



A Smart Orphanage Management System and Support App Powered by AI

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Abstract—Project Pragati is a socially impactful mobile application intended to transform orphanage homes into better managed and supported ones. An ambitious project by a team of aspiring developers with no prior full-stack experience, the app personifies a unique blend of learning and service. The app smoothens tasks regarding child record maintenance, donation tracking, volunteer management, and event scheduling. It also integrates some basic ML/NLP features, like sentiment analysis for monitoring the children’s well-being and a basic chatbot for support in communication. Simple in approach, yet highly accessible and functional, Project Pragati is designed to empower orphanage staff while fostering transparency, efficiency, and emotional care in homes.

I. INTRODUCTION

Most of the orphanage homes in many parts of the world are still plagued by outdated processes, administrative burdens, and poor digital outreach. Because of limited access to modern infrastructure, orphanage homes have ineffective data management, lack transparency in donations, and minimal engagement with the greater community. Eventually, these factors affect the overall care, support, and development opportunities for underprivileged children. This is where Project Pragati comes into play to provide an intelligent, user friendly, easy-to-scale mobile application, especially for orphanage management. In this connection, Flutter and Firebase were used to create an application that merges modern mobile development practices with beginner-level Machine Learning and Natural Language Processing. Core features include digital child record keeping,

donation and inventory tracking, multilingual chatbot features, sentiment analysis for well-being monitoring, and automation of event and volunteer scheduling. The name “Pragati” itself spells “progress” in Kannada and Sanskrit, symbolizing the motive of the whole project in using technology as a catalyst for positive change in child care institutions. Its goal is to build a future-ready ecosystem that connects orphanage staff, donors, and volunteers on one single platform. It supports multilingual features, real-time data syncing, and cloud storage for scalability and accessibility. It is designed to be modular to cope with enhancements like predictive analytics, emotion tracking, or smart dashboards in the future. Ultimately, Project Pragati hopes to bring improvement to operational efficiency, community engagement, and upliftment of the overall care and transparency within orphanage environments.

II. LITERATURE REVIEW

1. “Orphan Adoption Management System using Machine Learning Approach”, R. Kaladevi, Jeevitha B, Jeevitha V, 2022. Summary: This paper proposes a web-based orphan adoption system that uses SVM to match donors and orphans based on attributes like age and gender. It manages records and allows donor–orphan interactions in digital mode with requests for adoption and its approval. A recommendation engine supporting donors in identifying suitable children assists in moving away from manual record-keeping to automation.
2. “Advancement in Orphanage and Donation Management System using PHP”, Jayakrishnan M R, Rohit, 2022. Summary: The paper develops a PHP web platform to handle logistics of orphanage donations for the care of orphan



students. The modules of posting needs, tracking contributions, and interactions are included in this system. An intuitive user interface focuses on bridging the communication gap among orphanages and benefactors.

3. “Smart Children Management using Data Analytics, Machine Learning and IoT”, Faruk J, Adnan M, 2022. Summary: The authors review the integration of IoT and ML for smart child monitoring and data analytics. Deployment of sensors to track activities in real time and ML models designed to analyze behavioral patterns are discussed. The system architecture is elaborated upon in much detail, its accuracy, and how it may find applications in smart communities.

4. “Foster Care Management Using Web Application”, Dr. S K Manju Bargavi, Adhitya Yadav, 2023. Summary: The paper introduces a web app to manage foster care workflows, incorporating child profiles, event scheduling, and adoption tracking. It lays great emphasis on user-centered design and involvement of stakeholders for secure and scalable deployment. The architecture addresses aspects related to integration with existing systems and considerations for staff training.

5. “Developing an Automated Orphanage Management System”, Onyemaobi B.C, Adigun M.F, 2021. Summary: This work outlines a web-based solution to digitize orphanage record management, including personal, financial, and educational data. It automates routine tasks and reduces paper dependency. The focus is ease of access and operational efficiency, supported by a secure database backend.

6. “Improving Human AI Partnerships in Child Welfare”, Anna Kawakami, Venkatesh Sivaraman, Adam Perer, 2022. Summary: The paper explores design principles for collaborative human–AI systems in child welfare, with a key emphasis on explainability, trust, and fairness. Using interviews with caseworkers, it identifies challenges and proposes guidelines for transparent AI assistance.

7. “A Human-Centered Review of the Algorithms used within the U.S. Child Welfare System”, Devansh Saxena, Karla Badillo-Urquiola, 2020. Summary: The authors conduct an assessment of algorithmic systems implemented in the U.S. child welfare system from a human-centered perspective. They investigate the aspects of bias, user trust, and ethical consequences through literature review and stakeholder feedback. The study has brought forth the necessity for inclusive and transparent algorithmic design.

III. OBJECTIVES

1. Centralized Orphanage Management System: To build a unified digital platform that allows orphanage administrators to manage orphan profiles, events, and donations efficiently through a single interface.

2. Transparency in Donations: To provide a secure, trackable, and transparent donation process using the Razorpay payment gateway, ensuring donors can see where and how their contributions are utilized.

3. Intelligent Communication via Chatbot (NLP/ML): To develop an AI-powered chatbot that provides instant responses to user queries, donation assistance, and personalized engagement for donors, admins, and orphans.

4. Sentiment Analysis for Feedback Monitoring: To implement Machine Learning models for analyzing donor feedback to assess satisfaction levels and improve trust and transparency.

5. Enhancing Donor-Orphan Engagement: To enable meaningful connections between donors and orphans through event participation, real-time updates, and personalized notifications.

6. Scalable and Cloud-Based Infrastructure: To utilize Firebase Cloud Services for real-time database management, secure authentication, and seamless app performance across multiple orphanages.

7. Promoting Social Impact and Awareness: To use digital transformation and AI tools to empower orphanages, encourage community support, and foster positive societal change.

IV. METHODOLOGY

The development of Project Pragati follows a modular and iterative approach, combining mobile app development with the integration of intelligent features. The frontend is built using Flutter, enabling cross-platform compatibility, while Firebase serves as the backend for real-time database management, authentication, and cloud storage.

1. Agile Methodology: Project Pragati uses Agile for iterative development, enabling early delivery of key features and continuous user feedback.

2. User-Centered Design (UCD): The app emphasizes ease of use through user feedback, multilingual support, and accessibility for staff, volunteers, and donors.

3. Modular Architecture: Features are built as independent yet integrated modules, ensuring scalability and easier maintenance.

4. AI and ML Integration: AI powers features like sentiment analysis, document classification, and a chatbot for real-time assistance.

5. Cloud Infrastructure: Cloud technologies like Firebase ensure secure, real-time data sync and access across devices.

6. Security and Privacy: Role-based access and encryption protect sensitive data, aligning with privacy regulations.

7. Tools: Java(Android Studio), Flutter, Firebase Firestore, Razorpay, Python NLP libraries

V. SYSTEM DESIGN

System design plays a critical role in defining the overall structure, components, modules, and data flow of the proposed application. For “Project Pragati,” the system is designed to streamline orphanage operations, support donations, automate record keeping, and incorporate AI for intelligent suggestions



and communication. The System design contains the following Modules.

User Authentication Module, Child Management Module, Donation Management Module, AI-Powered ChatBot Module, Admin Dashboard Module.

User Authentication Module:

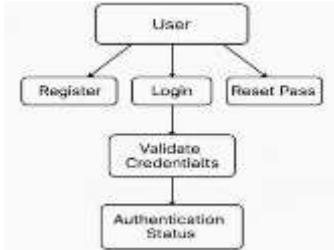


Fig. 1. User Authentication Module

The use case diagram represents how different actors interact with the authentication system in Project Pragati.

User: This encompasses Admins, Orphanage Staff, and Donors. Register Account: One can make a new account by providing personal details and selecting a role: Admin, Staff, or Donor. Log-in: Users provide their credentials, which include the username/e-mail and password. The system begins validation of the credentials. Logout: An authenticated user can log out to terminate their session. Reset Password: In case the user forgets their password, they can click on “Forgot Password” to reset it through OTP/email verification.

Child Management Module:



Fig. 2. Child Management Module

Add Child Record: Staff can create a new child record with fields such as name, DOB, health, and background. Update Child Information: Allows editing of existing records, for example, school progress, medical reports, or status updates. View Child Profile: Gives full access to a child's data. Delete Child Record: Deletes data; may require admin privileges.

Search Child: Enables searching by multiple filters such as age, gender, or health status. Assign to Facility / Sponsor: Links children to classes, medical units, or donors for further support.

Donation Management Module: Donor Registration/Login: Assures verification of identity and keeps track of donation history. Make a Donation: Donors can choose to donate cash, goods, or volunteer time. Donation History Tracking: Donors can access previous transactions and current status. View Receipts: Auto-generated digital receipts ensure transparency. View Orphanage Requests: Displays real-time needs such as groceries, books, or clothes. Approve/Reject Donations (Admin/Staff): Admin validates the donation for compliance and logging purposes. Update Donation Status: Tracks progress as the status moves from Pending → Received → Acknowledged.

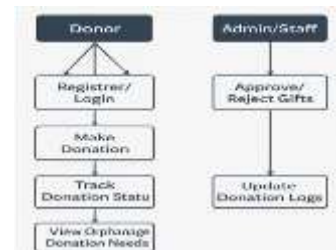


Fig. 3. Donation Management Module

AI-Powered ChatBot Module

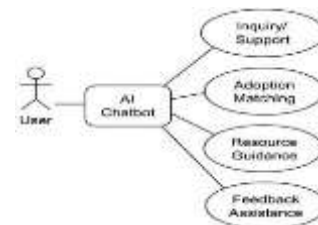


Fig. 4. AI-Powered ChatBot Module

Inquiry/Support: Allows users to ask general questions and receive immediate responses related to orphanage services, donations, or events. Adoption Matching: Provides preliminary guidance and helps match potential adopters with suitable orphan profiles according to their preferences. Resource Guidance: Directs users to relevant features or services within the app, such as donation pages, volunteering forms, or FAQs. Feedback on Response: Enables users to provide feedback on the chatbot's replies.



Admin Dashboard Module:

Admin logs in to the dashboard using valid credentials. User Management: Admin can add, update, or delete user accounts (such as orphanage staff or donors).

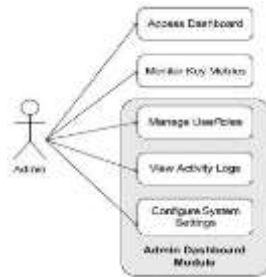


Fig. 5. Admin Dashboard Module

Monitor Donations: Keeps track of donation records and generates summaries. Oversee Events: Allows the admin to create, update, or cancel events organized for the children. View Analytics: Displays visual dashboards for app usage, trends, and reports. Send Notifications: Enables the admin to issue announcements or alerts to users. Respond to Feedback: Provides access to user feedback and allows triggering of responses. Access Chatbot Logs: Tracks and reviews queries handled by the AI Chatbot.

VI. IMPLEMENTATION

The system implementation of Project Pragati – A Smart Orphanage Management System and Support App Powered by AI involves the coordinated development of the frontend mobile application, backend logic, and cloud-based database services. The implementation follows a modular and layered approach to ensure scalability, maintainability, and ease of integration.

Frontend Implementation (Flutter) The frontend of Project Pragati is implemented using Flutter, a cross-platform UI framework that allows development of a single codebase for Android devices. Flutter was chosen due to its fast development cycle, expressive UI components, and native performance.

Backend Implementation (Java – Android Studio) The backend logic of Project Pragati is implemented using Java, integrated within the Android ecosystem using Android Studio. The backend handles business logic, validation, and coordination between the frontend and Firebase database.

Database Implementation (Firebase) Firebase acts as the cloud-based backend service and database for Project Pragati. It provides real-time data synchronization, scalability, and secure access control.

VII. RESULTS

The system is implemented using a multi-tier architecture, where backend logic manages user roles, processes, and data flow. The AI modules are trained offline and integrated through REST APIs. The mobile and web applications provide rolebased dashboards — administrators oversee operations, staff update records, donors view project transparency pages, and children interact with AI-based learning and emotional-support modules. The system also includes automated scheduling, smart reminders, chatbot support, and analytics dashboards. Robust security measures such as encryption, authentication, and data validation are strictly enforced. Overall, the system is designed to deliver a seamless, interactive, and intuitive experience for all stakeholders.

The implemented system demonstrates significant improvements in operational efficiency, data accuracy, and transparency. Attendance tracking accuracy has increased through automated facial recognition, while donor satisfaction has grown due to transparent dashboards that display real-time fund utilization. Children’s academic performance has improved thanks to personalized learning suggestions, and emotional analysis allows caregivers to detect early signs of distress. Inventory wastage has been minimized through predictive stock management, and detailed reports and analytics simplify administrative workflows and enhance decision making. Overall, the prototype demonstrates that AI enabled systems can profoundly transform the management and welfare landscape of orphanages.



Fig. 6. Sign Up Page

The system allows both staff and donors to sign up using correct details. Users can sign up either for donor or staff.



Fig. 7. Login Page

Authentication works smoothly with proper input validation. This page allows users to login using the registered / signup email id and password created while signing up the app. Once after entering correct login details it takes into the app. Users cannot login to staff role with same email id and password.



Fig. 8. Staff Dashboard

Once login done, it takes to user dashboard, where staff and donor dashboards will be different from one another role. Here, staff dashboard is attached. In this page we can see the different actions and roles that staff can perform.

1. Donations: Here donor can make a new donations like food, money, books etc.,
2. Events: It shows the upcoming events lists and details of lists.
3. Children Management: Children details, number of children will be displayed here.
4. My Events: Here events registered by the user will be shown.
5. Quick Actions: This section is to add the new child, creating new event and displays the view reports.
6. Recent Donations: It displays the recent donations made or received.



Fig. 9. Donation Management

Here, it shows the donations made by the users and also the total amount donated.

VIII. CONCLUSION AND FUTURE WORK

Project Pragati successfully meets the objective of creating an intelligent, transparent, and user-friendly Orphanage Management System. It integrates Flutter for front-end usability with Java for backend processing and Firebase services, ensuring secure data handling, smooth functioning, and realtime updates. Additionally, through the donation module, event management, orphan record handling, and AI-powered chatbot, the platform enhances administrative efficiency and donor engagement. Overall, Project Pragati provides a practical and effective digital solution that helps orphanages improve transparency, management, and communication—contributing to a more connected and supportive community.

In conclusion, the Smart Orphanage Management System and Support App Powered by AI demonstrates how technology can be responsibly and meaningfully applied to social welfare. It is built with the objectives of enhancing accountability, strengthening operations, supporting caregivers, empowering children, and building trust among donors. The system introduces a new dimension of orphanage care, where data-driven management, transparency, and intelligent support systems work together to create a nurturing and stable environment.

Although the current system delivers strong functionality, there remains great potential for expanding the solution into a more intelligent, predictive, and globally scalable platform. Future enhancements may focus on developing a more advanced AI model capable of predicting educational outcomes, emotional needs, and health risks for each child using longterm behavioral and medical data. Incorporating AI-enabled mental health monitoring—through sentiment analysis of voice recordings, chat interactions, or creative expressions—



could help caregivers detect early signs of depression, anxiety, trauma, or stress.

In the next development phases, blockchain technology could be introduced for donation traceability, ensuring absolute integrity and transparency in financial transactions. This would foster greater trust among donors, NGOs, and government agencies. The application could also evolve into a nationwide or international network where orphanages share resources, exchange volunteers, and collaborate on training programs.

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