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ITAI 1378

Lab 6 Chihuahua vs Muffin Experiment

This lab’s workshop walked us through key aspects of neural networks. In the lab we classified images, built a model, outlined it’s parameters, and explored the dataset as well. This taught me many concepts, as well as the ability to solve AI issues.

General Overview

Our lab taught us these key aspects via our experiment today, Muffin vs Chihuahua classification. While constructing our neural network for this very purpose, I furthered my understanding on data preprocessing, neural network construction, and PyTorch training loops. The notebook came with useful code comments, images, and other references in order to best explain the process. I was able to construct a useful AI model in google colab, while being educated in the process along the way.

Lab Objectives

This lab’s objectives were pretty clear-cut, ensuring we constructed our Neural Network correctly. Today’s objectives were to build and train a neural network, understand and utlise PyTorch, and then evaluate our newly constructed model. These primary tasks were easy to accomplish given the correct techniques.

Lab Techniques

In order to meet our objectives, I had to utilize our AI techniques from class. This involved preprocessing our data, defining the neural network, and using training on our new model. PyTorch resized our images to 244x244, and prepared them for our neural network. We even got to visualize it once our code block was corrected, helping me understand our mission even further.

Key Concepts

Neural Network Structure

While working on the lab many new lessons were taught, and old principles were reinforced. I learned that a neural networks is essentially many computational layers, used to digest and process data progressively. In our lab, the network used three layers to extract features from images, which resulted in our output layer. The output layer classified our images as either a chihuahua, or muffin.

Data Preprocessing

As we learned, images must be converted into easily digestible formats for our neural network. This is why the colab had the data be preprocessed, transforming each image into a consistent piece of data for the model to learn effectively.

Evaluation Metrics

Our model’s accuracy was quite high given it’s short time to be created. It’s accuracy on our validation set

Challenges and Missing Variables

While building our neural network, it became evident there were issues in the lab. While at first, I did not understand why there were “?”’s in place of variables, but understood that is where I must solve the issue. By inspecting existing code, and looking at the workbook, I was able to input the needed variables in place of the question marks. These question marks appeared in place of function names, variables, and etc. I was able to complete the entire notebook, while gaining understanding on what was missing, and what needed to be fixed. These issues were irritating at first, but then allowed for me to diagnose and solve them quicker and quicker as our workbook went on.

Effect on Personal Life

Useful Insights

This lab has helped me to understand not only neural network architecture, but what exactly impacts a model’s performance. Seeing how the neural network works in layers not only makes it easier to understand, but is a fascinating process, “simulated thought.” This was very interesting especially considering the way AI thinks problems through is a large interest of mine. This helped to refine my own AI abilities, and AI knowledge overall.

Real-World Application

AI Vision, especially in this use case, inspires so many use cases to be thought of. For example, a project where AI can tell a blind person, live, what they are seeing would work with this architecture. I also know this technology is used for medical imaging, and for good reason. With neural networks this complex and useful, it is no wonder we see AI vision helping people in real life all the time.