

***Project Report***  
***On***  
**“Imdad - Bridging Hunger with Humanity”**

Submitted to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur in the  
partial fulfillment of the requirements for

**The Degree of**  
**Bachelors of Technology**  
in  
**Computer Science and Engineering**  
By

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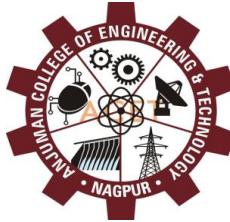
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**Nagpur**

**2024-25**

**Anjuman College of Engineering and Technology,  
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**CERTIFICATE**

*This is to certify that the report entitled*

**“Imdad - Bridging Hunger with Humanity”**

*is a bonafide work and it is submitted to the Rashtrasant Tukadoji Maharaj Nagpur University,  
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## **Declaration**

This Project Work titled "**Imdad - Bridging Hunger with Humanity**" is our own work carried out under the guidance of **Prof. Nazish Khan** and **Prof. Saima Ansari**, at A.C.E.T, Nagpur. This work in the same form or any other form is not submitted by us or by anyone else for award of any degree.

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# Abstract

Food waste is a global crisis with severe environmental, economic, and social repercussions. While millions of tons of surplus food are discarded daily, underprivileged communities, particularly orphans, face chronic food insecurity[1]. The stark contrast between food wastage and hunger highlights the urgent need for an efficient, structured, and technology-driven solution.

To address this challenge, this project proposes a digital platform designed to seamlessly connect food donors—such as caterers, restaurants, and event organizers—with orphanages in need. Initially partnering with a single orphanage, the platform streamlines the food donation process by allowing donors to instantly notify orphanages of available surplus food. Once a donation is accepted, logistics are coordinated, enabling food collection by either an orphanage representative or a designated third-party service. By optimizing food redistribution, this mobile application minimizes environmental impact, reduces food waste, and ensures that orphans receive consistent and nutritious meals[2].

Furthermore, this report presents a comprehensive development roadmap aimed at scaling the application to serve multiple orphanages, expanding its reach and social impact. By leveraging cutting-edge technology, this initiative aspires to revolutionize food donation, ensuring a sustainable, transparent, and highly efficient system. Ultimately, this project fosters a more compassionate and responsible society, encouraging collaborative efforts between food providers and orphanages to combat hunger and food wastage.

**Keywords:** Food waste, Food insecurity, Surplus food, Orphans, Food donation, Digital platform, Food redistribution, Mobile application, Logistics coordination, Sustainable system, Social impact

# **Index**

List of Tables	i
List of Figures	ii
Chapter 1 Introduction	1-5
1.1 Background of the Study	1
1.2 Overview of the Proposed Work	3
1.3 The problem of food wastage and hunger	4
1.4 Key features and impact	5
Chapter 2 Literature Review	6-11
2.1 Related Work	6
2.2 Drawbacks of the Existing Systems	9
2.3 Summary	10
Chapter 3 Proposed Work	12-18
3.1 Problem Definition	12
3.2 Aims & Objectives	13
3.2.1 Aim	13
3.2.2 Objectives	13
3.3 Proposed System	14
3.4 Implementation plan	15
3.5 Conclusion	16
Chapter 4 Analysis and Design	19-21
4.1 Methodology	19
4.2 Problem Definition	19
4.3 System Requirements	20
4.3.1 Hardware Requirements	20
4.3.2 Software Requirements	20
4.4 System Architecture	20
4.5 Workflow of the proposed system	21
Chapter 5 Implementation Details	22-35
5.1 Introduction	22
5.2 Technologies and Supporting Technologies	22
5.3 Results and Discussions	24
Chapter 6 Future Scope and Conclusion	36-38
6.1 Applications of The Proposed System	36
6.2 Advantages & Limitations of The Proposed System	37
6.2.1 Advantages	37
6.2.2 Limitations	38
6.3 Future Scope	39
6.4 Conclusion	40
References	42
Appendix A	44

## List of Tables

Sr. No.	Description	Page No.
Table 1	Summary of existing applications/researches	10

# List of Figures

Sr. No.	Description	Page No.
Figure 3.1	User Module Flow Diagram	16
Figure 3.2	Orphanage Module Flow Diagram	17
Figure 5.1.1	User Signup, User Login and Forgot Password Flow Diagram	25
Figure 5.1.2	Sign up and Sign in Page for user	26
Figure 5.2.1	Profile and Edit Profile Page	27
Figure 5.2.2	Edit Profile Flow Diagram	27
Figure 5.3.1	Donate Page	28
Figure 5.3.2	Donation Page Sequence Diagram	29
Figure 5.4.1	Orphanage Module	30
Figure 5.5.1	Ratings and Reviews Page	32
Figure 5.5.2	Update Ratings and Reviews Sequence Diagram	33
Figure 5.6.1	Reports and Analytics Flow Diagram.	34
Figure 5.6.2	Analytics Page	35

# **Chapter 1**

# **Introduction**

## **1.1 Background of the Study**

Food insecurity and resource misallocation continue to be pressing global challenges, affecting millions of individuals worldwide. Despite technological advancements and economic progress, the unequal distribution of food resources has led to a paradoxical situation—while tons of edible food are wasted daily, a significant portion of the population, particularly orphaned children and underprivileged communities, struggles to access nutritious and sufficient meals. This imbalance in food availability contributes to malnutrition, health issues, and a lower quality of life for those in need[3].

Recognizing this critical issue, *Imdad* emerges as an innovative, technology-driven food donation platform designed to bridge the gap between food surplus providers and orphanages. By leveraging modern digital solutions, *Imdad* provides an efficient, scalable, and user-friendly system that ensures excess food is redirected to those who need it most. The platform operates as both a web-based interface and a fully developed mobile application, allowing businesses, organizations, and individuals to seamlessly connect with orphanages and food relief centers.

The inception of *Imdad* was inspired by a simple yet stark observation—a tremendous amount of perfectly edible food is discarded daily by various entities, including:

- **Restaurants and Cafeterias:** Due to overproduction, near-expiry products, and unsold meals.
- **Grocery Stores and Supermarkets:** Disposing of food for minor cosmetic imperfections, excess inventory, or nearing expiry dates.
- **Households and Individuals:** Throwing away leftovers and unused ingredients that could otherwise be repurposed.
- **Event Organizers and Caterers:** Large quantities of unused meals from functions, weddings, and corporate gatherings are simply discarded.

While these entities often discard food for logistical or regulatory reasons, the wasted food remains perfectly safe and consumable. Meanwhile, on the other side of this imbalance, millions of orphaned and underprivileged children face chronic hunger and malnutrition due to lack of access to regular, nutritious meals. Insufficient funding, poor resource allocation, and inefficient food distribution networks further exacerbate food insecurity in orphanages and low-income communities.

This stark contrast between food wastage and food insecurity calls for an immediate and structured intervention. Traditional food donation systems often suffer from logistical challenges, lack of transparency, and inefficient coordination, making it difficult for donors and recipients to connect efficiently. To address this, *Imdad* integrates technology-driven solutions to simplify, streamline, and optimize the food donation process.

With its real-time tracking, automated notifications, and direct donor-to-orphanage communication, *Imdad* serves as a bridge that connects surplus food with those in need in the most effective manner possible. This initiative not only reduces food waste but also ensures that orphaned children receive the nourishment they need to grow, develop, and lead healthier lives.

Furthermore, *Imdad* has been designed with scalability in mind, ensuring that as participation grows, the platform can expand to support multiple orphanages, homeless shelters, and food relief organizations. By fostering collaboration between individuals, businesses, and charitable institutions, *Imdad* aims to establish a long-term, self-sustaining ecosystem that minimizes food wastage and maximizes food security for those who need it the most.

Initially, we named our project **FoodConnect** and even deployed a website under this name. However, upon discovering an existing application with the same name, we decided to rebrand our platform as **Imdad** to establish a unique identity. This change ensures distinction and clarity, while our mission to bridge the gap between food surplus and hunger remains unchanged.

In conclusion, *Imdad* stands as a practical, scalable, and impactful solution to the twin crises of food wastage and hunger. By effectively utilizing modern technology, real-time data processing, and cloud-based logistics management, it revolutionizes the way food donations are handled, ensuring efficient redistribution, community involvement, and a significant reduction in food insecurity. This initiative represents a transformational shift in food donation efforts, emphasizing that no edible food should go to waste while people continue to go hungry.

## 1.2 Overview of the Proposed Work

The proposed work focuses on developing a digital food donation platform that efficiently connects food donors with orphanages, ensuring surplus food is redirected to those in need rather than wasted. By integrating real-time tracking, automated notifications, and direct donor-orphanage communication, the system makes food donation seamless, transparent, and scalable.

Initially, the project will partner with a single orphanage, allowing restaurants, caterers, event organizers, and individuals to list surplus food via a web and mobile application. Once a donation is registered, the orphanage is notified and can accept or decline it. If accepted, food collection is arranged through an orphanage representative or a designated third-party service.

To ensure sustainability and efficiency, the system incorporates modern technologies such as:

- React Native & React.js for mobile and web development.
- Google Firebase for real-time database management and secure user authentication.
- Cloud-based authentication and automated notifications to enhance usability and security.

A quality control mechanism allows orphanages to rate donations, ensuring food safety and hygiene standards.

The future roadmap includes:

- Scaling to multiple orphanages, food banks, and shelters.
- AI-driven donation matching for optimized food distribution.
- Automated logistics coordination to streamline food pickup and delivery.
- Advanced analytics and reporting to track impact and efficiency.

By leveraging technology, this initiative aims to reduce food waste, enhance food security for vulnerable children, and foster a sustainable, community-driven culture of social responsibility.

### **1.3 The Problem of Food Waste and Hunger**

The world faces three starkly contrasting issues:

- **Excessive food waste:** A significant proportion of edible food is discarded due to overproduction, near-expiry dates, or aesthetic imperfections.
- **Rising food insecurity:** Millions of people, including children in orphanages, struggle to obtain sufficient nutrition.
- **Lack of structured redistribution mechanisms:** Many potential donors, such as restaurants and event organizers, are willing to contribute but lack an accessible platform to do so.

*Imdad* leverages modern technology to create an efficient, reliable, and accessible platform that facilitates food donations in real-time. Through a streamlined process, donors can list surplus food with details such as quantity, pickup location, and estimated serving capacity. Orphanages, in turn, receive notifications, assess the donations, and arrange pickups accordingly. This systematic approach ensures transparency, quality control, and ease of participation, making food redistribution an effortless and impactful process.

To address this gap, *Imdad* utilizes modern technology to create an efficient, transparent, and accessible donation system:

- **Mobile platform:** The mobile application is fully developed and ready for deployment.

- **Real-time donation tracking:** Donors can list surplus food along with quantity, pickup location, date and time and estimated serving capacity.
- **Seamless communication:** Orphanages receive instant notifications, allowing them to accept donations and arrange logistics promptly.

The mobile application *Imdad* is positioned to make a significant difference in reducing food waste and enhancing food security. The project not only addresses an urgent social issue but also fosters a culture of shared responsibility and compassion. Ultimately, *Imdad* aspires to create a sustainable ecosystem where surplus food serves a meaningful purpose—providing nourishment to vulnerable children rather than being wasted.

## 1.4 Key Features and Impact

The *Imdad* platform introduces several innovative features:

- **User Authentication & Authorization:** Ensuring the credibility of both donors and recipients.
- **Pickup & Delivery Management:** Orphanages can coordinate collection efforts to ensure food reaches them safely.
- **Quality Assurance:** Orphanages can rate food quality, ensuring high standards are maintained.
- **Reports & Analytics:** Insights into donation trends to optimize food distribution.

By leveraging technology and fostering a culture of collective responsibility, this initiative transforms surplus food into a valuable resource for orphanages. The ultimate vision of Imdad is to build a sustainable ecosystem where food waste is minimized, and no child has to sleep hungry.

# **Chapter 2**

# **Literature Review**

## 2.1 Related work

Food insecurity and food wastage are two pressing global challenges that require efficient, structured, and technology-driven solutions. Several organizations and research initiatives have attempted to bridge the gap between food surplus providers and those in need, but many existing systems face limitations in accessibility, scalability, and operational efficiency. While some rely on NGOs, government programs, or corporate partnerships, others struggle with real-time tracking, logistics coordination, and donor engagement.

This literature review explores various existing food donation platforms and initiatives, analyzing their methods, strengths, and drawbacks. By identifying gaps in user adoption, tracking mechanisms, operational independence, and logistics, this review highlights the need for a more advanced and targeted solution. The findings establish the foundation for *Imdad*, a technology-driven, scalable, and real-time food donation platform designed specifically to overcome these challenges and provide direct, efficient food redistribution to orphanages.

In the paper: Increasing Efficiency of NGOs for Management of Food Waste by Proposing Web-Based Application. International Journal for Research in Applied Science & Engineering Technology (IJRASET), 11(V), 2596-2598 by Prof. Nazish Khan, Prof. Samina Anjum , Avanti Maske , Devesh Singh Solanki, Kaikasha Sheikh , Mariya Ahmad (2023). [4], is a web-based platform designed to facilitate food donations by connecting donors with NGOs. The system includes modules for donor registration, NGO interaction, and admin management, developed using JavaScript. Its primary advantages lie in efficient food distribution, transparency, and ease of use. Donors can track their contributions, ensuring that food reaches those in need. However, its limited adoption poses a challenge, as success depends on widespread participation from both donors and NGOs. Additionally, users with limited digital access or technical skills may face difficulties in navigating the platform, making it less inclusive.

The Akshaya Patra Foundation [5] is a large-scale, government-supported initiative dedicated to alleviating childhood hunger by providing midday meals to underprivileged children across India. Through its partnerships with government

schools and aided institutions, the foundation ensures that millions of students receive nutritious meals daily, helping to improve school attendance, concentration levels, and overall well-being. By addressing malnutrition and food insecurity among school-going children, Akshaya Patra plays a crucial role in enhancing educational outcomes and public health. Despite its impact, Akshaya Patra primarily serves schoolchildren, excluding orphanages, shelters, and non-formal setups from its food network. *Imdad* bridges this gap by ensuring consistent food donations to these underserved groups, fostering a more inclusive approach to food security.

SeVa [6], a mobile application applies Human-Computer Interaction (HCI) principles to develop a food donation platform on Android, utilizing Android Studio and SQLite. Its user-centric design, ease of use, and cost-effective development make it a promising approach for food redistribution. However, challenges arise from the complexity of iterative design and limitations in applying basic Constraint Satisfaction Problems (CSP) concepts, which may affect the app's efficiency and scalability. Unlike Imdad, which integrates a comprehensive donation tracking system, SeVa focuses more on a generalized food-sharing approach.

Feeding India [7] is a hunger relief initiative that focuses on reducing food wastage and addressing malnutrition by forming partnerships with restaurants, corporate donors, and NGOs to redistribute surplus food. The organization plays a pivotal role in food security efforts, ensuring that excess food from businesses and events is redirected to those in need rather than being wasted. Through its extensive network of donors and nonprofit collaborators, Feeding India has successfully provided millions of meals to underprivileged communities, making a significant impact on hunger alleviation. The initiative also leverages digital tools for communication, logistics coordination, and impact measurement, allowing for better tracking and management of food donations. By utilizing online platforms and data-driven strategies, Feeding India ensures that food reaches the right people at the right time, minimizing inefficiencies in distribution. However, despite its effectiveness, the platform relies heavily on third-party partnerships, including NGOs and corporate donors, to facilitate food redistribution.

The National Food Security Mission (NFSM) [8] was launched by the Indian government in 2007 to combat food insecurity by enhancing agricultural productivity and ensuring sufficient food availability for the growing population. As a government-sponsored initiative, NFSM focuses on increasing crop yields, promoting sustainable farming techniques, and supporting farmers with financial and technological assistance. Over the years, the program has played a crucial role in strengthening India's food supply chain, contributing to higher agricultural output, improved farm income, and better soil health through the adoption of advanced agricultural practices, irrigation improvements, and subsidy-driven support mechanisms. NFSM has been instrumental in increasing the production of essential crops such as wheat, rice, pulses, and coarse cereals, which are staples for millions across India.

The Robin Hood Army (RHA) [9] is a volunteer-driven, zero-funds organization dedicated to mitigating hunger by redistributing surplus food to underprivileged communities. Founded in 2014, RHA operates by partnering with local restaurants, businesses, and individuals to collect excess food, which is then distributed by volunteers, known as "Robins," to those in need. The organization has expanded its reach across multiple countries, including India and Pakistan, serving millions of meals through grassroots efforts. RHA leverages social media platforms to mobilize volunteers and coordinate food distribution drives, effectively addressing food wastage and hunger without relying on monetary donations.

No Food Waste [10] is a non-governmental organization (NGO) founded in 2014 by Padmanaban Gopalan and his associates in Coimbatore, India, with the mission to eliminate hunger by redistributing surplus food to those in need. The organization identifies sources of excess food, such as weddings, parties, and events, collects the surplus, and delivers it to underprivileged communities, thereby addressing both food wastage and hunger. Operating primarily in Tamil Nadu, Andhra Pradesh, and Telangana, No Food Waste has developed a mobile application and hotline to streamline the donation process, allowing individuals and institutions to notify volunteers about available excess food. The app also utilizes crowdsourced data to identify "hunger spots," ensuring efficient distribution to areas with the greatest

need. On average, the organization provides approximately 600 plates of food daily, significantly impacting food security in the regions it serves

## 2.2 Drawbacks of Existing Systems

Despite various efforts to tackle food waste and hunger, existing food donation systems face several limitations that hinder their effectiveness. Below are the key drawbacks:

- 1. Limited Adoption & Accessibility:** Many platforms require technical expertise or complex registration, making it difficult for users with limited digital skills to participate. Their effectiveness relies heavily on widespread donor and NGO involvement, which is not always consistent. Additionally, poor internet access in certain areas further limits their reach.
- 2. Lack of Real-Time Donation Tracking & Transparency:** Most systems do not provide real-time tracking, causing delays in food collection and distribution. Donors lack visibility into how their contributions are being used, reducing trust. Without instant notifications, orphanages may miss timely food pickup opportunities.
- 3. Dependence on Third-Party Organizations & Partnerships:** Many platforms rely on NGOs, corporate donors, or government schemes, limiting their operational independence. If partnerships fail or funding stops, the entire system collapses. Small-scale donors often face barriers in contributing due to bureaucratic involvement.
- 4. Scalability & Efficiency Issues:** Some food donation apps use basic databases (e.g., SQLite), which struggle to handle large-scale donations. Manual coordination makes expansion difficult, leading to inefficiencies in food redistribution. Frequent modifications and updates slow down adoption.
- 5. Target Group Limitations:** Many food relief programs focus primarily on school meals, leaving out orphanages and other underserved groups. Some systems cater to large food chains, making it hard for individuals and small businesses to donate. This results in unequal food distribution.

**6. Logistical & Operational Challenges:** Poor pickup and delivery coordination often leads to food spoilage and wastage. Many platforms lack proper food quality checks, raising hygiene concerns. The absence of a structured feedback system makes it difficult to improve donation processes.

## 2.3 Summary

### 2.3.1 Summary Table

Sr. no	Existing Application/ Research	Drawbacks of Existing Systems	How Imdad Overcomes It
1.	Donate and Save (Website)[4]	Limited adoption due to complex registration and technical barriers.	User-friendly interface with simple registration, making food donation accessible to all.
3.	Akshaya Patra Foundation[5]	Focuses only on school meals, leaving out orphanages and other vulnerable groups.	Specifically designed to serve orphanages, ensuring consistent and nutritious food supply.
5.	SeVa: A Food Donation App[6]	Limited scalability due to basic database management, affecting large-scale donations.	Built on Firebase & React Native, allowing scalability and real-time database synchronization.
6.	Feeding India[7]	Relies heavily on partnerships, making direct donations difficult for individuals.	Direct donor-to-orphanage model, eliminating intermediaries and simplifying the process.
4.	National Food Security Mission (NFSM)[8]	Government-dependent, which may lead to policy changes affecting food distribution.	Independent, community-driven model that ensures sustainability without government reliance.
7.	Robin Hood Army[9]	Manual coordination results in delays and inefficiencies in food distribution.	Automated notifications & scheduling streamline donation pickups and deliveries
8.	No Food Waste[10]	Lacks a structured feedback system, making food quality assurance difficult.	Implements a rating and review system to maintain food hygiene and safety.

Table no.1 Summary table of existing applications/researches

Existing food donation systems, while impactful, suffer from limited accessibility, lack of real-time tracking, dependency on third parties, and logistical inefficiencies. Many rely on NGOs, corporate partnerships, or government funding, making them vulnerable to policy changes and funding constraints. Additionally, issues such as poor scalability, inefficient coordination, and lack of direct donor-to-recipient communication hinder their effectiveness.

**Imdad** overcomes these drawbacks by providing a real-time, user-friendly, and technology-driven platform that directly connects food donors with orphanages. Unlike traditional systems, Imdad ensures instant tracking, streamlined logistics, and a scalable infrastructure to make food redistribution faster, more transparent, and more efficient.

# **Chapter 3**

# **Proposed Work**

### **3.1 Problem Definition**

Globally, around 13.2% of food produced is lost between harvest and retail, while an estimated 19% of total global food production is wasted in households, food services, and retail sectors [11]. Food wastage and hunger coexist as critical global issues, creating a paradox where tons of edible food are discarded daily, while millions of people, particularly vulnerable children in orphanages, struggle with food insecurity and malnutrition. Despite advancements in food production and distribution, a significant portion of surplus food from restaurants, grocery stores, event organizers, and households is thrown away due to overproduction, expiry concerns, or logistical constraints. At the same time, orphanages, which rely heavily on donations and limited funding, often lack consistent access to nutritious meals, affecting the health and well-being of the children under their care.

One of the major challenges contributing to this issue is the absence of a structured and efficient food donation mechanism [12]. While some food donation platforms exist, they often suffer from limited accessibility, inefficient tracking systems, and logistical hurdles. Many rely on third-party organizations, NGOs, or government programs, which can result in delays, resource misallocation, and bureaucratic inefficiencies. Additionally, the lack of real-time updates and direct communication between food donors and orphanages creates uncertainty, making it difficult for recipients to plan their meals effectively.

Existing platforms suffer from limited accessibility, inefficient tracking, and logistical challenges, often relying on third-party organizations that cause delays and resource misallocation. The absence of real-time updates and direct donor-orphanage communication further complicates food redistribution, leading to waste and unmet nutritional needs.

To address this, a real-time, scalable, and user-friendly platform is needed to directly connect food donors with orphanages, integrating automated tracking, instant notifications, and efficient logistics coordination. By leveraging modern technology, Imdad ensures timely food redistribution, reduces wastage, and fosters a sustainable and transparent food donation system.

## **3.2 Aims & Objectives of the Proposed System**

### **3.2.1 Aim:**

The primary aim of Imdad is to reduce food wastage and alleviate hunger among orphanages by creating a seamless, technology-driven food donation platform. This system will directly connect surplus food providers (restaurants, caterers, households, and event organizers) with orphanages, ensuring that excess food is redistributed effectively and safely.

### **3.2.2 Objectives:**

- Bridge the gap between food donors and orphanages through a dedicated, real-time platform.
- Develop a user-friendly web and mobile application to simplify food donation, tracking, and logistics.
- Implement real-time notifications for efficient communication between donors and recipients.
- Ensure food safety and quality through structured verification and rating systems.
- Establish a transparent and scalable solution to encourage widespread adoption by small and large donors.
- Reduce dependency on third-party organizations by enabling direct coordination between donors and orphanages.
- Promote sustainable food donation practices through awareness campaigns and long-term partnerships.

### **3.3 Proposed System**

The *Imdad* system is built on a technology-driven approach that leverages web and mobile-based solutions to facilitate food donation. The methodology consists of:

#### **1. System Design & Architecture**

- **Frontend Development:** React Native for mobile applications.
- **Backend Development:** Firebase for real-time data storage and tracking.
- **User Authentication:** Google Firebase Authentication for secure donor and orphanage login.

#### **2. Functional Modules**

1. **User Authentication & Authorization** – Secure login for donors and orphanages.
2. **Donor Module** – Allows donors to list surplus food details (quantity, pickup time, location).
3. **Orphanage Module** – Enables orphanages to view available donations and accept/reject food offers.
4. **Food Listing & Details** – Displays available food donations with relevant information.
5. **Pickup & Delivery Management** – Ensures smooth coordination for food collection and transportation.
6. **Notification System** – Sends real-time alerts to donors and orphanages for food requests and confirmations.
7. **Quality Rating & Feedback** – Ensures food quality through reviews from orphanages.
8. **Reports & Analytics** – Provides insights into donation, food saved, and impact created.

## **3.4 Implementation Plan**

The implementation will be carried out in **phases** to ensure a smooth and efficient rollout:

### **Phase 1: System Design & Development**

- Define the user interface and backend architecture.
- Develop the web and mobile application with core functionalities.
- Integrate Firebase for real-time data handling and authentication.

### **Phase 2: Testing & Quality Assurance**

- Conduct internal testing for functionality, security, and performance.
- Gather feedback from initial users (orphanages & donors) to optimize usability.
- Implement food safety guidelines and rating systems.

### **Phase 3: Deployment & Launch**

- Deploy the web application and mobile app on Play Store and web servers.
- Initiate pilot testing with selected orphanages and donors.
- Conduct awareness campaigns to onboard restaurants, event organizers, and local food businesses.

### **Phase 4: Expansion & Future Enhancements**

- Scale the application by partnering with NGOs, food networks, and philanthropists.
- Enhance AI-driven donation recommendations to match food donors with nearby orphanages.
- Introduce automated logistics support for food pickup and delivery services.

### 3.5 Conclusion

The proposed Imdad system provides a technologically advanced, scalable, and sustainable solution for food donation, focusing on orphanages and underprivileged children. By addressing key limitations in existing systems, Imdad ensures real-time tracking, direct donor-orphanage coordination, food safety verification, and transparency. With a structured implementation plan, Imdad is set to redefine food redistribution, reducing waste while making a meaningful impact on society.

#### User Module Flow Diagram

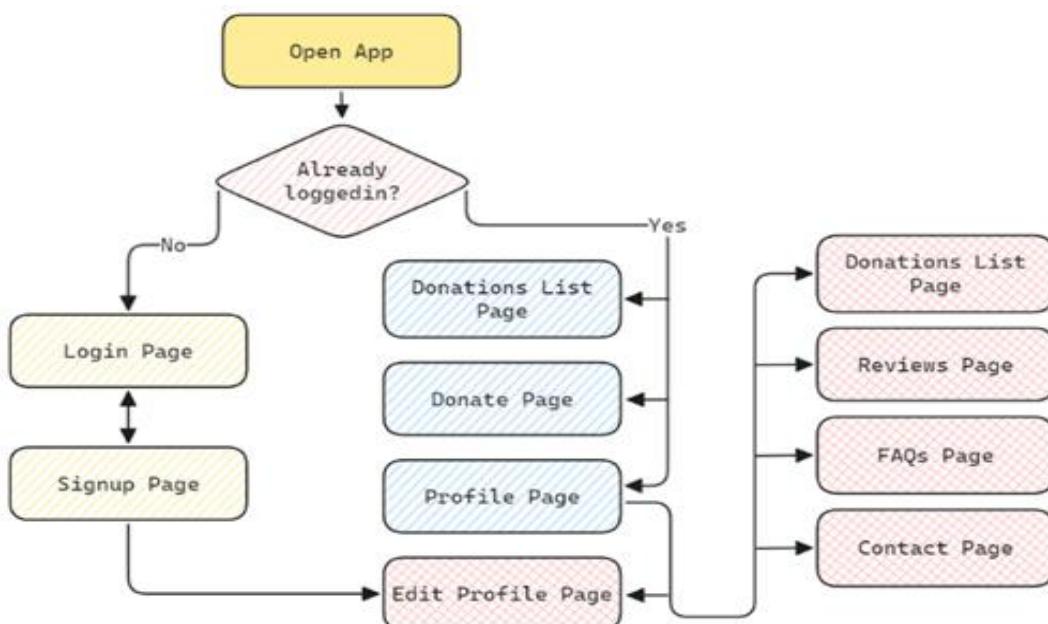


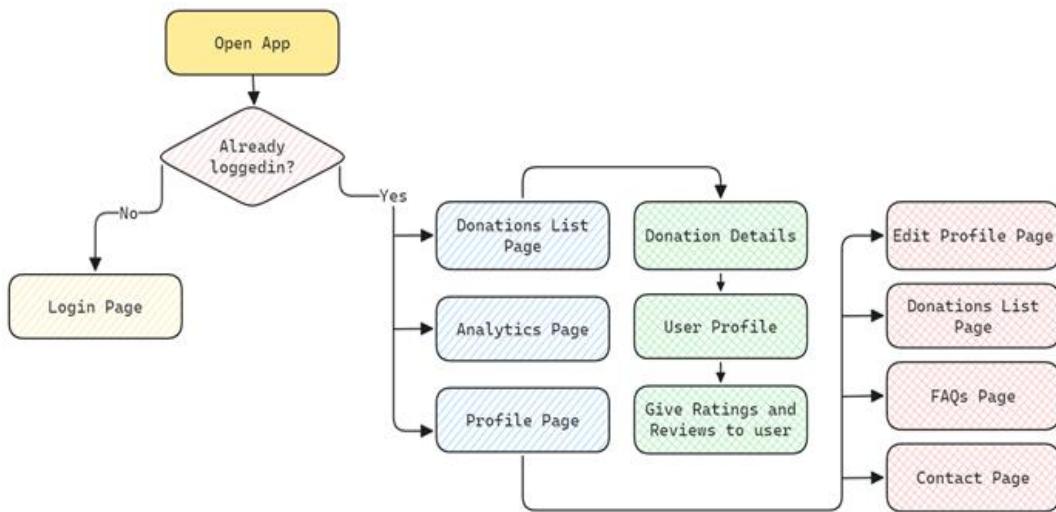
Fig. 3.1 User Module Flow Diagram

The (Fig. 3.1) represents the overall workflow for the User Module. As soon as the user launches the application, the system verifies if the user is already logged in or not. If the user is not logged in, the user is sent to the Login Page and the user can navigate to the Signup Page as well.

After the user has logged in successfully, he or she can use basic features like seeing a list of all the donations that have been made by him/her (Donations List Page), adding new donations (Donate Page), and editing personal information (Profile Page).

Also, from the Profile Page, the user is able to link to other support and information pages such as the Donations List Page, Reviews Page, FAQs Page, and Contact Page. This modularity implies that users are able to authenticate, create or read donations, edit their profile, and access relevant information easily.

### Orphanage Module Flow Diagram



**Fig. 3.2 Orphanage Module Flow Diagram**

The (Fig. 3.2) represents the Orphanage Module that streamlines the management of donations by equipping representatives with vital tools necessary for reviewing, tracking, and addressing donation request.

Upon launching the application, the orphanage representative's login status is verified. If they are not logged in, they are redirected to the Login Page to input their credentials. After a successful login, they are granted access to the main dashboard, which features the Donations List Page, Analytics Page, and Profile Page.

The Donations List Page acts as the primary interface where representatives can oversee and manage all incoming donation requests. From this page, they can delve into Donation Details, which offer extensive information regarding each donation. Additionally, they can view the User Profile of the donor to confirm their information and provide feedback if needed. Representatives also have the ability

to Give Ratings and Reviews to Users, thereby fostering trust and accountability within the system.

The Analytics Page presents valuable insights into donation trends, enabling representatives to monitor and evaluate the frequency and volume of donations over time. This functionality aids in recognizing donation patterns and optimizing the allocation of resources.

The Profile Page allows representatives to adjust their account settings and provides swift access to important sections such as Edit Profile, FAQs, Contact Page, and the Donations List Page. These features ensure that representatives can effectively manage donation-related responsibilities while facilitating smooth communication with donors and administrators.

This organized workflow significantly improves the overall experience of donation management, ensuring that the orphanage can effectively process donations, engage with donors, and track essential performance metrics.

# **Chapter 4**

# **Analysis and Design**

## 4.1 Methodology

The *Imdad* system follows a technology-driven, user-centric methodology that integrates web and mobile solutions for real-time food donation. The agile development approach ensures continuous improvements based on user feedback and evolving system requirements.

The methodology involves:

1. **Frontend Development:** React Native , expo and Tailwind css.
2. **Backend Development:** Google Firebase for real-time data storage and authentication.
3. **Secure User Authentication:** Firebase Authentication for safe donor and orphanage login.
4. **Real-time Notifications & Tracking:** Ensuring seamless communication and transparency.

## 4.2 Problem Definition

Food wastage and hunger remain critical issues, with orphanages struggling to secure a steady supply of nutritious food. Many food donation systems are inefficient, lack transparency, and depend on third-party organizations for distribution. Existing solutions often fail due to poor tracking, logistical challenges, and limited scalability.

The Imdad system aims to overcome these limitations by directly connecting food donors with orphanages through a real-time, efficient, and user-friendly platform, ensuring that surplus food reaches those in need before it goes to waste.

The development of Imdad follows a systematic, modular approach to ensure efficiency, scalability, and real-time operations:

1. **Requirement Gathering & Analysis:** Understanding user needs, system constraints, and defining functionalities.
2. **System Design & Architecture:** Creating workflow diagrams, database schema, and UI/UX prototypes.

3. **Development Phase:** Implementing core functionalities such as authentication, food listing, notifications, and tracking.
4. **Testing & Optimization:** Conducting functional, security, and performance testing to ensure system reliability.
5. **Deployment & User Training:** Launching the system and educating users on effective usage.
6. **Future Enhancements:** Expanding features based on feedback, integrating AI-based donation recommendations.

## 4.3 System Requirements

### 4.3.1 Hardware Requirements:

- **Server:** Cloud-based hosting for scalability (Google Firebase).
- **Client Devices:** Mobile (Android & iOS) and Web (PC, Tablet).
- **Storage:** Cloud database for secure food donation records.

### 4.3.2 Software Requirements:

- **Frontend:** React Native (Mobile).
- **Backend:** Firebase (Real-time storage & authentication).
- **Security:** Firebase Authentication for secure user management.

## 4.4 System Architecture

The **Imdad** system follows a three-tier architecture for efficient performance and scalability:

1. **Presentation Layer (Frontend):**
  - Mobile interface for donors and orphanages.
  - Built with React Native (Mobile).
2. **Data Layer (Database):**
  - Google Firebase for real-time storage and user authentication.
  - Stores donor data, orphanage records, food donation history, and analytics.

## **4.5 Workflow of the Proposed System**

The system workflow ensures seamless interaction between donors and orphanages while maintaining efficiency and transparency:

### **1. User Registration & Authentication:**

- Donors and orphanages sign up and verify accounts via Firebase Authentication.

### **2. Food Donation Submission (Donor Module):**

- Donors enter food details (type, quantity, pickup location, and expiry date).

### **3. Food Request & Approval (Orphanage Module):**

- Orphanages browse available donations and request collection.
- Donors receive real-time notifications for approval or scheduling changes.

### **4. Pickup & Delivery Coordination:**

- The system ensures logistics management through notifications and donor-orphanage communication.
- Food is collected, verified for quality, and delivered.

### **5. Quality Check & Feedback:**

- Orphanages rate the food quality, ensuring hygiene standards.
- The system logs feedback to enhance future donations.

### **6. Reports & Analytics:**

- The system generates real-time insights on food donations, distribution trends, and orphanage needs.

The Imdad system is designed to overcome limitations in existing food donation platforms by offering a real-time, user-friendly, and scalable solution. The three-tier system architecture, real-time tracking, and structured workflow ensure efficient food redistribution with minimal wastage.

With advanced technology, transparency, and automation, *Imdad* empowers donors and orphanages to seamlessly connect, promoting sustainable food donation practices.

# **Chapter 5**

## **Implementation Details**

## 5.1 Introduction

The successful implementation of *Imdad* demonstrates how technology can efficiently bridge the gap between food surplus providers and orphanages. By integrating real-time tracking, automated notifications, and a user-friendly interface, the system ensures that food donations reach recipients in a timely, transparent, and sustainable manner. This section provides an in-depth analysis of the technologies used, results obtained, challenges faced, and their solutions.

## 5.2 Technologies Used

To ensure scalability, efficiency, and security, *Imdad* incorporates a modern technology stack across various modules:

### 1. Frontend Development (User Interface)

- **React Native (Mobile App):** Enables cross-platform compatibility for Android and iOS, ensuring a smooth user experience.
- **Tailwind CSS:** Enhances UI styling, ensuring a clean and modern design with minimal development effort.
- **Expo Go:** Facilitates rapid testing and real-time app previews without needing full builds.

### 2. Backend Development (Server & API Handling)

- **Google Firebase:** It is a backend-as-a-service (BaaS) by Google, offering authentication, Firestore(real-time NoSQL database) and storage. It helps developers build scalable apps without managing backend infrastructure.

### 3. Database & Security

- **Firebase Firestore:** A real-time NoSQL database, ensuring fast and secure storage of donation records.
- **Firebase Authentication:** Implements secure login and verification for donors and orphanages.

## 4. Other Tools and Dependencies

- **react-native** - Core framework for building mobile applications using React.
- **react** - JavaScript library for building user interfaces.
- **expo** - Framework for developing React Native apps with managed and bare workflows.
- **firebase** - Backend-as-a-service for authentication, and, database.
- **expo-router** - File-based routing system for Expo and React Native apps.
- **expo-notifications** - Handles push and local notifications in Expo apps.
- **@react-native-async-storage/async-storage** - Persistent key-value storage for React Native.
- **react-native-reanimated** - Advanced animations and gestures for React Native.
- **react-native-screens** - Native screen management for better navigation performance.
- **react-native-safe-area-context** - Handles safe area insets for different devices.
- **expo-image-picker** - Provides access to the device's media library and camera.
- **react-native-gifted-charts** - Library for creating beautiful charts in React Native.
- **react-native-svg** - Library for rendering SVG graphics in React Native.
- **nativewind** - Tailwind CSS integration for styling in React Native.
- **tailwindcss** - Utility-first CSS framework for styling applications.
- **@react-native-community/datetimepicker** - Native date and time picker component.
- **@react-native-picker/picker** - Native picker component for dropdown selections.

## 5. Additional Technologies

- **Push Notifications:** Ensures instant alerts for new food donations and orphanage requests.

- **Analytics & Reports:** Monitor food donation trends and system performance.

## 5.3 Results and Discussions

The Imdad system underwent rigorous testing and evaluation, yielding successful results in real-time donation tracking, user engagement, and food distribution efficiency.

### 1. System Performance & Efficiency

- **Optimized real-time tracking:** Donations are updated instantly, ensuring fast and accurate food redistribution.
- **Smooth donor-orphanage interaction:** The notification system effectively reduces response times.
- **High-speed database operations:** Firebase Firestore ensures minimal data retrieval latency.

### 2. User Experience & Adoption

- The simple UI and guided navigation encourage participation from individuals and businesses.
- Push notifications and donation tracking significantly improve donor engagement.
- Initial feedback shows high satisfaction, with users finding the system convenient and efficient.

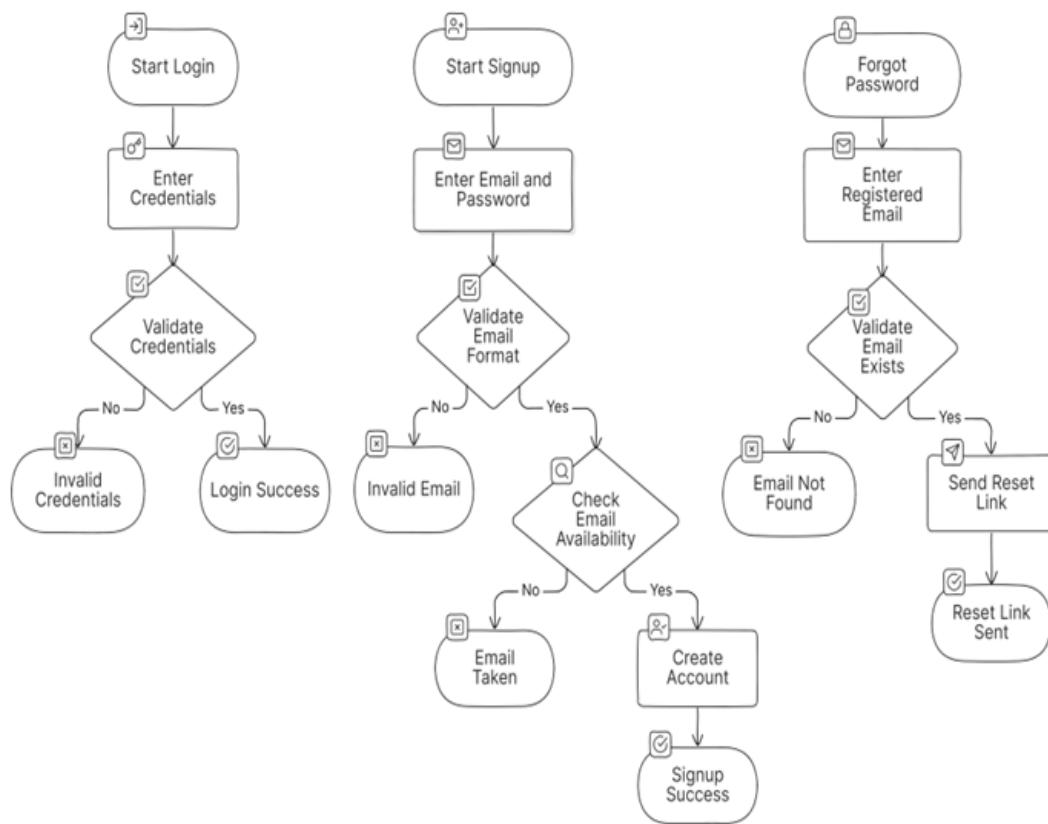
### 3. Food Distribution Impact

- The system ensures food is allocated before it perishes, reducing waste significantly.
- Orphanages receive timely donations, improving meal consistency for children.
- Quality assurance through ratings helps maintain high food standards.

The implementation of Imdad has proven that a technology-driven food donation platform can significantly enhance food redistribution efforts, ensuring faster response times, improved donor participation, and reduced food wastage. The system's real-time tracking, notification alerts, and seamless logistics coordination have created a more efficient and transparent donation process. With continuous optimizations and future enhancements, Imdad is well-positioned to scale further and create a lasting social impact.

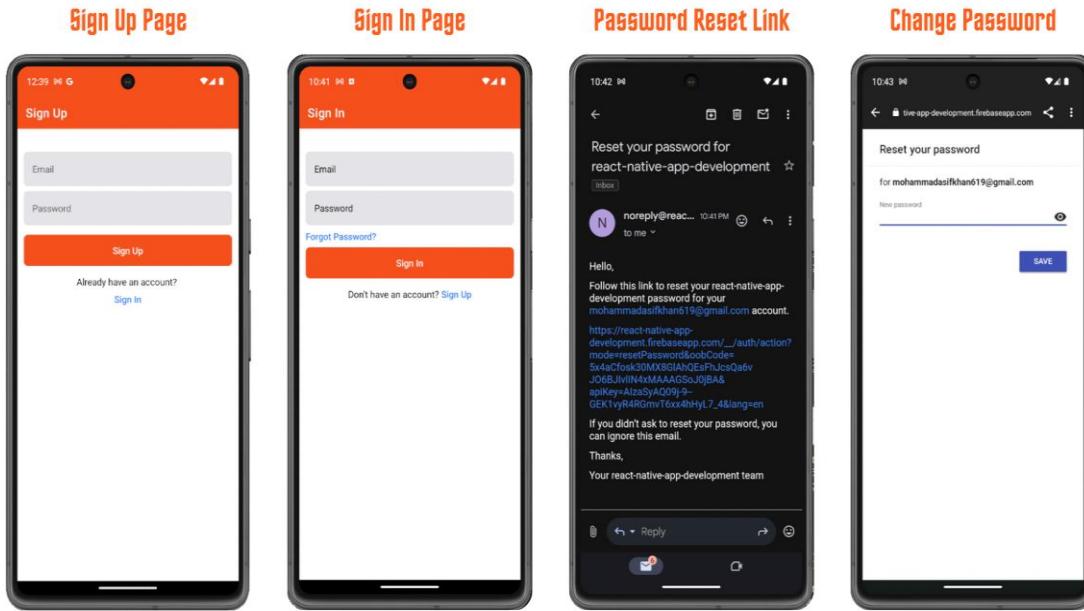
The different modules of the application are as follows:

### 1. Authentication and Authorization Module



**Fig. 5.1.1 User Signup, User Login and Forgot Password Flow Diagram**

The (**Fig. 5.1.1 and 5.1.2**) represents a structured overview of the authentication process within the food donation application, detailing user registration, login, password recovery, and email validation. All these features are implemented using the Google Firebase Authentication and the workflow ensures security, data integrity, and seamless user experience through systematic validation steps and error handling mechanisms.



**Fig 5.1.2 Sign up and Sign in Page for user**

## User Login

To access the application, users initiate the login process by entering their credentials. The system verifies the input data, granting access upon successful validation. If the credentials match the records, the user is logged in, achieving "Login Success." If the credentials are incorrect, an "Invalid Credentials" error message is displayed, prompting the user to re-enter the correct information.

## User Signup

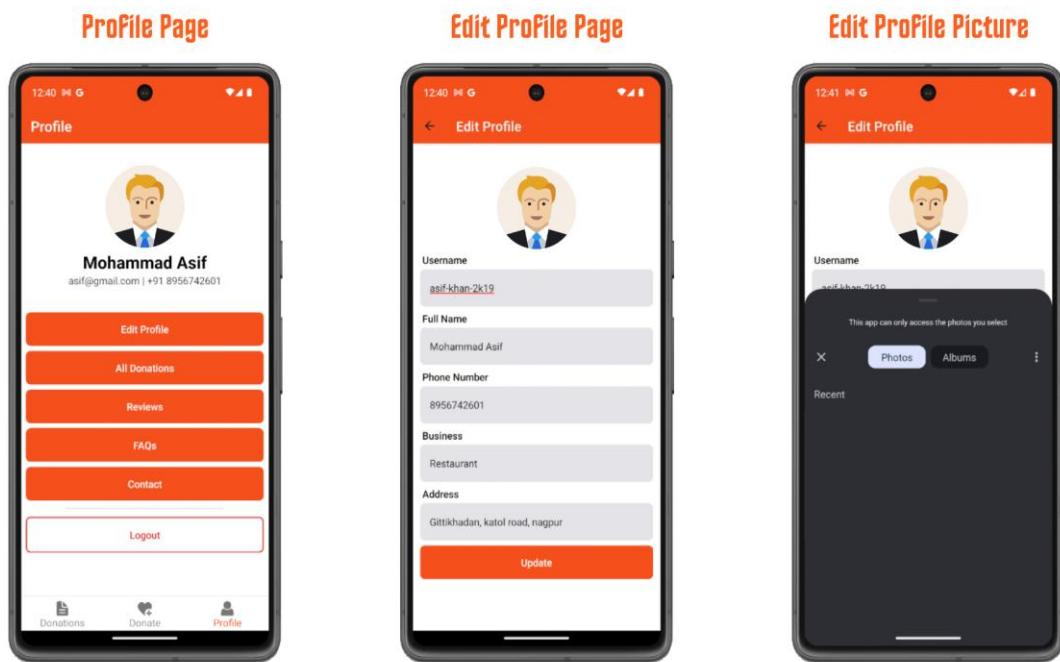
The signup process begins when a user selects "Start Signup" and enters their email and password. The system first verifies whether the email format is valid and then checks its availability. If both validations pass, the account is successfully created, leading to a "Signup Success" confirmation. However, if the email format is incorrect or the email is already registered, the user receives an appropriate error message, such as "Invalid Email" or "Email Already Taken."

## Forgot Password

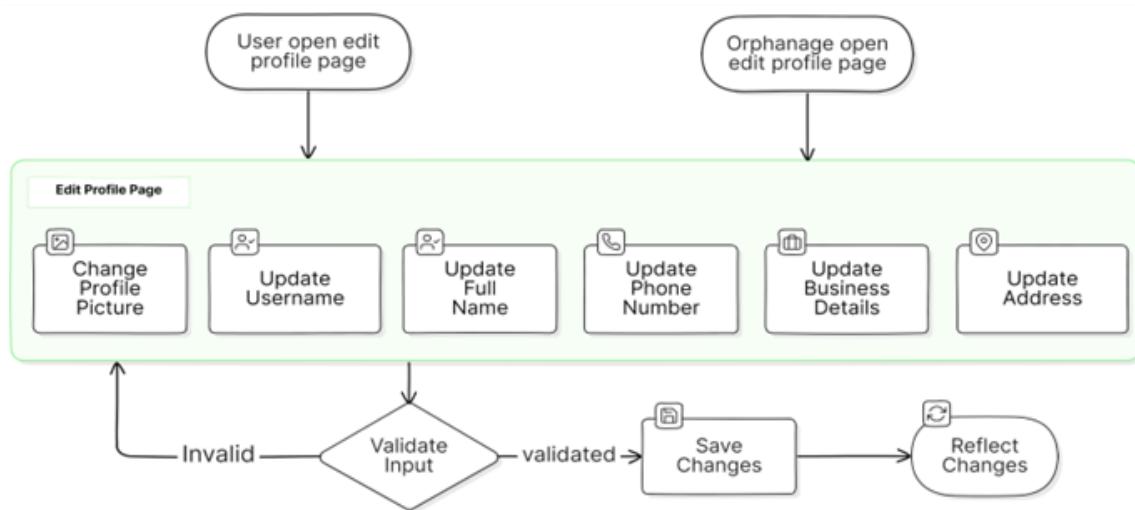
For users who have forgotten their password, the system offers a secure recovery mechanism. The user starts by entering their registered email. The system then verifies whether the email exists in the database. If the email is found, a password

reset link is sent to their email, and a "Reset Link Sent" message appears, allowing the user to reset their password. If the email does not exist, an "Email Not Found" error message is displayed, guiding the user accordingly.

## 2. Edit Profile



**Fig 5.2.1. Profile and Edit Profile Page**



**Fig. 5.2.2 Edit Profile Flow Diagram**

The (Fig. 5.2.1 and 5.2.2) explains the process of editing and updating the details of the users and the orphanage.

Both users and orphanages can update their profile details at any time. During signup, it is mandatory to provide all required details, ensuring a complete profile from the beginning. However, after registration, they have the flexibility to edit any information as needed.

The profile update process includes options to change the profile picture, full name, phone number, business details, and address. Since all details are already stored, users and orphanages can update them in any order without restrictions.

When an edit is made, the system validates the input before saving the changes. Once saved, the updated information is reflected in the profile instantly. This flexible and user-friendly approach ensures that users and orphanages can manage their profiles effortlessly.

### 3. Donor Module

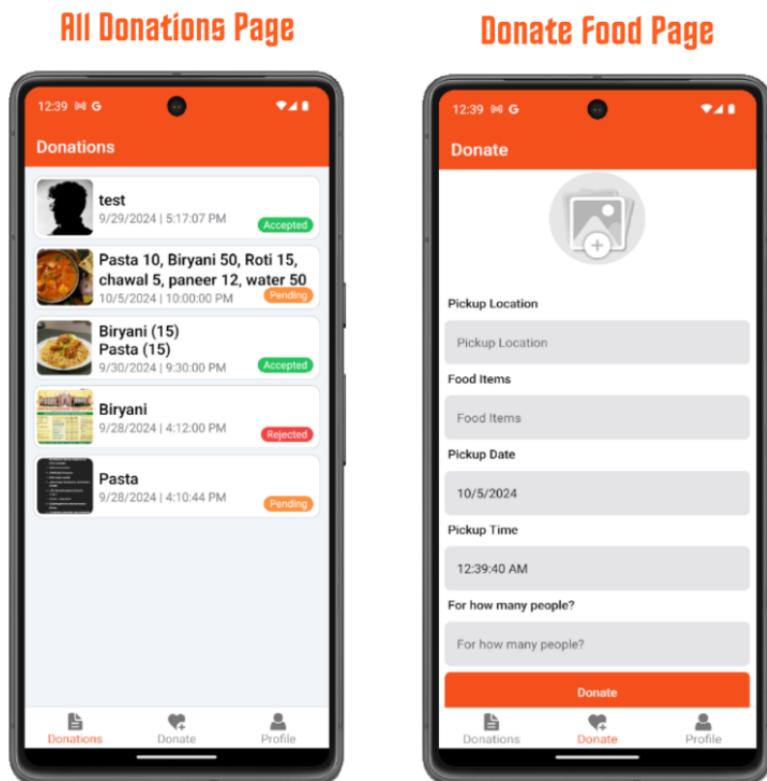
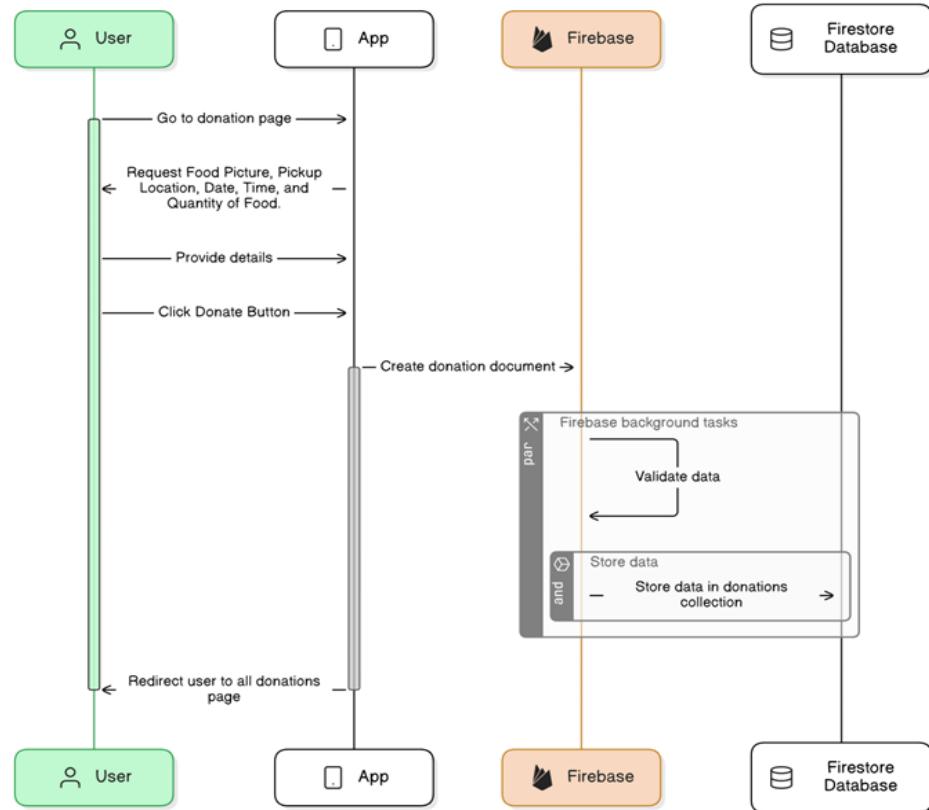


Fig 5.3.1 Donate Page



**Fig 5.3.2 Donation Page Sequence Diagram**

The diagrams in (**Fig. 5.3.1 and 5.3.2**) illustrates the donation process in the food donation application, outlining the interaction between the User, App, Firebase, and Firestore Database. Below are the detailed steps:

1. The user navigates to the donation page within the application, where they are prompted to provide essential donation details, including a food picture, pickup location, date, time, and food quantity.
2. After entering the required details, the user clicks the "Donate" button, initiating the donation process. The app then creates a donation document containing the provided information.
3. The donation document is sent to Firebase, where background tasks validate the data. This ensures that all fields are correctly filled, checking for missing or incorrect details before proceeding further.

- Once the validation is successfully completed, Firebase stores the donation details in the Firestore Database under the "donations" collection, making it accessible for tracking and processing.
- After the donation is successfully recorded, the application redirects the user to the "All Donations" page, allowing them to view their submitted donations along with their current statuses.

#### 4. Orphanage Module

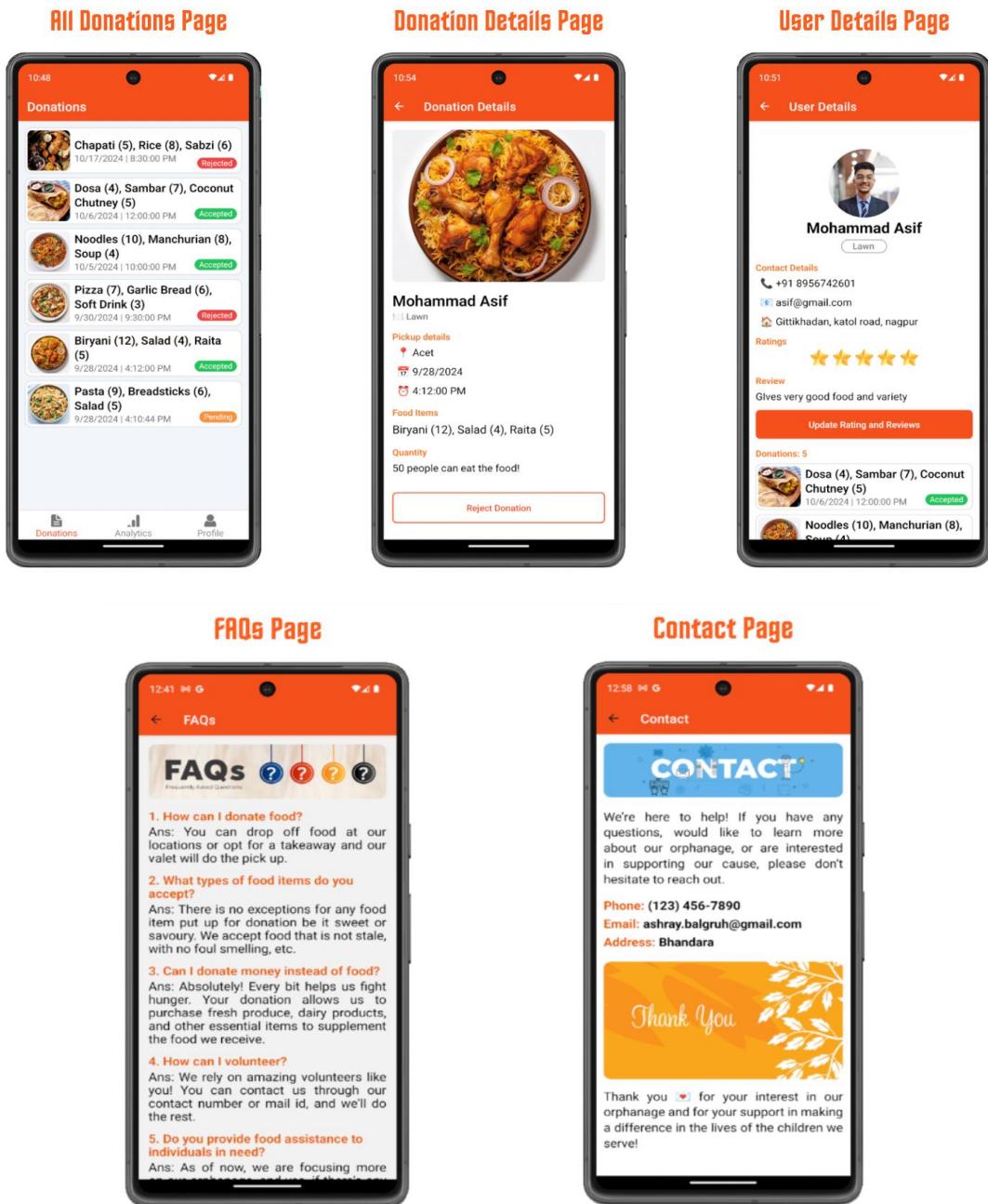


Fig. 5.4.1 Orphanage Module

## **All Donations Page**

The All Donations Page provides a list of food donations available for the orphanage to review. Each donation entry displays the food items along with their quantity, the date and time of donation, and a status label indicating whether the donation is Accepted (green), Pending (yellow), or Rejected (red). This allows orphanages to efficiently manage donations by tracking which ones are confirmed, pending, or declined. The interface is structured to ensure quick decision-making, enabling orphanages to select meals based on their needs while maintaining an organized donation system.

## **Donation Details Page**

The Donation Details Page gives a detailed view of a specific donation, helping the orphanage assess the food before deciding to accept or reject it. It includes the donor's name and location, pickup details such as the date, time, and venue, as well as a breakdown of food items and their respective quantities. Additionally, it provides an estimated number of people the meal can serve. A "Reject Donation" button is available for cases where the food may not meet the orphanage's requirements. This page ensures transparency, allowing orphanages to make informed decisions about food donations.

## **User Details Page**

The User Details Page displays donor information, making it easier for the orphanage to assess the donor's reliability and food quality. It includes the donor's profile picture, name, contact details (phone number, email, and address), and past donation history. A rating system allows orphanages to review donors based on the quality, variety, and consistency of their donations. Reviews and ratings help build trust between donors and recipients, ensuring that orphanages receive food from credible sources. Additionally, an "Update Rating and Reviews" button allows the orphanage to provide feedback, improving accountability within the donation system.

## FAQs Page

The FAQs Page provides answers to common queries related to food donation and volunteering. It is designed to guide users by addressing concerns such as how to donate food, what types of food are accepted, and whether monetary donations are allowed. The page also explains the process of volunteering and the current focus of the orphanage's food assistance program. Each question is highlighted in red for easy readability, followed by concise and clear responses. This ensures that donors and volunteers can quickly find the information they need, making the donation process seamless and efficient.

## Contact Page

The Contact Page serves as a direct communication channel between the orphanage and potential donors, volunteers, or supporters. It includes essential contact details such as a phone number, email address, and physical location (Bhandara), enabling users to reach out for inquiries or assistance. The page also features a warm “Thank You” message, expressing gratitude to those interested in supporting the orphanage. The visually appealing design, with a mix of text and graphics, reinforces a sense of appreciation and encourages more people to contribute to the cause.

## 5. Ratings and Reviews

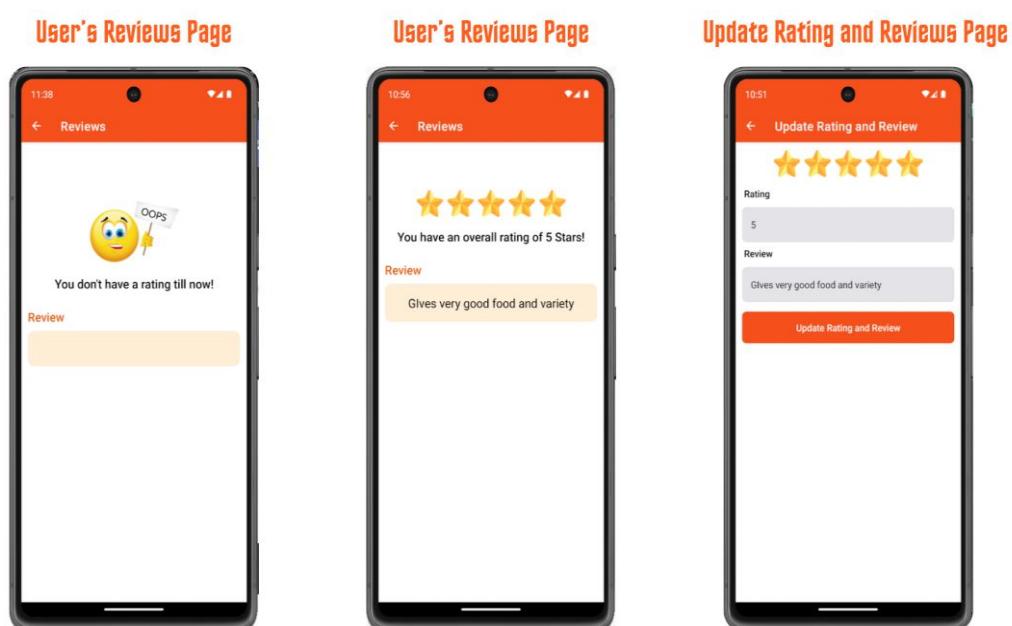
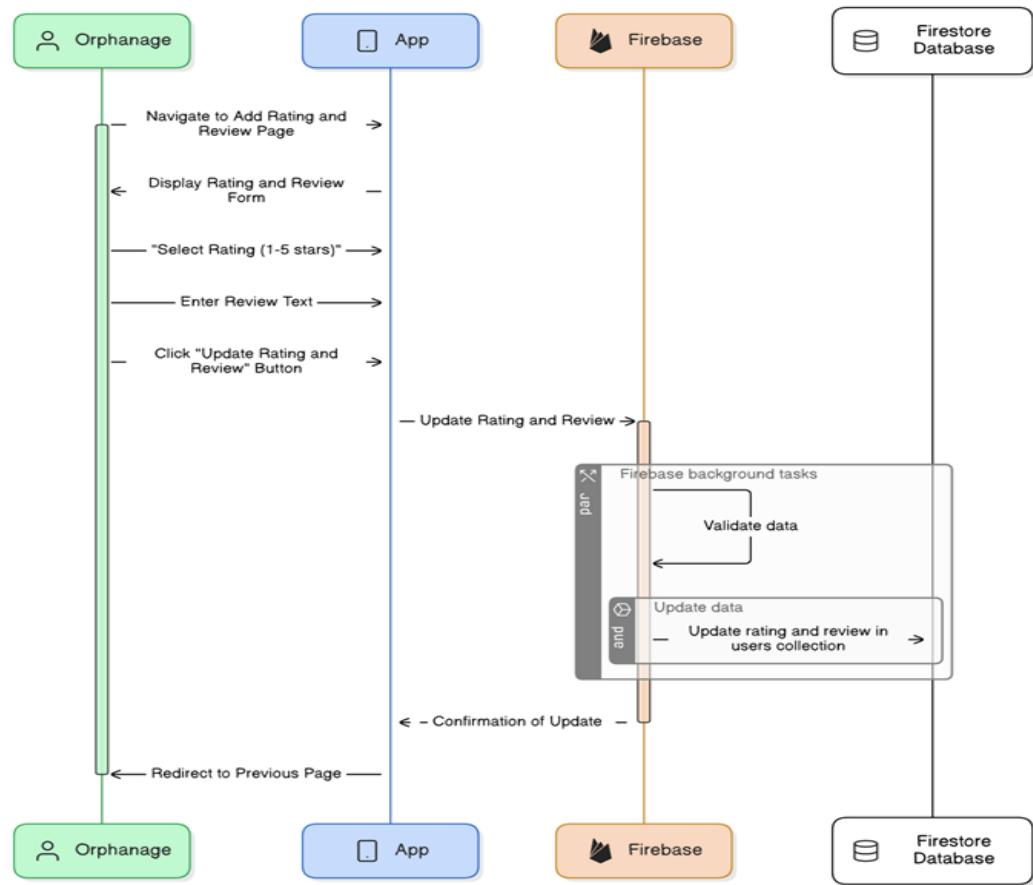


Fig. 5.5.1 Ratings and Reviews Page



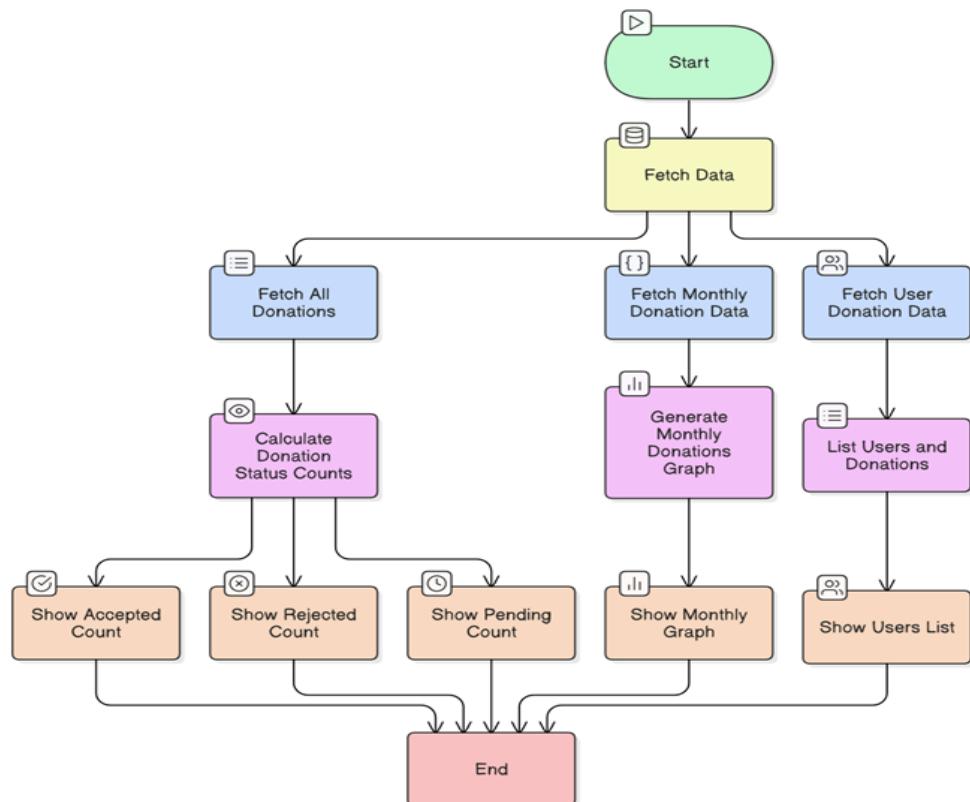
**Fig. 5.5.2 Update Ratings and Reviews Sequence Diagram**

The diagrams in (**Fig. 5.5.1 and 5.5.2**) illustrate the process of updating a rating and review by the orphanage within the food donation application. The interaction involves the Orphanage, App, Firebase, and Firestore Database. Below are the detailed steps:

1. The orphanage navigates to the "Add Rating and Review" page within the application. The app then displays a form where the orphanage can input their ratings and review for the user.
2. The orphanage selects a rating between 1 to 5 stars and enters their review text in the provided input field.
3. After providing the rating and review, the orphanage clicks the "Update Rating and Review" button, which triggers the update process. The app then sends the updated rating and review data to Firebase.

4. Firebase performs background validation to ensure the data is correctly formatted and does not contain any missing fields. Once validated, Firebase updates the “users” collection in Firestore with the new rating and review.
5. Upon successful completion of the update, Firebase sends a confirmation response back to the app. The app then redirects the orphanage to the previous page, completing the process.

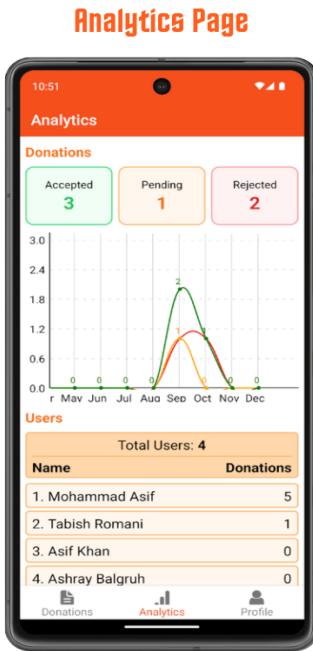
## 6. Reports and Analytics



**Fig 5.6.1 Reports and Analytics Flow Diagram.**

The flowchart in (**Fig. 5.6.1 and 5.6.2**) represents the gathering of reports and analytics in the food donation application. This page provides a detailed overview of donation data, including the total count of accepted, rejected, and pending donations, a graph of monthly donations, and a list of all registered users along with their respective donation contributions. The process follows these steps:

1. The process starts by fetching donation data from the database. This step ensures that all relevant information is available for analysis and display.



**Fig 5.6.2 Analytics Page**

2. The system retrieves all donation records, including their statuses. It then processes this data to calculate the total number of accepted, rejected, and pending donations. These counts are later displayed as separate statistics on the analytics page.
3. Simultaneously, the system fetches monthly donation data, processes it, and generates a monthly donations graph. This graph provides a visual representation of donation trends over time, helping to analyze how donations fluctuate across different months.
4. In addition to donation statistics, the system retrieves user-specific donation data. It lists all registered users and displays the number of donations each user has made. This helps track user engagement and contribution levels.
5. Finally, after processing all the data, the analytics page displays the calculated donation status counts, the monthly graph, and the list of users with their respective donations. This completes the analytics process, providing a comprehensive summary of donation activities.

# **Chapter 6**

## **Future Scope**

## **And**

## **Conclusion**

## **6.1 Applications**

The Imdad platform offers diverse applications across social, economic, and technological sectors, making it a valuable solution for food redistribution:

### **1. Food Redistribution & Waste Reduction**

- Ensures that surplus food from restaurants, households, and events is directed to orphanages and those in need, rather than being discarded.
- Reduces food wastage at the consumer and commercial levels, contributing to a more sustainable food system.

### **2. Community Engagement & Awareness**

- Encourages individuals, businesses, and institutions to actively participate in food donation, fostering a sense of social responsibility.
- Promotes awareness campaigns to educate people about the impact of food waste and hunger.

### **3. Non-Profit & Charity Support**

- Acts as a valuable tool for NGOs and charities that focus on hunger relief, allowing them to track food donations, optimize distribution, and ensure transparency.
- Facilitates collaborations between donors, orphanages, and social organizations, increasing outreach and effectiveness.

### **4. Government & Policy Integration**

- Can be integrated with government-backed food security programs to ensure better resource allocation and policy execution.
- Helps local authorities track food donation patterns, enabling data-driven policy improvements.

## **6.2 Advantages & Limitations of The Proposed System**

### **6.2.1 Advantages**

The *Imdad* system introduces several unique advantages over traditional food donation methods, making the process efficient, transparent, and scalable:

#### **1. Direct Donor-Orphanage Interaction**

- Removes third-party dependencies, allowing donors to directly connect with orphanages for food donations.
- Reduces the risk of food being mishandled or delayed due to unnecessary intermediaries.

#### **2. User-Friendly Interface**

- Designed for ease of use, making it accessible to individuals, small businesses, and organizations regardless of their technical skills.
- Seamless mobile application ensure quick registration and effortless donation processes.

#### **3. Scalability & Cloud Integration**

- Built on Firebase and React Native, ensuring the system can handle a growing number of users and donations efficiently.
- Can easily expand to new locations, allowing the platform to reach more orphanages and donors across different regions.

#### **4. Automated Notifications & Alerts**

- Sends real-time notifications to donors and orphanages, reducing response time and ensuring timely pickups.
- Automated reminders help orphanages stay informed about available food donations without manual follow-ups.

## **5. Food Quality Assurance**

- The rating and feedback system ensures that only safe and hygienic food is delivered to orphanages.
- Helps maintain high food safety standards, preventing the donation of spoiled or low-quality food.

## **6. Social & Environmental Impact**

- Reduces food wastage, making a significant contribution to environmental sustainability by preventing unnecessary disposal.
- Directly supports the fight against hunger, ensuring that orphaned and underprivileged children receive consistent and nutritious meals.

### **6.2.2 Limitations**

Despite its strong technological foundation and impact, *Imdad* faces certain challenges that need to be addressed for further improvement:

#### **1. Limited Initial Adoption**

- Many users are unaware of digital food donation platforms, leading to slow adoption rates in the early stages.
- Requires marketing campaigns and awareness drives to encourage wider participation.

#### **2. Dependence on Internet Connectivity**

- Since *Imdad* is a cloud-based platform, its functionality is limited in areas with poor or no internet access.
- This restricts its adoption in rural regions, where food security concerns are often high.

#### **3. Manual Food Pickup Coordination**

- The system relies on donors and orphanages to coordinate pickups, which may lead to scheduling conflicts.

- Introducing automated logistics solutions could reduce reliance on manual coordination.

#### **4. Scalability in Rural Areas**

- Expansion into remote areas requires partnerships with local NGOs and government programs.
- Ensuring consistent donor participation in rural regions remains a challenge.

#### **5. Food Quality Control Dependence**

- Food quality checks rely on user ratings and reviews, which may not always be accurate or reliable.
- Implementing AI-driven quality assessment could enhance food safety measures.

### **6.3 Future Scope**

To further enhance the impact and efficiency of Imdad, the following upgrades and expansions are planned:

#### **1. AI-Based Donation Matching**

- Implement AI-powered algorithms to match donors with nearby orphanages based on real-time demand and food type.

#### **2. Automated Pickup & Delivery Integration**

- Partner with local delivery services and logistics providers to introduce automated food collection and distribution.

#### **3. Offline Mode for Low-Connectivity Areas**

- Develop an offline data submission feature, allowing users in rural areas to register donations even with poor internet connectivity.

## **4. Government & Corporate Collaborations**

- Partner with government agencies and corporate CSR programs to integrate *Imdad* into national and regional food security initiatives.

### **6.4 Conclusion**

The Imdad system is a technology-driven, real-time food donation platform that successfully bridges the gap between food donors and orphanages. By leveraging modern web and mobile technologies, it ensures that surplus food is efficiently redistributed to those who need it most, preventing wastage while addressing food insecurity.

This initiative eliminates third-party dependencies by enabling direct communication between donors (restaurants, caterers, event organizers, households) and orphanages. The automated notification system, real-time tracking, and quality assurance features ensure that donations are safe, timely, and transparent.

The successful implementation and testing of the platform demonstrate its potential to redefine food donation systems by overcoming the limitations of manual coordination, lack of transparency, and logistical inefficiencies. The structured workflow simplifies food donations, making it easier for donors to contribute and for orphanages to receive much-needed food supplies.

Food waste and hunger coexist as two major global crises, despite the availability of surplus food that could be redirected to underprivileged communities. The Imdad platform provides a practical, scalable, and sustainable solution to combat this challenge.

Through real-time surplus food redistribution, Imdad significantly contributes to:

- Reducing food wastage, preventing edible food from being discarded.
- Ensuring food security for orphanages, providing consistent nutritional support.

- Fostering social responsibility, encouraging businesses and individuals to contribute towards hunger alleviation.
- Minimizing environmental impact, as food waste contributes to greenhouse gas emissions and resource depletion.

The platform's scalability and adaptability allow it to be expanded to additional orphanages, shelters, and community kitchens, amplifying its impact beyond its initial implementation.

The Imdad system has successfully bridged the gap between surplus food providers and orphanages, making the food donation process seamless, efficient, and scalable. The platform's real-time tracking, automated notifications, and direct communication features provide a modern, effective alternative to traditional food redistribution methods.

By continuously improving, scaling, and integrating advanced technologies, *Imdad* has the potential to become a global model for sustainable food donation. Its impact extends beyond just feeding orphaned children—it fosters a culture of responsible food consumption, strengthens communities, and creates a more compassionate, sustainable world.

Through collective effort, technological advancements, and social responsibility, *Imdad* envisions a future where no surplus food goes to waste, and no child goes to bed hungry.

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# Implementation of a Digital Solution for Efficient Food Donation and Waste Reduction

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**Abstract:** Food waste is a global issue with severe environmental, economic, and social impacts, and many underprivileged individuals face chronic food insecurity. The "Imdad" project presents a mobile app connecting food donors, restaurants, caterers, and households with orphanages in need. This paper explores its development, implementation, and impact in reducing waste, improving distribution, and fostering social responsibility. With real-time tracking, automated donor-recipient matching, and data analytics, Imdad offers a structured, user-friendly, and scalable solution for efficient food redistribution.

**Keywords:** Food waste management, food donation, NGOs, mobile application, digital transformation, social impact, sustainable food distribution.

## 1. Introduction:

Food insecurity and waste are closely linked global issues, with nearly 40% of food produced in India going to waste, while millions, especially orphaned children, face hunger. This highlights the need for an organized, tech-driven solution for food redistribution.

Imdad is a mobile-based platform designed to bridge the gap between food donors—such as restaurants, caterers, and households—and orphanages in need. Donors can register surplus food, which is then matched with nearby orphanages. The system facilitates food collection and delivery, ensuring timely distribution. With features like real-time tracking, automated notifications, donor impact reports, and feedback mechanisms, Imdad streamlines food redistribution and guarantees consistent access to nutritious meals for underprivileged children. It also encourages social engagement, promoting community-driven food donation and fostering a culture of shared responsibility.

## 2. Literature Review:

Food donation and security have been the focus of multiple applications, research initiatives, and government schemes aimed at addressing hunger and reducing food wastage. Various applications and initiatives have been developed, each with distinct methodologies, advantages, and limitations.

The "Donate and Save" website, using JavaScript, connects donors with NGOs for surplus food distribution, ensuring transparency and ease of use. However, its success depends on widespread adoption, and digital literacy barriers may limit accessibility. Similarly, the "Donate a Day" mobile app employs Rapid Application Development (RAD) for quick development and user feedback, but requires significant involvement and may not suit complex projects.

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37

## Implementation of a Digital Solution for Efficient Food Donation and Waste Reduction

The Akshaya Patra Foundation delivers nutritious meals to underprivileged children through government-run school programs. While effective in combating hunger, its focus on government schools may exclude other vulnerable groups. The National Food Security Mission, launched in 2007, enhances food security through increased production and improved soil health but faces issues like dietary diversity neglect, water stress, and subsidy dependence. Technology-driven solutions like the SeVa food donation app use Human-Computer Interaction (HCI) principles, providing a user-friendly and cost-effective design. However, iterative design complexities and scalability concerns persist. Feeding India, leveraging online tools for logistics and impact measurement, effectively tackles hunger through partnerships but depends heavily on these collaborations.

### 3. Proposed Methodology:

The development and implementation of Imdad followed a systematic and structured approach, comprising research, design, development, testing, and deployment phases. The initial phase focused on requirement analysis, during which surveys and interviews were conducted with orphanage administrators, food donors, and non-governmental organizations (NGOs) to identify core challenges and key functional requirements. This research phase provided valuable insights into the logistical, technical, and operational barriers to efficient food redistribution, ensuring that the application was designed to address these issues comprehensively. Following are the requirement analysis, the system design phase commenced, where user flow diagrams, wireframes, and architectural frameworks were developed to create an intuitive and scalable application. Special attention was given to user experience (UX) and user interface (UI) design, ensuring that both donors and recipients could easily navigate the application with minimal effort. The development phase adopted an agile methodology, allowing for iterative improvements based on user feedback. Regular testing and quality assurance processes were implemented to detect and resolve potential issues, ensuring a smooth and reliable user experience. Finally, the application was launched in phases, beginning with a pilot testing phase in select regions before rolling out full-scale implementation.

#### Module 1 - User Module:

The User Module ensures a seamless experience for donors and volunteers contributing food to orphanages. Upon accessing the app, users are first checked for authentication. If not logged in, they are directed to a Get Started screen to sign up or log in. Once authenticated, they reach the Home Screen, the main navigation hub, where they can make donations, update profiles, track donation history, submit reviews, browse FAQs, and contact support. With a user-friendly interface catering to all tech skill levels, the module enhances donor engagement, encouraging consistent participation in food donation activities.

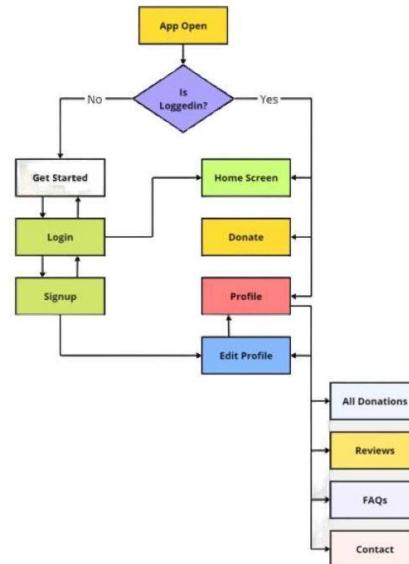


Fig 1. User Module – Flow Diagram

## Implementation of a Digital Solution for Efficient Food Donation and Waste Reduction

### Module 2 - Admin Module:

The Admin Module is tailored for orphanage administrators and organizational managers responsible for overseeing food donations and coordinating recipient logistics. Upon launching the application, administrators are required to log in to access their personalized dashboard. The Admin Dashboard functions as the central management hub, offering a comprehensive view of all donation activities. Administrators can track and analyze incoming food donations, view donor profiles, manage user accounts, respond to reviews, update their profile information, and oversee frequently asked questions (FAQs) to provide better assistance to users. Additionally, the platform includes an integrated contact feature, allowing direct communication between administrators, donors, and volunteers to facilitate smoother coordination. To enhance efficiency, data analytics tools are incorporated within the Admin Module, enabling orphanage managers to generate reports, gain insights into donation trends, and make data-driven decisions to optimize food redistribution efforts. This structured system ensures a well-organized and transparent food donation process, ultimately benefiting both donors and recipients.

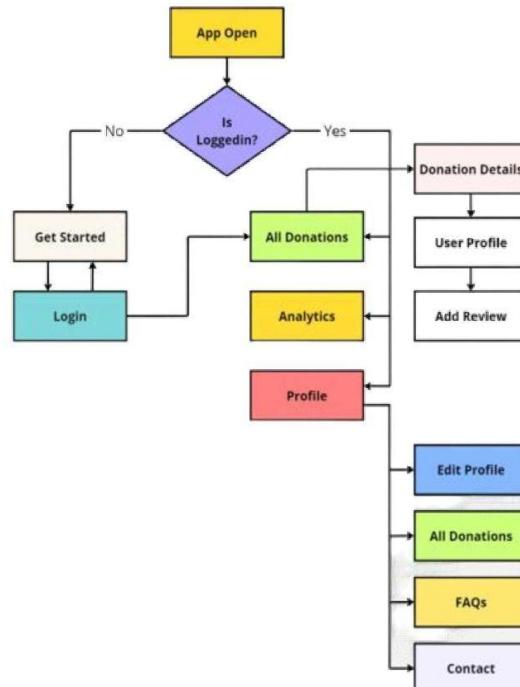


Fig 2. Admin Module – Flow Diagram

### Module 3 - User Authentication and Authorization module:

The User Authentication and Authorization module ensures secure user access and credential management. New users can register through the Sign Up page by providing their email and password, with a clearly visible "Sign Up" button for easy access. A link at the bottom allows users to switch to the Sign In page if they already have an account. Existing users can log in on the Sign In page using their email and password, with a "Forgot Password?" option for password recovery. There's also a link for users to navigate to the Sign Up page if they haven't registered yet. When users request to reset their password, they receive a secure email with a link to initiate the password reset process. On the Change Password page, users can enter and confirm their new password once they click the reset link in the email, enhancing app security. This flow ensures a seamless and secure experience for users, covering registration, login, and password recovery.

## Implementation of a Digital Solution for Efficient Food Donation and Waste Reduction

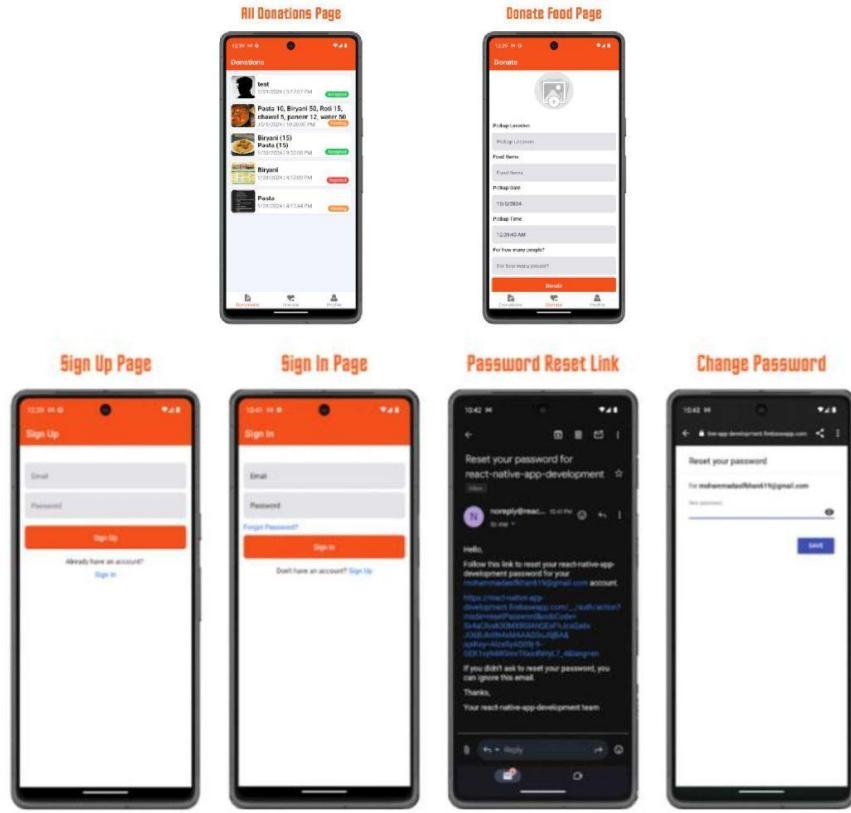


Fig 3. Sign up and Sign in Page for user

### Module 4 - Donor Module:

The Donation Process within the app is designed to make it easy and efficient for users to contribute food to the orphanage. The interface is user-friendly, ensuring that donors can quickly input all necessary details for a smooth donation experience. Users can start by uploading an image of the food items they wish to donate by clicking on the image upload section at the top of the screen. This helps the orphanage staff visually verify the donation.

Next, donors need to enter the pickup location, specifying where the food will be collected, ensuring that volunteers can reach them easily. The food items section allows donors to describe the type of food they are offering, helping the orphanage plan meal distribution efficiently. To streamline logistics, donors must select the pickup date and time, allowing for proper scheduling of collection. Additionally, they are required to specify how many people the food can serve, ensuring the orphanage can allocate the donation appropriately.

Once all details are entered, users can confirm their donation by clicking on the "Donate" button. The request is then sent to the orphanage team for approval and collection. Donors can track their past contributions under the "Donations" tab in the bottom navigation bar, ensuring transparency in the process. They can also manage their account details in the "Profile" section for a seamless user experience. This structured process ensures convenience for donors while helping the orphanage efficiently manage food distribution resources.

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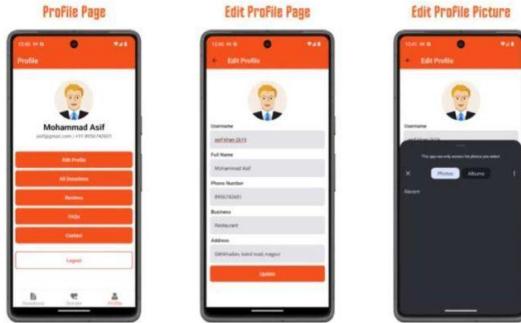


Fig 4. Profile and Edit Profile Page

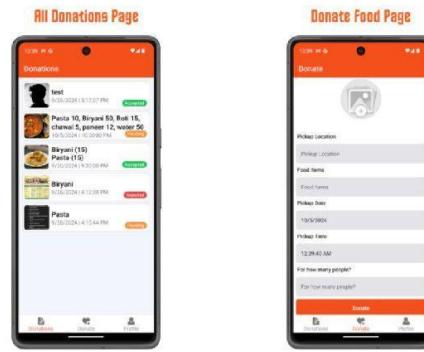


Fig 5. Donate Page

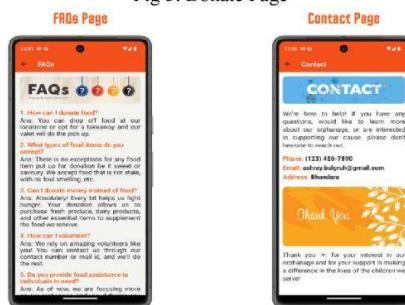


Fig 6. FAQ's and Contact Page

### Module 5: Orphanage Module:

The orphanage model of the food donation app ensures efficient and transparent food distribution. Donors list available food with details such as quantity and time, which orphanages can browse on the All Donations Page. Donations are marked as Accepted, Rejected, or Pending for easy management. When selecting a donation, orphanages access essential pickup info, including the donor's contact details and the number of people the food serves. The User Details Page lets orphanages review donor profiles, past donations, and ratings. The app also allows orphanages to rate donors, ensuring accountability, minimizing waste, and ensuring quality food reaches those in need.

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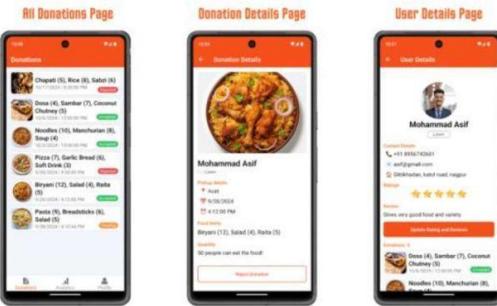


Fig 7. All Donation and Details page for user

### Module 6: Rating and Review:

The Rating and Review feature in the food donation app allows users to evaluate and provide feedback on donors based on their food quality and variety. The first User's Reviews Page shows an empty rating section with a message indicating that no ratings have been given yet. Once a user receives reviews, the second User's Reviews Page displays an overall rating (e.g., 5 stars) along with written feedback, such as "Gives very good food and variety." The Update Rating and Reviews Page enable users to modify their rating and review if needed. This feature helps maintain transparency, allowing orphanages to assess donors based on past experiences, ensuring better food quality and reliability in future donations.

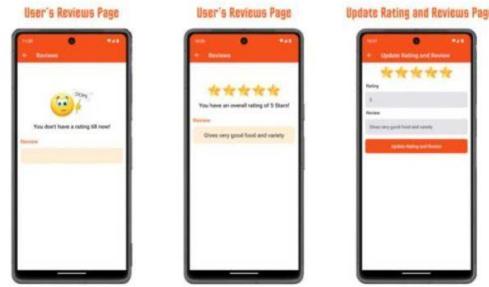


Fig 8. Rating and Reviews page

### Module 7: Reports and Analytics:

The Analytics Page provides insights into donation activities, categorizing them as Accepted (3), Pending (1), and Rejected (2). A graph visually represents donation trends over different months. The Users section lists donors and their contributions, with Mohammad Asif leading at 5 donations. This helps track donation success and recognizes active contributors. The page enables better food distribution management for orphanages and organizations.



Fig 9. Analytics Page

## Implementation of a Digital Solution for Efficient Food Donation and Waste Reduction

### 4. Applications:

Imdad empowers businesses and individuals to fulfil their social responsibility by donating surplus food, fostering a culture of generosity while contributing to community welfare and environmental sustainability. By providing an efficient platform for food donation, the app ensures that edible surplus food is redirected to those in need rather than wasted, promoting responsible resource management.

One of the key beneficiaries of Imdad are orphanages, which receive reliable and consistent meal supplies through the app. This guarantees that vulnerable children have access to nutritious food daily, addressing food insecurity and improving their overall well-being. Additionally, by receiving donated food, orphanages can significantly reduce their expenses on purchasing meals, enabling them to allocate their resources toward other essential needs such as education, healthcare, and infrastructure.

Beyond its direct impact on food security, Imdad fosters meaningful social connections. It bridges the gap between donors and orphanages, creating a sense of community and shared responsibility for social causes. The platform also encourages volunteerism by offering individuals opportunities to contribute through food distribution and other supportive tasks. This active engagement not only strengthens community bonds but also promotes a culture of giving and social cohesion.

### 5. Conclusion

The Imdad initiative leverages technology to connect food donors with orphanages, reducing waste and ensuring underprivileged children receive consistent, nutritious meals. Its efficient system features real-time tracking, automated donor-recipient matching, and a user-friendly interface, making donations seamless and scalable. Beyond food security, Imdad fosters social responsibility, engaging individuals, businesses, and organizations in charitable giving.

Despite its impact, challenges include logistics, internet dependency, and outreach. Ensuring food safety and stakeholder coordination requires ongoing monitoring and strong partnerships. Expanding to new regions demands significant infrastructure and funding. Looking ahead, Imdad plans to integrate AI for optimized food distribution, using predictive analytics to enhance donation forecasting. Collaborations with NGOs, corporations, and governments will expand its reach, while multilingual support and offline capabilities will improve accessibility. Imdad exemplifies a sustainable food redistribution model, tackling food insecurity, reducing waste, and inspiring community-driven change. With evolving technology, it has the potential to set a global standard in innovative food donation.

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## **Project Competition Details**

Ms. Sarah Khan, Ms. Yusra Maheen, Ms. Ashiya Khan, Ms. Reebanaaz Diwan, Mr. Mohammed Tabish Romani, Mr. Mohammad Asif Khan, February 27-28, 2025. Secured first position COMPUTSAV 2025 project competition held under the banner of “PCE ACM Student Chapter and SCOOOP”. Organized by “Priyadarshini College of Engineering”, Nagpur, India.





