

Categorizing Equus Members with Deep Learning

Miguel Corona

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1 Introduction

The objective of the project is to create a convolution neural network that can distinguish the members belonging to the Equus genus. The animals belonging to the Equus genus are horses, donkeys, and zebras. The network shall support the categorization of each pure breed i.e. hybrids such as mules are omitted due to being part horse and part donkey.

2 Data Preparation

2.1 Image Selection

Approximately 1040 total images were collected of horses, donkeys, and zebras. The images were selected such that each one only contains the animal associated with the image's label i.e. there are no images of hybrids nor images that contain more than one class. Images that contain multiple instances of the same class were permitted as entries to the dataset.

2.2 Preprocessing Data

The images were selected to emphasize their label. Any images that contained more than one class were cropped to ensure that a single class is present in the image. All samples were adjusted to become square images of dimensions 256 x 256 pixels with the use PIL. Landscape images were cropped to focus on the label to minimize potential information loss on the resizing of the images.

2.3 Data Distribution and Visualization

The distribution of samples is broken down in the following manner:

Donkey	392
Horse	315
Zebra	340

The reasoning for selecting more Donkey samples than those of the zebra is due to its variability. The breakdown may indicate that sufficient records are needed to distinguish between donkeys and adult horses and adult zebras, but additional donkey samples assist in determining whether a donkey or young horse or young zebra is present. Figure 1 contains a depiction of the data visualization.



Figure 1: Visualization of Equus Samples and Labels

2.4 Data Normalization

Normalization was performed on the images via rescaling of the RGB values such that the values lie in the $[0,1]$ interval. The rescaling of the RGB values on the images may alleviate the skewing that may occur on the grayscale images that may be present in the dataset.