

AI LABS

Image classification using CNN and PyTorch

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Overview

This code is a simple image classification model trained on a dataset using the PyTorch framework. The model is built using a convolutional neural network (CNN) architecture and trained on a dataset consisting of images of animals. After training, the model is able to classify new animal images with high accuracy.

The code first imports required libraries including PyTorch, NumPy, and PIL. It then sets up the dataset and data loaders for training, validation, and testing. Next, it defines the CNN architecture and sets up the optimizer and loss function for training. Finally, it trains the model on the dataset and saves the trained model.

To classify a new image, the code loads the trained model and applies it to the input image. The input image is pre-processed using the same data transforms that were applied to the training data. The model outputs a predicted label, which is then translated from Italian to English using a dictionary.

Before you start (Pre-requisites)

Have a Gmail account to use google Colab (easy to use, with all the necessary python libraries pre-installed), alternatively you can use different IDE's (e.g. Visual studio code, jupyter notebook, pycharm, etc). But make sure you have Python installed on your computer and all the required library.

Note: Training large data set in google colab will be timed out and interrupted with free version. In that case you can use jupyter notebook.

Training the model is often time consuming depends on the GPU, so you have an alternative you can use our AI-Tech.pt model which is already trained on the same Datasets.

Data

You can download the dataset from here: [Dataset](#)

Make sure you give the correct path for the dataset in the code.

Alternative you can use our pre-trained AI-Tech.pt model from here: [ai-tech.pt](#)

Get started

1. The code is used to train a machine learning model to recognize images of animals.
2. Before you can use the code, you need to make sure that you have all of the necessary software installed on your computer. This includes Python, the PyTorch library, and several other packages that are used by the code. You should also make sure that you have a folder containing a set of images that you want to use to train the model.
3. Once you have everything installed and set up, you can run the code by opening a terminal window, navigating to the folder containing the code, and typing `"python [filename]"` (where `"[filename]"` is the name of the Python script that contains the code).
4. When you run the code, it will first load the images from the folder you specified, and then it will split them into three sets: a training set, a validation set, and a test set. It will then use these sets to train the machine learning model.
5. The training process can take a while to complete, depending on the size of your image set and the speed of your computer. Once the training is finished, the code will save the trained model to a file on your computer.
6. You can then use the trained model to classify new images by running the code again and providing it with an image to classify. To do this, you will need to open a terminal window, navigate to the folder containing the code, and type `"python [filename]"` (where `"[filename]"` is the name of the Python script that contains the code).
7. When you run the code to classify a new image, it will first load the trained model from the file that it saved earlier. It will then ask you to provide the path to the image that you want to classify.
8. Once you provide the path to the image, the code will use the trained model to classify it. If the image contains an animal that the model recognizes, the code will print out the name of the animal in English. If the image contains an animal that the model doesn't recognize, the code will print out the name of the animal in the language used by the dataset that was used to train the model (Italian).
9. That's it! With these instructions, you should be able to use the code to train a machine learning model to recognize images of animals and classify new images based on what the model has learned.

Conclusion

The code is an example of how to train a Convolutional Neural Network (CNN) using PyTorch to classify images into different categories. The code loads an image dataset, pre-processes it, splits it into train, validation, and test sets, defines a CNN architecture, trains the CNN on the training set, evaluated its performance on the validation set, and finally uses it to make predictions on new unseen images. The trained model is saved for future use. The code can be used as a starting point for developing image classification systems for various applications.