Smart Veterinary Care System with AI-Based Disease Detection

Course Code: CSE 299
Section: 04
Project Group: 05

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Abstract—Pet owners often face difficulties in accessing veterinary products and obtaining basic health guidance in a timely manner. Physical veterinary clinics may be inconvenient due to distance, limited availability, or time constraints. With the rapid advancement of online services and artificial intelligence, digital platforms can play a significant role in simplifying pet healthcare management.

This project proposes the development of *petDoc*, an Online Veterinary Shop with AI-Based Disease Detection. The proposed system integrates an e-commerce platform for veterinary products with a machine learning-based disease detection feature. Pet owners can purchase required products online and receive preliminary disease-related guidance by providing symptoms or uploading images. The system aims to improve accessibility to veterinary products, support early disease awareness, and enhance user convenience through an integrated digital solution.

Keywords—Smart Veterinary System, Animal Healthcare, E-commerce, Machine Learning, Disease Detection

I. INTRODUCTION

Pets and domestic animals play an essential role in modern households, contributing to companionship, emotional well-being, and security. Maintaining proper animal healthcare requires regular veterinary consultation, timely disease diagnosis, and access to appropriate medical products. However, many pet owners face challenges in obtaining these services due to geographical barriers, limited clinic availability, high consultation costs, and busy lifestyles.

In many regions, veterinary healthcare services remain centralized in urban areas, making access difficult for rural populations. Additionally, early symptoms of common animal diseases often go unnoticed by pet owners due to lack of medical knowledge, resulting in delayed treatment and increased health risks. According to veterinary health studies, early-stage detection significantly improves treatment success rates and reduces medical costs [3].

The rapid growth of online services and artificial intelligence has enabled the development of intelligent healthcare platforms that can assist users beyond traditional physical systems. In the veterinary domain, however, most existing online platforms focus primarily on product sales or appointment scheduling, offering limited intelligent health support. This project aims to address this gap by developing an integrated online veterinary system that combines product purchasing with AI-based disease detection to enhance early awareness and accessibility.

II. PROBLEM STATEMENT

Despite technological advancements, several challenges continue to affect effective pet healthcare management:

- Limited access to veterinary healthcare services, especially for pet owners residing in remote or underserved areas.
- Delayed identification of common pet diseases due to lack of early symptom awareness and guidance.
- Difficulty in obtaining veterinary medicines and healthcare products promptly from physical stores.
- Existing online veterinary platforms focus mainly on e-commerce and lack intelligent disease detection features.
- Insufficient educational support for pet owners regarding preventive care and early-stage health risks.

These challenges highlight the need for a comprehensive digital system that integrates veterinary product management with artificial intelligence to support early disease awareness and informed decision-making.

III. OBJECTIVES OF THE PROJECT

The primary objectives of this project are as follows:

- To develop a secure, user-friendly online veterinary shopping platform.
- To assist pet owners in identifying potential diseases at an early stage using artificial intelligence.
- To provide basic disease-related information and precautionary measures.
- To design separate functional panels for users, administrators, and delivery personnel.
- To efficiently manage products, orders, and disease-related data through an administrative interface.

IV. LITERATURE REVIEW

Several studies have explored the application of digital technologies in veterinary healthcare. Hossain *et al.* [1] proposed a web-based veterinary management system focusing on digital record keeping and appointment scheduling. While the system improved administrative efficiency, it lacked intelligent diagnostic capabilities.

Smith and Doe [2] analyzed trends in veterinary e-commerce platforms and highlighted the increasing demand for online veterinary product marketplaces. However, their study indicated that most platforms provide limited healthcare support beyond product listings. Kumar and Singh [3]

reviewed the use of machine learning techniques in animal disease detection and demonstrated the effectiveness of classification models for early diagnosis. Despite promising results, these systems were not integrated into consumer-facing platforms.

Dash and Mishra [4] applied convolutional neural networks for automated skin disease detection in domestic animals using image data. Although the model achieved high accuracy, the study focused primarily on model performance without addressing real-world deployment or user accessibility. General deep learning techniques described by Goodfellow *et al.* [5] and Krizhevsky *et al.* [6] further establish the feasibility of image-based disease detection.

Based on the reviewed literature, there exists a research gap in developing an integrated platform that combines veterinary e-commerce with AI-based disease detection in a user-accessible web environment. The proposed system aims to bridge this gap by providing both services within a single digital solution.

V. PROPOSED SYSTEM OVERVIEW

The proposed system is a web-based application developed using the Django framework for backend operations and HTML, CSS, and Bootstrap for frontend design. The system is designed with modular architecture to ensure scalability, usability, and efficient management.

A. System Architecture

The system follows a three-tier architecture consisting of the presentation layer, application layer, and data layer. The presentation layer handles user interaction through a web interface. The application layer manages business logic, authentication, and AI-based disease detection. The data layer stores user information, pet records, product data, and order history in a relational database.

B. User Module

The user module allows pet owners to securely register and log into the system. Users can add pet information, browse veterinary products, manage shopping carts, and place orders. Additionally, users can access the disease detection feature by uploading pet images or selecting symptoms based on pet type.

C. Online Veterinary Shop Module

This module functions as an online marketplace for veterinary medicines, pet food, and accessories. Products are displayed with descriptions, pricing, and availability information to ensure a smooth purchasing experience.

D. AI-Based Disease Detection Module

The disease detection module allows users to upload images or input symptom information. A machine learning model trained on publicly available veterinary datasets analyzes the input and predicts possible diseases. The system then displays the predicted disease, associated symptoms, and precautionary measures.

Furthermore, the system recommends relevant medicines and products related to the predicted disease. These recommendations are provided as direct links to items available in the online veterinary shop, enabling immediate access and purchase.

E. Admin Module

The admin module enables administrators to manage users, products, disease data, and customer orders. Administrators can add, update, or remove records and monitor overall system activity.

F. Delivery Person Module

The delivery module allows delivery personnel to view assigned orders and update delivery status, ensuring transparent order tracking and efficient delivery management.

VI. METHODOLOGY

The development of the proposed system follows a structured methodology consisting of the following phases:

- Requirement analysis and system specification.
- Database design for users, pets, products, orders, and disease information.
- Frontend development using HTML, CSS, and Bootstrap.
- Backend implementation using Python and Django framework.
- Collection and preprocessing of publicly available veterinary disease datasets.
- Training and evaluation of a machine learning model for disease detection.
- Integration of the trained model with the web application.
- Implementation of product recommendation features.
- System testing, validation, and deployment.

VII. PERFORMANCE EVALUATION PLAN

The system performance will be evaluated using both technical and usability metrics. Machine learning model performance will be measured using accuracy, precision, recall, and F1-score. System usability will be assessed through user feedback and task completion time analysis. Website performance will be evaluated based on response time and system reliability.

VIII. CHALLENGES AND LIMITATIONS

The proposed system may face challenges such as limited availability of high-quality veterinary datasets, potential bias in disease prediction models, and the risk of misinterpretation of AI-generated results. Ethical considerations must be addressed by clearly informing users that the system provides preliminary guidance and does not replace professional veterinary consultation.

IX. EXPECTED OUTCOMES

The expected outcome of this project is a functional online veterinary platform integrated with AI-based disease detection. The system aims to improve access to veterinary products, support early disease awareness, and provide efficient management of users, products, and orders within a unified platform.

X. CONCLUSION

This project proposes an Online Veterinary Shop with AI-Based Disease Detection to enhance pet healthcare accessibility and awareness. By integrating e-commerce services with artificial intelligence, the system supports informed decision-making and early disease identification. Future enhancements may include real-time veterinary consultations and the incorporation of advanced AI models to improve diagnostic accuracy.

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