A Mini Project Report on

Petree: A ML based online pet shop

T.E. - I.T Engineering

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CERTIFICATE

This to certify that the Mini Project report on Loan Prediction System has been submitted by **Shreyash Ghute (20104051)**, **Mitali Chaudhari (20104104)** and **Sakshi Parab (20104059)** who are a Bonafede students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2022-2023** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ABSTRACT

There are tens of thousands of community animal shelters nationwide, which are independently run facilities. In those facilities, there are millions of healthy, lovable shelter animals who are not adopted each year, with approximately 30% of household pets in the United States coming from shelters/rescues. Why aren't the other 70% of pet households turning to pet adoption for their animals? What can be done to help persuade them to rescue an animal from a shelter/rescue?

Research and surveys were conducted to see what potential pet adopters wanted/needed to make the adoption process easy to use and beneficial, along with being efficient. With the analysis of various shelter forms, it was clear that the application process varied significantly from shelter to shelter, which led the potential pet adopters to conduct a time-consuming investigation into each individual shelter/rescues policies and procedures — often creating an overwhelming and frustrating experience. The main complaint was the lack of consistency from site to site, and even within each site. Too many shelters have inconsistent, outdated websites which tend to make the adoption process daunting, overwhelming, and confusing. Adopters want an easy-to-use system where they can keep track of their potential pets, along with a place to go for information. Many stated they felt after the adoption process, they were left on their own with no guidance or resources.

peTree wishes to create an effective system for pet adopters to allow them to find their ideal pet; while at the same time relieving local shelters/rescues of the burden of maintaining a website, and ultimately providing them with a useful tool — allowing them to focus on the health and well-being of the animals. Through the creation of a streamlined database, a simplified web presence and a complete branding campaign, users' frustrations with the adoption/searching process will be eased and shelters/rescues will be able to worry less about the digital marketing component of their business. By developing an aggregated database, a cohesive digital presence and crafting a fun, playful brand identity, all of which will aid in communicating mass amounts of varied information, as well as help to counter the negative social stigma that shelter animals have received.

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CHAPTER 1

INTRODUCTION

The act of adopting an animal is a kind and selfless one that will surely bring you much love and joy. When you look into the eyes of a shelter animal, they have these glassy pleading eyes. They are longing for the love and care you can provide. All they want is to be loved. These animals express so much love so much gratitude for you and their life with you. Giving that rescue animal a second chance at life will mean the world to them. They will continue to teach you each day and make you the see the world differently.

PeTree is an online pet adoption and shopping website that utilizes Machine Learning would be a revolutionary platform. It would enable prospective pet owners to find suitable pets for adoption based on their preferences and lifestyle. The website would also feature a shopping section where customers can buy pet-related products and accessories. Machine Learning algorithms would be used to match prospective pet owners with the most suitable pets based on different factors like their lifestyle, preferences, and living arrangements. The platform would use advanced algorithms that take into consideration various categories like breed, size, age, and temperament to match the best pets for the customers.

Moreover, the website would use Machine Learning algorithms to analyse customer data, such as search history and purchase behaviour, to provide personalized recommendations for products and services. This personalized experience would improve customer satisfaction and retention. Machine Learning would also be used to predict customer behaviour and purchase patterns and offer promotional deals and discounts accordingly. Welcome to the world of pet adoption! In this project, we will explore how machine learning can be used to improve the process of pet adoption. The adoption of a pet is an important decision that requires careful consideration and preparation. There are many factors to consider, such as the type of animal, breed, age, temperament, and the potential owner's lifestyle.

To help facilitate the pet adoption process, we will leverage the power of machine learning. By analysing large datasets of animal characteristics and owner preferences, we can develop models that can predict which pets are most suitable for different types of owners. These models can consider a variety of factors, such as size, energy level, activity requirements, and even personality traits.

Our goal is to use machine learning to match adoptable pets with the best possible homes. By doing so, we hope to increase the rate of successful adoptions, reduce the number of pets that end up in shelters, and ultimately improve the lives of animals and people alike. So, let us get started and use machine learning to make the world a better place for our furry friends!

- **Problem Identified:**

- Different sites to adopt and to shop the accessories for pets.
- No proper training and healthcare facilities provided.

- **Solution Proposed:**

- By using Petree the customers can adopt their favourite pet and get the corresponding accessories using the recommendation system. As we have used CNN, the customer should upload any image to the website (like google lens), hence the trained algorithm analyses the image and recommends many similar images of pets or products required.
- Petree is designed to bring out a solution on the trainings and healthcare facilities for the pets.

1.1 Purpose:

The purpose of pet adoption using machine learning is to improve the adoption process and increase the likelihood of successful adoptions by leveraging advanced technologies such as artificial intelligence and data analytics.

Machine learning algorithms can be used to match potential adopters with pets that fit their lifestyle, preferences, and living arrangements, reducing the time, cost, and resources required for manual matching by shelter staff. This can result in more accurate and objective matches, which can increase the likelihood of successful adoptions and reduce the number of pets returned to shelters. Machine learning can also be used to predict the likelihood of adoption for each animal, allowing shelters to prioritize animals that have a higher chance of adoption and optimize their resources. This can help reduce overcrowding in shelters, minimize the risk of euthanasia, and improve the overall welfare of animals.

In addition, machine learning algorithms can be trained on medical records of pets to detect and diagnose health issues early on, allowing for timely treatment and increasing the chances of adoption. This can help prevent the spread of diseases and reduce the burden on shelters for caring for sick animals. Overall, the purpose of pet adoption using machine learning is to enhance the adoption process, improve animal welfare, and reduce the number of homeless pets by leveraging technology to facilitate better matches between potential adopters and pets.

The main purpose of the project is to let ease the process and the troubles that occur when there are different sites to adopt and shop for the pets. This project gives a better solution for the problem discussed. The target audience of the project is the people adopt the pets and find it difficult to buy the related products of the pets. Also, the projects target the audience who do not find adoptions centers near them.

1.2 Problem Statement:

Pet adoption is a critical issue in society, with millions of pets being abandoned, neglected, or surrendered to shelters every year. Despite the efforts of animal welfare organizations and shelters, many pets still do not find their forever homes. This results in overcrowded shelters, where animals face a higher risk of euthanasia, and it also leads to an increase in the population of stray animals.

Additionally, many potential pet owners may be deterred from adopting due to a lack of awareness about the benefits of pet ownership, misconceptions about shelter pets, or difficulty finding the right match. This can lead to an increase in the number of animals living in shelters for extended periods, which can negatively impact their well-being. Therefore, there is a need to address the challenges surrounding pet adoption and increase awareness of the benefits of pet ownership while also improving the adoption process to ensure more pets find loving homes.

Nowadays pet adopters do not find proper pet adoption centers to adopt pets. Also, there are no proper pet accessories stores for the pets. So, using this website the pet parents can have a combined adoption center as well as a shopping site for their pets. Finding pets individually on the website becomes very difficult for the customer. One must find each item separately by visiting each page and each product, this becomes a hectic task for the customer.

The primary challenge is the matching of potential pet adopters with pets that fit their lifestyle, preferences, and living arrangements. This process is currently carried out manually by shelter staff, which can be time-consuming, subjective, and prone to errors. Machine learning algorithms can be used to analyze various factors such as adopter's location, lifestyle, family size, and pet preferences, to recommend the most suitable pets for adoption. This can lead to a higher rate of successful adoptions and reduce the number of pets returned to shelters.

Another challenge is the identification of potential health issues in pets that may impact their adoption. Machine learning algorithms can be trained on medical records of pets to detect and diagnose health issues early on, allowing for timely treatment and increasing the likelihood of adoption.

1.3 Objectives:

1. To build an online pet house which will be user friendly.
2. To provide facilities of veterinarian to the customers who adopt pets from our platform.
3. To give training sessions to the customers who are new to adopt a pet.
4. To let pet lovers, search for fur babies online that they can adopt.
5. Best products with multiple varieties and designs and assurance of the quality.
6. To manage all the information about customers and their reviews/feedbacks.

1.4 Scope

1. Can be useful for potential adopters to find a pet a pet that fits their lifestyle.
2. Can transform pet adoption processes into an easy, fast, and convenient way.
3. Can be helpful to the willing pet adopters who do not find adoption centers near them.
4. Can become a time saving hero, being a one-stop shop for adoption as-well-as shopping.
5. Can become a source of employment for many people (pet trainers, Vet. Doctors, online retailers.…. etc.)

CHAPTER 2

Literature Review

Sr.no	Title	Author(s)	Year	Algorithms	Limitations	Result
1	AI-Based Pet Adoption System	Vishwajeet Patil, Rohit Sawant, Sumit Kajbaje	April 2022	Convolutional Neural Network (CNN), K-Nearest Neighbor (KNN)	Use of outdated technology has added some limitations to the project.	People will get an opportunity to do something for helpless animals by either adopting them.
2	Pets and mental health - literature review	Janette O. Young, Liesel O'dwyer	January 2016	-	Outdated technology used which could not compete with the new rising tech.	Gradual rise in awareness regarding pets and their mental health.
3	Pet Adoption App	Manan Shah, Arsh Shaikh, Zaib Shaikh	April 2021	K-Nearest Neighbor	Only one algorithm used, whereas all other algorithms could have made it better.	Adoption of pets became easier as recommendation system helps customers to find many other pets.

CHAPTER 3

PROPOSED SYSTEM

3.1 Features and Functionality

1. **User Profile Creation:** Users can create profiles that capture their preferences, lifestyle, and pet ownership experience. This information can be used to match adoptable pets with potential owners based on their compatibility.

2. **Search Functionality:** Users can search for adoptable pets based on various criteria, such as breed, age, size, energy level, and personality traits.

3. **Machine Learning Algorithms:** The website can use machine learning algorithms to analyse data on pet characteristics and user preferences to provide personalized recommendations and match adoptable pets with potential owners.

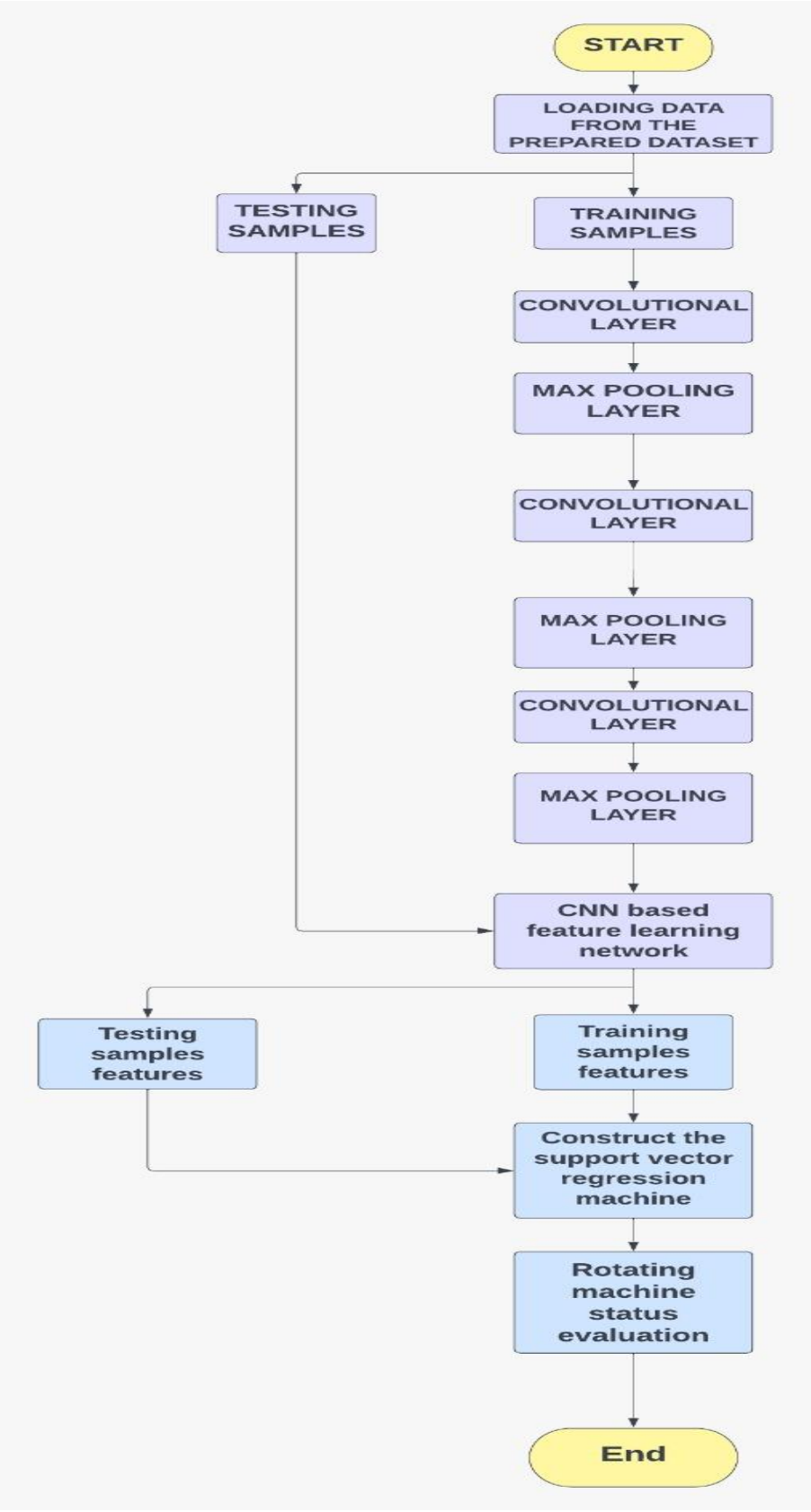
4. **Online Application Process:** Potential adopters can complete an online application that collects information about their lifestyle, living situation, and experience with pets. This information can be used to determine if the potential adopter is a good fit for the pet they are interested in.

5. **Virtual Meet and Greet:** The website can provide a virtual platform for potential adopters to interact with the pets they are interested in. This can be done through video calls or live-streamed play sessions.

6. **Feedback Mechanism:** Users can provide feedback on the adoption process and their experience with the website, which can be used to improve the matching process and overall user experience.

7. **Community Building:** The website can provide a platform for pet owners to connect, share experiences, and offer advice to one another.

3.2 Algorithm Working with flowchart



3.3 Algorithm Used:

A **Convolutional Neural Network (CNN)** is a type of artificial neural network that is primarily used for analysing images and other multidimensional data. The architecture of a CNN consists of multiple layers, including a convolutional layer, pooling layer, and fully connected layer.

The basic working of a CNN involves the following steps:

Input Layer: The input layer of a CNN receives the image data, which is represented as a matrix of pixel values.

Convolutional Layer: The convolutional layer is the core building block of a CNN. It consists of a set of filters or kernels that are used to scan the input image and extract features from it. The filters slide across the image, performing element-wise multiplication with the input pixels in their receptive field, then summing the results to produce a single output value. The process is repeated for each location on the input image to produce a feature map.

Activation Function: An activation function is applied to the output of the convolutional layer to introduce non-linearity into the model and improve its ability to capture complex patterns and relationships in the data.

Pooling Layer: The pooling layer is used to reduce the spatial dimensions of the feature maps by down sampling them. This helps to reduce the computational complexity of the network and also makes it more robust to variations in the input.

Fully Connected Layer: The fully connected layer is used to classify the features extracted by the previous layers into different categories or labels. It receives the output of the pooling layer and passes it through a series of dense layers, which perform matrix multiplications and apply activation functions to produce the final output.

Output Layer: The output layer of a CNN produces the final classification results in the form of a probability distribution over the different categories or labels.

CHAPTER 4

REQUIREMENT ANALYSIS

Functional requirements

- System must be able to verify and validate information.
- The system must encrypt the password of the user to provide security.
- Username and password will be used for login after user registration is confirmed.
- A dataset comprising of images of pets, shopping accessories.
- Trained Convolution Neural Network Algorithm which will be used for recommendation system.

Software requirements

- **Text Editor:**

  You will need a text editor to write and edit code. Examples of popular text editors include Visual Studio Code, Sublime Text, and Atom.

- **Web Server:**

  You will need a web server to host your website. Examples of web servers include Apache, Nginx, and Microsoft IIS

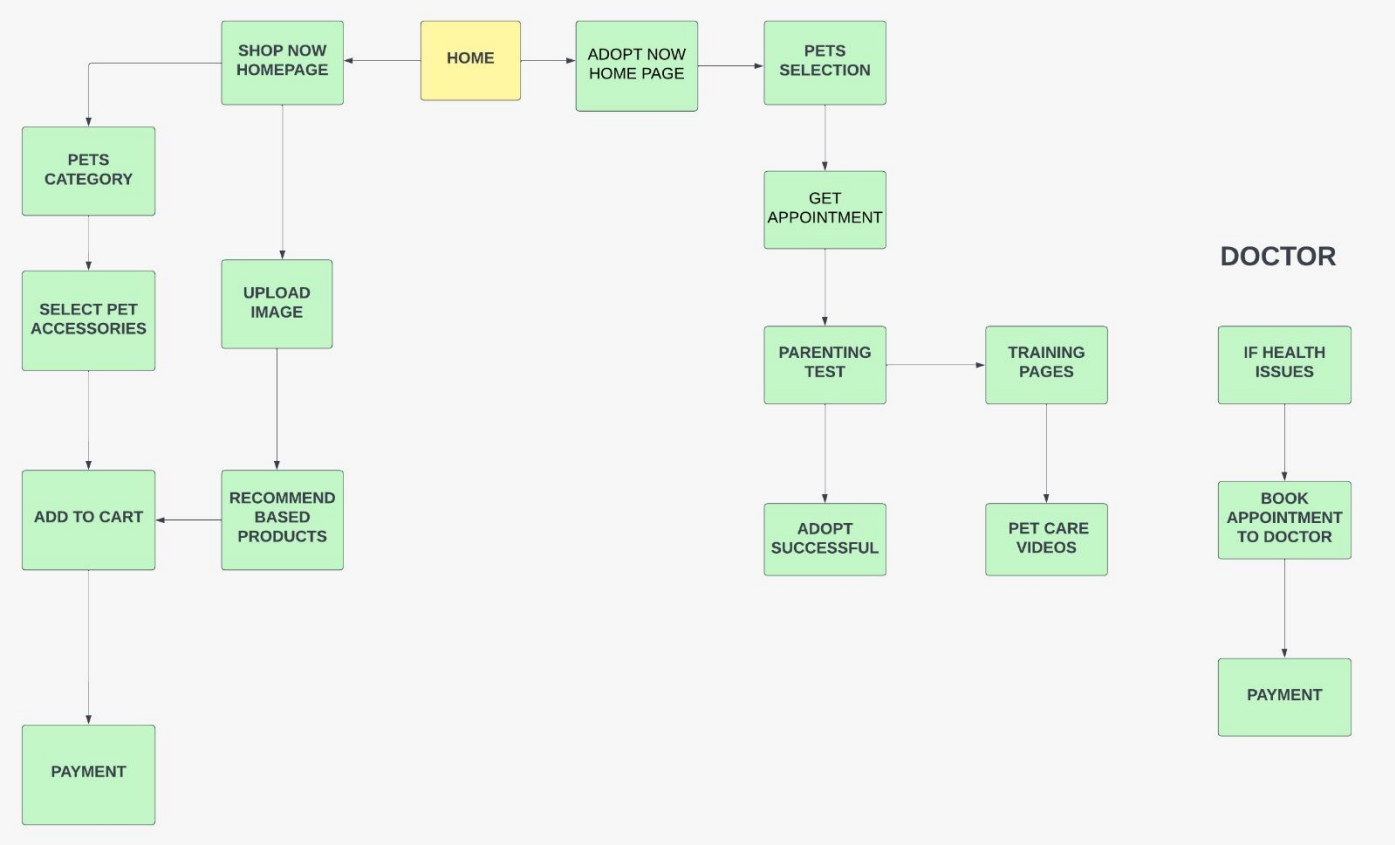
- **Network Connectivity**

  The system must have a good internet connectivity in order to access the website.

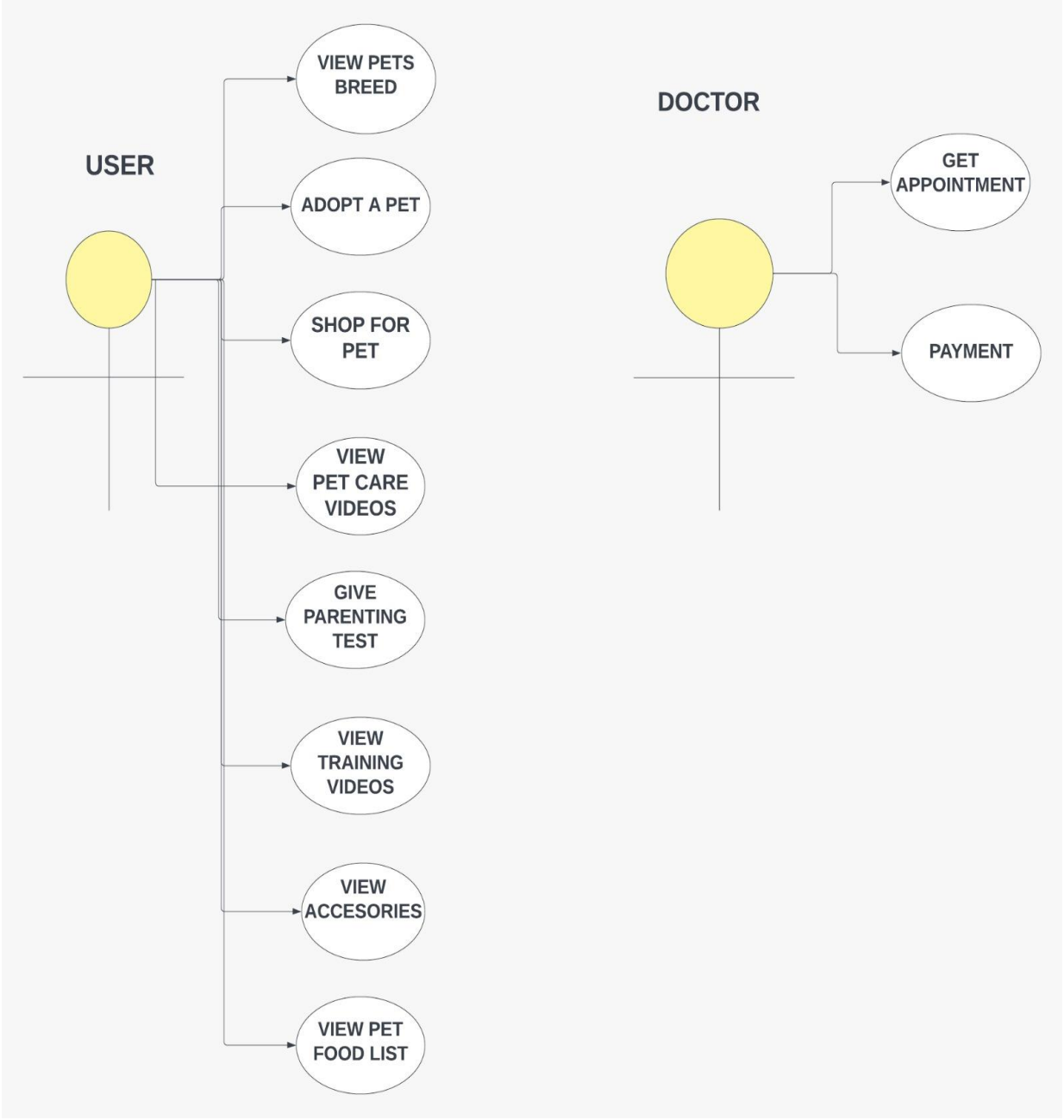
CHAPTER 5

PROJECT DESIGN

5.1 Block Diagram:



5.2 Used-Case Diagram:



CHAPTER 6

TECHNICAL SPECIFICATION

Development: VS Code

VS Code also known as Visual Studio Code is a source code editor made by Microsoft for Windows, Linux, MacOS. It has various features such as Debugging, Syntax highlighting, extension, intelligent code completion.

Frontend: Html, CSS, JavaScript

As a web developer, the three main languages we use to build websites are HTML, CSS, and JavaScript. JavaScript is the programming language, we use HTML to structure the site, and we use CSS to design and layout the web page. These days, CSS has become more than just a design language, though. You can implement animations and smooth transitions with just CSS.

OS: Windows

Windows is a graphical operating system developed by Microsoft. It allows users to view and store files, run the software, play games, watch videos, and provides a way to connect to the internet. It was released for both home computing and professional works.

Backend: PHP, MySQL

With PHP, you can connect to and manipulate databases. MySQL is the most popular database system used with PHP. PHP combined with MySQL are cross-platform (you can develop in Windows and serve on a Unix platform). The data in a MySQL database are stored in tables. A table is a collection of related data, and it consists of columns and rows. Databases are useful for storing information categorically.

Machine Learning Based Algorithm: Convolution Neural Network

A **Convolutional Neural Network (CNN)** is a type of Deep Learning neural network architecture commonly used in Computer Vision. Computer vision is a field of Artificial Intelligence that enables a computer to understand and interpret the image or visual data. Neural Networks are used in various datasets like images, audio, and text. Different types of Neural Networks are used for different purposes,

for example for predicting the sequence of words we use **Recurrent Neural Networks** more precisely an LSTM, similarly for image classification we use Convolution Neural networks.

In a regular Neural Network, there are three types of layers:

1. **Input Layers:** It is the layer in which we give input to our model. The number of neurons in this layer is equal to the total number of features in our data (number of pixels in the case of an image).
2. **Hidden Layer:** The input from the Input layer is then feed into the hidden layer. There can be many hidden layers depending upon our model and data size. Each hidden layer can have different numbers of neurons which are generally greater than the number of features. The output from each layer is computed by matrix multiplication of output of the previous layer with learnable weights of that layer and then by the addition of learnable biases followed by activation function which makes the network nonlinear.
3. **Output Layer:** The output from the hidden layer is then fed into a logistic function like sigmoid or SoftMax which converts the output of each class into the probability score of each class.

CHAPTER 7

PROJECT SCHEDULING

Sr.no	Group Members	Time Duration	Work to be done
1	Shreyash Ghute, Mitali Chaudhari, Sakshi Parab	2^{ND} week of January	Select the topic and work on the frontend GUI
2		First week of February	Design GUI for adoption pages for adoption pages
3		Mid-February	Design GUI for shopping pages for shopping site
4		Last week of February	Apply the Convolution Neural Network and train the datasets.
5		First week of March	Connect all separate pages of adoption and shopping sites.
6		Second week of March	Connect the algorithm with the project and use the recommendation system.

CHAPTER 8

IMPLEMENTATION

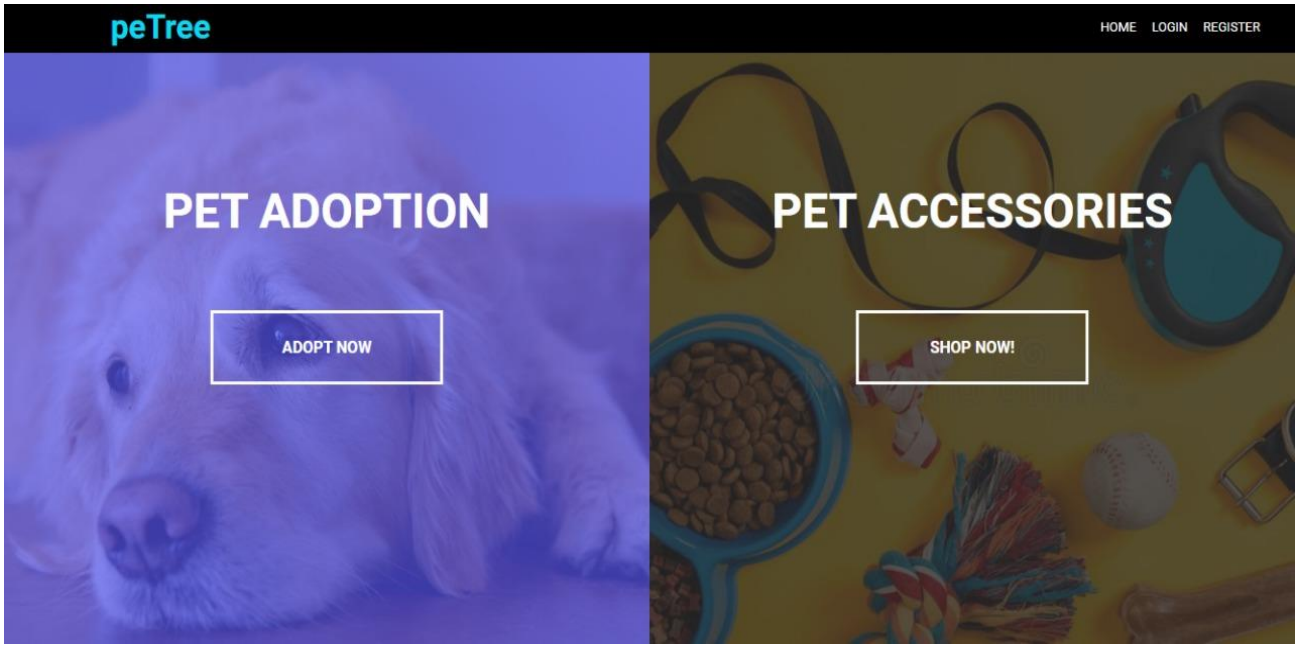


Fig1: Homepage

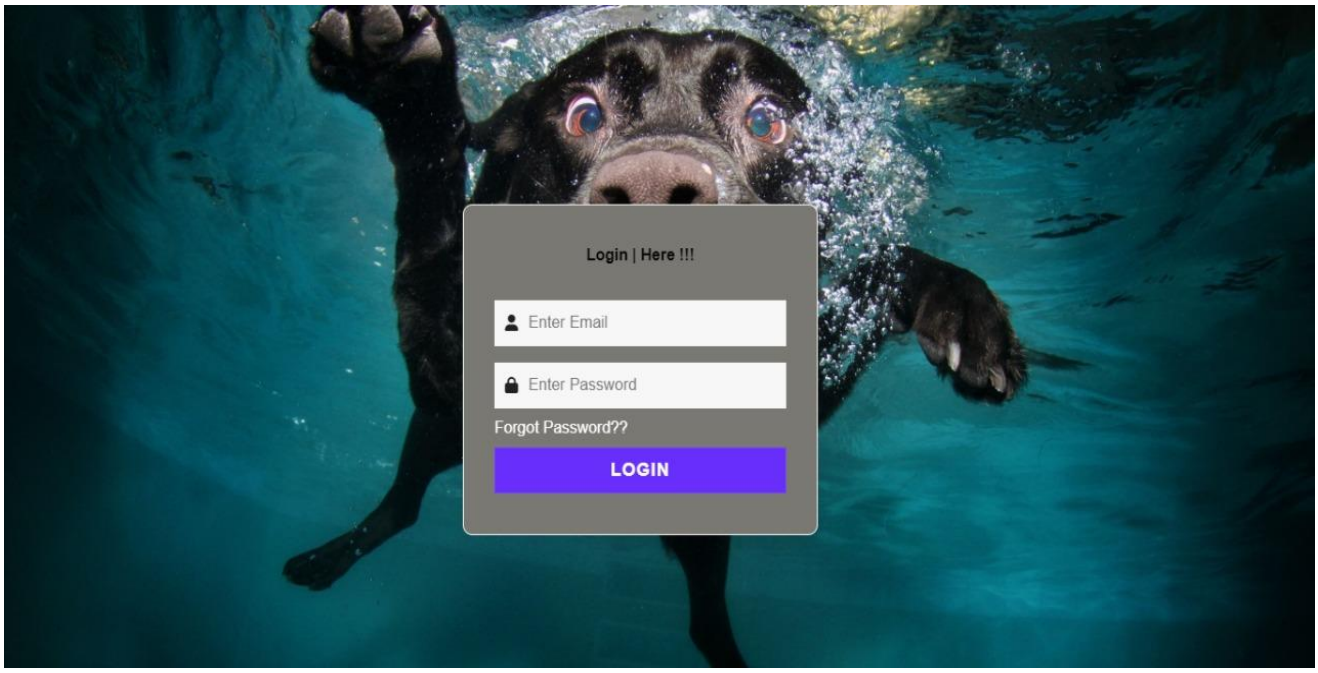


Fig2: Login

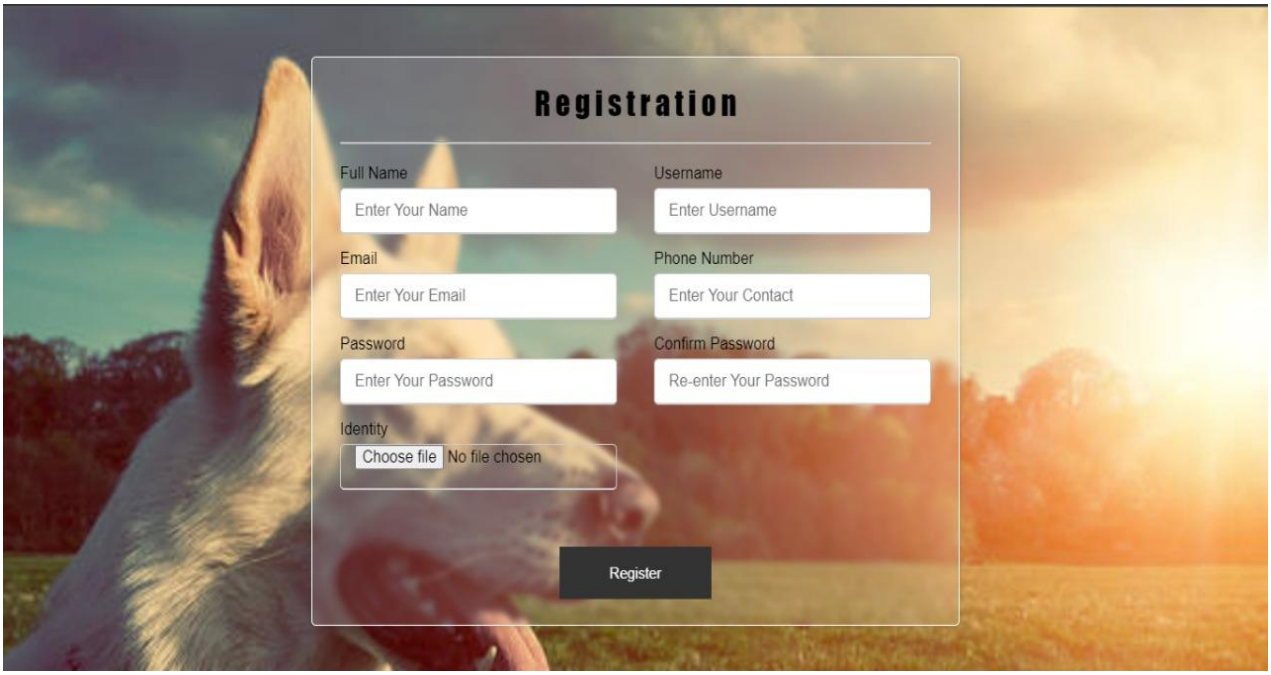


Fig 3: Register page

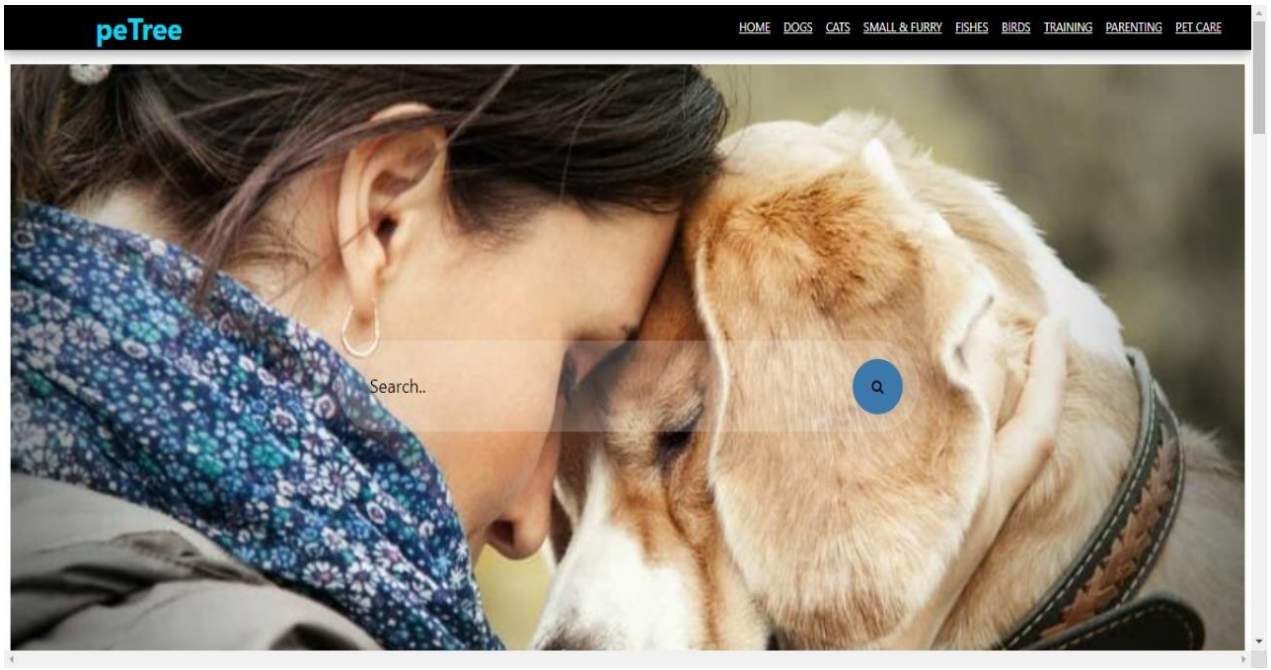


Fig 4: Adoption Homepage

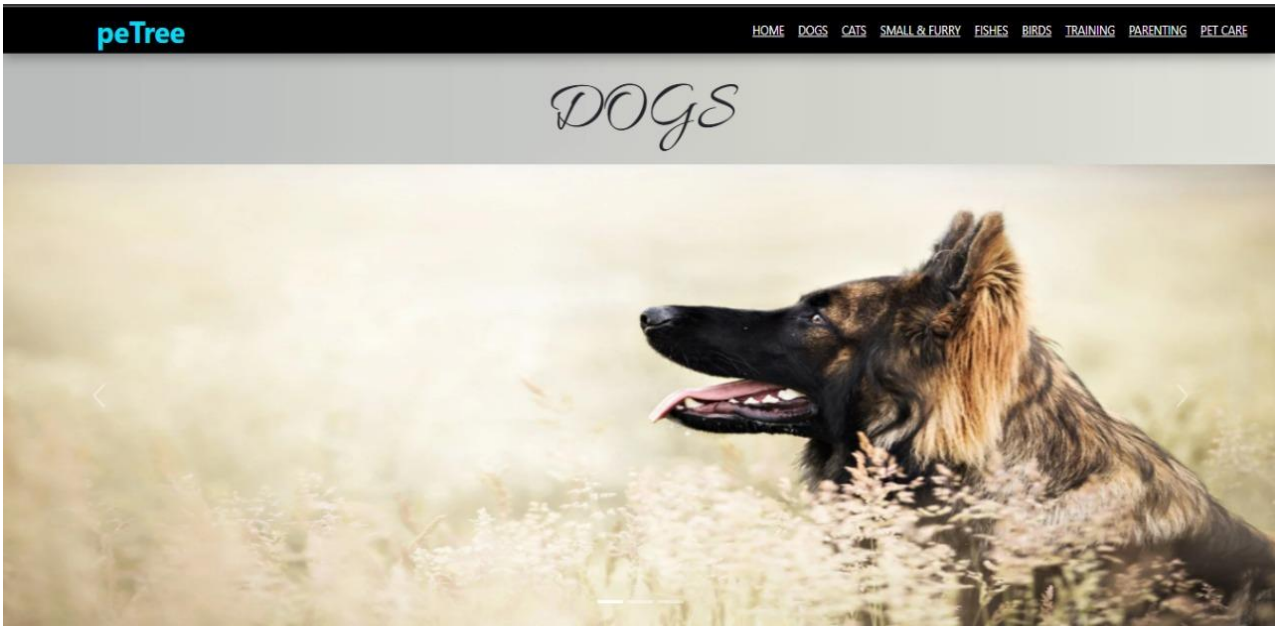


Fig5: Dog Adoption Page

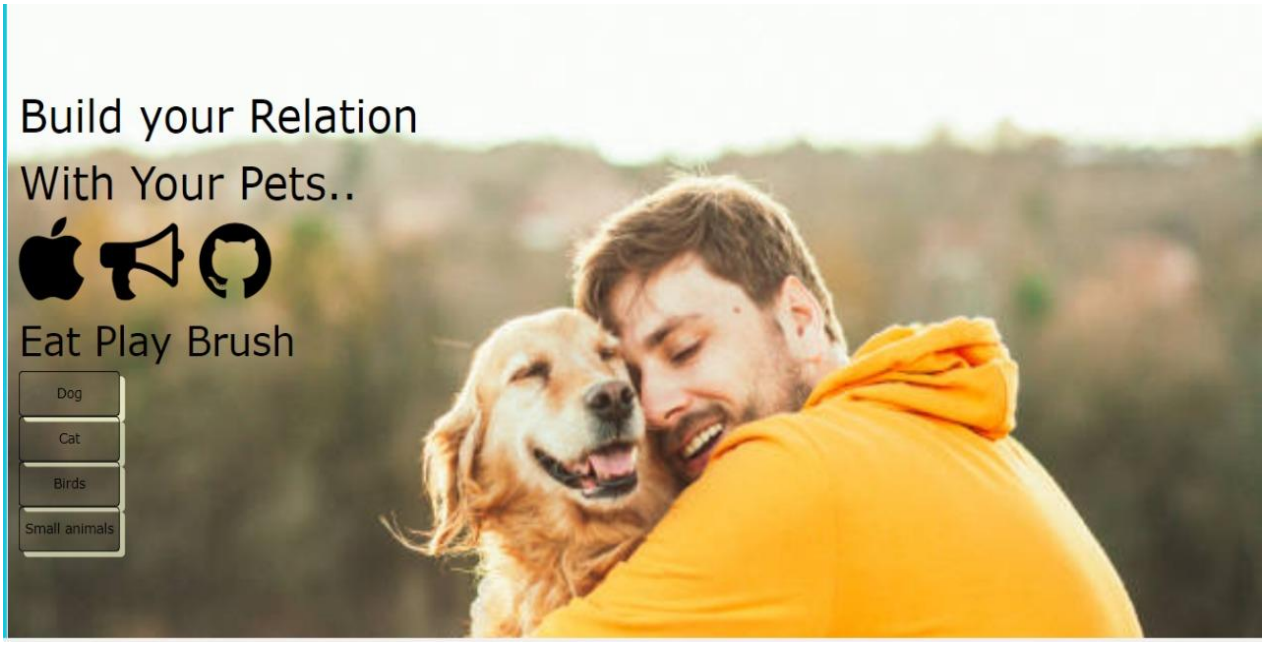


Fig 6: Training Page

Fig 7: Parenting Test

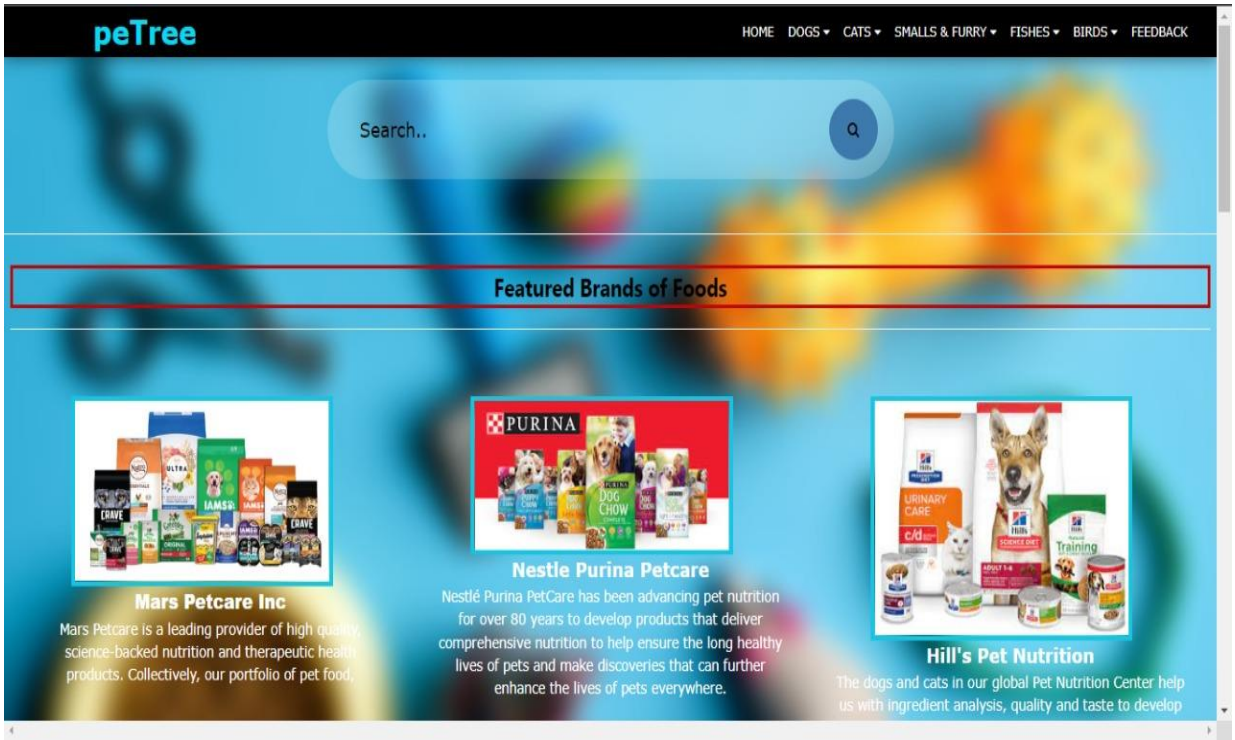


Fig 8: Shop now Homepage

CHAPTER 9

RESULT AND DISCUSSION

As the human-animal bond has evolved throughout time, it makes sense to think that it will continue to develop as the relationships people share with different animals also change. The health benefits of owning companion animals and interacting with different types of working animals are making major impacts in the lives of many people. As this bond continues to strengthen, newer areas of health focus, such as grieving the loss of a companion animal, will continue to gain traction. The same is true for production animals. As veterinarians and researchers continue to learn more about animal welfare and health standards, and as the agricultural industry shifts, new research and protocols will be instituted that optimize these relationships between humans and livestock. This is especially true within the context of One Health, a concept that describes the wellness of humans, animals, and the environment as permanently tied together. While much of the past and current conversation regarding One Health centers on zoonotic disease and animal reservoirs, smaller companion animals and the role they play in physical, mental, and societal health is becoming more topical. As scientists continue to gain more knowledge about the health benefits of the human-animal bond, that bond may continue to change.

Using the Convolution Neural Network (CNN), makes the recommendation process very easy for the customers to find their required pet or corresponding accessories. CNN uses three layers for identification of the image. First layer, being the **INPUT LAYER** accepts the uploaded image and determines the number of neurons in the image. Here the number of neurons equals to the number of features in the image. Second layer is the **HIDDEN LAYER**. The input from the input layer is then fed towards the hidden layer. A system can consist of number of hidden layers depending upon the size of the datasets and size of the images that are being uploaded. Each hidden layer can have different numbers of neurons which are generally greater than the number of features. The output from each layer is computed by matrix multiplication of output of the previous layer with learnable weights of that layer and then by the addition of learnable biases followed by activation function which makes the network nonlinear. The last layer is the **OUTPUT LAYER**. The output from the hidden layer is then fed into a logistic function like sigmoid or SoftMax which converts the output of each class into the probability score of each class. Applying this deep-learning algorithm identifies the uploaded the input image identifies it and recommends similar images to the customer. This helps the customer shop easily with many options to checkout from.

One of the primary benefits of using machine learning in pet adoption is the ability to match pets with potential owners based on their characteristics and preferences. By doing so, the adoption process becomes more personalized, increasing the likelihood of successful adoptions. The website can track the

number of adoptions that occur through the platform and compare it to traditional methods of adoption to determine if machine learning has a positive impact on the adoption rate.

Another key metric to evaluate is user satisfaction. The website can collect user feedback to determine if users find the adoption process more efficient and enjoyable with the use of machine learning. This feedback can also help identify areas of improvement for the website and the matching process. The effectiveness of the machine learning algorithms used in the website can also be evaluated. The accuracy of the matches between adoptable pets and potential owners can be measured by comparing the predicted compatibility with the actual outcome. If the predicted compatibility is high and matches lead to successful adoptions, this indicates that the machine learning algorithms are effective in improving the adoption process.

Overall, a pet adoption website that uses machine learning can provide a more efficient and personalized adoption process that leads to higher rates of successful adoptions. By leveraging the power of machine learning, we can improve the lives of animals and their new owners, making the world a better place for our furry friends.

CHAPTER 10

CONCLUSION AND FUTURE SCOPE

1. User has the choice of buying various pet accessories from the shopping section.
2. Using the applied algorithm, the user can find his/her required pet or the accessories by just uploading a similar image on the site.
3. He/she will get the Doctors appointment and the further consultations about the healthcare of the pet.
4. The new adopters will get trained if do not have any experience of having any pets.
5. Adopters will have a variety of services provided.
6. User can give feedback about the service provided etc.
7. As machine learning algorithms become more advanced, they can analyse more data points and provide even more personalized matches between adoptable pets and potential owners.
8. Mobile applications can be developed that utilize machine learning algorithms to provide on-the-go adoption recommendations and personalized matches based on the user's location and preferences.
9. Machine learning algorithms can analyse data on pet behaviour and provide insights into the temperament and personality traits of adoptable pets. This information can be used to match pets with potential owners who have the appropriate lifestyle and experience.
10. Voice and image recognition technology can be used to analyse user preferences and recommend adoptable pets based on their unique characteristics and preferences.

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