Loom: Modernizing Pet Care

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Introduction

Efficient pet care management has become a significant challenge for pet owners, breeders, veterinarians, and animal shelters due to fragmented handling of information such as medical records, appointments, and expenses. To address this issue, we have developed "Loom," a mobile application that centralizes all pet care tasks into a single, intuitive platform. This solution allows users to manage profiles for multiple pets, receive personalized notifications for important reminders, track related expenses, and even locate emergency veterinary services. With a user-friendly interface and robust functionalities, "Loom" aims to simplify and enhance the quality of pet care, providing peace of mind and efficiency to its users.

Problem

Managing pet care can be overwhelming due to the lack of a centralized solution for tracking medical records, vaccination schedules, and expenses. This fragmentation often leads to missed appointments, unexpected costs, and delays in accessing emergency services. Such inefficiencies make it challenging for pet owners and caregivers to provide consistent and effective care, especially when managing multiple pets.

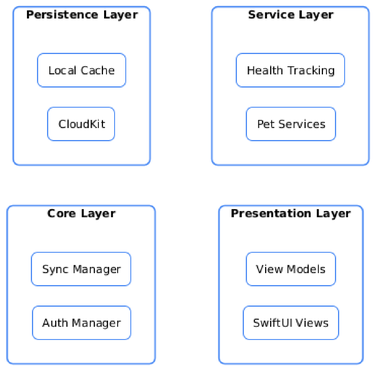
Solution

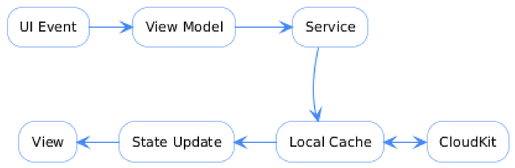
The "Loom" mobile application offers a centralized platform that consolidates all aspects of pet care management exclusively for iOS devices. Users can create detailed pet profiles, including medical histories and key information like vaccination dates. The app allows personalized reminders for vaccines and medications, ensuring pets receive timely medical attention. Additionally, "Loom" features a GPS-based emergency clinic locator for quick access to veterinary services. Its integration with the native iOS calendar and notification system ensures users never miss critical pet-related tasks, providing a seamless and optimized experience for iOS users.

Software Architecture Diagram

The system's core architecture comprises four distinct layers: presentation (MVVM pattern with SwiftUI), service (business logic and CloudKit operations), core (auth, sync, and network management), and persistence (CloudKit with local caching). This layered approach enables sophisticated features like time-based cache invalidation, optimistic updates, and conflict resolution while maintaining offline capabilities.

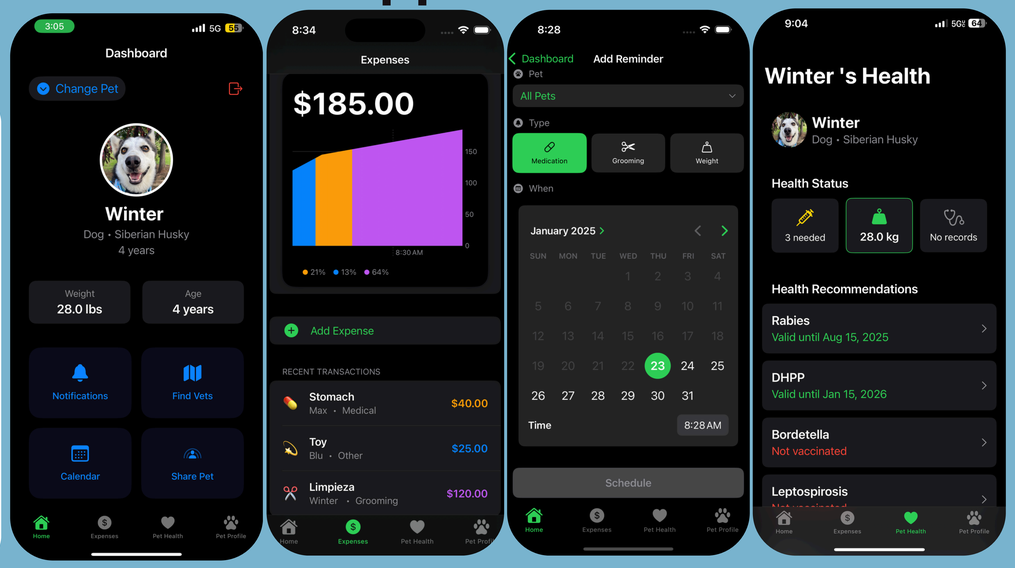
State management implements a unidirectional data flow pattern, where mutations occur through well-defined service methods handling both local and cloud updates. The integration architecture uses protocol-based design for loose coupling, implementing core services (notifications, calendar, health records) as singletons with clear protocols. This approach enables comprehensive testing through mock implementations while maintaining consistent access patterns.





The system implements unidirectional data flow through well-defined service methods, handling state mutations across local and cloud updates. Core services (notifications, calendar, health records) follow a protocol-based design with singleton patterns, enabling comprehensive testing through mock implementations. Security leverages CloudKit's identity system with record-level permissions, while a dedicated sync manager handles conflict resolution for concurrent modifications, ensuring data consistency across the distributed system.

App Preview



Conclusion

"Loom" offers an innovative and streamlined approach to pet care management, effectively resolving the challenges encountered by pet owners, breeders, and professionals. By integrating essential features like medical record organization, timely reminders for appointments, budget tracking, and a GPS-based emergency clinic finder, the app guarantees pets receive the care they need without delays. Its intuitive interface and comprehensive functionality empower users to manage their pets effortlessly, improving care standards while reducing stress. With "Loom", users can confidently stay on top of their pet-related responsibilities, ensuring healthier and happier lives for their animals.

Future Work

“Loom” plans to offer pet owners innovative features to improve pet care and support community efforts. One proposed feature is a spending tracker that uses a progress bar to display veterinary expenses, helping customers monitor how close they are to reaching the $1,500 cap for claiming a tax credit. Additionally, “Loom” plans to launch a storefront with locally made pet products, supporting small businesses while providing customers with high-quality items for their pets. In addition, we want to implement a subscription program where the money collected goes to nonprofit animal organizations.

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References