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A Mobile App to Assist During Encounter of Any Identified Wildlife Posing Danger to Mankind

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Abstract: Wildlife conservation efforts often face challenges related to communication, coordination, and timely response in rescue operations. This study describes the creation of a smartphone application that aims to facilitate wildlife rescue in order to address these problems. The Wildlife Rescue Mobile App enables public users to report sightings of wildlife in distress, allowing nearby rescuers to receive real-time notifications. Administrators can efficiently manage rescuer assignments, track incident reports, and oversee rescue operations. Built on a client-server architecture using Firebase for backend services, the app integrates features such as geolocation, notifications, species identification, and access to nearby hospitals. The platform supports three user roles public, rescuer, and administrator each with distinct functionalities. Through this system, the app fosters collaboration between the public and conservation efforts, ensuring faster and more organized wildlife rescue operations. The system's architecture, design specifications, and testing results demonstrate the app's scalability, usability, and effectiveness in wildlife conservation. Future enhancements could include AI for species recognition, offline functionality, and integration with emergency services.

Key Words: Wildlife rescue, mobile application, real-time reporting, animal rescue management, geolocation services, Firebase backend, conservation technology, rescue coordination, public engagement, wildlife conservation.

1.INTRODUCTION

Wildlife conservation has become a global priority due to the increasing threats posed by human activities, habitat destruction, and climate change. The survival of many species often depends on timely intervention, especially when animals are distressed, injured, or endangered. Traditional methods of reporting wildlife emergencies, such as phone hotlines, are often slow and inefficient, leading to delays in response and rescue efforts. This study describes the creation of a mobile application intended to simplify the reporting and management of animal rescue activities in response to these difficulties.

The Wildlife Rescue Mobile Application provides a platform where the public can actively participate in conservation by reporting wildlife sightings in real-time. Using modern technologies such as geolocation services, push notifications, and cloud-based management tools, the app facilitates efficient communication and coordination between public users, rescuers, and administrators. Rescuers are alerted to emergencies within their proximity, allowing for rapid response, while administrators can oversee operations, assign tasks, and track rescue efforts. By digitizing and centralizing these processes, the app enhances the overall effectiveness of wildlife rescue operations, ultimately contributing to the broader goal of wildlife conservation.

This paper explores the development and implementation of the Wildlife Rescue Mobile Application, detailing its design, functionality, and key features. It also discusses the potential impact of this technology on wildlife conservation efforts, highlighting how it empowers public engagement, improves rescue response times, and offers a scalable solution for managing multiple species rescue operations.

2.LITRATURE SURVEY

Wildlife rescue operations have traditionally relied on manual systems, where the public reports incidents through phone calls to designated numbers. While these systems have been somewhat effective, they are hindered by inefficiencies such as delayed responses, inadequate documentation, and limited coordination among rescuers and administrators. The need for a more integrated technological solution has become apparent, especially as human-wildlife conflicts, habitat destruction, and climate change exacerbate challenges in wildlife conservation. Existing applications like Sarpa, which focuses on snake rescues, have demonstrated the potential of technology in this domain. However, Sarpa's species-specific focus and lack of real-time geolocation services limit its utility for broader wildlife rescue efforts. This highlights the need for a more versatile and scalable solution. The proposed Wildlife Rescue Mobile App addresses these gaps by integrating real-time geolocation services, multi-species identification tools, and an efficient rescue task management system. These features are designed to streamline reporting, enhance coordination among rescuers, and improve administrative oversight, resulting in quicker and more accurate interventions. Previous studies in mobile health and emergency services show that real-time updates and location-based technologies significantly reduce response times and improve efficiency, which suggests that similar principles can be effectively applied to wildlife rescue. Furthermore, the potential use of artificial intelligence for species identification in future versions of the app presents an exciting avenue for enhancing rescue accuracy and preparedness. In summary, the Wildlife Rescue Mobile App aims to improve upon both manual systems and species-specific apps by offering a more comprehensive, inclusive, and efficient platform for wildlife conservation efforts.

3. PROBLEM STATEMENT

Wildlife rescue operations are critical for conserving endangered species and protecting ecosystems, but traditional methods of reporting and managing wildlife incidents are often inefficient and outdated. Most wildlife rescue efforts rely on manual reporting systems, where the public reports wildlife emergencies through phone calls or emails. These methods are prone to delays, miscommunication, and a lack of proper coordination between rescuers and administrators. Additionally, these systems often lack real-time location tracking, making it difficult for rescuers to respond promptly to wildlife in distress. Moreover, the majority of currently available apps are functionally constrained or species-specific, which limits their capacity to handle a wider variety of wildlife situations.

As habitat loss, climate change, and human-wildlife conflicts continue to increase, there is a growing need for a more scalable, efficient, and real-time solution that can streamline the process of wildlife rescue. The current fragmented approach results in delayed response times, a lack of centralized data, and difficulty in coordinating efforts among multiple rescuers and administrators. Wildlife rescue operations cannot completely realise their potential to help endangered and distressed animals without an integrated, comprehensive platform with capabilities like location monitoring, real-time notifications, and multi-species reporting.

As a result, it is imperative to create a single system that connects the general public, rescuers, and administrators in real time and tackles these issues. Such a system must be capable of managing multiple wildlife species, enabling accurate location-based reporting, and providing rescuers with timely notifications to improve the efficiency and success rate of rescue operations. The goal is to ensure faster response times, better coordination, and improved outcomes in wildlife conservation efforts.

4. PROPOSED SYSTEM AND METHODOLOGY

The development of the Wildlife Rescue Mobile Application followed a structured and iterative methodology, focusing on designing a user-friendly platform that facilitates real-time wildlife rescue reporting and management.

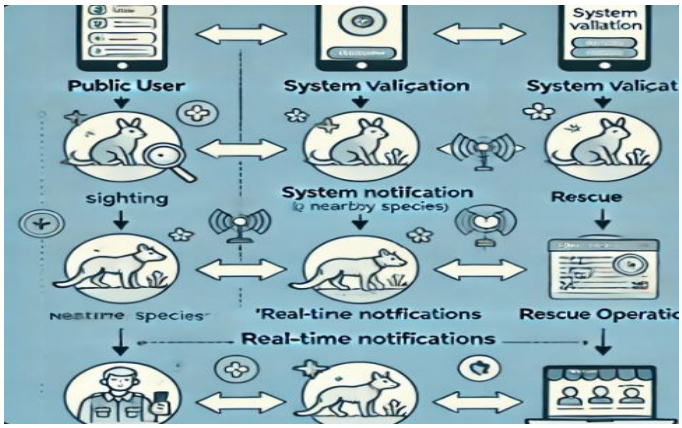

Fig-1: Workflow

The initial phase involved gathering detailed requirements from stakeholders, including wildlife conservationists, rescue teams, and administrative personnel. The primary goal was to understand the functional needs of the public users, rescuers, and administrators. This phase also included research into existing wildlife rescue systems and identification of gaps in current approaches.

A client-server paradigm was used to build a system architecture based on the requirements. The app's architecture includes three key interfaces: public user, rescuer, and admin. Each interface was tailored to meet the specific needs of the user roles. The system design also incorporated key functionalities such as geolocation for reporting wildlife sightings, real-time push notifications, and task management for rescuers.

The development of the Wildlife Rescue Mobile App follows a systematic approach designed to address the inefficiencies of traditional wildlife rescue operations by leveraging modern mobile technology. React Native, a cross-platform framework, is used in the development of the app, enabling smooth deployment on both iOS and Android smartphones. By using Firebase as the backend, the app provides real-time data synchronization, notifications, and authentication services. The combination of React Native for the front end and Firebase for the backend ensures that the system is both scalable and capable of handling real-time communication between public users, rescuers, and administrators.

The app's workflow is centered on three primary user roles: public users, rescuers, and administrators. Public users initiate the process by reporting wildlife sightings, providing critical information such as the animal species, location (using GPS), and any additional comments or observations. This report is transmitted to the app's Firebase Realtime Database, where it is stored and processed. Rescuers receive push notifications about nearby incidents through Firebase Cloud Messaging (FCM), allowing them to respond promptly. Meanwhile, administrators manage and oversee the rescue operations, assigning rescuers to specific tasks, monitoring progress, and generating reports for future analysis.

The app's design is based on a client-server architecture, with a strong emphasis on real-time updates and efficiency The public interface allows users to easily submit reports, which are then validated by the system before being stored. The rescuer interface provides rescuers with a dashboard to view and manage their assigned tasks, ensuring that no report goes unnoticed. The administrator interface offers a high-level overview of all rescue operations, allowing for effective resource allocation and task management.

The first stage involves the public user submitting a wildlife report, which triggers a series of validation checks to ensure the data is accurate. Once validated, the report is stored in the Firebase database and a notification is sent to nearby rescuers. Rescuers then use the app to access the report, perform the rescue, and update the task status once completed. Administrators are in charge of managing every step of this procedure, from getting the first report to making sure every rescue mission is finished. The DFD minimises delays and guarantees that all reports are processed promptly by guaranteeing an efficient and transparent data flow from report submission to rescue completion.

The software incorporates Google Maps API in addition to location-based services to assist rescuers in locating reported wildlife and neighbouring veterinary hospitals in case they become lost. Only authorised administrators and rescuers are able to access sensitive data thanks to Firebase Authentication, while phone numbers are used to authenticate public users. To further enhance the app's accessibility, offline functionality has been integrated, allowing users in remote areas to submit reports and synchronize data when they regain connectivity.

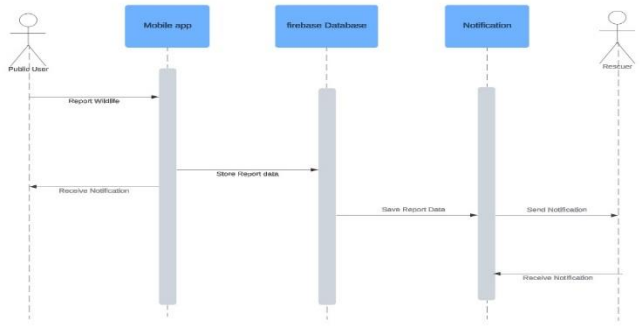

Fig-2: Sequence Diagram

This methodology not only streamlines the wildlife rescue process but also ensures that all stakeholders—from public users to administrators are actively involved and well-coordinated. By adopting a real-time, data-driven approach, the Wildlife Rescue Mobile App

significantly enhances the efficiency and effectiveness of wildlife conservation efforts.

5. RESULTS

The development and deployment of the Wildlife Rescue Mobile App have resulted in notable improvements in wildlife rescue operations. The app's integration of real-time features, such as GPS-based location tracking and instant notifications, has significantly reduced the time it takes for rescuers to respond to emergencies. Rescuers reported faster response times and more accurate navigation to wildlife in distress, leading to more successful rescue outcomes. The ability to report various species, rather than being limited to species-specific applications, expanded the app's utility and helped address a broader range of wildlife emergencies.

The task management system made it possible for administrators and rescuers to coordinate better, allocating resources more wisely and running operations more efficiently. Tasks could be assigned by administrators effectively based on availability and proximity, and real-time data synchronisation guaranteed that all stakeholders were informed as soon as possible, reducing communication delays.

Users praised the app's simplicity and ease of use, noting the quick reporting process and intuitive design. Public users found the app accessible, while rescuers benefited from real-time alerts and task tracking features. The offline reporting capability proved essential in remote areas, enabling users to report wildlife sightings even without an internet connection, with data automatically syncing once connectivity was restored.

Overall, the app has proven to be a valuable tool for wildlife rescue, enhancing communication, reducing response times, and increasing the success rate of rescue missions. The results demonstrate that the app effectively addresses key challenges in wildlife conservation by providing a real-time, scalable solution.

6. CONCLUSION

The Wildlife Rescue Mobile Application provides an innovative solution for enhancing wildlife conservation efforts through technology. By leveraging real-time reporting, geolocation services, and efficient communication channels, the app streamlines the process of wildlife rescue and management. Public users can easily report wildlife sightings, rescuers receive instant notifications for quick intervention, and administrators can effectively manage rescue operations through task assignment and data tracking.

The implementation of Firebase as a backend enables real-time data synchronization and secure authentication, while integration with Google Maps and SMS services ensures rescuers can access accurate location data and receive notifications even in remote areas. Through testing and validation, the application has demonstrated its ability to improve response times, increase public engagement in conservation, and enhance the efficiency of rescue teams.

This mobile platform represents a significant advancement in wildlife rescue management, fostering better coordination between the public, rescuers, and administrators. As the app evolves, future enhancements such as AI-powered species recognition and offline capabilities will further increase its impact, contributing to broader wildlife conservation initiatives and ensuring the protection of endangered species in real-time.

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