FurGuardian

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INTRODUCTION

We have developed a smart pet care system designed to assist pet owners who are away during the day. Our Internet of Things (IoT) capstone project integrates a distributed computing model with a mobile application, a cloud-connected database, and an intelligent embedded system featuring custom hardware and an enclosure (3D printed/laser cut).

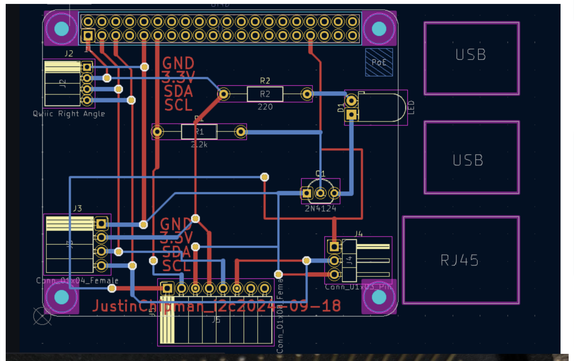
With our project, we have created and implemented a smart pet food dispenser. The key features of our project are a remote webcam feed triggered by an IR sensor, a remotely scheduled food dispenser, and a remotely controlled treat dispenser. With these features we aim to provide pet owners the opportunity to interact and care for their pets while they are away from home.

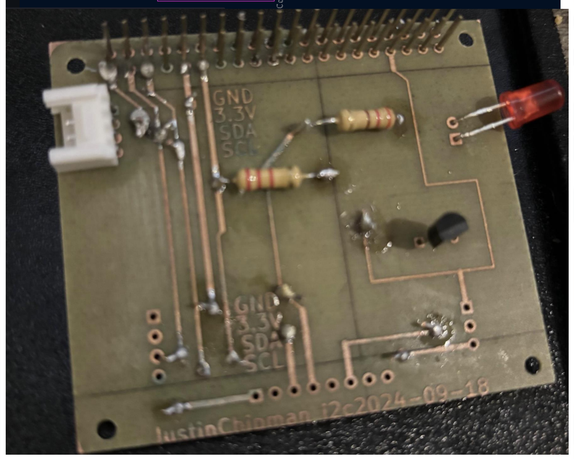
ENCLOSURE DESIGN

We have designed a custom 3D-printed enclosure to securely house the components of our smart pet food dispenser. Engineered for durability and efficiency, the enclosure features a compact structure (102.175 x 201.175 x 140mm) with optimized internal compartments for sensors, motors, and electronics.

The design includes ventilation for heat dissipation, secure mounting points for stability, and a modular layout for easy maintenance. Its sleek and functional form ensures seamless integration into any home environment, enhancing both usability and aesthetic appeal.

CIRCUIT BOARD METHOD

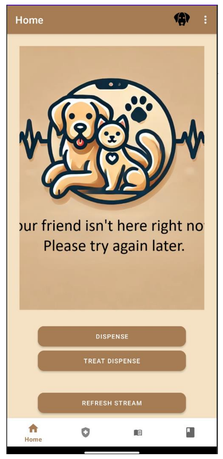




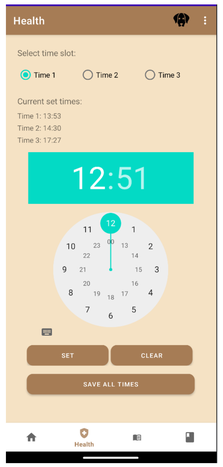
Our custom PCB design allows us to utilize the QWIIC connections with our raspberry pi 4. With this we were able to daisy chain our components together for seamless and reliable connection.

MOBILE APP RESULTS

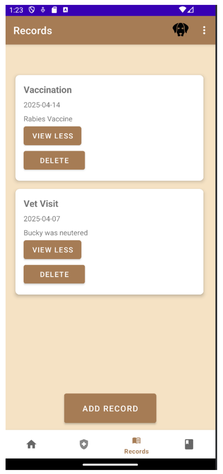
On the home screen of our app features the camera feed to the dispenser accompanied by a manual treat and food dispense button. There is a manual feed refresh button in case of feed disruptions.



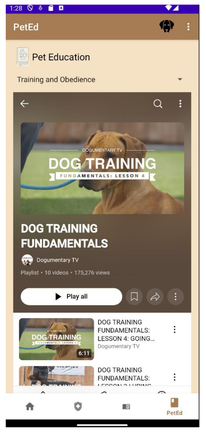
Our health screen features time picker that allows you to input scheduled feeding times up to 3 times a day.



Our records screen allows users to store their pets records. This could include vet visits, vaccination records, weight, and any other information the user deems important.



The pet education screen Features a wide variety Of categories for users to Scroll in search of the Information they need.



DATABASE

- Pet Profile Management: Store detailed pet information, including name, breed, age, medical history, and vaccination records.
- User Authentication: Secure login system using Firebase Authentication, supporting email/password and social logins.
- Real-time Updates: Instantly sync pet data across multiple devices using Firebase Firestore.
- Seamless Server Connectivity for Secure Pet Data Storage.
- User-Driven Updates: Data refreshes instantly when users modify pet profiles.
- Firebase Firestore Sync: Ensures changes are reflected across all connected devices.

TESTING

- We utilized sunflower seeds as a stand-in for pet food to simulate real-world feeding scenarios.
- Experimented with various dispensing mechanisms to identify the most efficient and pet-friendly method.
- Designed and 3D-printed an inner tube and spiral mechanism to evaluate different food dispensing techniques.

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