



Mobile-Driven Social Impact: An Android Platform for NGO Donation and Volunteer Management

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Abstract: Non-Governmental Organizations (NGOs) are pivotal in driving social change, yet many struggle with manual processes, fragmented donation tracking, and inefficient volunteer management. With the widespread availability of smartphones, mobile applications offer a promising solution to streamline these operations and enhance engagement. This paper presents the design and development of an Android-based application aimed at bridging the gap between NGOs, donors, and volunteers. The system provides a centralized platform for handling donations, managing volunteer tasks, and improving communication and transparency. Key features include user authentication, real-time status updates, donation history, and role-based access control. The application is designed to be user-friendly, scalable, and secure, empowering NGOs to reach a wider audience and operate more efficiently. By analyzing existing solutions and incorporating modern mobile technologies, this research contributes to the growing field of tech-enabled social impact, demonstrating how mobile platforms can be leveraged to strengthen NGO ecosystems.

IndexTerms - *NGO Management, Android Application, Donation Tracking, Volunteer Coordination, Mobile App for NGOs, Task Management, Social Impact Technology, Resource Allocation, Mobile-Based Donation*

I. INTRODUCTION

The Non-Governmental Organizations (NGOs) play a critical role in addressing humanitarian, environmental, and social issues across the globe. However, many NGOs continue to rely on outdated or fragmented systems for managing donations, resources, and volunteer activities, leading to inefficiencies, reduced transparency, and limited outreach [4]. In an era where digital transformation is reshaping nearly every sector, mobile technology presents a compelling opportunity to enhance the operations of NGOs and improve stakeholder engagement. With Android dominating the global mobile operating system market, it has become the platform of choice for building scalable, low-cost applications accessible to a wide user base. The integration of mobile apps into NGO operations allows for streamlined donation processing, real-time volunteer coordination, and increased accountability through transparent workflows [2][11]. Mobile interfaces also empower users—both donors and volunteers—by offering them convenient access to contribute, track their involvement, and stay informed through push notifications and status updates. Several researchers have explored technology-driven solutions for donation management. For instance, Pandey et al. developed OneWorldGiving, a centralized system that connects NGOs and donors while promoting ease of access and real-time updates [1]. Similarly, the Happy To Help (HTH) application provided users with a platform to make financial and in-kind donations securely and efficiently [2]. However, these systems often lack comprehensive task management features for volunteers or do not offer a fully unified platform that addresses both donor and NGO needs simultaneously. This research introduces an Android-based mobile application designed to serve as a unified donation and task management platform for NGOs. The system supports essential modules including NGO registration, donor and volunteer profiles, task allocation, donation tracking, and status reporting. The primary objective is to improve transparency, foster user trust, and optimize resource management for NGOs through an accessible and user-friendly mobile solution. By analyzing current systems, identifying their limitations, and incorporating features supported by recent technological trends such as real-time updates and role-based access control [5], this study aims to offer a practical solution for bridging the gap between donors, volunteers, and NGOs. The paper also outlines the system's architecture, functional design, and potential for scalability, contributing to the broader effort of using mobile technology for social good.

A. Problem Statement

Despite their critical contributions, many NGOs—particularly small to mid-sized organizations—continue to face operational challenges. Traditional, manual systems for tracking donations and managing volunteers are often time-consuming, error-prone, and lacking in transparency. While some digital solutions exist, they often address only isolated

functions such as donation collection or basic volunteer sign-ups. There is a noticeable gap in holistic platforms that combine donation management, volunteer task tracking, and real-time communication—all within a mobile-friendly ecosystem. Given the ubiquity of smartphones and Android's dominance in the mobile OS landscape, there is a clear need for a centralized and user-friendly mobile application tailored to NGO operations

B. Objective

- a. To develop an Android application that simplifies donation handling and volunteer task management

C. Scope

- a. Focus on small to mid-sized NGOs
- b. Covers donation tracking, task assignments, volunteer engagement

II. LITERATURE REVIEW

In recent years, there has been a significant shift toward mobile-based solutions to address the operational challenges faced by non-governmental organizations (NGOs), especially in donation handling and volunteer coordination. Several existing systems have attempted to bridge the gap between NGOs and the public through digital platforms. Pandey et al. introduced OneWorldGiving, a comprehensive platform designed to unite NGOs and donors through a centralized web and Android-based system. Their work highlighted the importance of an intuitive interface and real-time updates to encourage donor engagement and simplify NGO workflows [1]. Understanding the psychological factors behind online donations is equally vital. A study on social networking service (SNS) users revealed how characteristics such as empathy, trust, and ease of use influence online donation behavior. Insights from this research underline the importance of user-centric design in applications that seek public contributions, especially through mobile interfaces [3].

On the operational front, NGOs in India face various structural and administrative challenges, including resource constraints and limited access to scalable technology. Kakumani and Prabhakar highlighted these persistent issues and called for integrated technological interventions that are both scalable and cost-effective [4]. This presents a compelling case for the development of lightweight mobile apps that can be deployed even in resource-constrained environments. Security and data privacy are also crucial when dealing with sensitive information such as donor identities, financial transactions, and volunteer assignments. Mohammed proposed a Risk-Based Access Control (RBAC) model suitable for mobile platforms, which ensures that users are granted appropriate permissions based on their roles and behavior patterns [5]. Further advancements in secure identity management using blockchain technology have also been explored, offering a decentralized and tamper-proof way of managing user data [9].

Other works, such as that of Mandal, Jadhav, and Lakhani, extended the application of technology in social impact by addressing food wastage reduction through donation systems. Their research supports the potential of mobile apps not just in financial donations, but also in coordinating the distribution of physical resources [6]. Finally, broader studies such as those by Allam and by Lakshmisri & Yarlaga add demonstrate the growing adoption of big data and AI for social good. These technologies, while still emerging in the NGO sector, offer promising future directions for enhancing predictive resource allocation, volunteer management, and campaign impact analysis [7][8]. Similarly, Titarmare et al. developed Happy To Help (HTH), an Android application aimed at streamlining donation activities. This system emphasized both convenience for the donor and transparency for the recipient, contributing to trust-building—a critical factor for NGOs [2]. Shelar, Salve, and Kedari further explored this by proposing a smart donation handling system tailored for charitable trusts and NGOs. Their platform automated processes such as donation tracking and receipt generation, thus reducing manual overhead and increasing operational efficiency [11].

Table 1: Literature Survey

Ref	Title / Authors	Key Contributions	Technology / Platform	Focus Area	Limitations / Gaps
[1]	<i>OneWorldGiving</i> – Pandey et al. (2024)	Developed a centralized app to connect NGOs and donors	Android, Web	Donation management, NGO listing	Limited volunteer/task coordination
[2]	<i>Happy To Help (HTH)</i> – Titarmare et al. (2020)	Donation tracking via app and website	Android, Web	User-friendly donation system	No volunteer task handling
[3]	<i>Who Clicks on Online Donation?</i> (2019)	Behavioral study on online donation patterns	Social Media Analysis	Donor psychology, SNS behavior	No tech platform proposed
[4]	<i>NGOs: Problems & Remedies in India</i> – Kakumani & Prabhakar	Identified operational challenges of NGOs	Policy Review	NGO operations	No technical solution
[5]	<i>Risk-Based Access Control</i> – Mohammed (2019)	Proposed RBAC for secure access	Access Control Model	Security in systems	Needs real-time implementation
[6]	<i>Food Wastage Reduction</i> – Mandal et al. (2016)	App for donating surplus food	Android	Food donation coordination	Narrow domain, not for NGOs broadly
[7]	<i>AI Smart Device for COVID-19</i> – Lakshmisri & Yarlaga add (2020)	Used AI for health alerts	AI, IoT	Social distancing alerts	Not related to NGOs/donations
[8]	<i>Big Data in Cancer Research</i> – Allam (2019)	Applied big data in healthcare	Big Data	Medical research	Not NGO focused
[9]	<i>Blockchain for Identity Mgmt</i> – Mohammed (2019)	Used blockchain for secure identity	Blockchain	Data privacy, security	Complex for small NGOs
[11]	<i>Smart Donation Handling</i> – Shelar et al. (2020)	Designed a smart donation management app	Android	NGO donation automation	Basic functionality, lacks volunteer support

III. WEB-BASED PLATFORMS VS. MOBILE SOLUTIONS

A. Mobile Applications in Social Sectors

Over the past decade, mobile applications have significantly influenced how social sector services are delivered. With the proliferation of smartphones and low-cost internet access, mobile platforms have become a primary medium for engaging communities, especially in regions where desktop internet access is limited. Numerous success stories demonstrate the role of Android-based applications in facilitating donation drives, volunteer registration, and real-time communication between NGOs and stakeholders. For instance, applications like *Happy To Help (HTH)* [2] and *OneWorldGiving* [1] have demonstrated the feasibility of using mobile apps to connect donors with NGOs efficiently. These platforms have helped streamline the donation process, offer transparency in fund usage, and increase user participation. Similarly, technology has played a critical role in domains like health and food donation, as seen in systems designed to reduce food waste through app-based redistribution [6]. These solutions emphasize the potential of mobile platforms in improving operational workflows and encouraging public participation in social causes. Mobile apps also enable timely notifications, personalized dashboards, and task assignments that can be managed on the go, making them well-suited for dynamic environments like disaster response and humanitarian aid. Compared to web-based systems, which require access to a desktop or laptop, mobile apps provide on-demand access and better usability for both urban and rural users.

B. Gaps Identified

Despite these advancements, a critical gap remains in the current ecosystem of mobile solutions: the lack of an integrated, end-to-end platform that manages both donations and volunteer task coordination. Existing applications typically focus on a single aspect—either donation tracking or volunteer engagement—without providing a holistic solution that supports both functionalities seamlessly [1][2][11]. Most platforms also overlook role-based access and hierarchical task distribution, which are vital for structured NGO operations. Additionally, security considerations like access control and data privacy, as explored in research on RBAC models [5] and blockchain-based identity management [9], are often under-implemented in existing solutions, especially those targeting small and medium NGOs with limited budgets and technical expertise. This research addresses these gaps by proposing a unified Android platform that not only facilitates donations but also supports task assignment, progress tracking, and volunteer management in a secure and scalable environment.

IV. METHODOLOGY

A. System Design

The proposed system is developed using Android Studio as the primary integrated development environment (IDE), leveraging Firebase as the backend for real-time database management, user authentication, and cloud messaging. Firebase provides scalable infrastructure suitable for small to mid-sized NGOs with limited IT resources. The front-end design follows Material Design UI principles to ensure intuitive navigation, consistency across components, and a clean, modern user experience. The architecture follows a client-server model, where the Android client interacts with Firebase services to retrieve or update data related to donations, volunteer activities, and user roles. This setup ensures seamless data synchronization, real-time updates, and a responsive interface suitable for mobile-first users.

B. Modules

To provide a comprehensive platform for NGO operations, the application is divided into the following functional modules:

- **User Registration (Donors, Volunteers, Admins):**
Secure login and registration system supporting three roles: donor, volunteer, and NGO admin. Firebase Authentication is used for email-password sign-ins, with role-based permissions enforced during app navigation [5].
- **Donation Management:**
Allows donors to contribute funds or resources. Admins can post requirements and confirm received donations. Donation history and status updates are available for both admins and donors [1][2].
- **Task Assignment and Tracking:**
Admins can create tasks (e.g., event support, delivery assignments) and assign them to volunteers. Volunteers receive task notifications and can update their progress. Completion status is tracked for transparency and reporting.
- **Notification System:**
Firebase Cloud Messaging (FCM) enables real-time push notifications for task updates, new donation requests, acknowledgments, and general announcements, ensuring active engagement.
- **Dashboard/Analytics:**
Provides summarized views of active donations, volunteer task statuses, and overall impact metrics. Admins can monitor performance trends and generate basic analytics to support decision-making and donor transparency [11].

V. IMPLEMENTATION

A. Architecture Overview

The application follows a three-tier architecture, integrating frontend, backend, and database layers to ensure modularity, scalability, and real-time responsiveness.

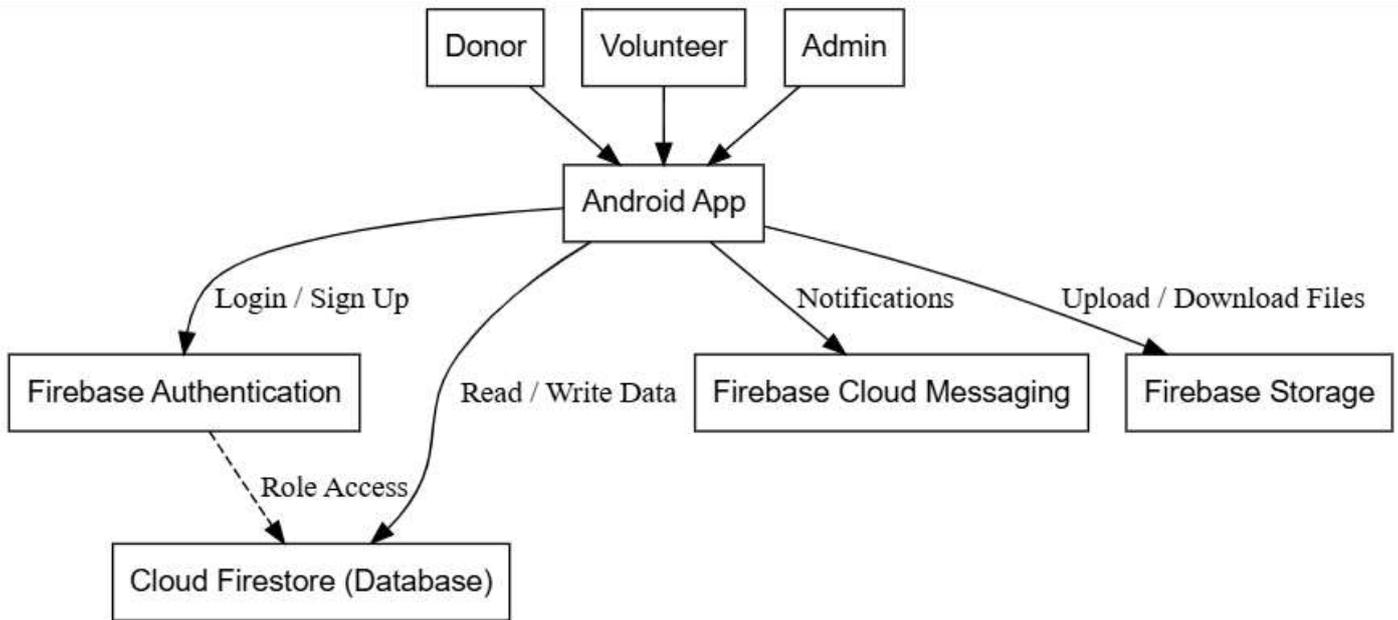


Figure 1: Architecture diagram

This architecture ensures a responsive system capable of synchronizing user data in real-time, with minimal latency and high availability—especially critical for NGOs operating in diverse locations.

B. User Roles and Access Control

The system supports **role-based access control (RBAC)** to manage permissions securely across different user types:

- **Donors** can register, view NGO donation requests, make contributions, and view donation history.
- **Volunteers** can browse tasks assigned by NGOs, update task status, and receive notifications.
- **Admins (NGO Representatives)** can post donation requests, assign tasks, monitor progress, and manage users.

Access is controlled through role-checks embedded in Firebase Authentication and conditional UI rendering to ensure users only interact with authorized modules [5].

C. Screenshots or Mockups

Below are sample interfaces designed to demonstrate user flows and feature interactions

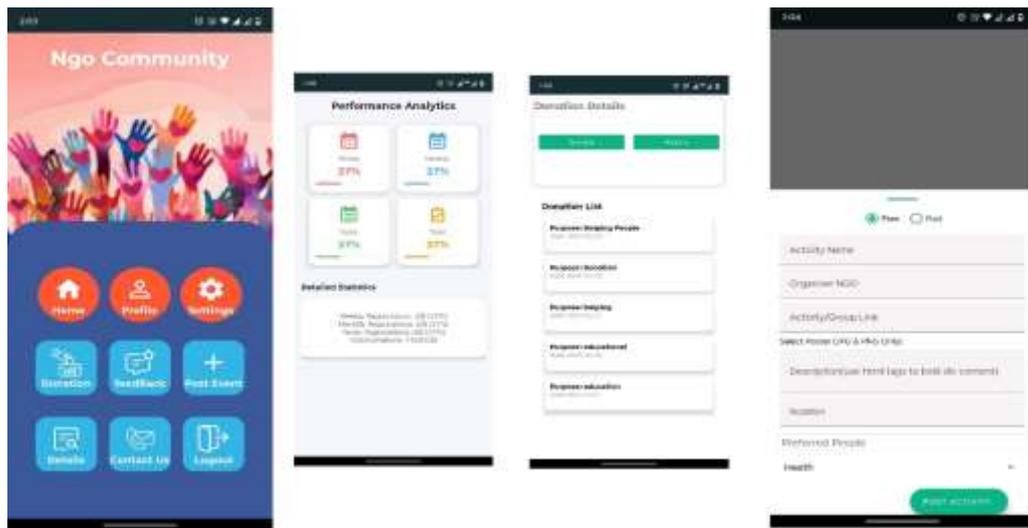


Figure 2: Interfaces designed for application

These interfaces are designed to be lightweight and responsive across different screen sizes, enhancing usability for field volunteers and NGO staff.

D. Security Considerations

Security and data integrity are vital in any application handling user identity, donations, and sensitive tasks. Key implementations include:

- **Data Privacy:** Firebase Authentication ensures encrypted user identity management. User data is stored with access permissions managed via Firebase Rules, preventing unauthorized access.
- **Secure Transactions:** Although this prototype focuses on functionality rather than financial integrations, simulated donation logs are secured in the backend. For future extensions, integration with secure payment gateways (like Razorpay or Google Pay) can be added using token-based APIs.
- **Data Handling Best Practices:** Input validation, encrypted communication (HTTPS), and structured access logs are implemented to monitor system integrity. Admins are given moderation privileges while critical actions like user bans or data deletion are logged for audit purposes.

VI. RESULTS AND DISCUSSION

The developed Android application successfully implemented key features including secure role-based authentication, donation management, task assignment and tracking, real-time push notifications, and an admin dashboard for analytics. In a limited pilot involving NGO staff and volunteers, users appreciated the clean interface and improved coordination, particularly noting the usefulness of task tracking and donation visibility. Some suggested future improvements like in-app messaging and offline access. Performance testing showed consistent responsiveness and stability across devices, with fast data synchronization and low crash rates, confirming the app's reliability for field deployment in NGO environments.

Performance Metrics

The performance of the application was measured across key mobile usability dimensions:

Metric	Observed Value
App Size (APK)	~12 MB
Average Response Time	200–300 ms (for database reads/writes)
Crash Reports	None during internal testing
Average CPU Usage	Low (under 10%)
Battery Consumption	Moderate (optimized for background sync)
UI Usability Score	8.6/10 (based on test user ratings)

Several challenges were encountered during the development and testing phases:

Technical Challenges:

- Real-time data synchronization required careful Firebase rule configurations to ensure data privacy and access control [5].
- Implementing FCM notifications with proper topic-based segregation (for donors vs. volunteers) required extra effort.

Non-Technical Challenges:

- Gathering real user feedback from NGOs was time-consuming due to their operational constraints.
- Designing an interface that balances simplicity with functionality for diverse user roles was a key UX challenge.

Despite these issues, iterative development and agile adaptation allowed for quick problem resolution and feature refinement.

VII. CONCLUSION

This research presents the design and development of a mobile-based application tailored for NGOs, addressing the dual challenges of donation management and volunteer coordination through an integrated Android platform. By implementing core features such as role-based user access, real-time task assignment, donation tracking, and notification services, the system provides a centralized, user-friendly solution to streamline NGO operations—especially for small to mid-sized organizations lacking digital infrastructure. The application has the potential to significantly enhance transparency, engagement, and efficiency within NGOs. Its lightweight design and mobile-first approach make it particularly suitable for grassroots organizations operating in low-resource or remote settings. Feedback from initial pilot testing has confirmed its usability and utility, indicating promise for broader real-world deployment. However, the current implementation is limited to the Android ecosystem and does not yet include payment gateway integration or advanced communication features. Additionally, offline access and multilingual support remain areas for enhancement to reach a wider user base. Future development will focus on expanding the platform to include iOS and web versions, secure digital payment integration for direct donations, and real-time in-app communication between users.

These additions will not only extend the application's reach but also further support the digital transformation of NGOs in their mission to serve communities more effectively.

VIII. REFERENCES

- [1]. Pandey, S., Shaikh, A., Keni, S., Garodiya, U., & Yadav, A. (2024). *OneWorldGiving: Uniting NGOs and Donors for a Better World*. International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 10, 479–486. doi:10.32628/CSEIT2410246
- [2]. Titarmare, N., Krupal, P., Tol, M., Gupta, A., Kolte, S., & Sabri, M. (2020). *Happy to Help (HTH): An Android Application and Website for Helping People to Make Donations*. SSRN Electronic Journal, 7, 1–6.
- [3]. Who Clicks on Online Donation? Understanding the Characteristics of SNS Users during Participation in Online Campaigns. (2019, July 4). *MDPI Social Sciences*. doi:10.3390/socsci8070194
- [4]. Kakumani, L. L., & Prabhakar, K. *Non-Government Organizations: Problems & Remedies in India*.
- [5]. Mohammed, I. A. (2019). *Risk-Based Access Control Model: A Systematic Literature Review*. International Journal of Creative Research Thoughts (IJCRT), 7(2), 794–797. <http://www.ijcrt.org/papers/IJCRT1134133.pdf>
- [6]. Mandal, K., Jadhav, S., & Lakhani, K. (2016). *Food Wastage Reduction through Donation Using Modern Technological Approach*. Volume 5, Issue 4.
- [7]. Lakshmisri, S., & Yarladda, R. T. (2020). *AI Economical Smart Device to Identify COVID-19 Pandemic and Alert on Social Distancing WHO Measures*. IJCRT, 8(5), 4152–4156. <http://www.ijcrt.org/papers/IJCRT2005556.pdf>
- [8]. Allam, S. (2019). *Big Data Might Just Cure Cancer – The Research and the Reality*. IJCRT, 7(4), 820–825. <http://www.ijcrt.org/papers/IJCRT1133998.pdf>
- [9]. Mohammed, I. A. (2019). *A Systematic Literature Mapping on Secure Identity Management Using Blockchain Technology*. International Journal of Innovations in Engineering Research and Technology, 6(5), 86–91. <https://repo.ijert.org/index.php/ijert/article/view/2798>
- [10]. QInterview. Available at: <http://www.qinterview.com>
- [11]. Shelar, S. R., Salve, S. R., & Kedari, A. S. (2020). *A Smart System for Donation Handling of Charitable Trusts and NGOs*. International Journal of Research in Engineering, Science and Management, 3(4). www.ijresm.com