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L05

Being able to learn, and familiarize myself with the SVM Algorithm, & CIFAR-10 dataset was very interesting to say the least, because neither I was honestly familiar with. I learned the SVM (Support Vector Machine) is a supervised learning algorithm for classification tasks. I learned the CIFAR-10 dataset is used for image classification tasks. It has over 60,000 images amongst 10 different classes. Each image has a size of 32x32 pixels, and it is splint into 50,00 training images, and 10,000 test images.

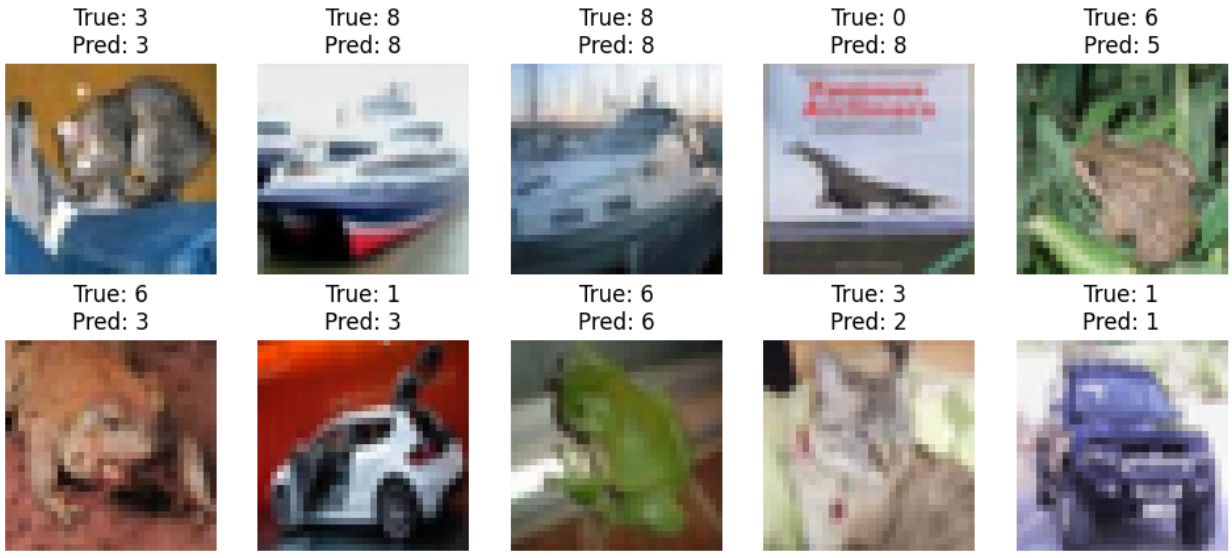
A issue that I did end up having was trying run the CIFAR-10 dataset in Jupyter notebooks. I did some research, and figured I may to need to work on reducing the size of my data even though I feel my computer should be resilient enough to process everything, I had to complete this project solely on Google Collab notebooks, because it worked more fluidly for me. The code that I attempted to run in Jupyter failed, while the code I ran in Collab produced nice results. So gaining experience on different platforms was a big takeaway for me this lesson. Limiting and manipulating sizes of data is another focal point, because a dataset containing so much should be handled efficiently. Also by adding greyscale to the images it reduces the complexity making the functionalities run faster, but sacrifices image quality. The data preparation process was basically importing the CIFAR-10 dataset, and using the SVM algorithm to classify and decide the images amongst different classes. The SVM models uses different kernels I just went with the GridSearchCV to tune hyper parameters, the models review was used with a accuracy, and classification report. Long time training with the SVMs was for sure my biggest issue. Everything really took a long time to load , and if it didn't load I received a lot of error messages even though I took the minimal route in the beginning to just make sure the program would run smoothly. Overall SVM is a powerful tool combined with different kernel methods, but it doesn't work so well with a dataset like CIFAR-10, because if its high influx of images and data. I feel like we're starting to make progress and this lesson was to for shadow for the more advanced

resources that can be used in these situations. From a source it stated CNNs (Convolutional Neural Networks) would be the better suitor to handle the image classification tasks.

An example of loading CIFAR-10:

```
# Import the need libraries
import numpy as np
import matplotlib.pyplot as plt
from tensorflow.keras.datasets import cifar10

# Load CIFAR-10 dataset
(x_train, y_train), (x_test, y_test) = cifar10.load_data()

# Define class names
class_names = ['airplane', 'automobile', 'bird', 'cat', 'deer',
               'dog', 'frog', 'horse', 'ship', 'truck']

# Visualize sample images
def plot_sample_images(images, labels, class_names, n=10):
    plt.figure(figsize=(12, 4))
    for i in range(n):
        plt.subplot(2, 5, i+1)
        plt.imshow(images[i])
        plt.title(class_names[labels[i][0]])
        plt.axis('off')
    plt.tight_layout()
    plt.show()

# Visualize 10 sample images
plot_sample_images(x_train, y_train, class_names)
```

For my instance I ran test that classified the images into different categories, in order to see if the SVM could detect the capability of actually figuring out what the image is, and these were my results.



The way that I gray scaled the images lost a lot of quality on recognition of the images in the classes I specified, but nonetheless AI wasn't able to 100% detect the images,.

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