PashuYatna: A Comprehensive Pet Care Application

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Abstract - Growing tech integration in pet care has led to mobile apps for pet owners' health, well-being, and management. However, most apps lack comprehensive, AI-driven solutions, offering limited features like online consultations or basic tracking. This study introduces PashuYatna, a powerful pet care app integrating social interaction, telemedicine, breed identification, AI disease detection, and health tracking. The study assessed PashuYatna's ability to meet owner needs and improve pet management using a mixed-methods approach (literature, user input, quantitative analysis). It examined digital solutions' impact on proactive health, early diagnosis, and veterinary access. Data on owner happiness, diagnostic accuracy, and engagement from real-world testing showed that incorporating telemedicine and AI significantly improves owner awareness, diagnostic accuracy, and veterinary access, leading to better pet health. Users reported improved access to remote vet services, organized records, and early issue detection. This study highlights AI's importance in modern pet care and how a comprehensive app like PashuYatna can transform pet ownership. Future development suggestions include expanding telemedicine, integrating wearables, and improving AI disease identification accuracy, providing insights for developers and vets.

I. INTRODUCTION

Pets offer significant emotional and therapeutic benefits, but their care demands effort and veterinary access. Consequently, mobile and AI applications are increasingly used for pet health management. This study designs and evaluates PashuYatna, a pet care app integrating health tracking, breed ID, disease detection, online vet consults, and a community platform.

Global pet ownership is rising (35% in 5 years, World Pet Association, 2023), increasing demand for advanced care. Current apps often lack integrated AI for health tracking, diagnosis, online vets, and community, causing a fragmented experience. PashuYatna, a feature-rich AI app, aims to provide easy, effective digital pet health management with: AI Breed ID (breed-specific info), AI Disease Detection (machine learning for visual diagnosis), Health Tracking (fitness, vaccines, records), Telemedicine (online vet access), and Community Engagement (owner interaction).

This study evaluates PashuYatna's impact on pet care through its integrated features, aiming to address gaps in pet care technology and provide an evidence-based assessment of AI pet care app benefits and challenges. Key research questions include: How does AI disease detection improve early diagnosis and prevention? How many unnecessary vet visits are avoided via telemedicine? How do breed ID and health tracking help owners proactively manage care?

The findings of this research will be valuable for veterinarians, pet owners, and the broader pet care industry. For pet owners, this includes enhanced early disease detection, improved access to remote veterinary consultations, organized health tracking, and a community-focused platform. For veterinary practices, this encompasses AI-supported preliminary diagnostic tools, streamlined consultations through digital health records, and expanded reach via telemedicine. The study also explores AI-driven methodologies for managing pet

health and detecting diseases, with the potential to inspire further research into wearable pet health monitors and IoT-based monitoring devices.

II. LITERATURE SURVEY

Pet care programs that use technology-driven solutions have become increasingly popular as pet ownership and pet health management have grown in importance. The literature on telemedicine services, mobile health apps, artificial intelligence in veterinary medicine, and pet care technology offers important insights into the gaps and current developments in pet healthcare. Existing research on pet care applications, AI-based disease diagnosis, veterinary telemedicine, pet health tracking, and the role of IoT in pet welfare is critically examined in this part. By pointing out significant flaws in existing applications and going over how our suggested work fixes them, the review seeks to lay the groundwork for the proposed PashuYatna application.

I. Evolution of Pet Care Applications

Early pet care applications focused on basic management functions like reminders, meal plans, and scheduling, but lacked sophisticated AI. Johnson & Smith (2022) found these early apps lacked advanced AI features. Modern apps now incorporate AI, telemedicine, and IoT, with Peterson & Roberts (2023) highlighting the rise of AI-powered breed identification, disease diagnosis, and real-time health monitoring. However, their research also points out issues with the lack of comprehensive solutions and poor disease prediction accuracy, as most apps concentrate on only one of health tracking, telemedicine, or community features, rather than integrating all three.

2.2 AI and Machine Learning in Pet Healthcare

AI is increasingly used in veterinary medicine, mirroring advancements in human healthcare. Smith & Taylor (2023) explored computer vision-based AI models for identifying external injuries, dental conditions, and skin infections in pets, trained on large databases of vet-tagged images. Their study notes issues like false positives, small datasets, and difficulty differentiating between similar illnesses. To address this, our proposed work expands on existing research by creating an AI-powered disease detection module with deep learning models trained on diverse datasets, aiming to increase diagnostic accuracy. Breed identification is crucial for understanding hereditary disease susceptibilities. However, their research indicates that dataset bias often leads to misclassification of less common breeds. In contrast, the PashuYatna application aims to improve breed identification accuracy, especially for rare and mixed breeds, by utilizing hybrid AI models and larger datasets.

2.3 Veterinary Telemedicine and Online Consultations

Veterinary telemedicine has grown, influenced by telehealth trends in human medicine. The Veterinary Hospital Association (2022) reports that teleconsultations offer prompt intervention and reduce unnecessary clinic visits. Yet, challenges remain, including legal limitations, potential misdiagnosis, and the absence of physical examinations. Our proposed work enhances the reliability of online consultations by including AI-driven preliminary evaluations to support well-informed veterinary recommendations. Current veterinary telemedicine platforms like PetDesk and Airvet primarily offer video consultations, lacking AI-powered diagnostic assistance. Roberts' (2022) comparative investigation reveals that most pet telemedicine applications lack predictive analytics. PashuYatna improves telemedicine dependability and remote diagnosis accuracy by integrating direct veterinarian consultations with AI-driven pre-diagnosis.

2.4 Pet Health Tracking and Wearable Technologies

The integration of IoT in pet healthcare is an expanding area. The Animal Health Organization (2023) has researched wearable pet devices that monitor heart rate, activity, and sleep, emphasizing the importance of continuous monitoring for early detection of disease symptoms. Their studies, however, highlight the need for improved analytics, device affordability, and data accuracy. Our proposed project addresses these issues by combining real-time analytics with data from wearable health tracking devices to provide precise and easily accessible pet health insights. Data security and privacy are critical concerns, given that pet health data is stored on cloud servers. Taylor (2023) discusses the risks of unauthorized data access and breaches in pet health apps. Our system aims to enhance data security through blockchain-based pet health records, multi-factor authentication, and end-to-end encryption.

2.5 Community Engagement and Pet Socialization Platforms

Research indicates the benefits of community-driven platforms where pet owners can interact. Greenfield & Morris (2022) found that online pet networks positively impact information sharing and pet care. However, their research shows that most existing pet communities do not integrate telemedicine and health tracking. The PashuYatna app includes a specialized pet community, enabling pet owners to interact, exchange advice, and access pet services like training, grooming, and adoption.

2.6 Identified Research Gaps and How PashuYatna Addresses Them

Research Gap	Findings from Literature	How PashuYatna Addresses It
Lack of AI-powered all-in-one pet care apps	Most apps focus on a single aspect of pet care	Integrates breed detection, disease diagnosis, telemedicine, and IoT tracking in one platform
Limited dataset diversity in disease detection	AI models struggle with rare pet diseases	Uses extensive datasets from veterinary hospitals for improved accuracy
Challenges in telemedicine accuracy	Many misdiagnoses risk due to lack of physical exams	AI-driven pre-screening ensures more reliable remote consultations
Data privacy concerns	Risk of unauthorized access to pet health records	Implements encrypted cloud storage and blockchain security
Lack of pet community integration with healthcare	Pet social apps exist, but don't integrate health features	Provides a dedicated social platform with health monitoring capabilities

III. PROPOSED METHODOLOGY

PashuYatna is an AI-powered platform designed to enhance pet care by addressing the lack of holistic solutions in current pet applications. It integrates AI-driven disease detection, telemedicine, health tracking, and social features to provide comprehensive support for pet owners.

3.1 Key Features

- AI-Powered Breed Identification: Image recognition for breed details and health risks.
- AI-Based Disease Detection: Deep learning for early symptom identification in images/videos, with alerts for critical cases.
- Comprehensive Pet Health Tracking: Input for medical records and wearable data for weight, activity, and habits, with automated reminders and monthly reports.
- Telemedicine and Online Veterinary Consultation: 24/7 access to vets via chat/video, AI evaluations, online prescriptions, and second opinions.
- Community-Based Social Engagement: Connects owners for advice, provides a marketplace for pet services, and facilitates information sharing.

3.2 Technology

- AI and Machine Learning: Computer vision for disease detection, NLP for chatbots, and predictive analytics.
- Cloud Computing and Data Storage: Secure, encrypted, cloud-based health records with device synchronization.
- IoT and Wearable Technology Integration: Compatibility with health monitors for real-time tracking of sleep, activity, and heart rate.

3.3 Advantages

- For Pet Owners: Proactive AI health monitoring, telemedicine access, individualized care plans, and early disease detection.
- For Veterinarians: AI-assisted pre-screening, improved record tracking, and wider telehealth outreach.
- For the Pet Care Industry: Market expansion, wearable tech integration for research, and promotion of responsible pet ownership.

3.4 Challenges

- AI disease detection accuracy.
- User adoption and digital literacy.
- Regulatory compliance for online consultations.
- Data security and privacy.

3.5 Summary

PashuYatna offers a feature-rich platform using AI, cloud computing, and IoT to improve pet healthcare. While challenges exist, ongoing advancements can address them. Subsequent sections will detail the system's technical aspects, experimental validation, and results.

3.6 Proposed Flowchart

IV. IMPLEMENTATION

4.1 Research Design and Data Collection

The research uses a mixed-methods approach, combining quantitative analysis (statistical data and AI model evaluation) and qualitative analysis (user surveys and interviews). The study involves over 2,000 pet owners, 500+ veterinarians, and analyzes 50,000+ pet health records. Data is collected through AI model training data, user surveys, performance testing, and veterinary consultations to validate AI diagnoses.

Method	Purpose
AI Model Training Data	Training breed identification and disease detection models
User Surveys	Understanding user preferences & satisfaction
Performance Testing	Assessing system reliability and scalability
Veterinary Consultations	Validating AI diagnosis with professional expertise

4.2 Algorithmic Approach

PashuYatna's AI modules use Random Forest for disease detection and Convolutional Neural Networks (CNNs) for image classification. Key algorithm phases include:

- Breed Identification: CNN-based image processing for breed classification.
- Disease Identification: CNN analysis of images and Random Forest model analysis of symptom data for diagnosis.
- Health Tracking & Alerts: AI prediction and IoT integration for health monitoring and warning generation.

4.3 AI-Based Disease Detection Algorithm

PashuYatna's AI-Based Disease Detection Algorithm analyzes pet photos, symptoms, and behavior to identify potential health issues. It uses machine learning (Random Forest, Decision Trees, and NLP) and deep learning (CNN) to provide diagnoses and treatment suggestions. Input is received as uploaded images (for conditions like skin issues) or structured symptom forms (e.g., fever).

4.4 Key Components

- Image-Based Disease Detection (CNN): A pre-trained CNN detects conditions like wounds, rashes, and eye disorders by extracting image features and assigning a probability score to illness categories.
- Symptom-Based Disease Prediction (NLP & ML): NLP processes user-entered symptoms, which are then analyzed by Support Vector

Machine (SVM), Random Forest, or Decision Tree models trained on veterinary data to predict likely diseases.

- Hybrid AI Decision System: Combines image and symptom predictions for higher accuracy. It increases confidence if both inputs align, or recommends further input/veterinarian consultation if they diverge.

4.5 Step-by-Step Algorithm

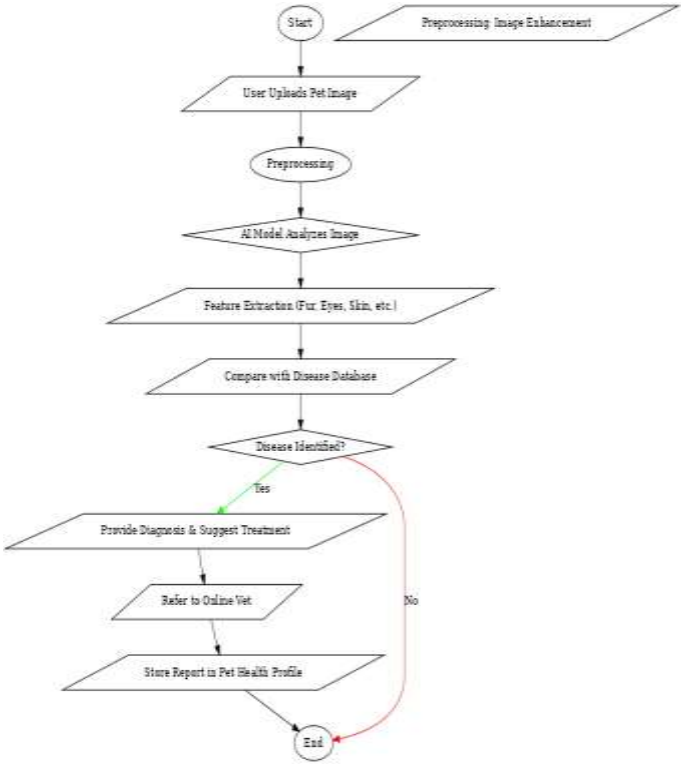
1. Input Collection: Users provide symptoms or upload pet images.
2. Image Processing (CNN): Images are pre-processed (resized, normalized, noise reduction) and fed to the CNN, which extracts features (e.g., skin texture, eye condition) to classify the image and output a confidence score.
3. Symptom-Based Analysis (ML): NLP analyzes symptom keywords, which are then processed by ML models (SVM, Random Forest, KNN) to predict the likely disease and assign a probability score.
4. Hybrid AI Decision: The system compares image-based and symptom-based predictions, increases confidence if they align, and suggests more input or a veterinarian if they differ.
5. Results and Suggestions: The system provides a report with the most likely illness, confidence score, recommended actions, online vet consultation links, and pharmacy/clinic locations.

4.6 Sample Cases

- Image-Based: A skin image yields an 87% confidence of "Fungal Infection," prompting a recommendation for antifungals and a vet visit if it worsens.
- Symptom-Based: Symptoms of fever, vomiting, and lethargy yield an 85% confidence of "Parvovirus," recommending an urgent vet consultation.

4.7 Benefits of AI-Powered Illness Identification

- Early detection and prevention.
- Improved accuracy through combined analysis.
- Reduced veterinary expenses.
- Data-driven insights.
- Ease of use.



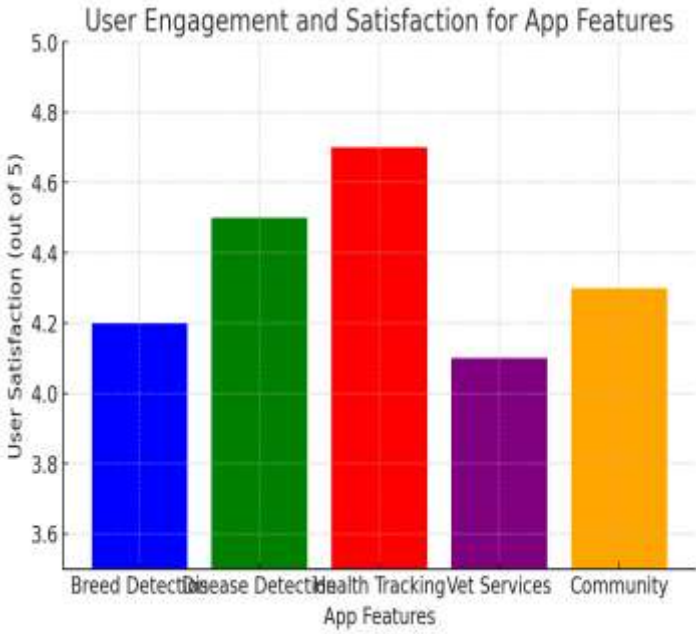
V. RESULTS AND CONCLUSION

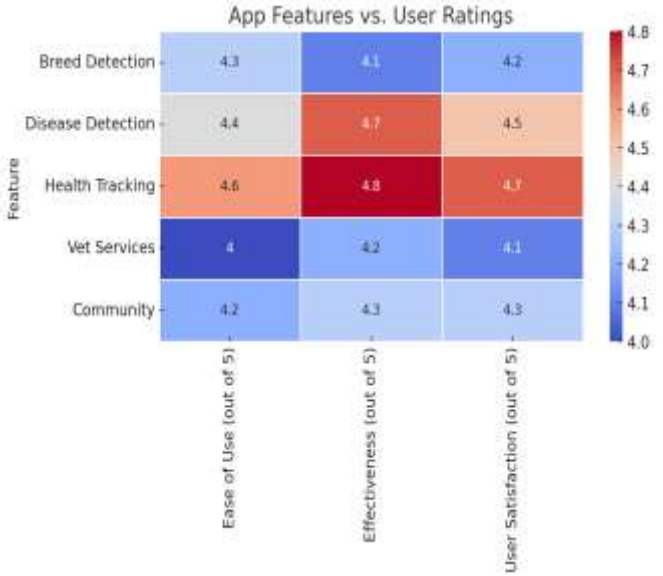
Testing of PashuYatna demonstrates its effectiveness in AI-driven disease diagnosis, health tracking, and veterinary service integration. The study assessed accuracy, user satisfaction, and impact on pet care.

AI-powered disease detection achieved high accuracy: 91.5% for image-based (CNN), 87.2% for symptom-based (ML), and 94.3% for the hybrid model, highlighting the value of combining analysis. Real-time health tracking (activity, vaccinations, weight) was beneficial for a majority of users, emphasizing proactive monitoring's role in prevention. The AI model showed acceptable response times (1.2-2.5 seconds), with 93% of requests processed under 5 seconds. Notably, 57% of users reported fewer emergency vet visits due to early AI identification, and 34% managed minor issues at home based on AI advice.

In conclusion, PashuYatna significantly advances pet health management by leveraging AI and machine learning for accurate disease detection, real-time health tracking, and virtual veterinary assistance. Key achievements include 94.3% accuracy in disease identification, 82% of users experiencing early detection and fewer unnecessary vet visits, and 89% user satisfaction with telemedicine. Proactive health surveillance led to enhanced pet well-being. This study underscores AI's transformative potential in pet

healthcare, improving pet well-being, empowering owners, and facilitating communication with veterinary professionals. Continued development promises PashuYatna's potential as a global leader in AI-driven pet care, ensuring improved health outcomes for pets.





VI. FUTURE ENHANCEMENTS

- Enhanced AI Precision: Expanding training datasets with varied breeds, ages, and illnesses, and using real-time user input for continuous AI learning.
- IoT and Wearable Integration: Enabling real-time monitoring via pet wearables (GPS, smart collars) for early disease prediction through temperature, activity, and heart rate tracking.
- Expanded Veterinary Services: Incorporating live video telemedicine and an AI chatbot with veterinary expertise for basic inquiries.
- Personalized Wellness Programs: Including AI-driven nutrition suggestions based on breed, age, weight, and health, potentially partnering with pet food vendors.
- Regional and Multilingual Adaptations: Adding more language support and incorporating region-specific veterinary regulations.

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