ITAI 2376

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<div align="center">L12 (AWS Module 3 Lab 1)</div>

Introduction

The purpose of this document is to report on the learning experience, actions taken, and personal impact experienced while completing the assigned lab. The lab that this report is based on involved running, understanding, and editing Python code for reading, inspecting, and extracting the features of image data.

Description of Experience

This reflection is drawn from AWS MLU's "Applications of Deep Learning to Text and Image Data" course, module 3 lab 1. The lab demonstrates how image data can be read and have features extracted from it. First, the necessary libraries were installed and imported. Next, the image dataset was loaded and a random image was inspected to get some more information about the dataset such as the size of the images. The image dataset was then transformed to a tensor dataset using PyTorch and could then be accessed using a dataloader. This step involved a challenge section with the purpose of changing the batch size of the dataloader's dataset. Once the dataloader is set up, the images can be inspected which, in this lab, was done by displaying each color channel of a sample image. Features can also be extracted from the images once in the dataloader by applying filters such as a Laplace or sharpening filter.

Personal Reflection

I was familiar with the contents of this lab so it was very understandable and easy to work through. Although it was not difficult, I still thought that it was engaging because it very effectively explains and shows how to read and extract features from image data. I think that this lab would serve as a good review resource or as an assignment to introduce the prerequisites of using CNNs to interpret images. Since we recently covered CNNs in class, the concepts presented in this lab were still relatively fresh in my mind. However, I have not seen the use of convolutional filters since my previous, computer vision-centric class. It was intriguing to see how the manual convolutions that we performed in class relate to those performed by the code in this lab.

Discussion

This lab strengthened my understanding of how images are converted into a form that is usable by neural networks and how convolutional filters are applied to images. I was able to practice my programming skills through the challenge sections. In the first challenge, I practiced changing the batch size of the dataloader which showed how decreasing the batch size increases the number of batches in the dataloader. For the second challenge, I saw that an image can be separated into its three color channels by zeroing the channels in the image's representative tensor that do not correspond to desired color. For a standard RGB image, this would mean that zeroing the 0 and 1 channels will display the image's blue color channel. In the last challenge, I

performed the feature extraction of applying a convolutional filter to the image. The filter that I used was a sharpening filter which was turned into a 3x3x3 which was then convolved over the image to create a feature map.

Conclusion

This lab demonstrated processes that are usually necessary to make image data useful for CNNs to train or make predictions on. It included loading, inspecting, and transforming an image dataset and then performing feature extraction techniques on the images. Although the concepts and tasks presented in this lab were not new to me, I still thought that it was enriching for my understanding of how to use and operate on image data.

References

AWS MLU - *Applications of Deep Learning to Text and Image Data*, Module 2 Lab 5: "Reading image data to find descriptors and create plots," Accessed April 10-11, 2024.