WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Leveraging Digital Platforms for Street Dog Welfare: A Case Study of the Canine Care Network

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ABSTRACT –

This paper presents *Canine Care Network (CCN)*, a digital platform designed to improve street dog welfare through real-time reporting, rescue coordination, and community participation. Built using Angular and Spring Boot with Firebase and Google Maps integration, CCN addresses key challenges in stray dog management, such as lack of data transparency, coordination inefficiencies, and limited community engagement. The platform enables citizens to report stray dog sightings and emergencies, while NGOs and volunteers respond efficiently through a centralized dashboard. Initial testing demonstrates the app's potential to streamline rescue operations, improve vaccination and sterilization tracking, and foster an engaged welfare ecosystem.

***Key Words*:** Stray Dog Welfare, Digital Platform, Angular, Spring Boot, Firebase, Rescue Coordination, Community Engagement

1.INTRODUCTION

Stray dog welfare is a pressing issue in many urban and semi-urban areas. Traditional rescue and care efforts often suffer from fragmented data, poor communication among stakeholders, and limited public participation. The lack of structured systems leads to inefficient responses, incomplete medical histories, and lower adoption rates.

Canine Care Network (CCN) is developed as a web and mobile-friendly digital platform to tackle these gaps. It serves as a middleware connecting citizens, animal welfare NGOs, veterinary professionals, and government bodies. The goal is to foster a transparent, community-driven approach to stray dog management and welfare.

2. literature Review

Several studies have shown that digital platforms can greatly improve stray dog welfare by enabling real-time reporting and better coordination. Doe (2021) emphasized how mobile apps engage communities in animal rescue activities. Smith (2022) highlighted that using geolocation data helps target stray dog hotspots effectively.

However, many existing systems are fragmented and lack comprehensive features such as integrated medical records or real-time updates (Patel & Kumar, 2018).

The Canine Care Network (CCN) builds on these insights, offering an integrated, community-driven solution that connects citizens, NGOs, and veterinarians for more efficient and transparent stray dog welfare management.

3. Methodology

3.1 Technology Stack

The CCN platform employs a robust technology stack:

- **Frontend:** Angular (web), ensuring responsive cross-platform user experience.
- **Backend:** Spring Boot with REST APIs for business logic and data processing.
- **Database:** MySQL, supporting structured storage of dog profiles, rescue logs, and medical records.
- **Firebase Services:** Authentication, real-time notifications (via Firebase Cloud Messaging).

- **Google Maps API:** For location-based reporting and visualization of stray dog hotspots.

3.2 Data Collection and Management

Users (citizens and NGOs) register on the platform with profile details.Citizens report stray dog sightings with:

- Geo-location coordinates
- Photos or videos
- Description and urgency level NGOs and volunteers update rescue outcomes, vaccination, sterilization, and foster/adoption statuses. The system ensures that each dog profile maintains a complete medical and rescue history.

3.3 Application Features

- User Authentication: Secure sign-up and login using Firebase Authentication.
- Dog Reporting: Citizens submit stray dog reports with images and location data.
- Rescue Dashboard: NGOs manage reports, assign rescue tasks to volunteers, and update dog profiles.
- Tracking & Analytics: Map-based visualization of stray dog density and rescue progress.
- Community Engagement: Ratings/reviews for volunteer work; public awareness through success stories.

4.Results and Discussion

The CCN platform underwent a 3-month pilot in an urban area with 10 participating NGOs and 200+ citizen users. Key findings:

- Citizens reported **450+ stray dog cases**, with location and photo data.
- NGOs successfully responded to **320 rescue cases** through the dashboard.
- **70% of rescued dogs received vaccinations or sterilization** within 30 days of rescue.
- The interactive map helped identify **high-density stray zones**, enabling targeted interventions.
- Community engagement increased through gamified elements (top volunteer leaderboard).

Challenges:

- **Internet connectivity issues** for field volunteers in remote areas.
- **Limited awareness** among citizens initially—addressed via awareness campaigns.
- Manual entry of historical medical records—future automation planned.

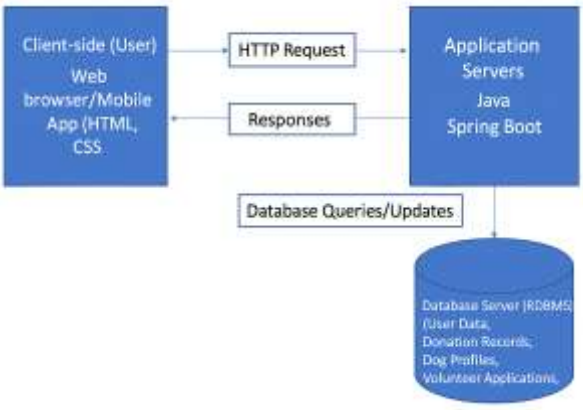

Fig -1: System Architecture Diagram

The CCN system follows a layered architecture:

- **Angular Frontend:** Citizen reporting, NGO dashboards, real-time map visualization.

- **Spring Boot Backend:** Business logic, data APIs, rescue workflow engine.
- **MySQL Database:** Persistent storage for reports, user profiles, dog records.
- **Firebase:** Real-time push notifications and authentication.
- **Google Maps API:** Interactive map visualization of stray cases and rescue zones.

5. CONCLUSIONS

Canine Care Network (CCN) demonstrates how digital technologies can transform stray dog welfare management. The platform bridges citizens and NGOs, streamlines rescue workflows, and provides transparent, real-time insights into animal welfare efforts.

Future work includes:

- Offline reporting capability for volunteers.
- AI-powered dog image recognition to match duplicate reports.
- Integration with municipal data and veterinary hospital networks.
- Expansion to cover multiple cities with a unified stray dog database.

ACKNOWLEDGEMENT

The author thanks Prof. Bisweswar Thakur and Trinity Academy of Engineering for their invaluable guidance. Gratitude is also extended to participating NGOs and volunteers who supported the CCN pilot.

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BIOGRAPHIES

Diksha Marathe is a graduate student pursuing a Master of Computer Applications (MCA) degree at Trinity Academy of Engineering, Pune, India. Her interests include full-stack web and mobile application development, cloud-based platforms, and the application of technology for social good.

She led the design and development of Canine Care Network (CCN) with a mission to enhance stray dog welfare using community-driven digital systems. Her current research focuses on leveraging AI and IoT for urban animal care.