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**Image Classification with SVM**

Understanding of concept of SVM

The main objective of a Support Vector Machine (SVM) is to identify the optimal hyperplane that effectively separates the data points of different classes in the feature space. Applying SVM in this assignment helped me gain a better understanding of the concept. However, using it for image classification with CIFAR-10 initially proved to be confusing, and I encountered difficulties in understanding the code.

Data Preparation

Transforming images by flattening them and converting them to grayscale was truly fascinating. It led me to contemplate the essence of the data we work with. Initially, I was worried that simplifying the images might result in losing important details. However, the results showed that the shapes and textures were enough for classification tasks like ours, even without color. This experience emphasized the importance of fully understanding your data before deciding on a model.

Training the SVM Model

SVM performed better than expected with certain classes, such as cats, dogs, and ships, despite not being designed to handle spatial relationships like CNNs. This challenged my assumption that deep learning models are always the best option. However, SVM's limitations became evident when dealing with complex visual data, highlighting the importance of using the right model for the right problem.

Application of SVM

Beyond image classification, SVM could be useful in other high-dimensional problems, such as text classification or sentiment analysis. This lab has broadened my understanding of SVM's applications.

Lessons Learned

SVM has limitations in handling images, as it took a long time to load until we got the subset of Dataset. The application was straightforward and very impressive. The data used has a significant impact on the outcome. Flattening and converting images to grayscale simplified the problem without losing too much important information.

Conclusion

This lab shows the application of SVM can still be a powerful tool in certain situations. It’s not always necessary to use deep learning; sometimes a simpler, well-applied model can do the job just as well. My biggest takeaway is the importance of thoughtful data preparation and critical model selection.