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June 6, 2023

Capstone Three Proposals:

1.) Deep Learning/ Image Processing/ Time Series Analysis- “Biologist Tracking Animals”

Biologists doing field observations could have cameras set up where they have hundreds of hours of footage to review for capturing wildlife in. Some of the things they are trying to track are: populations of specific species (increasing? decreasing?), travel patterns, hours of activity. In order to even begin exploring these questions, researchers need to find a lead on where a species population even exists. One way biologists are able to generate leads is by setting up cameras to capture footage for review later. With more cameras, there is more footage, and an increased chance of capturing wildlife by covering more area. Utilize a hunter’s recorded footage, with the specific animals of interest. For example, white tailed deer are hunted across the United States. Utilizing hunting footage, could we identify time stamps of when we saw the animals? First, by getting a video source of a long duration of animal raw footage, we can convert each frame to be a static image. Using stock images of a specific animal as training data or a few sample videos of smaller lengths I can train a convolutional neural network to recognize animal activity and to report back which frame the animal in question was sighted. Each frame would represent a particular time stamp, thus, allowing us to truncate our raw field observation footage into potential animal behavior patterns. This would open the door for biologists to incorporate machine learning into their research.

Resource to reference:
https://medium.com/nerd-for-tech/extraction-of-frames-from-a-single-video-2b9fdd901208
-allows me to utilize videos of my choice as data source, if it works
ex.) https://www.youtube.com/watch?v=t1d3hM7utIs

https://www.kaggle.com/datasets/whenamancodes/wild-animals-images
https://www.kaggle.com/datasets/mikoajfish99/marine-animal-images

2.) Audio Classification - “Speaking a little Cat”

For ages, our feline companions have cohabited with us humans yet there we have not come to understand their vocalizations. Is there a way to understand them? In a study about cats, 440 audio files of cat vocalizations were generated based on the following three scenarios: cat brushing, isolation or meal time. Using the audio files, I hope to generate a model that is able to classify a cat’s meows to their desires. This could be the building blocks to generate a language library for cats! Pet industries may find this model and its performance particularly useful if they are launching products that require cat vocalization cues.

Data source:
https://zenodo.org/record/4008297

3.) Classification/ Natural Language Processing - “Spam or Not?”

The increasing prevalence of spam emails poses a significant challenge for individuals and organizations, leading to wasted time, decreased productivity, and potential security risks. This proposal outlines a data science project focused on developing an effective spam identification system for emails. By leveraging advanced machine learning techniques, natural language processing (NLP), and a comprehensive dataset, we aim to create a robust and accurate model capable of accurately classifying emails as either spam or legitimate.

Data Source:
-(potentially) scrape up some examples from my personal email
-https://www.kaggle.com/datasets/venky73/spam-mails-dataset
-https://www2.aueb.gr/users/ion/data/enron-spam/