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Dog Breed Identification with Product Classification and Assisted Services

Ruchitha G K[1], Sporthi R[2], Varun Attiganal Venkatesh[3], Dr.Swathi K[4]

Assistant Professor, Dept. of Computer Science, K.S. Institute of Technology, Bengaluru, India[1]

Student, Computer Science, K.S. Institute of Technology, Bengaluru, India[2,3,4,5]

Abstract: Owning a furry companion can have many positive effects on a person's life. Not only do they get to live with a friend, but there are also some hidden benefits to keeping a pet in home. There are many health benefits of owning a pet. They can increase opportunities to exercise, get outside, and socialize. Regular walking or playing with pets can decrease blood pressure, cholesterol levels, and triglyceride levels. Pets can help manage loneliness and depression by giving us companionship. Most households in the United States have at least one pet. Studies have shown that the bond between people and their pets can increase fitness, lower stress, and bring happiness to their owners. Some of the health benefits of having a pet include: decreased blood pressure, decreased cholesterol levels, decreased triglyceride levels, decreased feelings of loneliness, increased opportunities for exercise and outdoor activities, increased opportunities for socialization.

Keywords: Classification, Machine Learning, Pets

I. INTRODUCTION

Owning a furry companion can have many positive effects on a person's life. Not only do they get to live with a friend, but there are also some hidden benefits to keeping a pet in home. There are many health benefits of owning a pet. They can increase opportunities to exercise, get outside, and socialize. Regular walking or playing with pets can decrease blood pressure, cholesterol levels, and triglyceride levels. Pets can help manage loneliness and depression by giving us companionship. Most households in the United States have at least one pet. Studies have shown that the bond between people and their pets can increase fitness, lower stress, and bring happiness to their owners. Some of the health benefits of having a pet include: decreased blood pressure, decreased cholesterol levels, decreased triglyceride levels, decreased feelings of loneliness, increased opportunities for exercise and outdoor activities, increased opportunities for socialization. And therefore the demand for having a pet at home has been increasing progressively for the past few years. The population of pets was around 18 billion in the year 2018 and is said to reach over 30 billion by the year 2023. This increase in the population of pets has also automatically increased the value of the consumer's market. Over 210 million dollars are spent on pets in a country. With huge demand for pets and the necessary to have pets, our project holds the above discussed topics as a base to create something truly amazing for a pet owner.

II. METHODOLOGY

Breed classification: Identification of the breed of the dog. Image processing and classifier will be added. This is mainly for the users who do not know the breed of their pet and struggle with the upbringing of the pet. They can identify the breed of their pets. A small box of general information about that breed will be displayed to educate the user regarding the same.

Vet and grooming services: We aim to develop an application that makes the process of looking after a pet easier. Veterinarian visits play a vital role in looking after the pets. Regular visits to the vets ensure that pets are in healthy condition. Our application allows the registered users to book appointments with the vets when it is required. We also aim to have a chat box which can be used by the pet owners to talk to the vets when it is an emergency or whenever they feel the need for an immediate consultancy. Vaccinating pets is a vital component of responsible pet care. The application also sends email reminders to pet owners asking them to get their pets vaccinated if any vaccination is due. This helps the pet owners to avoid missing any vaccination to their pets. These four factors discussed above (appointments, consultancy, push notifications, online chat) avoids confusion and makes pet consultancy easier.)

Food and products specific to breed and age: Elements of pet ownership include providing them with fresh, cool water and healthy food at all times that is specific to the breed. With so many meal options to choose from, one might often get confused with what to feed their pets. This application helps to buy food for pets based on their breed, age and nutrient contents. Along with food, pet accessories are also available to the users who wish to shop from our application. Categorizing these accessories will also be done to make sure that the user gets the best product specific for the breed of their pets.

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Lost and found pets: Images of Dogs that are lost are classified based on the breed and location so the users can recognize them easily and facilitate fast return of the dog. The centralized structure can facilitate the process.

III. IMPLEMENTATION

A. Pre-processing

The breed detection is a 2 step process

1) Extracting a target image- YOLO is used to crop out the excess in a image to obtain only the target image.

2) Classification-inception transfer learning is used to compare the target image and return the breed of the dog. Keggle dataset is used to train and test the machine

B. Using YOLO Algorithm for Image Recognition

In order to implement the classifier module, we have taken a data set from Kaggle. Cackle is a very well-known site which contains a lot of data sets. Kaggle allows any user to publish the data that they have collected and it also allows to explore and build any type of data science projects. In our classification module we are classified up to 120 breeds of dog. These 120 breeds of dogs are distinct to another and are present in the data set that we have downloaded. We have ensured that we are clearly classified these 120 breeds of dogs. Knowing the fact that there exists more than 120 breeds of dogs, we have decided to implement and scale are projects to more breeds of dogs in the near future. Every image has to be pre-process it actually goes into the classifier module. Even in our project we are pre processing. The data set that we have downloaded does not have any false data or any bad data and therefore we have skipped the process of data cleaning since while downloading the data set itself the data cleaning was done to us through Kaggle. This is a huge advantage of using Kaggle. The only preprocessor we are applying to all the images in the data set is basically making it ready for training, testing and validation. For every picture that is present in the data state we are providing a label and an index to each of them. This is called as annotation where in a label is defined to any data set or values. This become very crucial when we are identifying and validating data. The first very important step of classification module would be to create what is called as a bounding box. These bounding box is help us to identify the object that is dog in our case and crop them out and it save them to a folder. The cropping out of images and saving them to a folder is done according to ImageNet Standards. ImageNet if nothing but an image database in which each and every node that is present in the hierarchy is depicted by thousands and thousands of images. The cropping of the pictures according to image net standards involve a certain dimension and certain fixed normalization values

C. Lost Portal

Now that we're talking about lost portal. We have multiple components, posts, forms and a single post. So we give you a form for you to put the name, message and image of your lost dog. This consists of the form component. Once you hit on submit this is where our redux and redux thunk take place. Redux thunk is used to access or communicate with external resources. We can make http requests and other useful things with redux-thunk. So how the project works is to give some input and redux takes care next. Redux has a few things that we need to take note of firstly we have the actions, which are then sent to the reducer, the reducer updates whatever new value we have. So how do we get the new value, also we are using mongo DB as our database and we have value stored in it. So this will be our new values whatever we fetch from our database. When we input some value we send an action, this is the redux action and then we use redux thunk to make http request to our server backend and fetch data from our database if we are facing some post and store it it was trailer and send this to our end user and the reducer will update our store. Store is where we take our values into each separate component. We use the useSelector hook to get these values from our redux store. So the store contains some value and we take this value and put it in our component or we can say our react component and store it in our local state and this in turn can be displayed to our UI. We know how the MVC architecture works and react focus is just on the V part, V being the view of MVC architecture. We can take an example of posting a lost dog. We give you a form to fill in the details as mentioned earlier, once you fill the details you hit on the submit button and then we use axios which is a package that we have installed to make API requests and responses much simpler. We are using Express JS as our server for the lost dog portal and products categorization. Some of the important end points that will be hitting from the front-end to our server would be the post end point and all of this is mentioned in the routes of an Express server. So once we have hit the endpoint we will be using Mongoose and we take the request that comes with the http and use mongoose to make a post to our database that is mongo DB. We successfully made a post of the Lost dog.

D. Product Categorization

Similarly we have the product component. Share will have to fetch all the dogs, details of each of these dogs, products related to these dogs. We have already stored this in our database. We make a get request and fetch all the data from our database. This is done as soon as we enter the product page and we have used the useEffect hook to make the get request. One fits this data we store it in a local state of a component, i.e the products component and we display theinformation to the user. Coming to the backend we have connected to our mongo DB cluster in our server index.js. We also have the route middleware and controllers folder in our server side. There we have also created models for the user, posts and products which can be used to do multiple functions with our database for example posting, fetching, editing, deleting

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etc. This is a brief of how we have connected our front end and back end of our application. To summarise we have used react JS, flask, mongo DB, express JS, redux and redux thunk to achieve the connectivity of a frontend and backend.

IV. CONCLUSION

Throughout this project we aim to provide the user with the best experience in using our application. Application is developed only for the web we have made sure that we have incorporated all the features that can provide users the best experience. Where also reducing the navigation time of a window by providing all the features under one roof. Most of the application that are already present on the internet do not have all the features that are incorporated in a centralized way and we are providing in a centralized to a which could be a major advantage. Detection of breed, product categorization gives users a sound knowledge about the pit and helps them to understand the breed of the dog and also guide them to choose the right product for their pets. This way they can provide what is best for their pets and also take care of them effectively and efficiently. The Lost portal is an assisted service that is specifically provided to the user. Any time the user knows that their pet has been missing they can simply post their pm on to our website and all the people can view this thing and help the person find the missing. The last portal is not only specific to talk so that users can post any and pet that is lost.

V. FUTURE ENHANCEMENT

The future enhancements of the project would include to detect more than 120 breeds of dogs. Model only detects the breed of the dog if the image contains only a single talk but we are planning to expand it to identify multiple dog breed in one single image itself. We are also planning to implement all the Lost dogs and filter them specific to your city and also include a location on the map. Intent on recommending more products for almost all the breed of dogs. To improve authentication so users can also have a safe experience when dealing with the application.

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