

Animal Image Classification

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1 Introduction

1.1 Background

In recent years, AI has been an growing topic. Many advancements have been made in several areas within AI including Computer Vision, Natural Language Processing, and other Machine Learning (ML) and Deep Learning (DL) projects [1]. With the release of LLM's such as ChatGPT and Dall-E, the public can now use these tools. However, the general public views AI as a negative advancement in technology. The main belief is that it reduces privacy, but can assist in other areas of life such as finding accurate information online [2].

1.2 Project Description

Our project was designed to show AI can be helpful tool. Additionally, we are beginners in the realm of ML, so this project serves as a step towards real world problem solving. The problem we sought to solve was Image Classification. We employed several ML algorithms to perform Animal Classification for images. Our goal was to learn how to do Image Classification using different methodologies to accurately predict whether an image contained a: cat, dog, or panda.

1.3 Dataset Overview and Preparation

The dataset used contained 3000 RGB images separated into 3 folders, 1 folder per animal [3]. These images ranged varying sizes, ranging less than 100 pixels by 100 pixels to larger than 1000 pixels by 1000 pixels. Each folder contained 1000 images of the depicted animal. From the given images, we selected images that were deemed clean and usable for our models. After cleaning, we had 2,952 images. Our criteria for removing images was as follows:

1. Multiple interested animal species in the same image. For example, a cat and a dog within the same image.
2. Too small of an image size: less than 100 pixels by 100 pixels.
3. Subject of the image was too difficult to see. This may include obscurities, filters, low resolution, etc.
4. The image did not contain the subject animal.

After cleaning the images, we further prepared the dataset to be entered into a readable format for the various models we selected. These included:

- Resizing images to 500 pixels by 500 pixels
- Resizing images to 224 pixels 224 pixels
- Converting images to grayscale
- Converting images to arrays
- Creating new images by augmenting the given images
 - Augment effects included: rotation, zoom, horizontal flipping, vertical/horizontal shifting, shear transforming, and pixel filling.

With these changes in mind, the amount of data becomes: 2,952 images and $(Length * Width * ColorMode) + 1$ Features. Thus for images in RGB sized 500 pixels by 500 pixels, we would have 750,001 features. The reasons for having different image sizes, color modes, and data augmentation was to increase the performance and reduce the runtime to construct the models.

1.4 Outline

The outline of this paper is as follows: First we will discuss the research that contributed to our understanding and gave insights into beginning the project. Second, we will discuss the methods and techniques employed to achieve our goal of making an image classifier. Afterwards, we will evaluate and compare the performance of our models. Lastly, we will discuss some future works that can be done to explore further into this topic.

2 Related Works

[Research and description of algs]

Related work: Explain if there is a relevant paper that worked on the same problem

3 Methods

[What we did to do classify the images]

Methods: Describe the methods that you used to solve the problem

4 Evaluation

[Evaluate and compare the models performance] Evaluation: Compare the methods you used

5 Conclusion

[Summarize] Conclusion: Write a conclusion and future work for your project

Here you summarize the essential aspects and findings of your work and analysis.

6 Future Work

[What improvements could be done]

better alg?

References

- [1] Stanford: What are the most important Advances in AI?
- [2] PRC: Growing public concern about the role of artificial intelligence in daily life
- [3] Kaggle: Animal Image Dataset(DOG, CAT and PANDA)