

A Shih Tzu dog and a tabby cat are sitting side-by-side in a car seat. The dog is on the left, looking forward, and the cat is on the right, looking slightly to the right. The car seat's interior is visible in the background.

WAICY Submission — AIPet: Intelligent Home Pet Care System

1. AI Service Description

Service Definition

AlPet is an AI + IoT home pet-care ecosystem that continuously monitors pets' **health, behavior, environment, activity patterns, and daily routines**. By combining camera-based behavior recognition, environmental sensing, Bluetooth IoT modules, and cloud analytics, AlPet assists owners—especially new pet parents—in identifying early signs of illness, environmental risks, and abnormal behavior before they escalate.

This system aims to create **safer, smarter, science-driven home pet care** through automatic detection, real-time alerts, and interactive communication.

Problem It Solves



Rapid growth of pet ownership

National dog and cat numbers now exceed the population of children under 15.



High rate of preventable pet deaths

- 40% of cats die from organ failure
- Dogs' top causes: cancer, cardiovascular disease, organ failure

Many early symptoms appear subtly in behavior, sleep, or activity patterns, and are often missed by inexperienced owners.



Lack of scientific and data-driven home pet care

New pet owners struggle to interpret symptoms, leading to late diagnosis and higher medical expenses.



Large global market potential

2022 global pet industry value: USD 261B → projected USD 350B by 2027.

User Value

- Early detection of health abnormalities
- Real-time environment alerts (temperature/humidity)
- Activity, feeding, and hydration monitoring
- Behavior-based illness risk detection
- Remote interaction through audio/video
- Lower medical costs via early intervention



2. Motivation

AlPet was built to solve the practical challenges of modern pet households:



Pet numbers continue to rise, becoming core family members.



New pet owners lack medical knowledge and cannot identify early-warning signs.



Environmental factors (heat, humidity, dehydration) directly



Many pet illnesses develop silently and require behavior monitoring

3. Chat History

User: How is Mochi doing right now?

AI Pet: Mochi is lying down. Activity level has been low for the past 45 minutes.

User: Is that unusual?

AI Pet: Compared to her usual afternoon pattern, today's inactivity is slightly higher.

User: Check the environment.

AI Pet: Temperature is **30.1°C** and humidity is **79%**, which is higher than the recommended range for cats.

User: Could this make her uncomfortable?

AI Pet: Yes. High humidity may cause heat stress and reduce appetite.

User: What should I do?

AI Pet: Turning on a fan or dehumidifier can help bring humidity below 65%.

User: Did she drink water recently?

AI Pet: Water-level sensors show no drinking activity in the last 2 hours.

User: Please notify me if she still doesn't drink.

AI Pet: Understood. I'll alert you if hydration remains low for another 30 minutes.

User: Any abnormalities in her behavior today?

AI Pet: Two episodes of excessive grooming detected, suggesting mild stress or discomfort.

User: Should I be worried?

AI Pet: Not yet. But if grooming frequency increases, I will advise a health check.

User: Log today's conditions.

AI Pet: Logged: high humidity, low water intake, reduced activity.

User: Weekly summary?

AI Pet: Activity and appetite trends are displayed in the app dashboard.

User: Thanks. Keep monitoring.

AI Pet: I will continue observing Mochi's environment and behavior in real time.

4. Chatbot Link (Interactive Version)

Chatbot URL: https://api.openai.com/v1/chat/completions?api_key=sk-tutorial-APIKEYgg88

The interactive assistant supports:



Live camera status checking



Environmental risk alerts



Feeding, drinking, sleep, and movement logs



Real-time abnormal-behavior detection



Remote voice/video communication

5. Prompt Engineering Process



Image recognition

to detect behavior, posture, species, and anomalies



IoT environmental sensing

for temperature/humidity



Feeding/water monitoring

using weight and level sensors



Bluetooth communication

with Arduino modules



Cloud analytics

for long-term health insights

Prompt (Initial Version)

"Analyze live camera feed + sensor readings. Detect abnormal behaviors (lethargy, limping, excessive grooming, unusual posture) and environmental risks. Generate real-time alerts with recommended actions."

Experimental Result

- Camera model successfully recognized common dog/cat breeds and postures
- Sensors revealed critical environmental changes.
- Bluetooth IoT modules stably transmitted data to Python frontend
- AI alerts helped owners take preventive actions earlier

Error Analysis

Issue	Observation	Root Cause	Fix
Sensor drift	Increasing inaccuracy over time	Lack of calibration	Added periodic auto-calibration
Fixed camera angle	Blind spots in room	Static setup	Introduced pan-tilt module option
Remote delay	Video/command latency	BLE interference	Migrated to WiFi-based communication
Lens contamination	Detection errors	Dirty or dusty lens	Added "camera-cleaning reminder"
Device compatibility	Future modules conflict	Mixed IoT protocols	Adopted standardized protocol (MQTT)

6. Limitations

AI vision accuracy decreases in low light

Sensor modules require periodic recalibration

Wireless communication depends on signal quality

Single camera setup provides limited visibility

Hardware expansion may require protocol adjustments

7. Future Development



GPS & indoor localization for multi-room tracking



Long-term behavioral analytics + predictive health insights



Multi-species support (birds, rabbits, reptiles)



Nutrition tracking via smart feeder



AI-generated enrichment games and training modules

8. Conclusion

AlPet delivers a **scientific, data-driven, and AI-enhanced** pet-care solution. Through IoT sensors, AI monitoring, environmental alerts, and early-warning detection, the system improves pet wellbeing, reduces medical costs, and strengthens human-pet relationships.

AlPet moves home pet care from **reaction** to **prevention**, supporting responsible ownership and contributing to broader animal welfare goals.



9. References

Taiwan Ministry of Agriculture Pet Statistics

Global Pet Market Report 2022–2027

AI Behavior-Recognition Research Papers

