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COLLEGE OF ENGINEERING
A U T O N O M O U S

SMART CAR SERVICE HUB

24MCAR295 - Mini Project

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ABSTRCT

The Centralized Pet Welfare and Pet Management System is a comprehensive, AI-enabled, role-based web platform designed to unify and streamline the ecosystem of pet welfare services. This system integrates key functionalities such as pet adoption, animal shelter management, veterinary health tracking, rescue coordination, legal case reporting, vaccination scheduling, public reporting, and an e-commerce hub for pet-related products and services — all within a scalable and modular architecture.

The platform supports a diverse set of user roles, including Adopters, Shelter Staff, Veterinarians, Animal Welfare Officers, Public Users, Service Providers, and System Administrators. Each role is provided with tailored access and tools, enabling real-time collaboration, effective case handling, and transparent data management. The system leverages artificial intelligence for functionalities such as breed detection, disease prediction, vaccination alerts, and rescue urgency analysis, enhancing both user experience and operational efficiency.

Developed as a mini project, this prototype focuses on core workflows including pet adoption, rescue reporting, animal health record management, and vaccination tracking. It lays a strong foundation for future extension into a fully distributed, microservice-based architecture capable of supporting large-scale, real-world deployment for centralized pet welfare management.

Requirement Gathering

Date : 05-08-2025

Project Overview

This project addresses major gaps in existing pet management workflows — lack of centralization, uncoordinated adoptions, delayed rescue response, and fragmented health/vaccination records. By digitalizing these areas with AI and real-time alerts, the platform ensures safety, transparency, and efficiency in managing the welfare of pets and stray animals.

Problems Solved
- Scattered adoption/rescue platforms
- Manual vaccination tracking
- Limited pet healthcare integration
- Absence of legal case monitoring
- Poor communication between shelters, vets, and adopters

System Scope

· Type: Functional working prototype with scope for real-world extension

· Implementation Scale: Mini-project for academic submission (MCA), but designed with scalability for major project extension

· Features: Core modules fully functional, integration-ready components (e.g., payment, map), flexible for future feature enhancements

Target Audience

1. Adopters / Pet Owners
- Individuals seeking to adopt pets from shelters or foster homes.
- Can browse available animals, submit adoption or foster requests, receive health and vaccination alerts, and track adoption status.
- Access post-adoption services such as reminders, pet profiles, and veterinary updates.

2. Shelter Staff
- Responsible for managing animals within shelters (add, update, mark adopted/sick/deceased).
- Handle adoption processes, feeding schedules, and transfer logistics.
- Access dedicated dashboards for shelter analytics, resource allocation, and volunteer coordination.

3. Veterinarians
- Manage and update animal health records, vaccination schedules, and prescriptions.
- Use AI tools for disease prediction, health trend analysis, and medication recommendations.
- Can generate e-prescriptions, plan vaccination batches, and participate in telemedicine modules.

4. Animal Welfare Officers
- Receive public alerts and rescue requests.
- Assign rescue teams, track operations (pickup, medical aid, release, adoption), and log legal evidence.
- Collaborate with police/legal authorities on abuse cases through dedicated dashboards.

5. Public Users

- General users who can:
  - ○ Report lost/found animals or cruelty cases.
  - ○ Upload rescue requests with photos and location pins.
  - ○ Donate money or resources, sponsor pets, register as volunteers or feeders.
  - ○ Learn about animal rights and welfare through educational content.

6. Service Providers

- Includes pet boarders, trainers, groomers, and pet sitters.
- Can list services in the marketplace, accept bookings, and manage customer profiles.
- May integrate with pet tracking and live-streaming modules for transparency.

7. Administrator (Main Admin)

- Has full platform access.
- Manages user accounts, roles, permissions, content moderation, and platform-wide analytics.
- Approves adoption/foster requests, verifies public reports, manages legal documentation, and handles donations and funding distribution.

Modules

Module	Functionality Provided
User Authentication	Handles registration, login, logout, role-based access control, and session management for all user types.
Adoption Management	Allows adopters to browse pets, submit adoption requests, and track progress; enables shelter staff to manage pet listings, statuses, and adoption workflows.
Shelter Management	Enables shelter staff to upload and manage animal data, track feeding and medical care, and update availability or status (adopted, ill, deceased).
Veterinary Management	Vets can view and update animal health records, schedule vaccinations, track treatments, and generate e-prescriptions
Vaccination Reminder System	Sends automated alerts and reminders to adopters and shelter staff for upcoming or overdue vaccinations.
Admin Dashboard	View all system data, assign sub-admins, approve bookings, manage overall workflow
Sub-Admin Dashboards	Manage assigned service (view, update, delete, assign), view service-specific analytics
Payment Gateway (Optional)	Integrated with booking modules to handle online payments

User Roles & Permissions

Role Permissions

User
Book services, make payments, view booking history, browse cars, update profile

Sub-Admin
Manage one or more specific modules, update statuses, handle service requests

Main-Admin
Full access: manage users, sub-admins, services, inventory, view reports

Feasibility Study – CarvoHub

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1. Technical Feasibility

This evaluates whether the technology and tools required to develop the system are available and suitable.

• Technology Stack:
  – Frontend: React.js (UI), HTML, CSS, JavaScript
  – Backend: Node.js with Express.js
  – Database: MongoDB Atlas
  – Authentication: JWT (JSON Web Tokens)
  – Hosting: Render, Vercel, or Netlify for frontend; Railway or Heroku for backend

• Justification:
  – All chosen technologies are open-source and well-supported.
  – Easy for a student-level team to handle.
  – Scalable for future enhancements like payment gateways and map APIs.

Conclusion: Technically feasible.

2. Economic Feasibility

This evaluates whether the project is financially viable, especially in an academic context.

• Development Cost:
  – No software licensing costs (all open-source tools)
  – Free-tier cloud database and hosting options available
  – Development possible on personal computers

  – Can be hosted on free-tier platforms

– Minimal cost for scaling in the future

• Benefit Analysis:
  – Saves time and money for users
  – Potential for monetization in real-world use

Conclusion: Economically feasible.

3. Operational Feasibility

This assesses how well the proposed system solves the identified problem and how easy it is to operate and manage.

• User-Friendly Interface:
  – Dashboard-based navigation for each role
  – Clear service flows for booking and tracking

• Access Control:
  – Role-based login with restricted access

• Automation:
  – Reduces manual work by automating booking and inventory tracking

• Learning Curve:
  – Easy for both technical and non-technical users

Conclusion: Operationally feasible.

4. Schedule Feasibility

This evaluates whether the system can be developed within the available time.

• Development Timeline: 4–6 weeks
  – Week 1: Requirements gathering, UI design
  – Week 2-3: Frontend and backend development
  – Week 4: Module integration
  – Week 5: Testing
  – Week 6: Documentation and finalization

Conclusion: Feasible within academic timeframe.

5. Legal & Ethical Feasibility

• No sensitive personal data is collected in the academic version.
• Ethical service practices can be enforced.
• Terms & Conditions can be included for real-world deployment.

Conclusion: Legally and ethically feasible.

Final Verdict
The Centralized Pet Welfare System is:
- Technically feasible
- Cost-effective
- Operationally efficient
- Scalable into a fully-featured microservice platform

This project not only serves academic purposes but lays the groundwork for a national-scale animal welfare platform — combining AI, public collaboration, and multi-role workflows under one unified system.