National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computer Science

CS344: Web Engineering

PROJECT REPORT

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Introduction:

In recent years, the adoption of animals from shelters has emerged as a compassionate alternative to buying pets. However, the adoption process can often be time-consuming, disorganized, or inaccessible due to outdated systems. The Pet Adoption System Website aims to modernize and simplify this process through a user-friendly, web-based platform built using the MERN stack (MongoDB, Express.js, React.js, and Node.js).

This project leverages the full power of JavaScript in both front-end and back-end development, allowing for a seamless, efficient, and responsive web application. The platform enables users to browse available pets (either through the shelter module or through the pet module) and view their individual profiles, apply for adoptions, and manage user sessions. Meanwhile, administrators can maintain the pet database and process applications efficiently.

By streamlining the pet adoption workflow, this project aspires to promote animal welfare and create a better connection between shelters and potential adopters through modern web technologies.

Motivation:

The inspiration behind creating this Pet Adoption System Website stems from the observable gap between animal shelters and individuals seeking to adopt pets. Many shelters still rely on traditional or semi-digital processes that are not only inefficient but also lack transparency and accessibility. This often discourages potential adopters and delays the rehoming of animals.

As web development students, we wanted to address a real-world issue using the skills and tools we've learned throughout the course. The MERN stack was chosen for its flexibility, scalability, and popularity in industry-grade applications. It allowed us to build a fully functional, responsive, and interactive single-page application that mirrors the performance and architecture of modern web services.

The system is designed to not only make adoption easier for users but also to aid shelters in managing their operations digitally by reducing paperwork, improving communication, and accelerating the adoption process.

Link to the Github Repository:

https://github.com/i-agus/FLUFFI/tree/master/backend

Description of the Website:

The Pet Adoption Website is designed as a comprehensive platform for connecting animal shelters with potential adopters. It serves multiple purposes: allowing users to browse adoptable pets, learn more about shelters, submit applications, manage their profiles, and even donate to the cause.

Content is well-organized across different web pages, including static informational pages (About, FAQ, Contact), dynamic pet and shelter listings, user dashboards, and admin-only controls. The structure enhances usability and encourages users to engage in adoption or support activities.

Each pet has a dedicated profile, which includes name, age, breed, gender, shelter details, and a photo gallery. Visitors can filter pets by attributes like type, breed, and location, improving discoverability.

The admin system allows backend control over pet and shelter data, including CRUD operations and application management
The Pet Adoption Website serves as a platform where users can explore and adopt pets, learn about shelters, and contribute via donations. It organizes content across multiple pages, including user and admin functionalities. The site supports user registration, pet filtering, adoption applications, shelter management, and donations.

Pages are structured as follows:
1. **Home:** Landing page with featured pets and blog posts.

2. **About/FAQ/Contact**: Informational pages.
3. **PetsList & PetDetail**: Browsing and detailed view of adoptable pets.
4. **ShelterList & ShelterDetail:** Shelter information and associated pets.
5. **Login/Register:** User authentication.
6. **User Dashboard/Profile/Applications:** Personalized user sections.
7. **Admin Dashboard & Management Pages:** Admin-specific control panels.

Description of the Website Layout:

The website is built using Bootstrap and React.js with a responsive layout intended for desktop use. It operates as a single-page application, with dynamic routing to render pages without full reloads.

A uniform user interface is maintained through reusable components such as the Navbar and Footer. The navigation bar adapts based on user roles, displaying appropriate options for guests, authenticated users, and admins.

While the design includes responsive elements, the current implementation is optimized for laptop and desktop displays. Features like pet cards, shelter lists, and forms are structured primarily for larger screens and may not display optimally on mobile devices.

Interactive components such as cards, modals, dropdowns, and loading indicators—enhance usability and engagement on desktop. Basic accessibility principles are followed to ensure general usability. The application uses protected and role-based routes for secure access, with visual feedback through loaders and notifications to improve the desktop browsing experience.

Screenshots from the project:
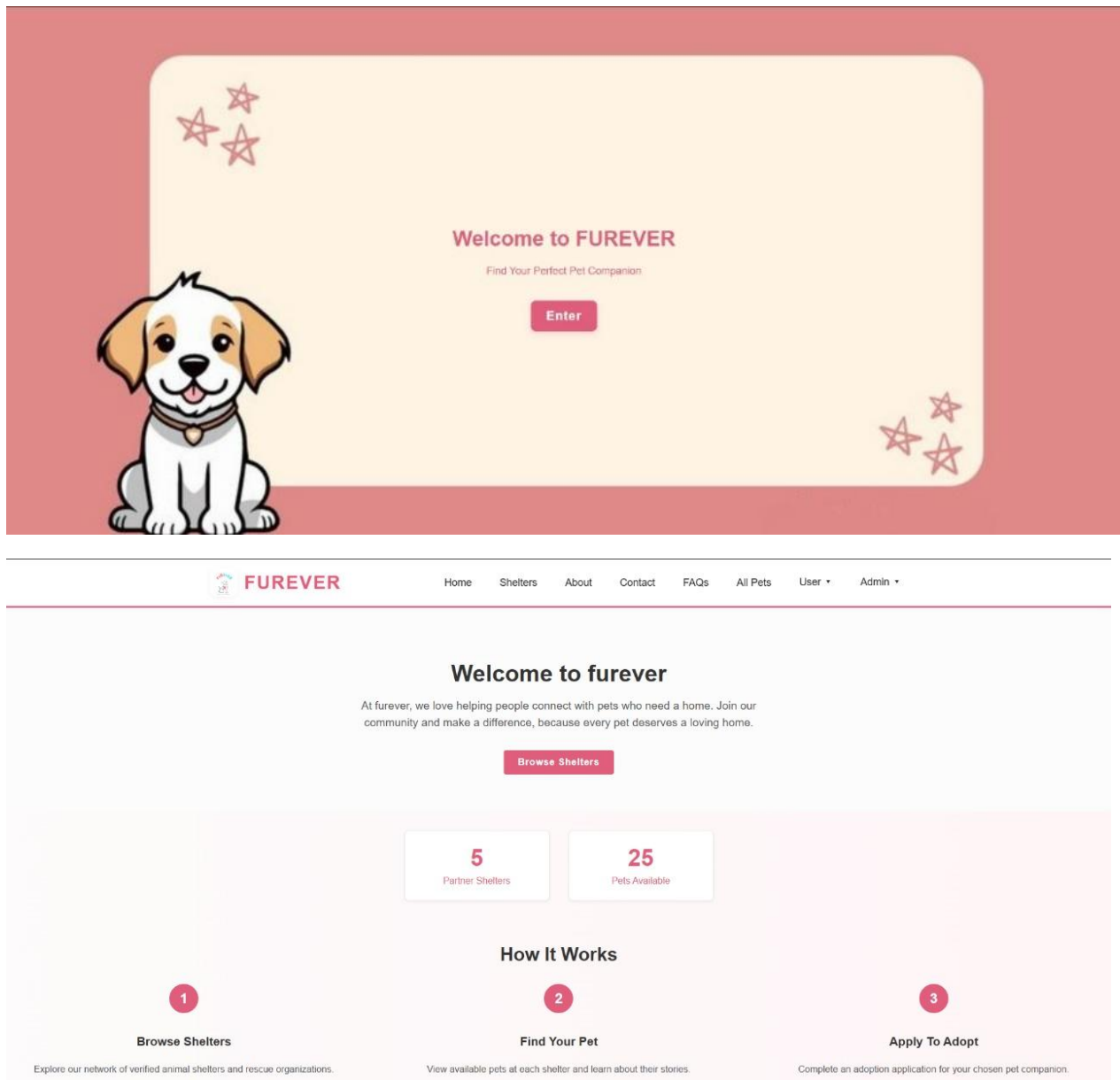
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FUREVER

Home Shelters About Contact FAQs All Pets User ▾ Admin ▾

Recently Added Pets

Max

Labrador · 3 years old

View Details

Luna

Persian Cat · 2 years old

View Details

Bugs

White Bunny · 2 years old

View Details

About

Contact

FAQs

All Pets

Shelters

localhost:3000

FUREVER

Home Shelters About Contact FAQs All Pets User ▾ Admin ▾

Available Pet Shelters

Search shelters..   Home

Found 6 shelters

Happy Paws Shelter

123 Bark Lane, Paw City

A loving home for pets waiting for adoption.

View Details

Whiskers Haven

456 Meow Street, Catville

Specializing in cat and kitten rescue and adoption.

View Details

Forever Friends Animal Sanctuary

789 Rescue Road, Petropolis

Dedicated to finding forever homes for all types of animals.

View Details

Little Paws Rescue

101 Small Avenue, Tiny Town

Focused on small breed dogs and puppies finding their forever homes.

View Details

Exotic Haven

202 Unique Boulevard, Exotica

Specializing in exotic pets and unusual animal companions.

View Details

localhost:3000/shelters

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   User ▾   Admin ▾

← Back to All Shelters

Whiskers Haven

Address: 456 Meow Street, Catville
Phone: 555-123-4567
Email: info@whiskershaven.org

About this Shelter

Specializing in cat and kitten rescue and adoption.

Pets at this Shelter

Oliver
Breed: Siamese
Age: 3 years
Gender: Male
Status: Available

Vocal and affectionate feline.

Adopt Now

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   User ▾   Admin ▾

FUREVER
ADOPT A FURRY FRIEND

About Furever

Furever is a heartfelt platform dedicated to connecting loving humans with pets in need of a forever home. Our mission is to ensure every pet finds a warm, welcoming family.

We collaborate with shelters, rescue centers, and volunteers to streamline the adoption process, making it easier and more joyful for everyone involved.

Whether you're looking for a playful pet, a calm companion, or a furry friend to brighten your days, Furever is here to help.

Contact Us

Have questions? We'd love to hear from you. Send us a message and we'll respond as soon as possible.

@fluffi_pets

contact@furever.com

Furever Pet Adoption

+1 (555) 123-4567

Your Name

Please fill in this field.

Your Email

Your Message

Send Message

Frequently Asked Questions

What is Furever?	How do I adopt a pet?
Is there any adoption fee?	Can I donate or volunteer?
How do you ensure the pets are healthy?	Do you support foster care?
Can I adopt more than one pet?	Are your services available internationally?
How can shelters list pets on Furever?	

Frequently Asked Questions

What is Furever?	How do I adopt a pet?
Is there any adoption fee?	Can I donate or volunteer?
How do you ensure the pets are healthy?	**Do you support foster care?** Yes! Furever supports fostering programs and works with shelters that encourage temporary care before full adoption.
Can I adopt more than one pet?	Are your services available internationally?
How can shelters list pets on Furever?	

Available Pets for Adoption

Max
Type: Dog
Breed: Labrador
Age: 3 years
Gender: Male
Status: Available
Description: Friendly and energetic.
Adopt Now

Luna
Type: Cat
Breed: Persian Cat
Age: 2 years
Gender: Female
Status: Available
Description: Loves cuddles and naps.
Adopt Now

Bugs
Type: Rabbit
Breed: White Bunny
Age: 2 years
Gender: Female
Status: Available
Description: Loves to hop around and play.
Adopt Now

Rocky
Type: Dog
Breed: German Shepherd
Age: 5 years
Gender: Male
Status: Available
Description: Loyal and protective companion.
Adopt Now

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Login

Email

Password

Login

Don't have an account? Register

Register

Username

Email

Password

Register

Already have an account? Login

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Admin Login

Enter your username

Enter your password

Login

Demo credentials: **admin** / **admin123**

Return to Home

Admin Sign Up

Username

Email

Password

Sign Up

Already have an account? Login   Return to Home

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FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   👤 User Dashboard   🡒 Logout

Welcome, R!

Edit Profile

My Applications

Donations

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   👤 User Dashboard   🡒 Logout

Edit Profile

User148

r@gmail.com

Save

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   User Dashboard   Logout

Bella

Type: Dog

Breed: Beagle

Age: 1 years

Gender: Female

Status: Available

Description: Playful puppy with lots of energy.

Adopt Now

Oliver

Type: Cat

Breed: Sia...

Age: 3 yea...

Gender: M...

Status: Available

Description: Vocal and affectionate feline.

Adopt Now

Status: Available

Description: Gentle giant with a fluffy coat.

Adopt Now

Milo

Type: Cat

Breed: Tabby

Age: 2 years

Gender: Male

Status: Available

Description: Curious and playful tabby cat.

Adopt Now

Request Adoption for Oliver

I love cats!

Send Request   Cancel

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   User Dashboard   Logout

My Adoption Applications

Pet	Status	Date
Oliver	Pending	18/05/2025
Cleo	Pending	18/05/2025

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   ● Admin Dashboard   [→ Logout

FUREVER Admin   ● admin   [→ Logout

🐾 Admin Dashboard   ↻ Refresh Data

Welcome, **admin**

🐕 Total Pets	✅ Available Pets	⏳ Adopted Pets
25	**25**	**0**

📋 Pending Applications

📋 Pending Applications

0

🐕 Manage Pets   Add New Pet

Name	Breed	Age	Status	Actions
Max	Labrador	3	Available	Edit
Luna	Persian Cat	2	Available	Edit
Bugs	White Bunny	2	Available	Edit
Rocky	German Shepherd	5	Available	Edit

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   👤 Admin Dashboard   🔓 Logout

🏢 **Manage Shelters**   **Add New Shelter**

Name	Address	Phone	Actions
Happy Paws Shelter	123 Bark Lane, Paw City	123-456-7890	Edit
Whiskers Haven	456 Meow Street, Catville	555-123-4567	Edit
Forever Friends Animal Sanctuary	789 Rescue Road, Petropolis	888-765-4321	Edit
Little Paws Rescue	101 Small Avenue, Tiny Town	222-333-4444	Edit
Exotic Haven	202 Unique Boulevard, Exotica	777-888-9999	Edit

📋 **Recent Applications**   **View All**

Pet	User ID	Status	Date

FUREVER   Home   Shelters   About   Contact   FAQs   All Pets   👤 Admin Dashboard   🔓 Logout

Manage Adoption Applications   Back to Dashboard

Pet	User ID	Date Applied	Status	Message	Actions
Oliver	6829f6b68828c2e955d75206	18/05/2025	Pending	I love cats!	Approve / Reject / Mark Pending
Cleo	6829f6b68828c2e955d75206	18/05/2025	Pending	yayyy	Approve / Reject / Mark Pending

Functional and Non-Functional Requirements:

Functional Requirements:

1. User registration and login with JWT-based authentication.
2. Role-based access for users and admins.
3. Pet listing with filters and search functionality.
4. Shelter listing and detailed views.
5. Adoption application submission and tracking.
6. Admin functionalities for managing shelters, pets, and applications.
7. Donation support via forms.

Non-Functional Requirements:

1. Responsive design using Bootstrap.
2. Secure storage of credentials and tokens.
3. Fast and smooth loading with data fetching indicators.
4. Use of MongoDB Atlas with Mongoose for database operations.
5. Integration of protected and admin-only routes.
6. Alerts and notifications for actions (e.g., submission, errors).

Backend Overview:

The backend is built using Node.js with Express.js, utilizing MongoDB and Mongoose for data storage. It contains separate models for pets and shelters, and controllers for handling logic. Routes are modularized for pets and shelters. Sensitive information is secured via a `.env` file. CORS and JSON middleware are configured for frontend communication.

Main files include:

1. **server.js:** Initializes the server and connects to MongoDB.
2. **models/:** Pet.js and Shelter.js define the data schema.
3. **routes/:** petRoutes.js and shelterRoutes.js handle API endpoints.
4. **controllers/:** Business logic for CRUD operations on pets and shelters.
5. **config/db.js:** Connects the backend to the MongoDB database.

MongoDB Compass and Database Structure:

MongoDB Compass is used to visually manage and explore the database. Collections include `pets`, `shelters`, `users`, and `applications`. Each pet is linked to a shelter via `shelterId`, enabling structured data referencing. This allows filtered views such as pets by shelter or global browsing. Data consistency is maintained via Mongoose schemas.

Conclusion

The Pet Adoption System Website developed using the MERN stack demonstrates how modern web technologies can be effectively utilized to address societal and organizational challenges. This project has not only enhanced our technical skills in full-stack development but also provided insight into creating user-centric, purpose-driven solutions.

By offering a platform where shelters can list pets and users can browse and apply for adoption, the system bridges a crucial gap in the animal adoption process. It represents a step toward digitizing shelter operations and making pet adoption more accessible, efficient, and humane.

Through this project, we've realized the impact that well-designed softwares can have on meaningful causes, and it has further motivated us to use technology to contribute positively to society.