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# L06 Chihuahua or Muffin

The lab assignment was challenging but enjoyable to complete. This assignment gave me practical experience with tools that are utilized for machine learning projects and served as a helpful introduction to machine learning. My takeaway from this assignment was how I could use these tools to distinguish between photos of muffins and chihuahuas using convolutional neural networks (CNNs) and transfer learning. It illustrated how identical photos might offer issues for image classification models. During the lab, I discovered methods to maximize the accuracy and practical applications of machine learning.

## Objectives

The lab aimed for us to understand how CNNs operate and demonstrate how to use transfer learning to create an accurate image classifier even with a limited dataset. The skills we concentrated on included image preprocessing, which involved resizing or enhancing the images in order to prepare them for inclusion in the model. We also used convolutional neural networks to assist the model to sort between a chihuahua and a muffin, we used them to detect features like edges and forms.

## Challenges/How I Overcame Them

One of the issues I had completing this was how tedious the coding process could be. Several times, I had trouble debugging my code, especially when small mistakes made the code not run. I found myself going back to the Jupyter Notebook frequently to fix minor mistakes and test different codes to make sure the model would function. I would even refer back to the instructions with the assignment, thinking that I had missed an important step. This got annoying at times, and I discovered that I needed a lot of patience in order to attain the desired outcomes.

When faced with these challenges I used ChatGPT and the AI feature in Google Colab to check my code cells and fix any small mistakes that I had missed. These tools were very useful in speeding up the debugging process and helped me understand the errors in my code. Some errors I didn't understand why they wouldn't work even when I would change many things. By asking for explanations or suggestions for improvement, I was able to get the code running without wasting too much time on tedious corrections.

## Insights Gained

I learned that errors or unexpected results can be common in machine learning projects, which can be complex and tedious. Thanks to this lab, I now have a better understanding of how machine learning may be used for picture classification. I understand now that minor details like model design and image preprocessing can have a huge impact on a model's performance. I believe that I developed a greater appreciation for transfer learning since it spared us from the need to train from scratch and guiding us to employ a pre-trained model to get good outcomes.

## Potential Real-World Applications

"The skills learned in this assignment can be related to many diverse areas. These tools can help in medical imaging to identify abnormalities in any individual or tumors that are cancerous. Retailers use automated systems to improve service for customers and control inventory by making use of image recognition technology. These image classification methods can be used by self-driving cars to identify things while in motion. I can also imagine the potential within the fashion and cosmetics industry. Product recommendations could be based on image classification to predict fashion trends or user preferences.

## Conclusion/ Personal Reflection

This assignment really taught me a lot about not just the technical side of machine learning but, actually, how significant persistence and problem-solving are in life. Sometimes, I found the process of coding to be very tedious, where a minute mistake initiated the failure of the whole code. With help from AI tools like ChatGPT, those mistakes could be repaired and the flow of machine learning code could be understood. The process also showed the need for flexibility and openness toward the adoption of new knowledge. This was my first time seriously using transfer learning and CNNs, and although the process was challenging, I enjoyed getting the model to work.