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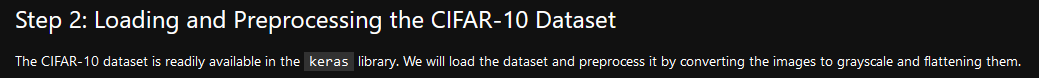
ITAI 1378

Professor McManus

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Assignment L05

Support Vector Machines (SVM) is a machine learning tool that helps sort data by finding a line or boundary that separates different groups. In image classification, SVM can be used to tell the difference between things, like whether a picture shows a cat or a dog, by looking at important details in the image. It's good for smaller sets of data and can work with both simple and more complex patterns using different methods. The preparation for this lab is very detailed and straight forward. The first step is installing the required libraries to include numpy, matplotlib, tensorflow, scikit-learn. Installing them all at once does take a little time but it was not a bad wait and without them we would not be able to complete the lab. It is important that after the libraries are installed that we import them and others as well to ensure we can use the functions that we need.



Step 2 is loading and preprocessing the dataset. This is the first time I have used a dataset that is built into a library and this made getting the correct data very easy. For several other labs I have used Kaggle or other online resources for the data and this is by far the easiest way I have loaded a library and learned that you can store some amount of data in a library. I understand that it isn’t the best way for large datasets but was a lesson learned. In the pre-processing of the data the steps taken are to train, assign the available names for the sets of classes. After this we are then able to filter and convert all images into the same size greyscale and flatness so the machine can filter classify them more accurately.

A screenshot of a computer

Description automatically generated

Step 3 Training, This step of the process is where everything comes together and how we can make sure that the model is fit well for our dataset. We want to make sure that the model isn’t over or under fit in the testing phase to ensure the most consistent results when we run it for the entire dataset. After this we are then able to see how the images look at the different stages of the process kind of a insight to what the code is doing and how it is able to work.

A screenshot of a computer screen

Description automatically generated

Conclusion, In this lab, we learned how to load, prepare, and classify images from the CIFAR-10 dataset using an SVM model. We converted the images to grayscale, flattened them into feature vectors, and used these to train the SVM. The model was then tested to see how well it could classify the images. While SVMs are good for tasks like image classification, they can be slow with larger datasets. This lab gave us a basic understanding of machine learning, and in future lessons, we’ll move on to more advanced models like Convolutional Neural Networks.

References:

<https://www.ibm.com/topics/support-vector-machine>