

Jaypee Institute of Information Technology, Noida

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING AND IT



Project Title: Homeless Hearts (Stray Animal Portal)

Enrol. No.	Name of Student
9921103030	Ayushi Tripathi
9921103053	Shivangi Suyash
9921103089	Bhavya Srivastava
9921103093	Palak Agarwal

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Signature(s) of Students:

Ayushi Tripathi (9921103030)

Shivangi Suyash (9921103053)

Bhavya Srivastava (9921103089)

Palak Agarwal (9921103093)

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and beliefs, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma from a university or other institute of higher learning, except where due acknowledgment has been made in the text.

Place: Jaypee Institute of Information Technology, Noida, Sector 128

Date: 25 April, 2024

Name: Ayushi Tripathi Enrollment no.:9921103030

Name: Shivangi Suyash Enrollment no.:9921103053

Name: Bhavya Srivastava Enrollment no.:9921103089

Name: Palak Agarwal Enrollment no.:9921103093

CERTIFICATE

This is to certify that the work titled “Homeless Hearts (Stray Animal Portal)” submitted by Ayushi Tripathi, Shivangi Suyash, Bhavya Srivastava, Palak Agarwal of B.Tech. of Jaypee Institute of Information Technology, Noida has been carried out under my supervision. This work has not been submitted partially or wholly to any other University or Institute for the award of any other degree or diploma.

Digital Signature of Supervisor:

Name of Supervisor: Prof. Charu Gandhi

Designation: Professor

Date: 25 April, 2024

ABSTRACT

The Stray Animal Management Portal (SAMP) proposes a comprehensive solution to the challenges posed by stray animal populations. SAMP aims to optimize volunteer management and animal care through a digital platform, enhancing the effectiveness of existing animal welfare organizations. The portal offers three main functionalities: adoption, donation, and volunteer management, tailored to improve operational efficiencies and animal welfare outcomes.

The adoption module simplifies the process of finding suitable homes for stray animals by providing an online database where potential adopters can view available animals, learn about their history, health status, and characteristics, and apply for adoption. In parallel, the donation functionality streamlines the process for contributors to fund necessities such as food, old animal products, and monetary support, ensuring sustained financial backing from the community.

Central to SAMP is the volunteer management module, which coordinates the activities of new and existing volunteers. Volunteers can register, receive training, and be assigned tasks according to their skills and availability. A rule-based chatbot provides immediate assistance and guidance to volunteers, enhancing the quality of animal care and volunteer experience. On the other hand, administrators benefit from a robust dashboard that visualizes critical metrics, aiding data-driven decisions, resource allocation, and identifying areas needing additional support.

SAMP prioritizes user-friendliness, ensuring effective interaction for all stakeholders. Developed using scalable, secure web technologies, the portal can handle large volumes of data and user interactions without compromising performance.

By implementing SAMP, significant improvements in stray animal management are anticipated through enhanced coordination of volunteers and resources. The portal engages the community in meaningful ways, leading to better care and successful adoptions of strays. This project represents a strategic integration of technology and compassion, aiming to create sustainable impacts on animal welfare practices.

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List of Abbreviations

HSI	Humane Society International
JS	Java Script
DB	Database
NoSQL	Not only Structured Query Language
ODM	Object Data Modelling
UI	User Interface
DOM	Document Object Model
JSON	Java Script Object Notation
HTML	HyperText Markup Language
MERN	MongoDB, Express JS, Reacts JS, Node JS
API	Application Programming Interface
SDK	Software Development Kit
GIS	Geographic Information System

Chapter 1

INTRODUCTION

We are excited to introduce our innovative Stray Animal Portal, a dynamic digital solution designed to enhance the operational efficiency of organizations committed to the welfare of stray animals. This comprehensive platform is crafted to streamline the management of volunteers and improve the care and tracking of stray animals through a user-friendly online interface.

Volunteers play a pivotal role in the operations of animal welfare organizations, and our portal is equipped with tools to help them manage their activities more efficiently. For administrators, the portal offers powerful monitoring and management tools. Our Stray Animal Portal is designed not just as a tool, but as a partner in the noble cause of animal welfare. By bridging the gap between technology and compassion.

Chapter 2

BACKGROUND STUDY

Paper 1

Title of the Paper: Technology for Improving Street Dog Welfare and Capturing Data in Digital Format during Street Dog Sterilisation Programmes

HSI has developed a web and mobile application suite called ‘HSIApps’ with custom tailored workflows to improve the efficiency (lower programmatic cost) and improve the welfare of dogs in care throughout the sterilisation process. The Android-based mobile app is simple and easy to use for teams in the field. The web app has data dashboards, record views, and reports for monitoring and evaluation purposes. The use of such digital applications can improve dog population management programme implementation, ensure positive outcomes for dogs postoperatively, and facilitate programmatic monitoring and evaluation.

Paper 2

Title of the Paper: Stray Dogs and Public Health: Population Estimation in Punjab, India

The overpopulation of stray dogs is a serious public health and animal welfare concern in India. Neglected zoonotic diseases such as rabies and echinococcosis are transmitted at the stray–dog human interface, particularly in low to middle-income countries. The current study was designed to estimate the stray dog populations in Punjab to enhance the implementation of animal birth and disease (for example, rabies vaccination) control programs. This is the first systematic estimation of the stray dog population using a recommended method (mark–re-sight) in Punjab, India.

Paper 3

Title of the Paper: Agapet: Supporting A Responsible Adoption Process for Stray and Abandoned Pets in Urban Areas

Organizations and governments strive to ensure stray pets are adopted. However, doing so is challenging: citizens often do not want to adopt. During four months, we worked closely with a civic-led rescue organization in Ecuador to explore how technology can support organizations in motivating responsible and sustained adoption. As a result, we propose Agapet, a mobile app that, using a timeline, visual representation of milestones, short pet-ownership courses, and a rewards system, sheds light on all the stages of the adoption journey.

Paper 4

Title of the Paper: Statistical Analysis of the Influence of Stray Animals on People's Lives

This paper analyzes people's attitudes towards stray animals from the perspective of statistics. Through the survey of people around the country, the data are obtained and analyzed by SPSS to explore the impact of stray animals on people's lives. At the same time, combined with the measures to control the number of stray animals and the impact on people's lives and other related factors, the paper puts forward relevant suggestions on how to further improve stray animals and management in various regions.

Chapter 3

REQUIREMENT ANALYSIS

3.1. Problem Statement

Stray animal organizations often struggle with efficiently managing the large number of volunteers, tracking the well-being and status of animals, and coordinating adoption and donation processes. Existing systems may lack integration, leading to inefficiencies and missed opportunities for animal care. Organizations need a unified platform to streamline these activities, manage data effectively, and enhance volunteer interaction to improve overall operations and animal care.

3.2. Solution

The proposed stray animal portal leverages technologies like React JS, Node JS, Express JS, Chart.js, and MongoDB to create a comprehensive solution. It offers features for adoption, donations, and volunteer management, including task assignments like food distribution and vet visits. The portal includes a rule-based chatbot for instant guidance, and an admin dashboard for real-time monitoring and data visualization, ensuring better management of resources and improved care for strays.

3.3. Software and Hardware Requirements

1. Frontend Development:

- ❖ React JS: Library for building the user interface.
- ❖ Node.js: Runtime environment and package manager for managing the project's dependencies.

2. Backend Development:

- ❖ Node JS: As a runtime environment.
- ❖ Express JS: Framework for building the API.
- ❖ MongoDB: NoSQL database for storing data related to animals, volunteers, tasks, donations, and adoptions.
- ❖ Mongoose: ODM library for MongoDB and Node.js for managing relationships between data and providing schema validation.

3. Visualization:

- ❖ Chart.js: Simple yet flexible JavaScript charting for designers & developers for building interactive dashboards.

3.4. React JS

React JS is a powerful JavaScript library developed by Facebook for building user interfaces, particularly for single-page applications where you need a fast interaction with the user. It allows developers to create reusable UI components, which helps in maintaining the code when working on large-scale projects. React's key feature includes a virtual DOM that optimizes rendering, making the user experience smooth and responsive. It facilitates the creation of interactive, stateful & reusable UI components that handle view layer logic and has been widely adopted due to its efficiency, flexibility, and broad support from the community.

3.5. Node JS

Node.js is an open-source, cross-platform runtime environment for executing JavaScript code outside of a browser. It's built on Chrome's V8 JavaScript engine, and it allows developers to use JavaScript to write command-line tools and server-side scripting—running scripts server-side to produce dynamic web page content before the page is sent to the user's web browser. Hence, Node.js represents a "JavaScript everywhere" paradigm, unifying web-application development around a single programming language, rather than different languages for server-side and client-side scripts.

3.6. Express JS

Express.js is a minimal and flexible Node.js web application framework that provides a robust set of features to develop web and mobile applications. It facilitates the rapid development of Node-based web applications by providing middleware integration, simplified routing, and a strong set of features for web and mobile services. Developers prefer Express for its performance and high-test coverage. It's designed to build single-page, multi-page, and hybrid web applications and APIs efficiently, making it a fundamental component for Node.js.

3.7. MongoDB

MongoDB is a NoSQL database that provides high performance, high availability, and easy scalability. It uses a document-oriented data model, and data is stored in flexible, JSON-like documents where fields can vary from document to document, which makes the database very flexible and adaptable to real-time applications. MongoDB is designed to meet the demands of modern apps with powerful querying and aggregation features, as well as full index support, sharding, and replication. It is widely used in big data and real-time web applications.

3.7. Chart.js

Chart.js is a simple yet flexible JavaScript charting library that provides designers and developers with the tools to add interactive, visually appealing charts to web applications. It uses HTML5 Canvas for rendering and supports a wide range of chart types such as line, bar, radar, doughnut, and pie charts,

among others. Chart.js is responsive, maintaining the display of the charts across different device screens. It's popular due to its ease of use, customization options, and ability to integrate smoothly with other web development technologies, including React and Angular.

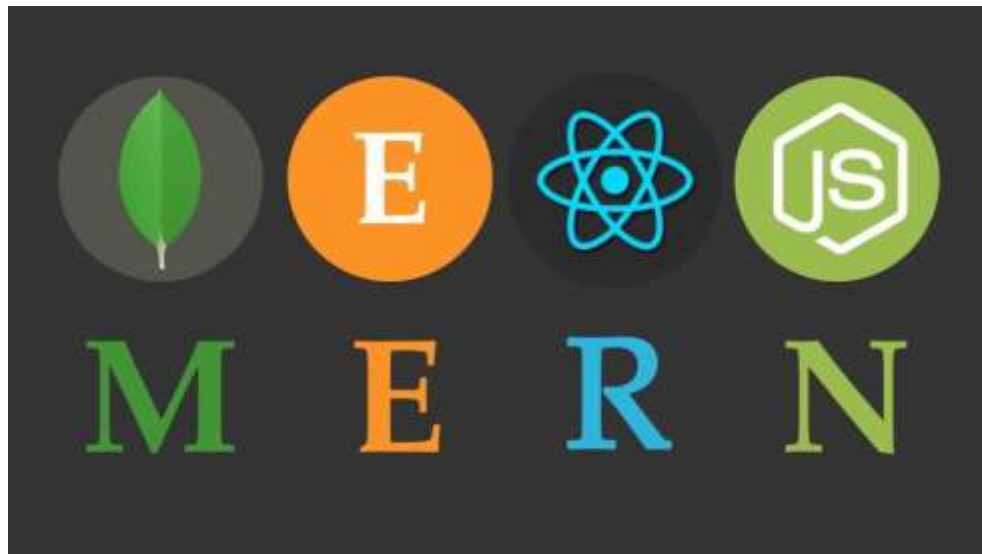


Figure 3.1. MERN Stack

Chapter 4

DETAILED DESIGN

4.1. Architecture of the project

The project is built using a MERN stack architecture, which consists of MongoDB, Express.js, React.js, and Node.js. This technology stack enables the creation of a full-stack JavaScript environment, offering a seamless development process from client-side to server-side execution.

React.js is utilized for building the user interface of the portal. The application starts with a homepage where general information about the portal and contact options via email are presented. A navigation bar allows users to access different sections: adopting animals, making donations via Razorpay, volunteering opportunities, and user login. React Router is employed to manage routing across these different views dynamically without refreshing the page.

Node.js and Express.js create the server environment and API that handle requests from the frontend. The API manages user authentication, data retrieval for animals ready for adoption, volunteer management, and donation processing. MongoDB, integrated through Mongoose for object data modeling, stores all application data including user credentials, stray animal details, and donation records.

Razorpay API is integrated for handling donations, providing a secure gateway for financial transactions. 'mailto' is used for sending emails from the server, facilitating communication regarding information.

Upon logging in, users are directed to specific dashboards based on their role. Volunteers access features like food collection routes, vet visit details, and the ability to add new stray animals. The admin dashboard shows various data visualizations that offer insights into the operations, such as volunteer activity and animal status updates.

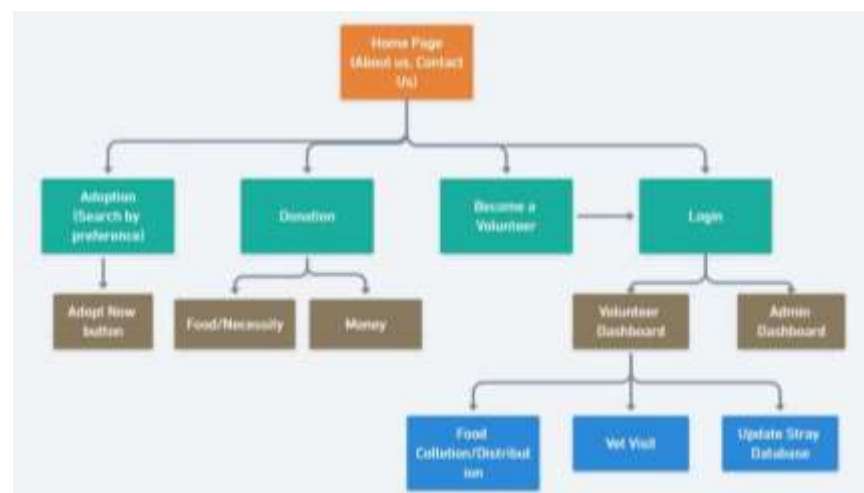


Figure 4.1. Workflow Diagram

Chapter 5

IMPLEMENTATION

Implementing the stray animal portal will require setting up several components, including the frontend user interface, backend services, authentication mechanisms, database management, email integration, payment processing, and visualization tools. Below is an outline of how to approach these features:

1. Project Structure:

Frontend: Use React JS for building interactive UI components. Organize the project into components for reusable elements like navbar, footer, forms, etc.

Backend: Node.js with Express.js framework to handle server-side logic, API endpoints, and middleware integration.

Database: MongoDB to store and retrieve data about strays and volunteers.

Authentication: Authentication for volunteers and admin.

Payment Gateway: Integrate Razorpay for handling donations.

Mailing Feature: Integrate an email service with prewritten mails to ease user interaction.

Visualization: Use Chart.js for creating visualizations on the admin dashboard.

2. User Interface Components:

Home Page: Information about the portal, contact form, and navigation bar.

Adoption Page: List of animals ready for adoption pulled from MongoDB, with a mail option for interested users.

Donation Page: Integration with Razorpay to accept various forms of donations.

Volunteer Signup/Login Page: Forms for new volunteers to sign up and existing volunteers to log in.

Volunteer Dashboard: Different sections for food distribution (with checklists), vet visits, and adding a new stray.

Admin Dashboard: Visualizations of data and activities, management tools for strays and volunteers.

3. MongoDB Database:

Strays Collection: Store details like name, age, health status, location, and photos.

Volunteers Collection: Personal information, tasks assigned, and activity logs.

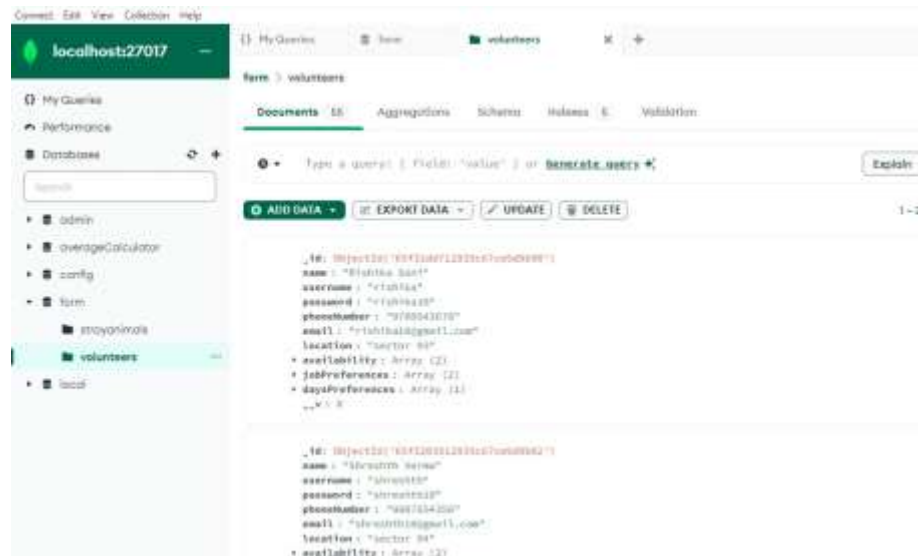


Figure 5.1. MongoDB Database

4. Volunteer and Admin Authentication:

Differentiate between volunteer and admin roles, granting appropriate permissions and dashboard access.

5. Mailing Feature:

Automate sending emails for adoption inquiries directly from the adoption page.

6. Donation Payment Integration:

Using Razorpay SDK: Integrate Razorpay for handling monetary donations. Ensure secure handling of payment data and provide users with confirmation of transactions.



Figure 5.2. Razorpay to aid donation

7. Visualizations for Admin Dashboard:

Using Chart.js: Display visual data representations such as the number of strays and volunteers in an area, volunteer preferences etc. Visualize data trends to help admins make informed decisions.

8. Adoption List from Database:

Implement features for users to view detailed profiles of animals ready for adoption. Enable searching and filtering based on animal characteristics.

9. Rule based Chatbot:

It effectively handles inquiries and offers rule-based advice on common tasks such as food distribution protocols, veterinary care procedures, etc

Chapter 6

EXPERIMENTAL RESULTS AND ANALYSIS

6.1. Experimental Results and Analysis:

1. Home Page:

The Home Page serves as the welcoming interface of the portal, providing information about its mission and services. It includes a contact form and a navigation bar for easy access to other pages like Adoption, Donation, and Volunteer Sign-Up. The design enhances user engagement by offering clear, concise information and a user-friendly layout that encourages exploration of the portal's features.



Figure 6.1. Home Page

2. Adoption Page:

This page displays a list of animals ready for adoption, each with a detailed profile pulled from MongoDB. Users can click to send an email if they're interested in any animal. The page is designed for ease of browsing, allowing users to quickly find and express interest in adopting strays, fostering a direct and emotional connection with the animals.



Figure 6.2. Adopt Page

3. Donation Page:

Integrated with Razorpay, the Donation Page facilitates the acceptance of monetary, food, and necessity donations. It's structured to provide a simple, secure donation process, encouraging more contributions through its straightforward layout and multiple giving options, which increases the portal's support for stray animals.



Figure 6.3. Donate Page

4. Volunteer Signup/Login Page:

This page provides forms for new volunteers to register and existing volunteers to log in. It's designed to be welcoming and informative, explaining the benefits and responsibilities of volunteering, which helps in recruiting motivated individuals and retaining them through a streamlined sign-up process.



Figure 6.4. Volunteer Login

5. Volunteer Dashboard:

The dashboard is divided into sections for managing food distribution tasks, vet visits, and adding new strays. Each section includes practical functionalities like checklists for locations and vet information, enhancing the efficiency and organization of volunteer activities, which helps in effective on-ground support for strays.

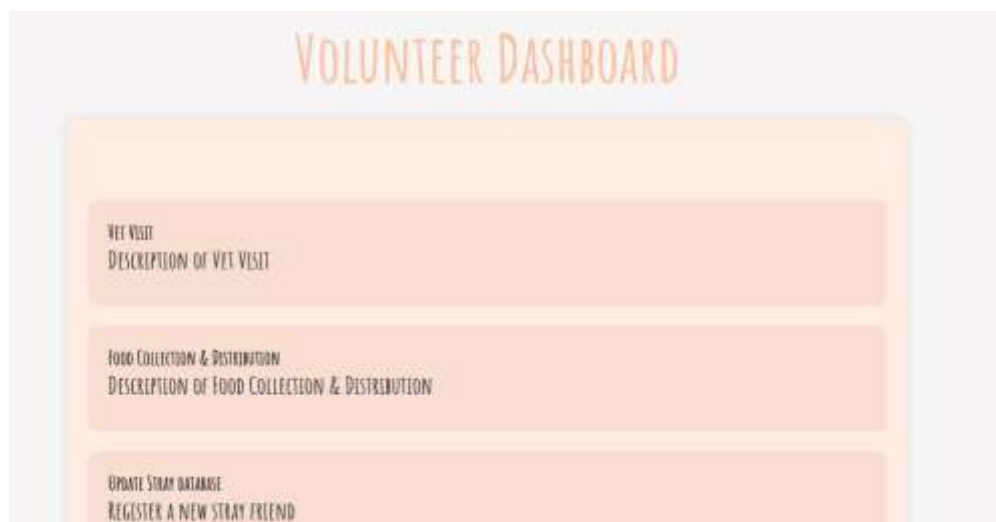


Figure 6.5. Volunteer Dashboard

6. Admin Dashboard:

This dashboard offers comprehensive visualizations of adoption rates, volunteer activities, and donation trends. The tools provided allow for easy management of strays and volunteers. It's designed to facilitate quick insights and decision-making, crucial for the dynamic environment of stray animal care and volunteer coordination.



Figure 6.6. Admin Dashboard

7. Chatbot:

In the stray animal portal, the chatbot serves as a critical tool for providing real-time assistance and guidance to volunteers. It effectively handles inquiries and offers rule-based advice on common tasks such as food distribution protocols, veterinary care procedures, and how to update stray animal records. The chatbot's availability around the clock ensures that volunteers receive immediate answers, reducing downtime and enhancing their ability to act swiftly in various situations. Its integration helps streamline communication within the portal, boosts operational efficiency, and enhances volunteer satisfaction by providing them with dependable and instant support, ultimately improving the overall care of the animals.

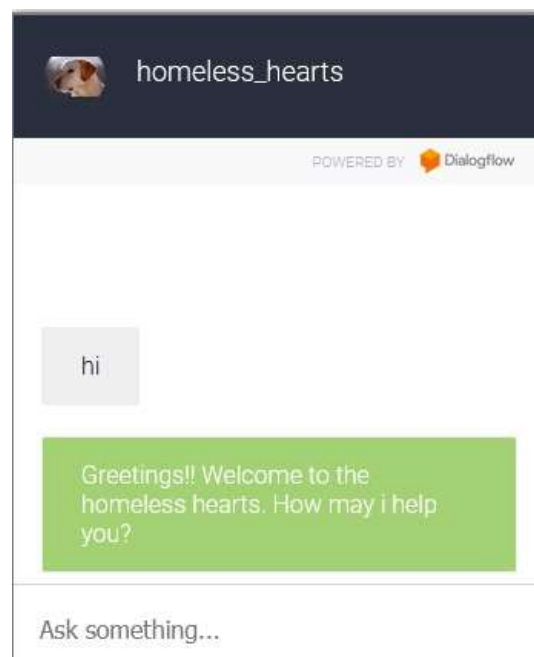


Figure 6.7. Chatbot

8. Blog Page:

The Blog Page in the stray animal portal serves as a critical educational resource, featuring articles on stray animal care, nutrition, shelter, and first aid. By providing well-researched and easily accessible information, this page helps spread awareness and educate the public on responsible pet care and the needs of strays. The effectiveness of this page lies in its ability to engage users through compelling content that promotes empathy and action. It fosters a knowledgeable community equipped to provide better care for strays. Additionally, regularly updated content ensures repeat visits, increasing user engagement and supporting the portal's mission of improving stray animal welfare.



Figure 6.8. Blog Page

Chapter 7

CONCLUSION OF THE REPORT AND FUTURE SCOPE

7.1. Conclusion

The development of a stray animal portal marks a significant step towards improving the welfare of stray animals through technology. By integrating functionalities such as adoption listings, donation processing, volunteer management, and comprehensive educational blogs, the portal serves as a multifaceted tool that not only facilitates the logistical needs of animal welfare organizations but also fosters community involvement. The user-friendly design of the front end, combined with the robust backend framework provided by technologies like React JS, Node.js, Express.js, MongoDB, and Chart.js, ensures that the portal is both efficient and scalable. The implementation of features like email integration for adoption inquiries, Razorpay for donations, and dynamic dashboards for admin and volunteers further enhances the portal's effectiveness in real-time communication and data management. This platform not only streamlines the management of stray animals and volunteers but also raises public awareness about the importance of animal welfare, thereby creating a more informed and compassionate community.

7.2. Future Scope

1. **Mobile App Development:** Extend the platform with a mobile app to increase accessibility for volunteers and donors on-the-go.
2. **AI Integration:** Incorporate artificial intelligence for image recognition to help in identifying and cataloging stray animals more efficiently.
3. **Expanded Reporting Tools:** Develop more advanced analytics and reporting features for admins to monitor and predict trends in animal welfare needs.
4. **Partnership Opportunities:** Collaborate with more animal welfare organizations and veterinary services to expand the network and resources available through the portal.
5. **Interactive Map Features:** Implement GIS mapping for real-time tracking of strays and volunteer activities.
6. **Enhanced Volunteer Training:** Offer online training modules and certifications for volunteers through the portal to ensure better care and handling of animals.
7. **Community Forums:** Add forums and discussion boards to foster a community where users can share experiences, advice, and stories about stray animal care.
8. **Language Localization:** Adapt the portal for use in multiple languages to reach a wider audience and engage non-English speaking volunteers and donors.

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