Design and Development of a Community Centric Digital Framework for Rescue Coordination, Volunteer Engagement and Adoption Management

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ABSTRACT
The increasing population of stray animals in urban and semi-urban areas has emerged as a major animal welfare concern due to abandonment, injuries, diseases, and the lack of coordinated rescue and rehabilitation services. Traditional animal welfare practices often depend on manual reporting, fragmented communication, and disconnected management processes, resulting in delayed rescue responses, inefficient volunteer participation, and difficulties in managing adoption activities. To address these challenges, this research proposes a Community-Centric Digital Framework for Stray Animal Welfare, Rescue Coordination, Volunteer Engagement, and Adoption Management. The proposed system provides a unified web-based platform that connects citizens, administrators, volunteers, and potential adopters through an organized digital environment. It enables users to report stray animals by submitting relevant information, including animal details, photographs, location, and health conditions. The platform supports centralized animal record management, rescue request monitoring, and coordinated handling of animal welfare activities. It also incorporates volunteer engagement and adoption management functionalities, allowing administrators to manage animal information, review adoption applications, approve users, and monitor related activities. Furthermore, the system provides communication facilities through which users can submit inquiries and interact with administrators for assistance. By integrating community participation, centralized information management, and structured administrative workflows, the proposed framework aims to improve coordination, transparency, and accessibility in stray animal welfare services. Overall, the study demonstrates the potential of digital technologies to strengthen community involvement, support responsible animal adoption, and improve the management of stray animal welfare activities.

Keywords: Stray Animal Welfare, Community-Centric Framework, Digital Animal Management, Rescue Coordination, Volunteer Engagement, Pet Adoption, Web-Based Platform.

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1. INTRODUCTION

Very little is known about the prevalence, scope, and methods of community engagement employed by animal control and field services officers to address the issue of animal cruelty and neglect [1,2]. This study used a phenomenological approach to understand how officers defined community engagement. [1,2]. The researchers conducted semi-structured interviews with twenty-nine animal control and field services officers. The definitions of community engagement varied greatly across this sample of U.S.

officers. However, most officers agreed that strategies such as relationship-building, providing assistance or information, and allowing time for compliance were among the most effective community engagement strategies [2,3]. In addition, several barriers to incorporating community engagement strategies in the work of animal control professionals were identified. Future research and policymaking should seek to establish a consistent definition of community engagement in animal control and field services that can then be optimized for specific communities through rigorous evaluation.

Animal control and field services officers (also often referred to as animal protection and animal services officers) are on the front lines of many animal protection issues, putting them in a unique position to engage with the communities they serve. Animal protection encompasses a "broad spectrum of political, legal, economic, and investigative strategies" [4]. For the purpose of this study, the authors utilize the terms "animal control" and "field services" to describe this concept because they are the most commonly used terms in the United States to describe the professionals who are tasked with animal protection efforts, including, but may not be limited to: enforcement of animal-related laws and ordinances, management of dangerous or vicious animals, reuniting lost people and their pets, addressing animal specific public health concerns (rabies, animal waste, etc.), and investigation of animal neglect, cruelty, hoarding, and intentional acts of abuse [5].

In the United States, animal protection activities are carried out by a variety of agency types including municipal agencies, nonprofit agencies with a government contract, and nonprofit agencies without a government contract [4]. To empower communities to prevent and respond to animal cruelty and neglect, animal control and field services organizations must employ effective and culturally responsive community engagement strategies [6]. This study used Gadamer's hermeneutical phenomenology to understand how animal control and field services officers defined community engagement in their work. Phenomenology allows researchers to develop a common meaning of a phenomenon based on a group of individuals lived experiences.

2. LITERATURE SURVEY

Babita Koushik, et al. [7] developed a web-based project to address the growing issue of stray animals suffering from hunger, disease, and neglect in urban areas. The purpose of this study was to design and implement a digital platform that enabled citizens, NGOs, and veterinary services to collaborate effectively in reporting, rescuing, and rehabilitating stray animals. The project followed a modular design where users could report animals, NGOs managed rescue operations, and admins monitored system activities. The analysis of system performance showed improved communication, faster rescue response, and enhanced public participation in animal welfare. Sharma, D. and Ram, B., [8] developed a digital platform that connected citizens, rescue organizations, veterinarians, and local authorities to facilitate faster reporting and rehabilitation of stray animals. Current research trends showed that web-based and mobile applications were being developed globally to improve the monitoring, rescue, and adoption of stray animals through data analytics and geolocation-based reporting.

Kalaivani A/P Subramaniam and Hazinah Kutty Mammi, [9] developed and deployed the Stray Rescue Management System (SRMS), a robust web-based platform aimed at enhancing the management and rescue operations for stray animals. The SRMS integrated essential functionalities, including reporting stray animals, facilitating donations, managing adoptions, coordinating volunteer activities, and providing educational resources on animal welfare. By fostering collaboration between shelters, rescue teams, and the public, the SRMS optimized rescue efforts and promoted responsible pet ownership. Nikita Jagtap, et al. [10] developed a user-friendly website to support the sheltering and adoption of stray animals. Users could upload basic details, pictures, and information about stray pets through a simple form. These details were displayed on the website for potential adopters to view and select a pet for adoption. Adopters could apply by filling out a form with their details, and both parties could connect using their contact information to finalize the adoption process.

Jay Prajapati, et al. [11] developed an innovative web-based platform designed to bridge the gap between individuals who found stray animals and rescue organizations, volunteers, and potential adopters. The platform provided an Instagram-style reporting interface, allowing users to report stray animals with images, location details, and health status. Additionally, it featured a categorized adoption feed with pet profiles, an interactive three-stage adoption process, and a location-based search for nearby pets and shelters. To enhance rescue efforts, the system integrated volunteer registration, donation modules, and real-time notifications. Diksha Jitendra Marathe and Prof. Bisweswar Thakur, [12] developed a digital platform 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, Canine Care Network (CCN) addressed key challenges in stray dog management, such as lack of data transparency, coordination inefficiencies, and limited community engagement.

Choudhary K. and Palsaniya V. K, [13] proposed a system that created awareness about responsible animal care, adoption, and humane treatment of strays. It encouraged citizens to actively engage in welfare initiatives and collaborate with local organizations for better outcomes. In conclusion, the Stray Animal Rescue System fulfilled its objective of building an efficient, user-friendly, and socially impactful platform for stray animal management. Bhuyar R. and Holey S., [14] proposed a system that demonstrated how web-based technology could be utilized to address the growing problem of stray animal welfare and management. The system acted as a bridge between the public, NGOs, veterinary services, and local authorities, enabling quick reporting of stray or injured animals and ensuring faster coordination among rescuers.

Srinivas Rao Uttarkar, et al. [15] proposed a compassionate initiative to address the challenges faced by street animals. The primary objective of this endeavor was to extend support to animals in need, particularly those dwelling on the margins of urban landscapes. Their innovative mobile application empowered individuals to be the catalysts for positive change by providing a seamless platform. If a person encountered an animal in distress, they could capture an image and effortlessly upload it to the platform. Dinesh Bhadane, et al. [16] proposed a user-friendly web platform to connect people with animal shelters. The implemented system streamlined pet adoption processes and aimed to reduce stray animal populations. However, the study identified a significant research gap, particularly in rural areas, were limited access to adoption services restricted pet placement opportunities. This limitation underscored the need for a more inclusive system that catered to both urban and rural populations.

3. PROPOSED METHODOLOGY

The proposed study adopts a structured digital approach as shown in Fig. 1 to improve the coordination and management of stray animal rescue, welfare, and adoption activities. The methodology focuses on establishing a centralized platform that enables systematic reporting, tracking, and management of rescue operations involving citizens, volunteers, welfare organizations, and adopters. By digitizing rescue workflows, the study aims to eliminate the inefficiencies caused by fragmented communication and manual record keeping. All rescue-related information, including animal condition, location details, rescue status, and follow-up actions, is maintained in a centralized data repository, ensuring consistency and accessibility across stakeholders.

The methodology further emphasizes transparency, accountability, and data-driven decision-making in animal welfare operations. Rescue requests submitted by citizens are processed through a defined workflow that supports prioritization, assignment, and progress monitoring. Adoption and volunteer management processes are integrated into the same system to maintain continuity from rescue to rehabilitation and rehoming. The use of modern web technologies enables real-time updates, secure data handling, and scalable system performance. Through this structured digital framework, the study demonstrates how coordinated information flow and centralized monitoring can significantly enhance the effectiveness and responsiveness of animal welfare services.

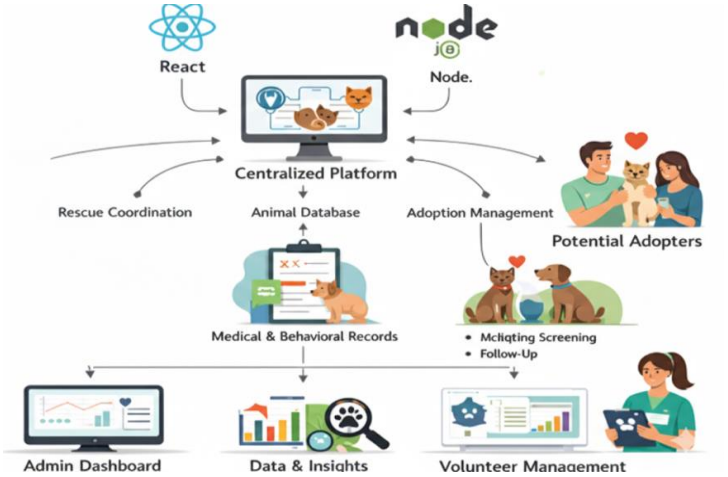


Fig. 1: System architecture for proposed stray animal rescue coordination platform

4. RESULTS AND DISCUSSION

The image as shown in the Fig. 2, Fig. 3 and Fig. 4, webpage is an admin dashboard page for the Stray Anim l Rescue & Adoption platform. It allows the admin to add new pets by entering details such as pet name, age, breed, gender, size, vaccination status, location, description, and uploading pet photos, then submitting them to the database. The page also displays recent adoption requests where the admin can accept or revoke requests, and includes a support center section for handling user queries through a chat interface, along with navigation options like Add Pet, Approvals, Manage Pets, Support, and a Logout button.

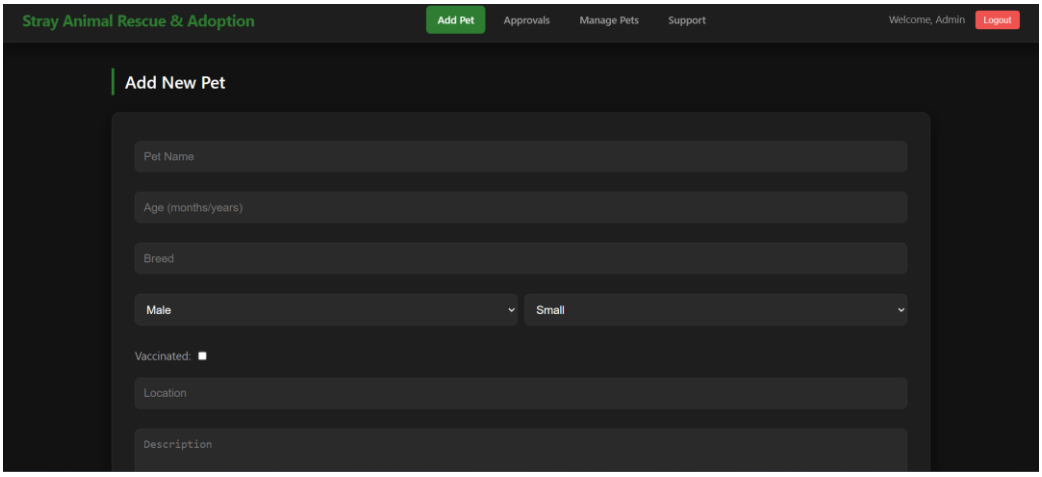


Fig. 2: Admin page add pet section for Stray Animal Welfare

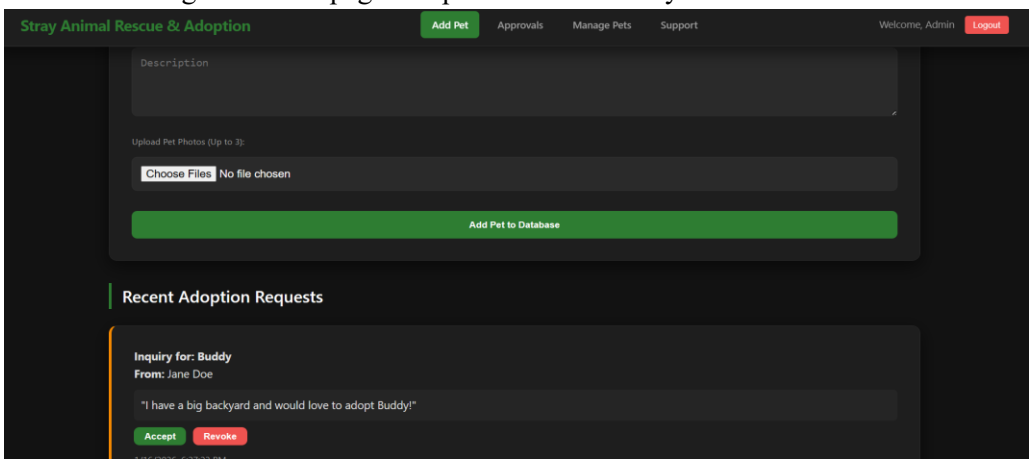


Fig. 3: Admin page add pet section for Stray Animal Welfare

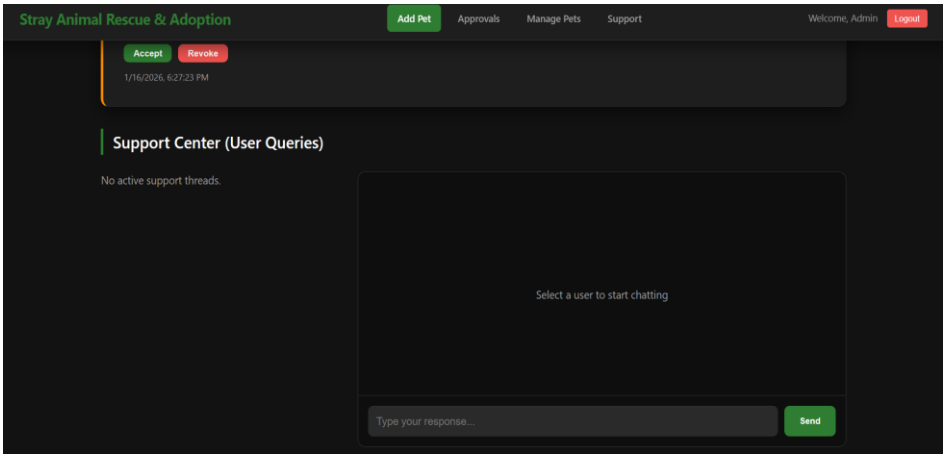


Fig. 4: Admin page add pet section for Stray Animal Welfare

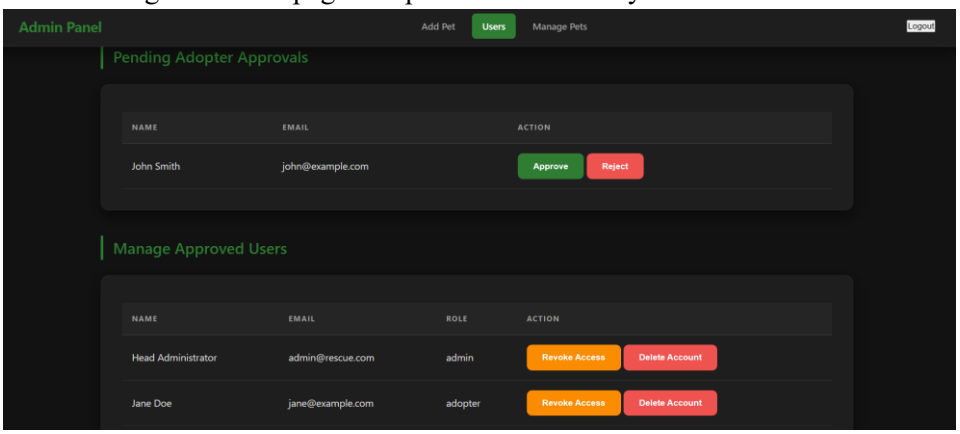


Fig. 5: Admin Panel in the Stray Animal Rescue & Adoption system

The image as shown in the Fig. 5, webpage is the Users section of the Admin Panel in the Stray Animal Rescue & Adoption system. It shows Pending Adopter Approvals, where the admin can review new adopter requests and approve or reject them. It also includes a Manage Approved Users area that lists existing users with their name, email, and role, and provides actions such as revoke access or delete account, along with navigation options and a logout button.

The image as shown in the Fig. 6, webpage is the Users section of the Admin Panel in the Stray Animal Rescue & Adoption system. It shows Pending Adopter Approvals, where the admin can review new adopter requests and approve or reject them. It also includes a Manage Approved Users area that lists existing users with their name, email, and role, and provides actions such as revoke access or delete account, along with navigation options and a logout button.

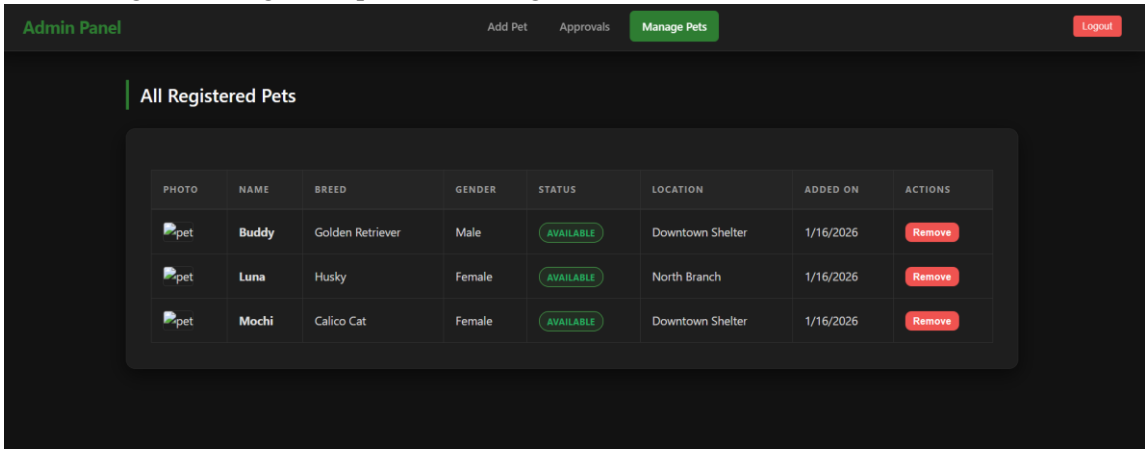


Fig. 6: Users section of the Admin Panel for Stray Animal Welfare

This webpage is the Support page for adopters in the Stray Rescue platform. It provides a Contact Support section where users can type their inquiry and submit it using the Send Inquiry button to message the administrators. On the right side, it shows the Conversation History panel, which displays previous support messages (currently showing no history yet), along with navigation options like Browse Pets, My Requests, Support, and Logout.

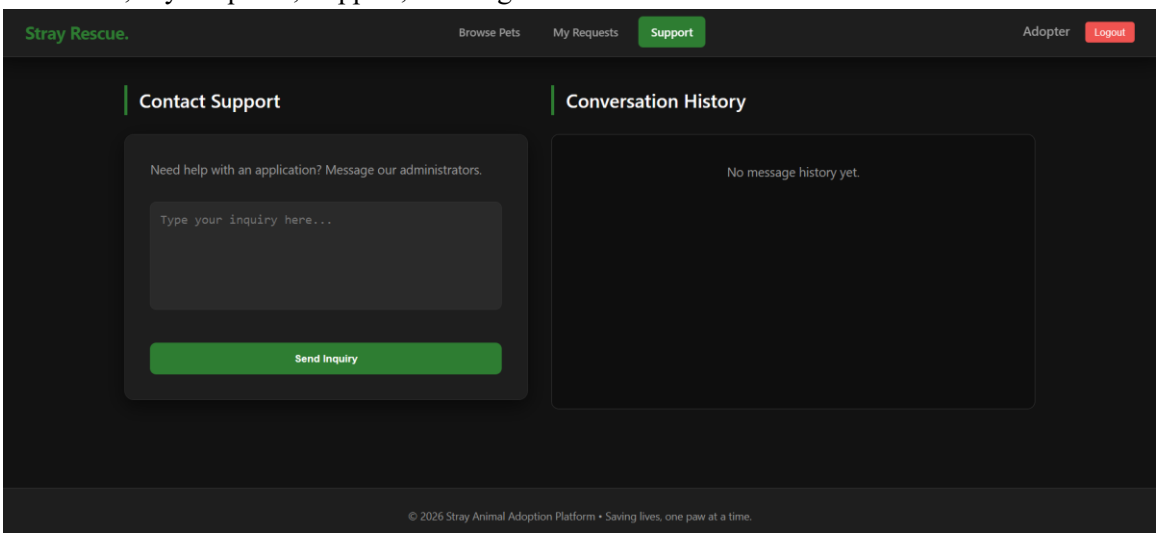


Fig. 7: The contact support section between user and admin in Stray Animal Welfare

5. CONCLUSION

The stray animal rescue coordination study demonstrates the effectiveness of a centralized digital platform in improving the management of animal welfare activities. By integrating structured reporting, real-time rescue tracking, volunteer coordination, and adoption management into a single system, the study addresses major limitations of traditional manual rescue practices. The implementation highlights how transparent workflows, centralized data storage, and role-based access can significantly enhance response efficiency and operational accountability. The system enables timely rescue interventions, maintains comprehensive animal welfare records, and supports responsible adoption processes. Overall, the study confirms that digitally coordinated rescue operations can contribute to improved animal survival, better welfare outcomes, and stronger community participation. The platform can be further enhanced by incorporating mobile application support to allow citizens and volunteers to report and respond to rescue cases more conveniently. Advanced data analytics and predictive models can be introduced to identify high-risk areas and optimize resource allocation for rescue operations.

REFERENCES

[1]. Moss, L.R.; Hawes, S.M.; Connolly, K.; Bergstrom, M.; O'Reilly, K.; Morris, K.N. Animal Control and Field Services Officers' Perspectives on Community Engagement: A Qualitative Phenomenology Study. Animals 2023, 13, 68. https://doi.org/10.3390/ani13010068

[2]. Moss LR, Hawes SM, Connolly K, Bergstrom M, O'Reilly K, Morris KN. Animal Control and Field Services Officers' Perspectives on Community Engagement: A Qualitative Phenomenology Study. Animals. 2023; 13(1):68. https://doi.org/10.3390/ani13010068

[3]. Moss, Liana R., Sloane M. Hawes, Katherine Connolly, Morgan Bergstrom, Kaleigh O'Reilly, and Kevin N. Morris. 2023. "Animal Control and Field Services Officers' Perspectives on Community Engagement: A Qualitative Phenomenology Study" Animals 13, no. 1: 68. https://doi.org/10.3390/ani13010068

[4]. Moss, L. R., Hawes, S. M., Connolly, K., Bergstrom, M., O'Reilly, K., & Morris, K. N. (2023). Animal Control and Field Services Officers' Perspectives on Community Engagement: A Qualitative Phenomenology Study. Animals, 13(1), 68. https://doi.org/10.3390/ani13010068

[5]. National Animal Care & Control Association. Recognizing the Role of the Animal Control Officer. Available online: https://www.nacanet.org/recognizing-the-role-of-the-animal-control-officer/ (accessed on 5 December 2022).

[6]. Coulter, K.; Nicholls, B.; Fitzgerald, A. Animal protection: Organizational constraints and collaborative opportunities. J. Community Saf. Well-Being 2022, 7, 16–19.

[7]. Prof. Babita Koushik, Kunal Topare, Dhruv Bhingarde, Shashank Gorule, Om Ghatge, "Stray Animal Rescue System - A Technological Approach to Animal Welfare", International Research Journal of Modernization in Engineering Technology and Science (IRJMETS), Vol. 7, no.11, pp. 658 – 662, 2025.

[8]. Sharma, D., & Ram, B., "Awareness and perception of stray dogs and rabies in Shimla: An evaluative study", International Journal of Community Medicine and Public Health, Vol. 12, no.9, pp. 4063-4068, 2025.

[9]. Kalaivani A/P Subramaniam and Hazinah Kutty Mammi, "Stray Rescue Management System (SRMS)", International Journal of Innovative Computing, Vol. 15, no.1, pp. 139-144, 2025.

[10]. Tosif Jamadar, Nikita Jagtap, Raviraj Shete, Umra Pathan, Kiran More, "Web Application for Stray Animal Adoption and Care Website", Journal of Emerging Technology's and Innovative Research (JETIR), Vol. 12, no.4, 2025.

[11]. Mr. Jay Prajapati, Mr. Roshan Vishwakarma, Mr. Rishit Deliwala, Mrs. Sneha Singh, "Pet Adoption and Rescue Center", International Journal of Creative Research Thoughts (IJCRT), Vol. 13, pp. 711 – 721, 2025.

[12]. Diksha Jitendra Marathe, Prof. Bisweswar Thakur, "Leveraging Digital Platforms for Street Dog Welfare: A Case Study of the Canine Care Network", International Journal of Research Publication and Reviews, Vol 6, pp 2769-2771, 2025.

[13]. Choudhary K. and Palsaniya V. K, "Overview of the stray animals in India and their regulation", Journal of Advances in Biology & Biotechnology, Vol. 27, no.7, pp. 893-899, 2024.

[14]. Bhuyar R. and Holey S., "Investigating the need for animal welfare centres in metropolitan cities and framing design guidelines in the Indian context", International Journal of Research in Engineering Science and Management, Vol. 7, no.5, pp. 75-80, 2024.

[15]. Srinivas Rao Uttarkar, Tushar Kumar Soni, Sangeetha G, "Design of an Automated Animal Rescue and Adoption Management System", International Journal of Engineering Research in Computer Science and Engineering (IJERCSE), Vol. 11, no.5, pp. 166 – 170, 2024.

[16]. Dinesh Bhadane, Pushkar Khirude, Onkar Chavan, and Abhishek Lokare, "Pet Adoption System Using Web Technology," International Journal of Science Research Engineering Management, vol. 5, no. 3, pp. 42–46, 2023.