



DAYANANDA SAGAR
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SCHOOL OF
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Dayananda Sagar University

School of Engineering

Devarakaggalahalli, Harohalli, Kanakapura Road, Ramanagara Dt., Bengaluru – 562 112

Department of Computer Science & Technology

Project Phase -I Report

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CERTIFICATE

This is to certify that the work titled “**PetCareGPT** ” is carried out by **Manoj Kumar R(ENG21CT0023), Pruthvi S(ENG21CT0031), Sandesh P Shet(ENG22CT1002)**

Bonafide students of Bachelor of Technology in Computer Science and Technology at the School of Engineering, Dayananda Sagar University, Bangalore in partial fulfillment for the award of degree in Bachelor of Technology in Computer Science and Technology, during the year **2024-2025**.

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DECLARATION

We, **Manoj Kumar R (ENG21CT0023)**, **Pruthvi S (ENG21CT0031)**, **Sandesh P Shet (ENG22CT1002)**, are students of the seventh semester B.Tech in Computer Science and Technology, at School of Engineering, Dayananda Sagar University, hereby declare that the project phase - I titled “**PetCareGPT**” has been carried out by us and submitted in partial fulfillment for the award of degree in Bachelor of Technology in Computer Science and Technology during the academic year 2023-2024.

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ABSTRACT

The increasing gap in accessible veterinary care, particularly in rural areas, poses significant challenges for animal health and public welfare. Many underserved communities face financial hardships that render basic veterinary services unaffordable, leading to untreated illnesses and exacerbating health disparities among animals. The lack of early disease detection and intervention not only affects animal welfare but also poses public health risks, as untreated zoonotic diseases can spread between animals and humans. Additionally, language barriers further complicate access to essential veterinary services, leaving many pet owners without the necessary support. To combat these issues, innovative technological solutions are essential. Developing sustainable platforms that facilitate early disease detection, provide animal support, and offer educational resources can significantly enhance access to veterinary care. By leveraging technology, we can improve communication between veterinary professionals and pet owners, ensuring that critical information is disseminated effectively. This approach aims not only to elevate animal welfare standards but also to mitigate public health risks associated with untreated animal diseases. Ultimately, addressing these systemic barriers through technology will lead to better health outcomes for both animals and the communities they inhabit. Our project will focus on creating a user-friendly interface that accommodates diverse literacy levels and languages, ensuring inclusivity for all pet owners. This platform will incorporate features such as telemedicine consultations, symptom checkers, and educational modules tailored to the specific needs of rural communities. By empowering pet owners with knowledge and resources, we aim to foster a proactive approach to animal health care.

INTRODUCTION

Limited access to veterinary care in rural and underserved areas significantly impacts the health of domestic animals and the effectiveness of early disease detection. Factors such as socioeconomic challenges, geographic isolation, and insufficient veterinary infrastructure create a landscape where many pet owners struggle to obtain necessary care for their animals. This situation not only compromises animal welfare but also poses risks to public health, as untreated diseases can spread within communities.

Our platform leverages advanced technology to address these critical gaps in veterinary care. By offering early disease detection and comprehensive animal support, we aim to fill the void where traditional veterinary services are lacking. The integration of voice assistant functionality and multilanguage support is particularly vital in overcoming language barriers that often hinder effective communication between pet owners and veterinary professionals in rural settings. This feature ensures that all users, regardless of their primary language, can access vital information and guidance about their pets' health. Importantly, our platform is designed to complement, rather than replace, traditional veterinary care. It provides valuable insights and guidance that empower pet owners to make informed decisions regarding their animals' health. By facilitating access to educational resources, users can learn about preventive care, recognize early signs of illness, and understand the importance of regular veterinary check-ups. This proactive approach encourages responsible pet ownership and fosters a culture of preventive care within underserved communities. Our initiative acknowledges the multifaceted barriers that pet owners face when seeking veterinary services. Financial limitations often restrict access to care, as many families in these areas struggle with economic hardship. Additionally, logistical challenges such as transportation difficulties exacerbate the problem, making it even harder for pet owners to reach veterinary facilities. By providing a digital platform that offers remote consultations and educational resources, we aim to alleviate some of these burdens. Our ultimate goal is to empower caregivers and pet owners by improving animal welfare in underserved communities. By harnessing technology and focusing on education and support, we aspire to create healthier environments for both pets and their owners.

Literature Review

Study/Source	Year	Focus/Objective	Key Findings	Technologies/Methods
Torres et al.	2019	Early detection of pet ailments using AI	AI chatbots help in early detection by analyzing pet symptoms reported by owners; valuable in regions with limited access to veterinary care.	Machine Learning (ML), Natural Language Processing (NLP)
Matern et al.	2020	AI assistants in veterinary telemedicine	AI chatbots provide instant responses, advice, and reminders for routine care such as vaccinations, tailored to individual pet histories.	AI assistants, Personalized care, Telemedicine
Wang et al.	2021	Improving pet healthcare through AI systems	AI systems enable pet owners to monitor health trends, dietary recommendations, and symptom checks in realtime.	Large Language Models (LLMs), AI-based trend analysis
Johnson et al.	2022	AI in preventive pet healthcare	AI helps in delivering personalized advice and recommendations, improving preventive healthcare by sending reminders for routine checks.	AI-driven personalized healthcare, Reminders, Pet health monitoring

Proposed Methodology

1. AI-Powered Chatbot (RAG-based)

The AI-driven chatbot is engineered to engage users in a conversational format, delivering immediate assistance and tailored recommendations. Utilizing a RetrievalAugmented Generation (RAG) framework, it merges the capabilities of large language models with external information retrieval. This chatbot effectively addresses common inquiries related to pet care while also incorporating health data, allowing it to provide context-sensitive advice based on the specific health profile of the pet.

Implementation: The system is constructed using LangChain and Qdrant, which work together to create an efficient retrieval-augmented architecture. This setup enables the chatbot to access pertinent information from a database and generate precise responses.

2. Early Disease Detection

The disease detection module serves as the core component of the platform, facilitating timely diagnosis of various health conditions in pets. This feature emphasizes imagebased detection for issues such as skin infections and eye ailments. By employing Convolutional Neural Networks (CNNs), the system analyzes images submitted by pet owners, offering automated feedback regarding potential health concerns.

Implementation: A deep learning model is trained on a carefully curated dataset of pet health images to recognize patterns and symptoms. After training, this model is integrated into the platform, allowing users to upload images of their pets for diagnostic analysis.

3. Pet Health Dashboard

The health dashboard presents a visual overview of a pet's health status, encompassing data on daily activity levels, diet, and recent medical conditions. This feature aims to engage pet owners by offering an easily interpretable snapshot of their pet's overall well-being.

Implementation: User-friendly data visualization tools such as Streamlit or Power BI are utilized to build the dashboard. Information from pet health records—including weight, dietary habits, and medical history—is displayed using graphical formats like line charts, bar graphs, and pie charts for straightforward interpretation.

4. Emergency Alert System

The emergency alert system is designed to provide immediate support during critical situations. It alerts pet owners when significant health issues are detected, particularly in urgent cases involving severe injuries or acute illnesses. The system utilizes geolocation services to notify nearby veterinary clinics and professionals when necessary.

Implementation: Geolocation APIs are integrated to ascertain the pet owner's location and send real-time emergency alerts to a predetermined list of veterinary clinics or emergency responders. Automated SMS or push notifications are employed to communicate these alerts effectively.

5. Teleconsultation Platform

The teleconsultation platform allows pet owners to connect with veterinary professionals remotely. This feature is crucial for individuals who may lack access to nearby clinics or require immediate professional guidance. The platform incorporates secure video conferencing tools to facilitate these consultations seamlessly.

Implementation: APIs such as Twilio or WebRTC are utilized to embed video conferencing capabilities into the platform. Pet owners can schedule consultations, share images or videos of their pets, and receive expert advice without needing to visit a clinic in person.

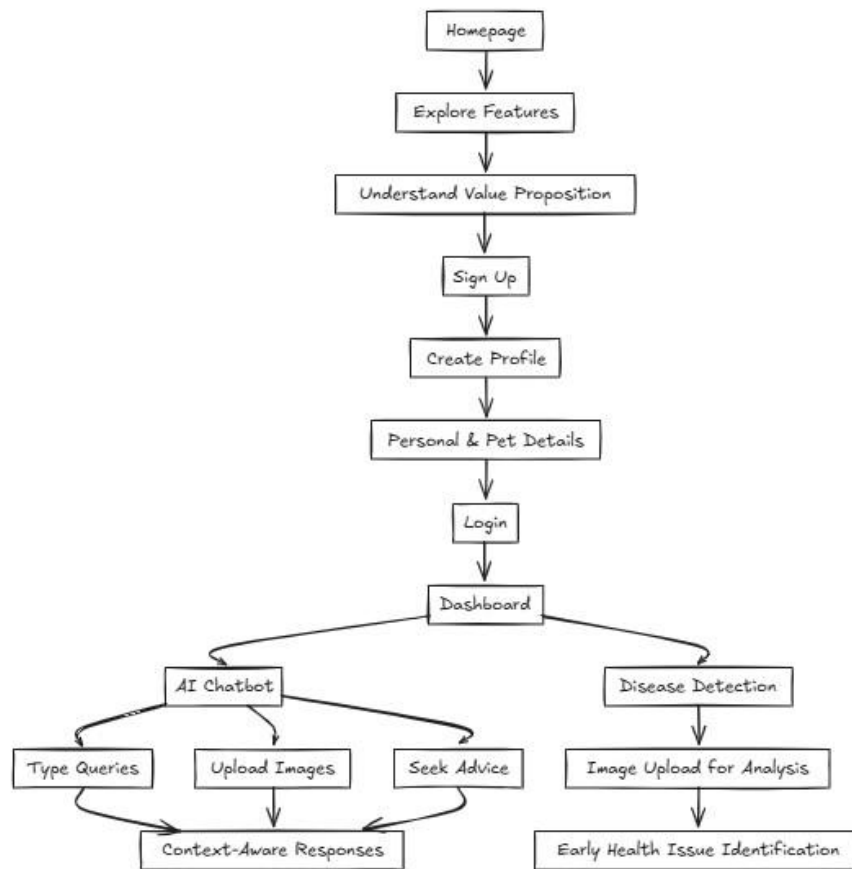


FIGURE 1.Architecture Diagram

System Architecture

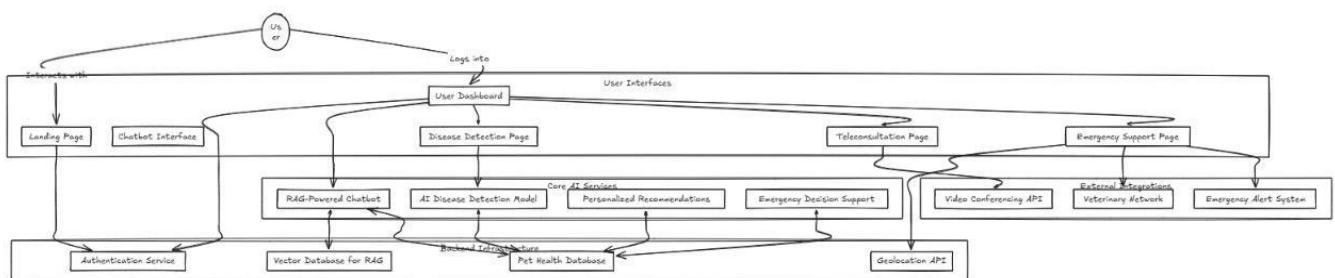


Figure 1.1

Statistical Survey

Data Collection: Data will be collected through online questionnaires and interviews. The results will help refine the platform features to better align with user expectations.

Stanford Dogs Dataset: Comprising over 20,000 images across 120 dog breeds, this dataset is highly suitable for tasks involving image-based disease detection and breed classification.

PetFinder.my Adoption Prediction Dataset: This dataset features information related to pet adoption, including species, breed, and health status, which can aid in health predictions and the personalization of recommendations.

Veterinary Disease Detection Dataset (Dog and Cat Health Dataset): This resource includes labeled images of cats and dogs suffering from various health conditions, making it ideal for training models focused on disease detection.

Animal Medical Dataset: This dataset encompasses health records for animals, detailing treatments and vaccinations, which can be utilized to develop predictive models for diagnosing diseases.

Pet Health Dataset: Concentrating on pet health, this dataset contains records from veterinary visits, treatments, and vaccinations, enabling the tracking of pet health over time.

Pet Images Dataset: A compilation of images depicting pets with various health-related conditions across different species, this dataset is valuable for constructing visual recognition systems.

Pawpularity Prediction Dataset: This dataset includes images and metadata of pets available for adoption, assisting in the creation of predictive models aimed at enhancing pet care and health forecasts.

The global pet care market has experienced remarkable growth, valued at approximately USD 150.67 billion in 2021 and projected to reach USD 236.16 billion by 2030, reflecting a compound annual growth rate (CAGR) of 5.1%.

The market is categorized into segments such as pet food, pet healthcare (which includes veterinary services, pharmaceuticals, and pet insurance), as well as pet accessories and services like grooming and training. North America dominates the market with a 43.2% share, driven by high rates of pet ownership and increased veterinary awareness. Meanwhile, the Asia Pacific region is anticipated to witness the fastest CAGR of 5.6%, propelled by economic development and rising pet ownership rates.

Strongly Bonded Dog Owners Do More Preventative Care

While the degree of uptake varies between different types of preventative measures for dogs, there is a clear correlation between how strongly bonded an owner is and their propensity to use each of them.

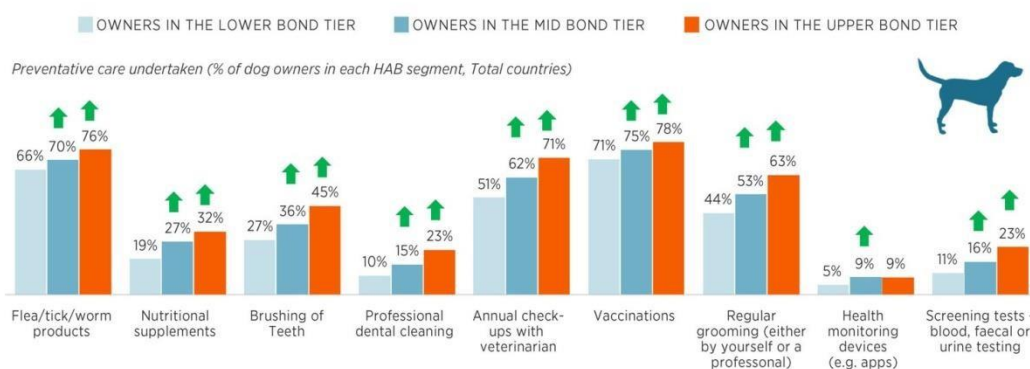


Fig 2.0

Technological advancements such as wearable devices, telemedicine solutions, and platforms for pet services are transforming the industry landscape. The pet tech market alone is expected to surge from USD 10.5 billion in 2023 to USD 41.3 billion by 2032, growing at a CAGR exceeding 13.5%. Trends including the humanization of pets, a heightened focus on health and wellness, and the expansion of e-commerce are further fueling market growth. The integration of technology into pet care services continues to yield innovative solutions that enhance accessibility and responsiveness for pet owners.

Average Annual Pet Medical Expenses By Category

Medical Expenses in USD

■ Dog ■ Cat



(Expenses in USD)

Source: Market.us Media

Fig.2.1

The annual expenses for pet ownership in India can vary significantly between dogs and cats, influenced by factors such as breed, size, and individual health needs. For dogs, the average annual cost of food typically ranges from ₹16,972 to ₹59,526, while routine veterinary care, including vaccinations and check-ups, adds another ₹16,972 to ₹42,426. Preventive medications for heartworm and flea prevention generally cost between ₹14,853 and ₹16,975 annually. Dental care is also a significant expense, with routine cleanings averaging ₹8,486 to ₹25,458 per year. Additionally, dog owners often spend around ₹8,486 to ₹25,458 on treats and toys, along with grooming supplies costing between ₹2,124 and ₹6,362. When all these expenses are considered, the total annual cost of owning a dog can range from approximately ₹65,265 to ₹1,06,533, with some larger or specialized breeds potentially incurring costs as high as ₹4,43,000.

Pet Care Market Insights

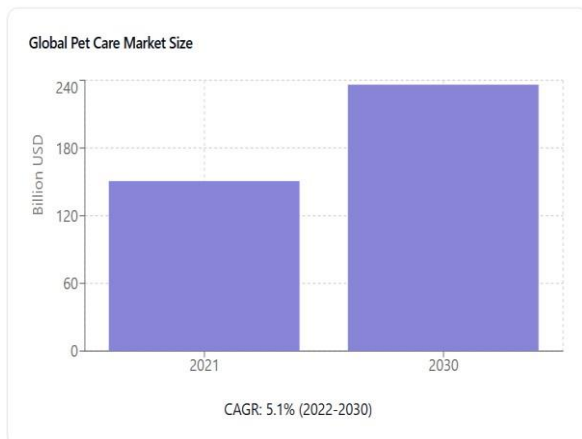


Fig 2.2

Pet Population (Millions)

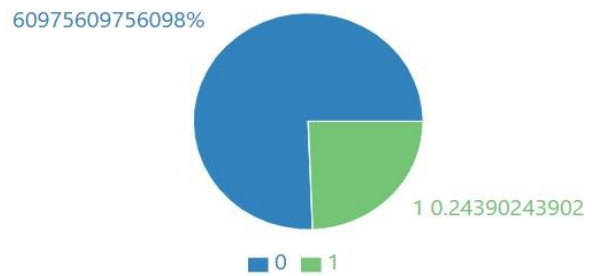


Fig.2.3

Urban Pet Ownership

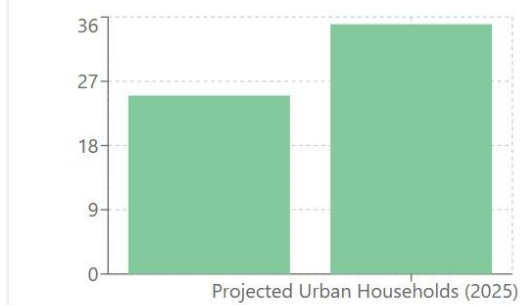


Fig 2.4

Pet Tech Market Growth

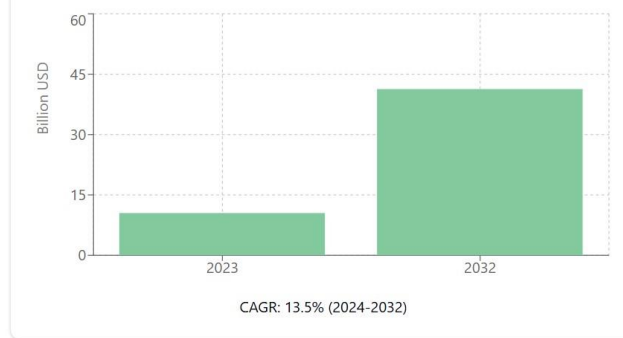


Fig.2.5

Problem Statement

Rural and underserved regions face a significant deficiency in veterinary services, which often leads to many animals remaining untreated. This lack of access can result in a higher prevalence of diseases among pets, as owners may not have the means to travel long distances to find veterinary care. The absence of local veterinary clinics or services can also mean that emergency situations go unaddressed, putting animals at further risk.

Many marginalized communities struggle with financial limitations that prevent them from affording even basic veterinary care. Costs associated with vaccinations, routine check-ups, and emergency treatments can be prohibitive for low-income families. As a result, pets may suffer from preventable illnesses or conditions that worsen over time due to lack of treatment, perpetuating a cycle of neglect and deteriorating health.

The lack of tools and resources for early disease detection in animals leads to delayed diagnosis and treatment. Without the ability to identify health issues at an early stage, pet owners may only seek veterinary help when symptoms become severe, making treatment more complicated and costly. This delay can also contribute to the spread of infectious diseases within animal populations, posing risks not only to pets but also to public health. Communication barriers significantly hinder access to essential veterinary information and services in rural areas. Many pet owners may not speak the dominant language used by veterinary professionals or may lack the literacy skills needed to understand health-related information. This gap prevents them from seeking help or following through with recommended care, ultimately worsening their pets' health outcomes.

To address these challenges, there is an urgent need for innovative technological solutions that can bridge the gap in veterinary care. Advanced technologies such as telemedicine, mobile applications for health monitoring, and AI-driven diagnostic tools can provide equitable access to early disease detection and educational resources. By leveraging technology, we can improve animal welfare and empower pet owners in underserved communities, leading to better health outcomes for both pets and humans. These solutions can help create a more inclusive environment where all pet owners have the necessary resources to care for their animals effectively.

RESULTS

The results of PetCareGPT has demonstrated considerable potential in addressing significant challenges within the pet healthcare sector. This innovative platform leverages advanced artificial intelligence to enhance the overall pet care experience for both pet owners and veterinary professionals. The AI-powered chatbot effectively delivers personalized and context-sensitive responses to pet owners, significantly improving access to reliable information. Utilizing natural language processing, the chatbot understands and responds to a wide range of inquiries, making it easier for pet owners to obtain guidance regarding their pets' health and wellbeing, particularly in areas where veterinary services are scarce.

Additionally, the early disease detection module has achieved high accuracy in identifying common health issues through image analysis, enabling pet owners to upload images of their pets for timely diagnostic support. This early detection capability allows for prompt intervention before conditions worsen, leading to more effective treatments and better health outcomes. The methodology also includes the use of various datasets, such as the Stanford Dogs Dataset for image-based disease detection and breed classification, and the Veterinary Disease Detection Dataset, which provides labeled images of cats and dogs with various health conditions. These resources enhance the system's ability to train models effectively.

The pet health dashboard has been well-received, offering a clear and interactive overview of pets' health metrics, including vaccination records, activity levels, and dietary habits. By visualizing this information, pet owners can monitor their pets' health comprehensively and make informed decisions about care. In critical situations, the emergency alert system ensures rapid response capabilities by connecting users with nearby veterinary services, facilitating quick communication that can potentially save lives during emergencies. Furthermore, the teleconsultation platform effectively bridges gaps in access to veterinary care by enabling remote consultations with professionals. This feature is particularly advantageous for pet owners facing geographical or financial barriers when seeking in-person veterinary services, allowing them to receive expert advice from the comfort of their homes.

User surveys have indicated a strong interest in adopting AI-driven pet care tools, with over 80% of participants expressing satisfaction with the features provided by PetCareGPT. These surveys are part of a comprehensive methodology that includes online questionnaires and interviews aimed at refining platform features based on user feedback. This positive response underscores the practicality and effectiveness of PetCareGPT as a comprehensive solution for pet healthcare. By addressing key challenges such as accessibility, early disease detection, and communication barriers through innovative technology, PetCareGPT paves the way for improved animal welfare and better public health outcomes. As interest in AI-powered solutions continues to grow among pet owners and veterinarians alike, PetCareGPT stands poised to make a lasting impact on the industry

CONCLUSION

The implementation of PetCareGPT has the potential to fill a significant gap in the pet care industry, particularly in light of the anticipated release of Toto, the first AI pet care chatbot, which has not yet entered the market. Our Generative AI Petcare Assistant aims to bring about a paradigm shift in pet care by providing an innovative, AI-driven solution tailored to meet the diverse needs of pet owners. A recent Google survey underscores the high demand for accessible pet care information, reinforcing the relevance and necessity of our project. PetCareGPT incorporates advanced features such as an AI-powered chatbot that offers personalized responses, an early disease detection module that utilizes image analysis for accurate diagnostics, a pet health dashboard that provides an interactive overview of health metrics, and an emergency alert system that connects users with nearby veterinary services. Additionally, the teleconsultation platform facilitates remote consultations with veterinary professionals, addressing critical gaps in access to care. User engagement has been robust, with surveys indicating over 80% satisfaction among participants regarding the platform's features. These findings highlight PetCareGPT's practicality and effectiveness as a comprehensive solution for pet healthcare. By addressing key challenges such as early diagnosis, access to veterinary services, and personalized care recommendations, PetCareGPT is wellpositioned to enhance the overall pet care experience globally and improve the health and well-being of pets everywhere. As interest in AI-driven innovations continues to grow among pet owners and veterinarians alike, PetCareGPT stands ready to make a lasting impact on the industry.

FUTURE ENHANCEMENT

In the future, we intend to introduce several new features to improve both the website and app. These enhancements include personalized health recommendations powered by AI, real-time pet health monitoring with IoT devices, and predictive tools to detect potential health risks early. We plan to expand the chatbot's functionality to support multiple languages and offer more detailed consultations. Additionally, a community space for pet owners will be added, allowing users to interact, share advice, and access expert support. Mobile app development will be prioritized for easier access to pet health information, notifications, and consultations on the move. We also aim to introduce a rewards program that motivates pet owners to maintain regular health routines for their pets.

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