather data from 20 online respondents. Although feedback suggested a few minor usability improvements, the prototype met its objectives and encouraged user participation [12].

In paper [13], The authors created the B-Door app, which securely connects blood banks, donors, and recipients in real time through approved organisations while protecting donor identity using the J48 algorithm. In paper [14], The authors suggested a GPS-enabled Android-based blood management system that would allow hospitals, donors, and blood banks to communicate in real time, guaranteeing prompt blood supply and effective emergency response. In paper [15], The authors presented DonoSync, an open donation management system created using a user-centred, iterative process. The study demonstrated how it may increase scalability and tracking of donations, providing chances for better charitable administration across industries. In paper [16], The writers created an Android application for clothing donations that links contributors with local organisations and orphans. The application ensures effective and transparent communication between donors and organisations by streamlining gift requests, alerts, and collections through GPS-based monitoring.

In paper [17], The authors discovered that while religious has no effect on clothing donation intentions, environmental attitude and donation attitude do, underscoring the importance of sustainable clothing disposal. In paper [18], the authors developed the iDonate application using the Agile methodology to build a user-friendly donation platform. The outcomes demonstrated increased user involvement and pleasure, demonstrating its efficacy in encouraging consistent philanthropic giving. In paper [19], The authors created an app that uses the "Want Help" and "Want to Help" modules to link donors with those in need, facilitating aid in areas like food, education, and healthcare to lessen the effects of poverty. In paper [20], The authors explained how the Health Sciences Library at the University at Buffalo created the Donation Programs for Books, Journals, and Media webpage. In addition to discussing library Gifts and Exchange (G&E) practices and highlighting programs like sending medical books to Afghanistan, the study traced its development since 1998. In paper [21], The writers created Bridge, an Android app that links people in need with those who would like to contribute books. The application makes use of Android's accessibility and user-friendliness to develop a straightforward yet powerful platform that facilitates the successful trade of unwanted books and encourages information sharing among community members. In paper [22], the authors provided recommendations for efficient app design by identifying the main elements that affect users' continuing usage of mobile donation applications: type-cause fit, name-cause match, cause involvement, and perceived efficacy.

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Table 1: Summary For The Literature Survey

Reference	System / Study Focus	Key Contribution / Finding	Identified Limitation
[8]	Open-source platforms like Opencollective	Most donations are individual and small-scale; short-term impact on development	Low transparency, poor sustainability, high charges
[9] – Ouhbi et al.	Android-based donor search application	Identified gaps in app engagement features like alerts and recommendations	Lacked personalization and smart notifications
[10]	Leetchi donation & Twitter engagement mining	70+ social media parameters analyzed to boost fundraising success	Dependency on external platforms like Twitter
[11] – SeVa App	Donating surplus food from local sources	Enabled food redistribution using mobile platform	Limited t food category; lacks multi-category scaling
[12]	Malaysian Android donation app using RAD model	Prototype validated user participation and ease of donation	Small sample size (20 users), limited scalability
[13] – B-Door App	Secure blood donation with J48 algorithm	Enabled identity-protected match between blood bank and recipients	Focused only on blood donation, no hyperlocal logistics
[14]	GPS-enabled blood management	Real-time hospital–donor–bank coordination	Emergency only, not general donation framework
[15] – DonoSync	Open donation management with iterative design	Improves tracking and administrative scalability	Requires coordination overhead between NGOs
[16]	Clothing donation via Android + GPS	Efficient pickup coordination and notifications	Limited to clothing, lacks trust and fraud control module
[17]	Clothing donation attitude analysis	Found motivation tied to environmental mindset more than religion	Behavioral insight only, no technology model proposed
[18] – iDonate	Agile-based digital donation system	Improved donor engagement and retention	Did not integrate geo-matching or urgency-based prioritization
[19]	“Want Help / Want to Help” dual module system	Facilitated mutual aid beyond donations (education, healthcare)	No reputation or trust score mechanism
[20]	Library donation program portal	Managed book/media donations internationally	Traditional web-based—no AI or real-time logistics
[21] – Bridge App	Book exchange donation platform	Community-based exchange via Android app	Limited routing intelligence and impact visualization
[22]	UX factors affecting donation app retention	Identified cause-fit and perceived usefulness as main retention drivers	Insight-focused study, lacks technical deployment strategy

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III. ARCHITECTURE

Donify is a collaborative, hyperlocal donation platform that eliminates middlemen and enables direct communication between donors and recipients within a 5-kilometer service area. To ensure that donations are traceable, timely, and socially verified, the design prioritises trust (light identity verification), quick local matching, AI-enhanced recommendations, self-service logistics, and robust data management. Donify integrates contemporary cloud and artificial intelligence (AI) services with zoning (geographic segmentation), monitoring (activity & fraud detection), and scheduling (slot allocation) to guarantee secure, effective, and transparent transactions at scale.

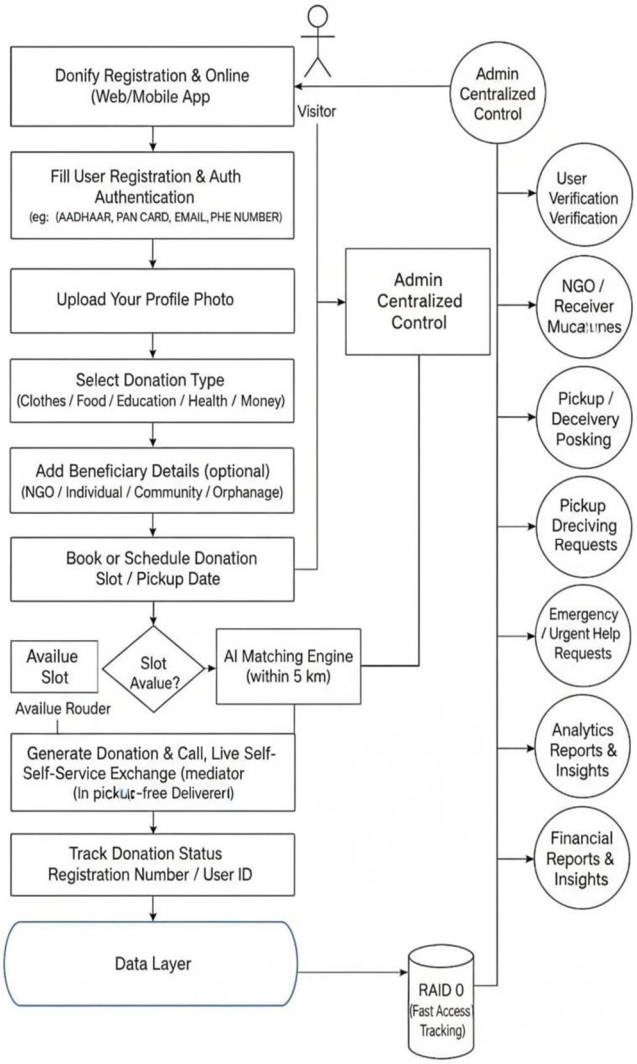


Figure 1: Architecture Diagram

1) *Dashboard for registration (point of entry for users):* A mobile and web portal that is responsive and allows users to register as either donors, recipients, or both. Name, contact information, delivery address (geo-coordinates), preferred role, and optional organization/NGO details are all gathered on the registration form. To build baseline trust, users upload a recent photo and one government ID (Aadhaar /PAN) or a verified email address or phone number. Additionally, the dashboard offers new users step-by-step instructions, usage guidelines, and assistance.
2) *Minimal Verification and User Authentication (privacy-first):* Simple eKYC that verifies identity without interfering with giving or receiving. Options for authentication include PAN, phone OTP, email verification, and eKYC based on Aadhaar. Personally identifying information is hidden in public views to preserve privacy; contact information is only disclosed with both parties' consent. This model maintains accountability while sacrificing extensive institutional verification in favor of quick on-boarding.

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3) *Module for Donation Posting and Requests:* Donors make donation listings that include the following information: quantity, preferred pickup/drop method, description, photos, category, and ideal pickup time. Requests can be posted by recipients (individuals or non-governmental organizations) with details about their need, ability to receive, and availability for pickup. Geotag, time-window, and a "match radius" that defaults to 5 km are all included in every listing.
4) *Zoning and Geolocation Engine (5 km range):* The platform uses geofencing to limit matches to the donor's specified radius (by default, ≤ 5 km) and divides the service area into micro-zones, or neighborhood polygons. Zoning avoids overlapping pickups, cuts down on transit time, and distributes donated resources fairly. Additionally, the engine supports short-term "campaign zones" for disaster relief and local drives
5) *Logistics Self-Service & Route Support:* Donors and recipients usually handle handovers on their own because Donify operates within a 5-kilometer radius. The app offers suggested meeting locations, ETAs for walking and driving routes, turn-by-turn directions, and safety advice for contactless transactions. Volunteer pickup options may be shown to users in need of assistance (opt-in system).
6) *Dashboard for Donation Status and History:* Listed → Matched → Scheduled → In Transit → Delivered → Closed are the current status states. Receipts are available for download by both parties, and the platform keeps track of each user's donations—both given and received—which feeds the reputation system and permits impact reporting.
7) *Controls for Abuse, Reputation, and Privacy:* Users are rated by a lightweight reputation system based on their past disputes, completed transactions, and community reviews. Accounts are flagged for review when abuse is detected. Until both parties accept the match, personal contact information is hidden; any misuse can be reported to the administrator directly along with supporting documentation (chat logs, images).
8) *Alert and Notification System:* Notifications via email, SMS, and push for games, upcoming times, cancellations, changes, and emergency help requests, as well as AI-generated recommendations (e.g., “Nearby receivers urgently need clothes”). Rules for notifications take into account user preferences and quiet times.
9) *Panel for Administration Monitoring and Moderation (centralised control):* Administrators can configure zoning parameters, manage volunteers and non-governmental organizations, review audit logs, verify flagged accounts, moderate disputes, and create operational reports using a centralized dashboard. During emergencies, administrators can also temporarily increase the service radius and broadcast alerts (such as public health advisories or urgent drives).
10) *Module for Volunteer and NGO Management:* Volunteers and NGOs can sign up, post their capacity, and choose to participate in assisted pickups. Administrators can assign verified volunteers to assist in high-demand neighbourhoods. The admin console displays volunteer assignments and availability.
11) *Financial Transparency, Impact Reporting, and Analytics:* The number of donations, categories, successful matches, delivery times, active users, and geographic heat maps are all displayed in aggregated dashboards. A financial transparency ledger offers fund-flow summaries and receipts for monetary donations (if supported) in order to foster trust.
12) *Cloud Data Layer (access & storage that is scalable):* For worldwide accessibility and scalability, centralized cloud databases store profiles, listings, chat logs, audit trails, and analytical data. During drives or emergencies, cloud services offer automatic scaling to meet peak demand.
13) *Strategy for Data Access and Storage (RAID + backups):* High-performance arrays may be used by local on-premises or edge servers (RAID 0 was previously recommended for speed); however, the architecture must make up for RAID 0's lack of redundancy through the use of cross-region replication, synchronous cloud backups, and periodic snapshots. The data is protected by role-based access control (RBAC), encryption both in transit and at rest, and GDPR/India-equivalent privacy compliance measures.
14) *Compliance & Security:* OTP/2FA for sensitive actions, AES encryption for storage, TLS for network traffic, and frequent security audits. The platform complies with legal requirements for data portability and erasure, and it maintains a data-retention policy.
15) *Auditing, Forensics, and Logging:* All match and confirmation events (who matched whom, timestamps, and status changes) have unchangeable logs. These logs facilitate the resolution of disputes, provide donor/NGO audit trails, and serve as privacy-preserving machine-learning retraining datasets.
16) *Extensibility & Integration:* APIs for volunteer management systems, payment gateways (if money donations are enabled), mapping and routing providers, and NGO bulk on-boarding (a, b, c). The system is made to accommodate new modules (like microloans and an upcycled goods marketplace) without interfering with the main peer-to-peer processes.

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IV. ANALYSIS

Donify's gamification architecture, includes leader-boards, badges, and coins, is a critical difference that increases user engagement and retention over the long term [23], [24]. This structure is similar to well-established methods in behavioural economics, where loyalty and ongoing user participation are fuelled by rivalry and group identification [25].

Significant operational and architectural difficulties arise when low-touch logistical operations such as the physical exchange of goods are combined with high-touch, regulated procedures—such as priority contributions. While the latter requires stringent compliance, data protection, and real-time coordination, the former depends on trust, effective matching, and scalable logistics [26].

In terms of technology, strong geospatial infrastructure, real-time communication, and fraud prevention are essential to Donify's success. The platform's 5 km hyperlocal promise depends on quick and precise proximity-based searches, which are ensured by using MongoDB's 2dsphere indexing [20]. Scalability depends on query performance optimisation, especially when filter clauses and indexing techniques are used correctly. To preserve the integrity of logistical operations and reward distribution, the platform must also incorporate anti-fraud measures like GPS spoofing detection, route verification, and proof-of-handover [27].

The last-mile collecting problem is a major operational concern. Untrained donors frequently cause delays, which makes it challenging to maintain consistent ETAs. Service dependability can be greatly increased by using solutions like "ready-for-pickup" confirmations, real-time warnings, and transparent rider tracking. Furthermore, establishing long-term trust depends heavily on data governance and NGO verification. Credibility is preserved and administrative bottlenecks are avoided with the aid of transparent data-sharing policies with partner organisations, automated verification systems, and clear protocols.

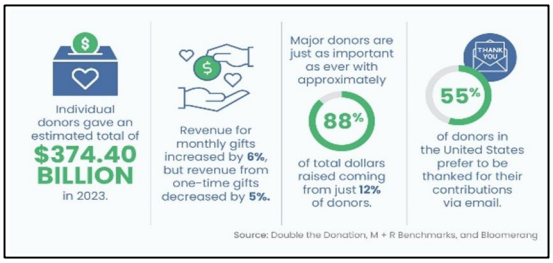


Figure 5. Non-profit fundraising Statistics 2025 (taken from 360matchpro.com)

V. MAJOR FINDING

After studying research papers from previous editions, the researcher recognized the main issues with Donation Systems. Many problems and difficulties have surfaced in the field recently. The following are some of the present problems and difficulties in Traditional Donation Systems:

1) *Donor Engagement and Trust Building:* To keep donors motivated, digital contribution systems need to improve social proof and effect transparency. Due to increased trust and perceived authenticity, Saxton and Wang demonstrate that visible effect indicators (such public donation logs and receiver verification) dramatically raise donor retention rates and repeat giving [28].
2) *Data Security and Privacy*: Donor reluctance is still high because of worries about identity theft, exposure of payment information, and unapproved profiling. According to Xu et al., unless sufficient safeguards for confidentiality, encrypted payment methods, and consent-based data processing procedures are put in place, 60% of donors steer clear of new donation apps [29]. This highlights the necessity of limited data retention models and secure authentication.
3) *Social and Behavioural Impact:* Donation behaviour is more strongly influenced by emotional engagement than by informative cues. According to McDonnell and King, indications of community connection, personal recognition, and sympathetic narrative create greater emotional resonance, thereby boosting the frequency of contributions and sustains platform participation [30].
4) *Technology and Smart Donation Systems*: According to Singh and Sinha, AI-driven matching systems that use resource classification, donor intent profile, and spatial clustering increase match accuracy and distribution efficiency while lowering the need for middlemen by 25–40% [31]. This facilitates the deployment of recommendation algorithms that are context-aware for automated donation coordination.
5) *Sustainability and Scalability*: Guo and Chen point out that cloud-native micro service architectures provide fault tolerance, distributed data processes, and load balancing while providing systems to scale automatically during periods of high demand [32]. Long-term sustainability without centralised administrative expenses is made feasible by this.

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This analysis's objective is to identify the main operational and interactional bottlenecks in the Donify platform, with a focus on real-time data processing, risk mitigation in direct transactions, donor engagement, and the infrastructure requirements necessary to support a scalable, mediator-free donation model.

a) *AI-Driven Trust Scoring and Behavioral Anomaly Detection:* An approach based on reinforcement learning Using metrics like completion rate, response latency, geographic consistency, and user feedback vectors, Trust Engine continuously assesses user interactions. Every user is given a dynamic trust coefficient (T-score) by the engine. Graph Neural Network (GNN)-based anomaly detection detects patterns of deviation from typical exchange behaviour and sends out an auto-flag risk notice prior to peer engagement in order to reduce fraudulent intent.

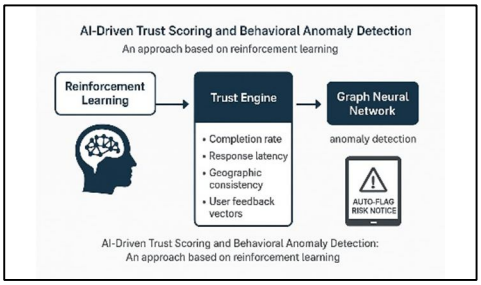


Figure 4 AI Driven Trust scoring and behaviour Anomaly detection

b) *Lightweight Identity Authentication using Hybrid Verification Layer:* Donify uses a Hybrid Digital Identity Layer (HDIL) in place of centralized KYC validation, combining:
- An OTP cryptographic handshake based on Aadhaar
- Mo-bileNet-V3 Face Embedding Comparison Model
- Identity Proofing Using Ephemeral Tokens (ET-IP Protocol)

In accordance with zero-trust architecture and privacy-preserving computing requirements, the protocol guarantees one-time identity attestation without maintaining biometric templates.

c) *Geo-Spatial Distance Optimization using AI-Based Clustering:* Donify's contribution logistics layer uses a geospatial clustering approach that matches user couples within a utility-optimized radius of 5 km. This is determined by combining K-Means spatial clustering with Haversine-based location scoring. Semantically aligning nearest-possible matches with donation category embed-dings is ensured by the matchmaking model, which takes into account both proximity and donation intent similarity vectors. This removes middlemen and third-party logistics, reducing routing overhead and encouraging self-managed donation exchange

d) *Encrypted Live Tracking with Ephemeral Session Key Exchange:* Donify uses a session-based encryption layer with AES-256 ephemeral key rotation, in accordance with the Session-Based Cryptographic Tunnelling (SBCT) principle, to protect user privacy while navigating live exchanges. In order to ensure zero data retention, a time-decay encrypted channel is started with each location update and automatically ends after donation confirmation. Using forward secrecy methods akin to TLS 1.3 ephemeral handshakes used in India Stack's digital service exchange standards, session keys are never reused and are always destroyed.

e) *Decentralized Community Moderation via Reputation Propagation Engine:* Donify uses a federated community trust governance framework in place of centralised moderation, in which users build up a dynamic donation reputation score that is calculated using a weighted interaction ledger. Users with a high trust index are granted soft moderating rights, which allow them to identify fraudulent listings, confirm legitimate requests, and contribute to trust propagation weights. This approach is modelled after DAO-style decentralised moderation. Because of this, the platform can grow naturally without requiring a lot of administrative work.

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Table 2: Complete Summary Table

Analysis Area	Identified Issue in Existing Donation Systems	How Donify Solves the Issue
Hyperlocal Donation Platforms	Long-distance logistics increase delays and discourage participation	Uses 5 km micro-zones with geofencing to ensure fast, local, and efficient exchanges
Decentralized Charity Architecture	Traditional NGO-based models are centralized and opaque	Enables peer-to-peer donation without heavy NGO dependency, increasing transparency
Peer-to-Peer Matching Mechanism	Manual or FCFS matching ignores urgency and leads to inefficient distribution	Uses AI-based weighted scoring (urgency + location + category) for smart allocation
Digital Philanthropy Applications	Most platforms only allow listing donations; no intelligent recommendation	Donify provides smart recommendations and notifications based on community demand
Routing and Pickup Scheduling	Lack of standardized logistics causes failed or delayed handovers	Integrates route suggestions, time slot booking, and volunteer optional pickup
Transparency & Trust Layer	Donors are unsure where their items go; lack of tracking reduces trust	Implements real-time status tracking + digital receipt + impact logs
User Engagement & Retention	Donation apps lack motivation features, leading to inactive users	Introduces gamification — badges, leaderboards, impact levels to retain users
Scalability & Data Management	Traditional donation drives struggle with scaling during high-demand periods	Uses cloud-backed data layer with auto-scaling and activity monitoring
Verification & Abuse Prevention	Fake accounts and misuse of resources due to weak validation	Uses light KYC with Aadhaar/PAN/OTP + reputation scoring + abuse flag system

VI. CONCLUSION

Donify is a big step forward in altering the ecology of charity donations by using technology to connect contributors and beneficiaries.The inefficiencies, lack of trust, and restricted accessibility that plague traditional contribution systems are addressed by its user-centric design, AI-driven matching, and transparency-focused features. Donify's integration of secure verification, real-time location tracking, and smooth communication not only guarantees that resources go to the proper recipients on time, but it also encourages accountability and involvement from donors. Additionally, the platform emphasises how technology may improve social impact and community support, highlighting the revolutionary potential of digital tools in social welfare. Donify's position as a scalable and sustainable paradigm for charity participation may be further cemented by future developments such as deeper user experience, predictive analytics for donation trends, and integration with bigger networks. Donify is an example of how cutting-edge digital solutions can empower both individuals and communities, establishing a standard for openness, effectiveness, and trust in the contemporary charitable environment.

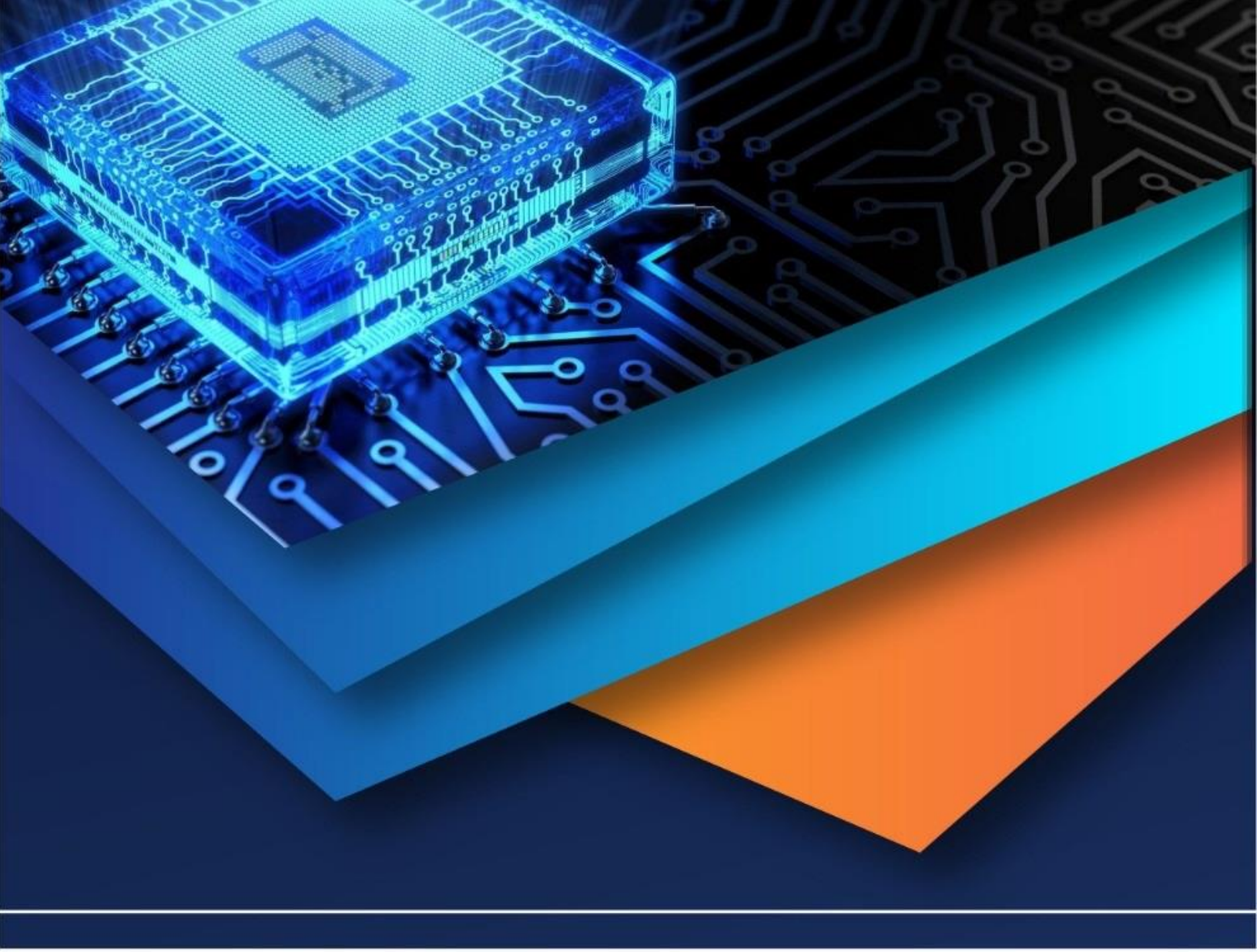
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