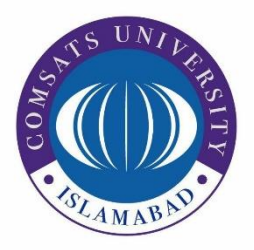

COMSATS University Islamabad (CUI)

Project Proposal

for

FelineConnect

Version 1.0

By

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Supervisor

Mr. Zahid Anwar

Bachelor of Science in Computer Science (2021-2024)

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Project Category:

☐ **A-**Web Application/Web Application based Information System
☐ **B-**Problem Solving and Artificial Intelligence
☐ **C-**Image Processing

Abstract

The proposed cat breed recognition system with an integrated online store aims to address the challenges faced by cat owners in accurately identifying their pets' breeds and sourcing relevant products. Currently, cat owners rely on manual recognition or external sources, leading to misidentification and fragmented user experiences.
The proposed system leverages deep learning models like ResNet-50 to ensure precise breed identification from uploaded images and offers a centralized platform for seamless cat food purchases. Objectives include providing accurate breed identification, creating a user-friendly interface, implementing an integrated online store, establishing a feedback loop for continuous improvement, optimizing transactions, and ensuring accessibility.
This project's significance lies in offering convenience, reliability, and enhanced user satisfaction for cat owners, bridging the gap in the current fragmented user experience and providing a comprehensive solution for managing cat-related information and purchases.

1. Introduction

The purpose of this project proposal document is to outline a comprehensive solution for cat owners facing challenges in identifying their pets' breeds and sourcing relevant products. In today's environment, cat owners often struggle with manual recognition methods or rely on external sources, leading to misidentification and fragmented user experiences.
The proposed cat breed recognition system with an integrated online store seeks to bridge this gap by leveraging deep learning models like ResNet-50 to ensure precise breed identification from uploaded images.
Additionally, the system offers a centralized platform for seamless cat food purchases, addressing the need for a comprehensive solution that caters to both breed identification and product sourcing. This project aims to provide accurate breed identification, create a user-friendly interface, implement an integrated online store, establish a feedback loop for continuous improvement, optimize transactions, and ensure accessibility across different devices. By addressing these key objectives, this project aims to enhance user satisfaction, convenience, and reliability for cat owners, ultimately offering a comprehensive and effective solution for managing cat-related information and purchases.

2. Problem Statement

Currently, cat owners face challenges in accurately identifying the breed of their domestic cats, relying on manual recognition or external sources. This lack of a streamlined solution often leads to misidentification or uncertainty about the specific breed.

Additionally, there's a need for a centralized platform that integrates cat breed recognition with an online store for cat food products. Users lack a comprehensive system where they can seamlessly upload images of their cats, receive accurate breed identification through a deep learning model, and then explore an online store for purchasing cat food items.

The absence of such a system results in a fragmented user experience, where cat owners may struggle to find reliable information about their pets' breeds and encounter challenges in sourcing relevant products.

3. Problem Solution/Objectives of the Proposed System

The proposed cat breed recognition system with an integrated online store addresses the challenges faced by cat owners in accurately identifying their pets' breeds and sourcing relevant products. Leveraging deep learning models like ResNet-50, the system ensures precise breed identification from uploaded images, eliminating uncertainties.

Users can easily upload cat images, receive instant breed identification results, and conveniently purchase cat food items tailored to their pets' needs. The platform's user-friendly interface, coupled with features like user authentication, profile management, and feedback collection, enhances user engagement and satisfaction.

By providing a centralized solution, the platform streamlines the user experience, offering convenience and reliability in managing cat-related information and purchases. Continuous updates and improvements further enhance the platform's value, ensuring a comprehensive and effective solution for cat owners.

3.1 Objectives

BO-1: Provide accurate and instant cat breed identification using deep learning and computer vision techniques.

BO-2: Create a user-friendly interface that allows users to easily upload cat images, receive prompt breed identification, and navigate through the online store.

BO-3: Implement an integrated online store allowing users to purchase cat food products.

BO-4: Establish a feedback loop for users to provide insights into breed recognition accuracy, enabling continuous model improvement.

BO-5: Optimize the online store for efficient transactions, including secure payment processing and order confirmation.

BO-6: Ensure the system is accessible to a diverse user base, considering different devices and user needs.

4. Related System Analysis/Literature Review

Table 1: Related System Analysis with FelineConnect

Application Name	Weakness	Proposed Project Solution
Cat breed identifier App	Does not provide accurate result as it covers less cat breeds.	FelineConnect utilizes advanced deep learning and computer vision techniques to accurately identify cat breeds.
Cat Breeds App	User will pay for Cat breed Recognition feature.	FelineConnect will be free for each user to identify their cat breed accurately.
Cat Scanner App	Complex user interface	FelineConnect will adopt a minimalist design philosophy, reducing clutter and unnecessary elements to create a clean and uncluttered interface

5. Vision Statement

For cat owners who struggle with accurately identifying their pets' breeds and sourcing relevant products, the FelineConnect platform is an integrated cat breed recognition system and online store. It offers precise breed identification using deep learning models like ResNet-50, seamless cat food purchases, user-friendly interface, feedback loop for continuous improvement, and secure transactions.

Unlike existing fragmented solutions, FelineConnect provides a centralized platform that enhances user satisfaction, convenience, and reliability, bridging the gap in managing cat-related information and purchases for diverse stakeholders.

6. Scope

The scope of the project encompasses the development of a comprehensive cat breed recognition system with an integrated online store, known as FelineConnect. The main functionalities of this project include accurate breed identification using deep learning and computer vision techniques, allowing users to upload cat images for instant identification results. The system will feature a user-

friendly interface enabling easy navigation through the online store, where users can purchase cat food products securely. Additionally, the platform will implement a feedback loop for users to provide insights into breed recognition accuracy, facilitating continuous model improvement. The scope also includes optimizing the online store for efficient transactions, including secure payment processing and order confirmation, ensuring accessibility across different devices for a diverse user base.
Overall, FelineConnect aims to provide a centralized solution for cat owners to manage cat-related information and purchases conveniently, enhancing user satisfaction and reliability in breed identification and product sourcing.

7. Modules

7.1 Module 1: User Authentication and Profile Management

FE-1: Users can create an account by providing personalized information.

FE-2: Access the account by providing information such as email and password.

FE-3: Users can add their names, profile photo, and bio information.

FE-4: Permanently delete user accounts.

FE-5: Change existing passwords.

FE-6: Forgot password option to recover account access via email.

7.2 Module 2: Image Submission

FE-1: Users can upload images of their cats for breed recognition.

FE-2: Implement image preprocessing to standardize pixel values and sizes.

FE-3: Validate and normalize input images to enhance model accuracy.

FE-4: Split dataset into training and testing sets for model training.

7.3 Module 3: ResNet-50 Integration

FE-1: Integrate ResNet-50 architecture for accurate cat breed recognition.

FE-2: Transfer learning on a pre-trained ResNet-50 model.

FE-3: Fine-tune the model on a dataset of domestic cat breeds.

7.4 Module 4: Breed Detection Result

FE-1: Display detected cat breed along with confidence score.

FE-2: Provide visual representation of key features contributing to breed identification.

FE-3: Allow users to provide feedback on the accuracy of breed recognition.

7.5 Module 5: Online Store – Cat Food

FE-1: Users can buy cat food items from the online store.

FE-2: Add food items to the shopping cart.

FE-3: Remove food items from the cart.

FE-4: Provide a review and rating system for purchased food items.

7.6 Module 6: Payment Processing

FE-1: Facilitate cart checkout.

FE-2: Integrate a secure payment gateway.

FE-3: Confirm orders and provide order details.

7.7 Module 7: User Interaction and Queries

FE-1: Allow users to submit queries or questions.

FE-2: Implement a chatbot for quick responses.

FE-3: Users can ask questions, provide commands, or engage in conversations with the chatbot.

FE-4: The chatbot would be able to generate relevant responses based on the user's input.

FE-5: The chatbot would be trained on custom data to provide user with their desired information.

7.8 Module 8: Admin Management

FE-1: View and manage user feedback on model predictions.

FE-2: View and manage cat food inventory in the store.

FE-3: Manage user accounts, including authentication and authorization.

FE-4: Admin can add another admin.

8. System Limitations/Constraints

LI-1: The accuracy of breed identification may be affected by the quality and clarity of uploaded cat images, leading to potential misidentifications for low-quality images.

LI-2: The system may not be able to identify all cat breeds, especially rare or mixed breeds.

LI-3: While the system provides comprehensive cat care information and expert advice, it is not a substitute for professional veterinary consultation.

LI-4: The effectiveness of the user feedback loop is dependent on user participation.

LI-5: The system's performance and response time may vary based on user traffic and server load, potentially causing delays or temporary unavailability during peak usage periods.

C-1: The development and continuous improvement of the system requires a large and diverse dataset of cat images.

C-2: The deep learning and computer vision algorithms used for breed identification require significant computational resources

C-3: Technical constraints related to hardware and software compatibility, especially for image processing and deep learning algorithms, may limit the system's scalability and performance on certain devices or platforms.

9. Data Gathering Approach

Conduct extensive user research: Interviews with cat owners and pet enthusiasts can provide valuable insights into their challenges, preferences, and expectations regarding breed identification and product sourcing.

Engage in focus groups with cat owners and pet enthusiasts to explore their expectations for a comprehensive cat breed recognition and product sourcing.

Gather expert insights: Consult with veterinarians and cat breeders to gain insights into breed-specific characteristics.

Analyze existing data sources: Review publicly available datasets of cat images and breed information to enhance the training data for breed identification models.

10. Tools and Technologies

Table 2: Tools and Technologies for FelineConnect

Tools And Technologies	**Tools**	**Version**	**Rationale**
	Visual Studio Code	Latest	IDE
	MS Word	365	Documentation
	MS PowerPoint	365	Presentation
	Figma	Latest	Design & mockups
	Canva	Latest	Design & mockups
	Project Professional	2019	Design Work
	Git/GitHub	Latest	Version Control
	Technology	**Version**	**Rationale**
	Python	Latest	Backend development
	HTML/CSS/JavaScript	HTML5/CSS3/ ES6	Front-end Development
	React JS	Latest	Front-end Development
	MongoDB	7.0	DBMS
	Node JS	Latest	Backend Framework
	Express	Latest	Server-Side
	TensorFlow	Latest	Deep Learning Library
	Pytorch	Latest	Deep learning Framework
	Keras	Latest	Neural Network Library

11. Project Stakeholders and Roles

Table 3: Project Stakeholders for FelineConnect

Project Sponsor	COMSATS University Islamabad, Islamabad Campus
Stakeholder	• **Student 1:** Saifullah • **Student 2:** Talha Ziaullah • **Project Supervisor Name:** Mr. Zahid Anwar • **Final Year Project Committee:** Evaluation of project

12. Module based Work Division

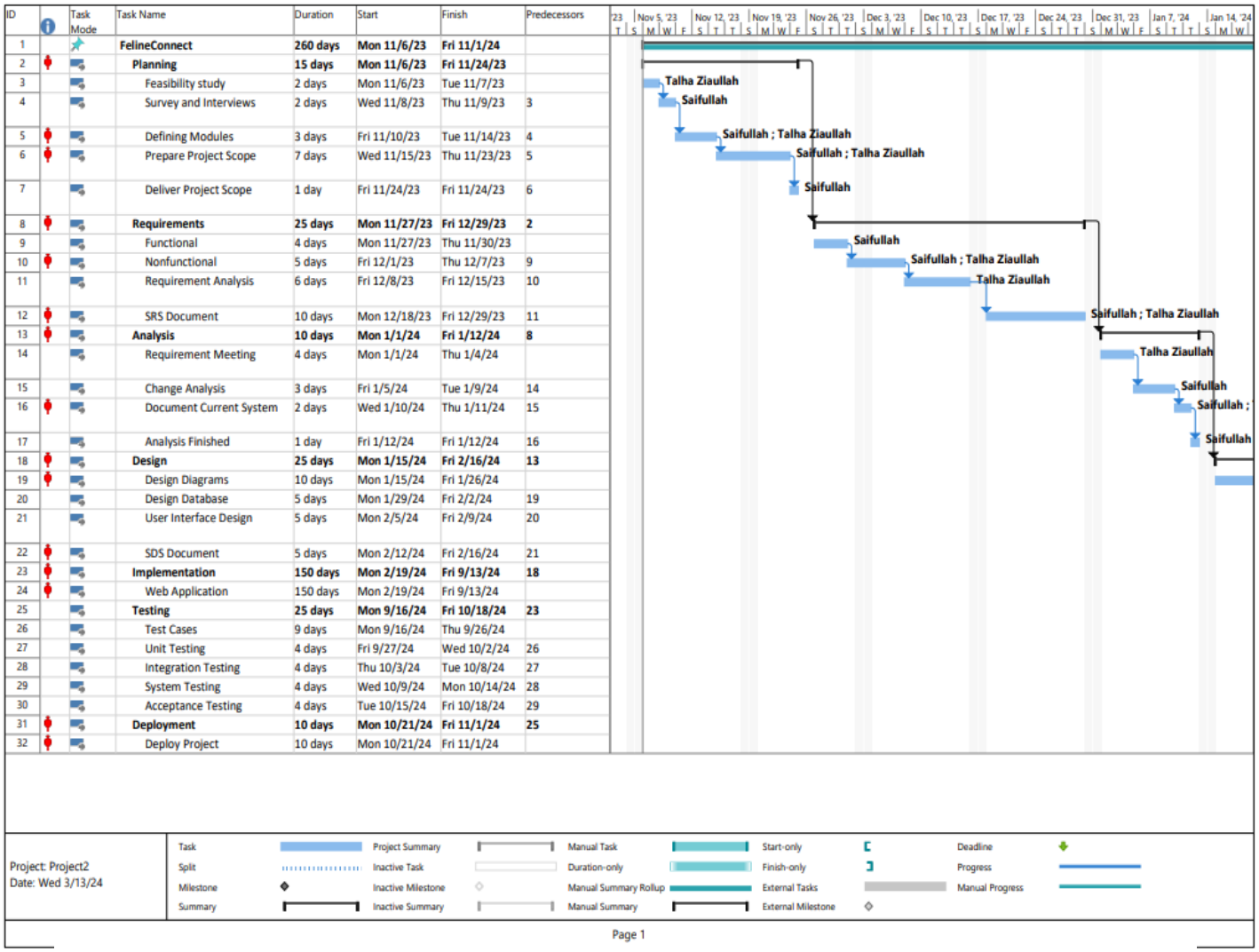
Table 4: Team Member Work Division for FelineConnect

Student Name	Student Registration Number	Responsibility/ Module / Feature
Saifullah	CIIT/SP21-BSE-104/ISB	**Mr. Saifullah (Module 1,3,4,5)** 1. User Authentication and Profile Management 2. ResNet-50 Integration 3. Breed Detection Result 4. Online Store - Food Store
Talha Ziaullah	CIIT/SP20-BSE-094/ISB	**Mr. Talha Ziaullah (Modules 2,6,7,8)** 1. Image Submission 2. Payment Processing 3. User Interaction and Queries 4. Admin Management

13. WBS and Gantt Chart

Table 5: WBS FelineConnect

ID		Task	Duration	Resources
1	**Planning**		**15 days**	**Saifullah; Talha Ziaullah**
2		Feasibility study	2 days	**Talha Ziaullah**
3		Survey and Interviews	2 days	Saifullah
4		Defining Modules	3 days	Saifullah; Talha Ziaullah
5		Prepare Project Scope	7 days	Saifullah; Talha Ziaullah
6		Deliver Project Scope	1 day	Saifullah
7	**Requirements**		**25 days**	**Saifullah; Talha Ziaullah**
8		Functional	4 days	Saifullah
9		Nonfunctional	5 days	Saifullah; Talha Ziaullah
10		Requirement Analysis	6 days	Talha Ziaullah
11		SRS Document	10 days	Saifullah; Talha Ziaullah
12	**Analysis**		**10 days**	**Saifullah; Talha Ziaullah**
13		Requirement Meeting	4 days	Talha Ziaullah
14		Change Analysis	3 days	Saifullah
15		Document Current System	2 days	Saifullah; Talha Ziaullah
16		Analysis Finished	1 day	Saifullah
17	**Design**		**25 days**	**Saifullah; Talha Ziaullah**
18		Design Diagrams	10 days	Saifullah; Talha Ziaullah
19		Design Database	5 days	Saifullah
20		User Interface Design	5 days	Talha Ziaullah
21		SDS Document	5 days	Saifullah; Talha Ziaullah
22	**Implementation**		**150 Days**	**Saifullah; Talha Ziaullah**
23		Web Application	150 days	Saifullah; Talha Ziaullah
24				
25	**Testing**		**25days**	**Saifullah; Talha Ziaullah**
26		Test Cases	9 days	Saifullah
27		Unit Testing	4 days	Saifullah
28		Integration Testing	4 days	Saifullah
29		System Testing	4 days	Talha Ziaullah
30		Acceptance Testing	4 days	Talha Ziaullah
31	**Deployment**		**10 days**	**Saifullah; Talha Ziaullah**
32		Deploy Project	10 days	Saifullah; Talha Ziaullah



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**FelineConnect**	**260 days**	**Mon 11/6/23**	**Fri 11/1/24**	
2		**Planning**	**15 days**	**Mon 11/6/23**	**Fri 11/24/23**	
3		Feasibility study	2 days	Mon 11/6/23	Tue 11/7/23	
4		Survey and Interviews	2 days	Wed 11/8/23	Thu 11/9/23	3
5		Defining Modules	3 days	Fri 11/10/23	Tue 11/14/23	4
6		Prepare Project Scope	7 days	Wed 11/15/23	Thu 11/23/23	5
7		Deliver Project Scope	1 day	Fri 11/24/23	Fri 11/24/23	6
8		**Requirements**	**25 days**	**Mon 11/27/23**	**Fri 12/29/23**	**2**
9		Functional	4 days	Mon 11/27/23	Thu 11/30/23	
10		Nonfunctional	5 days	Fri 12/1/23	Thu 12/7/23	9
11		Requirement Analysis	6 days	Fri 12/8/23	Fri 12/15/23	10
12		SRS Document	10 days	Mon 12/18/23	Fri 12/29/23	11
13		**Analysis**	**10 days**	**Mon 1/1/24**	**Fri 1/12/24**	**8**
14		Requirement Meeting	4 days	Mon 1/1/24	Thu 1/4/24	
15		Change Analysis	3 days	Fri 1/5/24	Tue 1/9/24	14
16		Document Current System	2 days	Wed 1/10/24	Thu 1/11/24	15
17		Analysis Finished	1 day	Fri 1/12/24	Fri 1/12/24	16
18		**Design**	**25 days**	**Mon 1/15/24**	**Fri 2/16/24**	**13**
19		Design Diagrams	10 days	Mon 1/15/24	Fri 1/26/24	
20		Design Database	5 days	Mon 1/29/24	Fri 2/2/24	19
21		User Interface Design	5 days	Mon 2/5/24	Fri 2/9/24	20
22		SDS Document	5 days	Mon 2/12/24	Fri 2/16/24	21
23		**Implementation**	**150 days**	**Mon 2/19/24**	**Fri 9/13/24**	**18**
24		Web Application	150 days	Mon 2/19/24	Fri 9/13/24	
25		**Testing**	**25 days**	**Mon 9/16/24**	**Fri 10/18/24**	**23**
26		Test Cases	9 days	Mon 9/16/24	Thu 9/26/24	
27		Unit Testing	4 days	Fri 9/27/24	Wed 10/2/24	26
28		Integration Testing	4 days	Thu 10/3/24	Tue 10/8/24	27
29		System Testing	4 days	Wed 10/9/24	Mon 10/14/24	28
30		Acceptance Testing	4 days	Tue 10/15/24	Fri 10/18/24	29
31		**Deployment**	**10 days**	**Mon 10/21/24**	**Fri 11/1/24**	**25**
32		Deploy Project	10 days	Mon 10/21/24	Fri 11/1/24	

Figure 1: FelineConnect Gantt Chart

Figure 1.1: FelineConnect Gantt Chart (Continue)

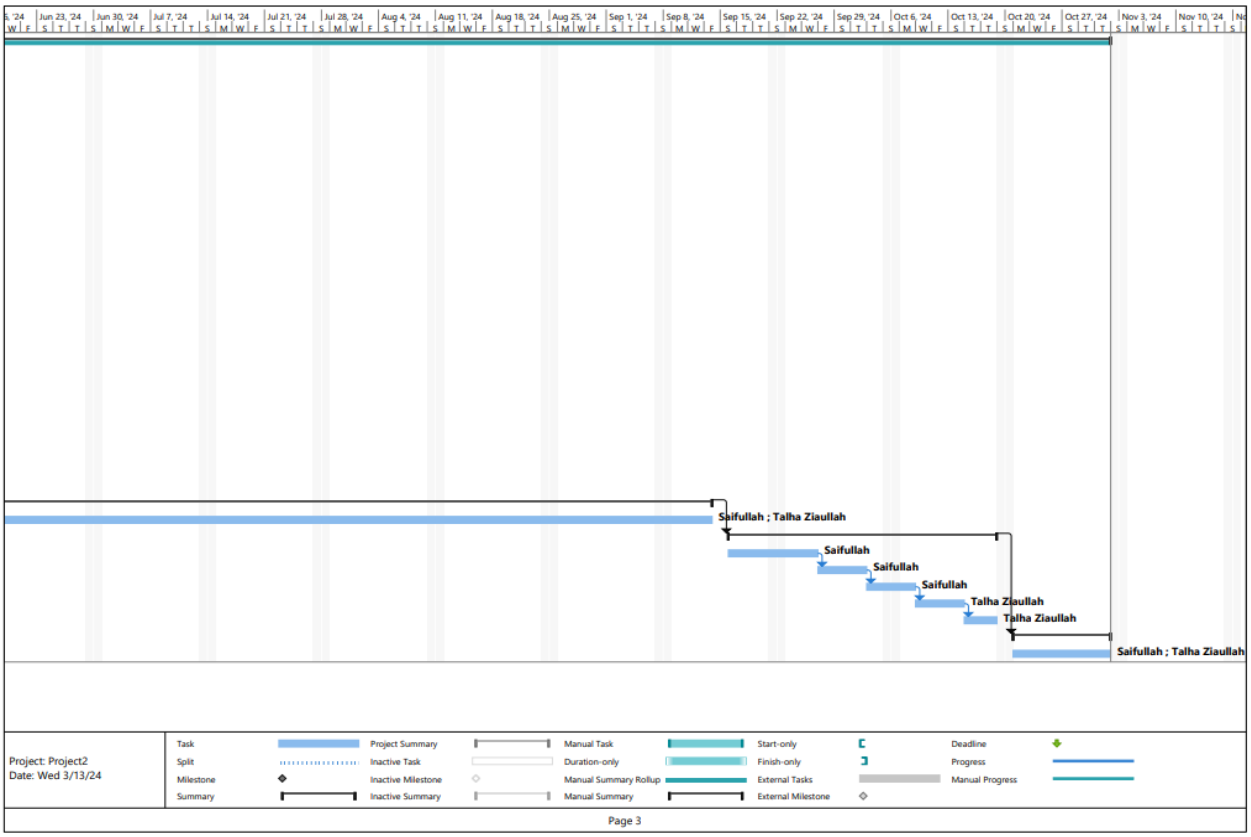


Figure 1.2: FelineConnect Gantt Chart (Continue)

14. Mockups

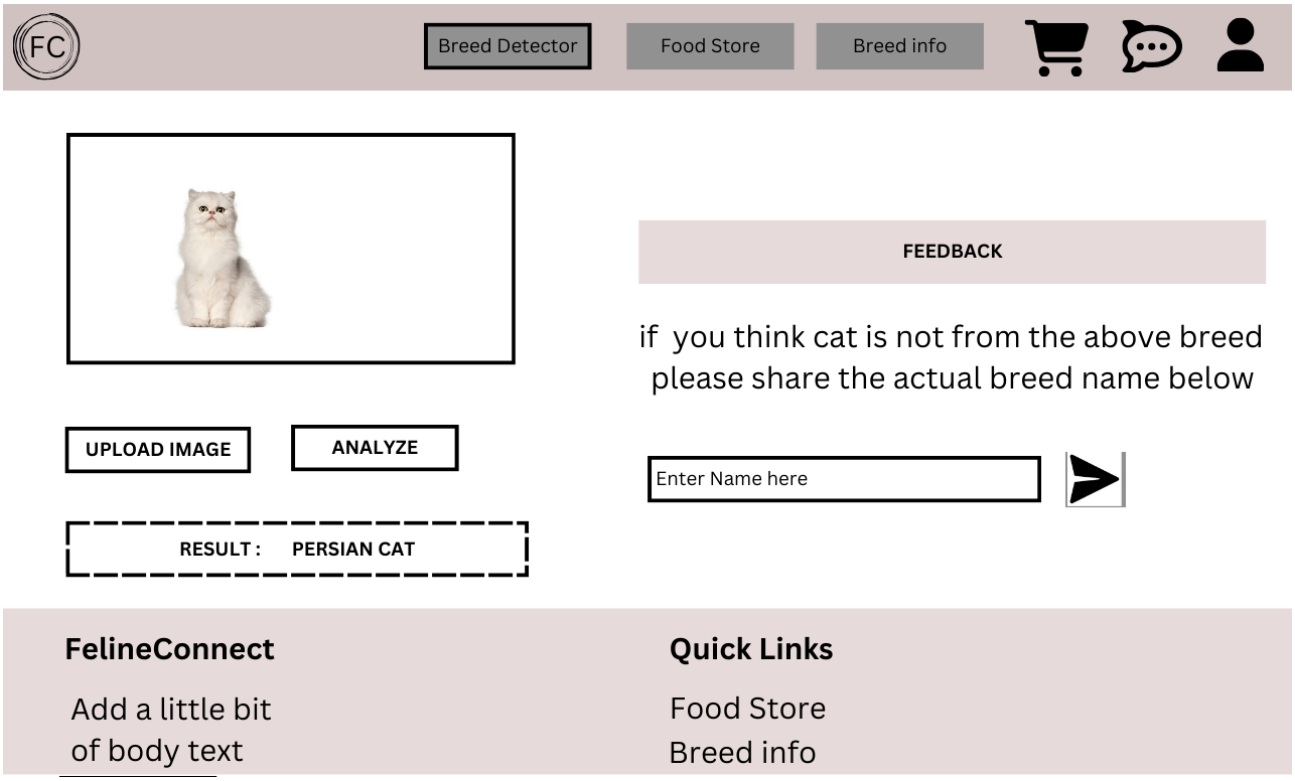


Figure 2: FelineConnect Breed Recognition Mockup

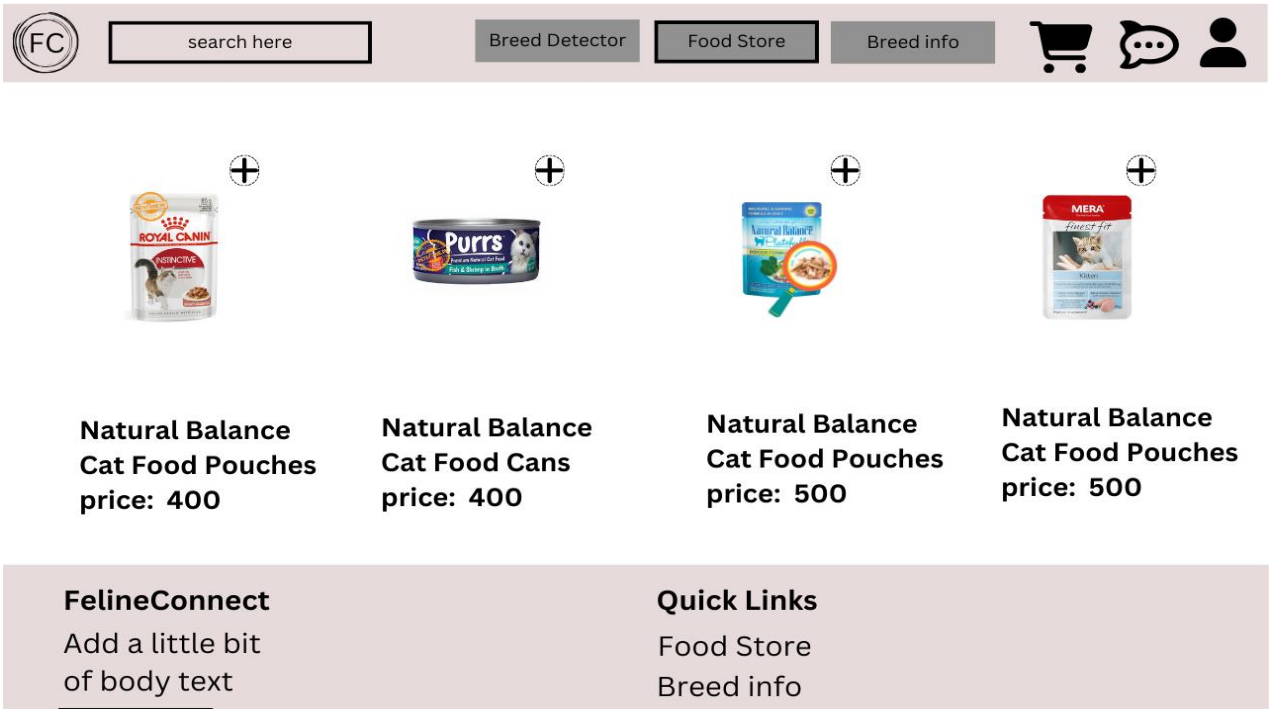


Figure 2.1: FelineConnect Food Store Mockup

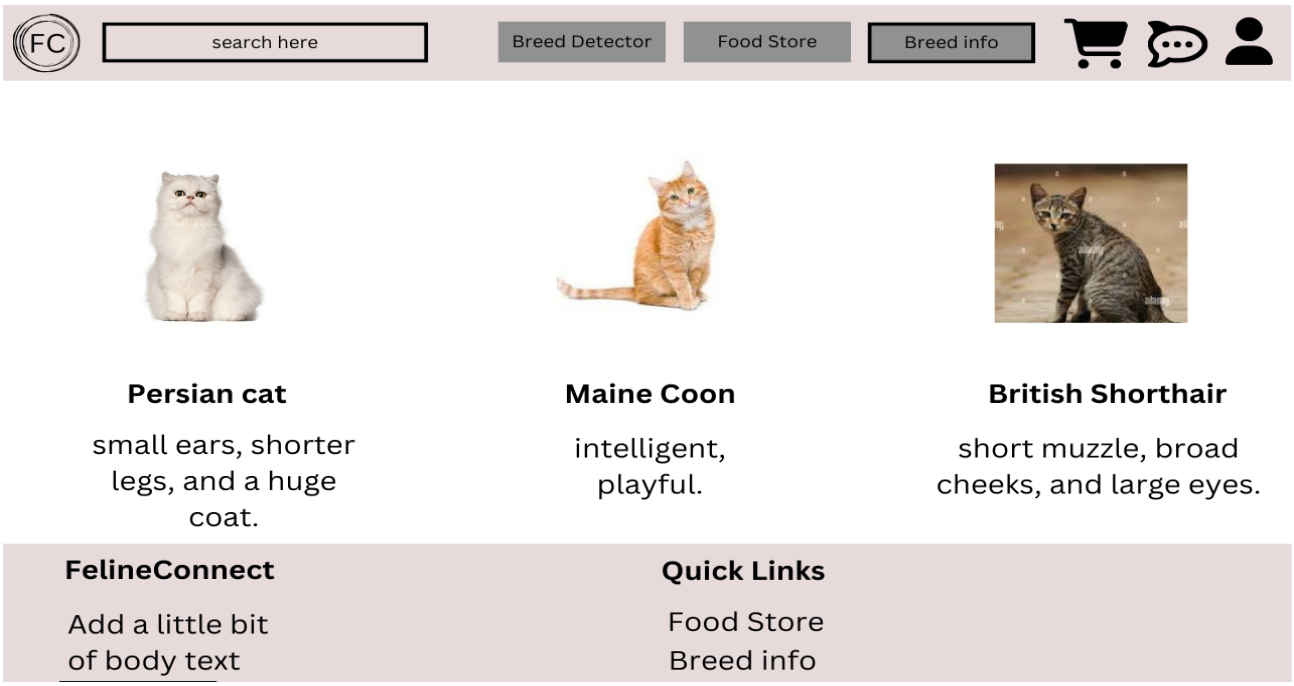


Figure 2.2: FelineConnect Breed Info Mockup

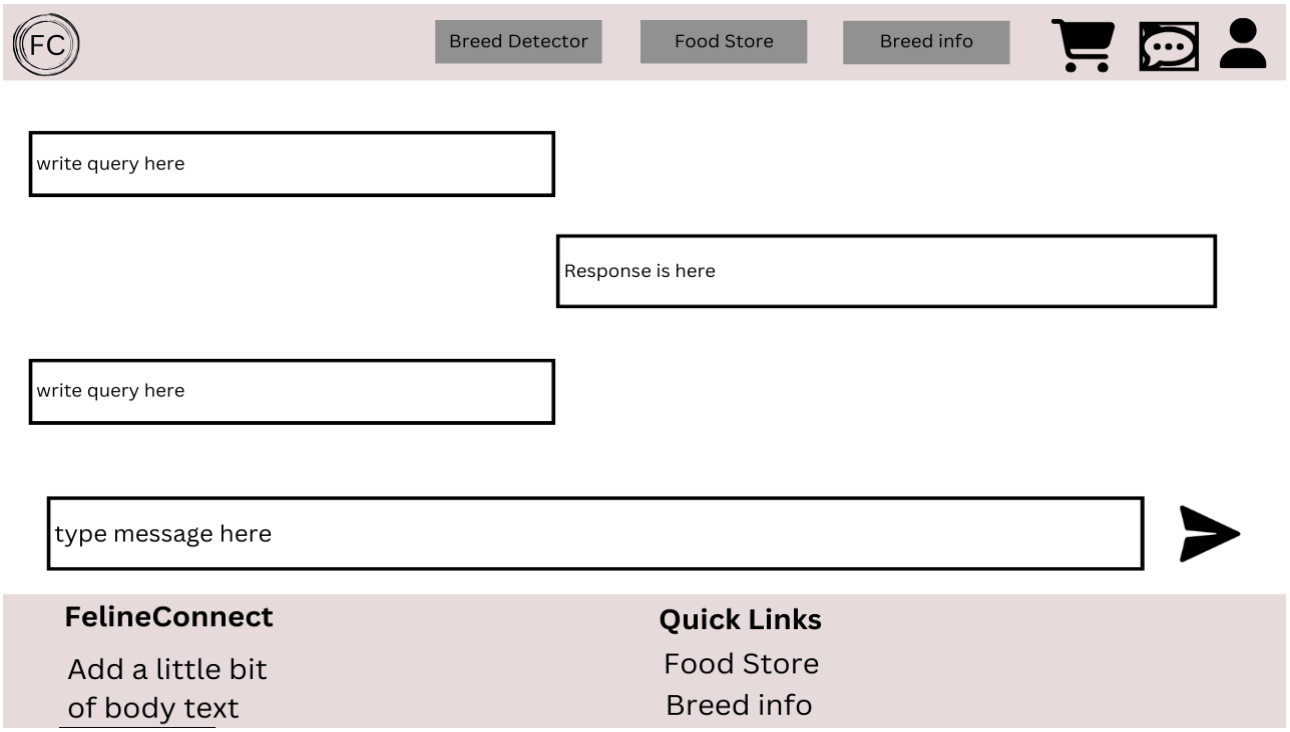


Figure 2.3: FelineConnect Chatbot Mockup

15. References

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- https://www.kaggle.com/datasets/imsparsh/animal-breed-cats-and-dogs

16. Plagiarism Report