**ITAI 1378**

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**Reflective journal**

**First of all, it is difficult to identify photos in a general sense. The well-known "Chihuahua or Muffin" example shows how difficult it can be, even for computers, to distinguish between objects that look identical. This example demonstrated the requirement for robust models capable of extracting the salient features from photos in order to classify images correctly.**

**In this image classification model, we used PyTorch, specifically targeting the differences between the small dog and chocolate chip muffins. The main point was to familiarize us with key deep learning concepts, showing us the structure of neural networks, data processing with the model, and how the model was trained. Throughout the workshop, we were held by hand and she showed us the process of building a feedforward neural network, giving examples of how math is combined with it, and gaining hands-on experience with Pytorch.**

**We had data that was copied from a data set from a source file that we imported as plt. We also had torchvision imported to be utilized for loading datasets, applying transformation, and defining the neural networks by extending PyTorch’s nn.Module. The program gave participants an understanding of how to construct more complicated architectures for image classification problems, despite the fact that the implemented model only used fully connected layers.**

**I learned how machine learning can be applied to classify images into different categories. By training my own model to recognize a picture by going through a convolutional neural network, meaning that the model applies filters to the images so that it can detect specific features from the image layers (width/length of pixels, red, blue, green). It gave a quick overview of the basic structure and function of neural networks, all the layers activations, and the importance of forward passes, as we can see here:**

**A computer screen shot of a program

Description automatically generated**

is activated here 🡪

this is where the input data flows through the network

x is flattened and then passes through each layer

A computer screen shot of text

Description automatically generated

I noticed as well that the data was thoroughly prepared for training, like resizing images, normalizing, and the pixel values. The keyword that caught my eye was transforms. It gave a brief explanation of converting images to tensors. Basically, before it's fed into the model, it transforms. Resize((input\_height, input\_width)) resizes each image into the input that I gave it, which was 450x300. I'm guessing it does this because it needs to have all images the same size.

The normalize at the end gives the same value for each color channel RGB; it makes the pixel value have a mean of 0.5 as seen.A black background with white text

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A computer screen shot of a program code

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Real Word Applications:

Not some time ago, I saw a post on Instagram about computer vision talking about AI being able to identify breast cancer. I’m excited for the future of medical imaging; maybe in a not-so-distant future we will be able to predict cancer in more areas. YUPPYY

Tesla cars use image classification to distinguish different objects on the road. With this very basic model, we were able to classify a muffin from a chihuahua. Imagine the advanced training model that self-driving cars have to be able to continuously be moving and still identify objects.

Image classification systems can help in identifying criminals or monitoring activities in real-time, improving the security of a business or company.

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