

A Practical Introduction to Deep Learning with Caffe and Python

// tags deep learning machine learning python caffe

Deep learning is the new big trend in machine learning. It had many recent successes in computer vision, automatic speech recognition and natural language processing.

The goal of this blog post is to give you a hands-on introduction to deep learning. To do this, we will build a Cat/Dog image classifier using a deep learning algorithm called convolutional neural network (CNN) and a [Kaggle dataset](#).

This post is divided into 2 main parts. The first part covers some core concepts behind deep learning, while the second part is structured in a hands-on tutorial format.

In the first part of the hands-on tutorial (section 4), we will build a Cat/Dog image classifier using a convolutional neural network from scratch. In the second part of the tutorial (section 5), we will cover an advanced technique for training convolutional neural networks called transfer learning. We will use some Python code and a popular open source deep learning framework called Caffe to build the classifier. Our classifier will be able to achieve a classification accuracy of 97%.

By the end of this post, you will understand how convolutional neural networks work, and you will get familiar with the steps and the code for building these networks.

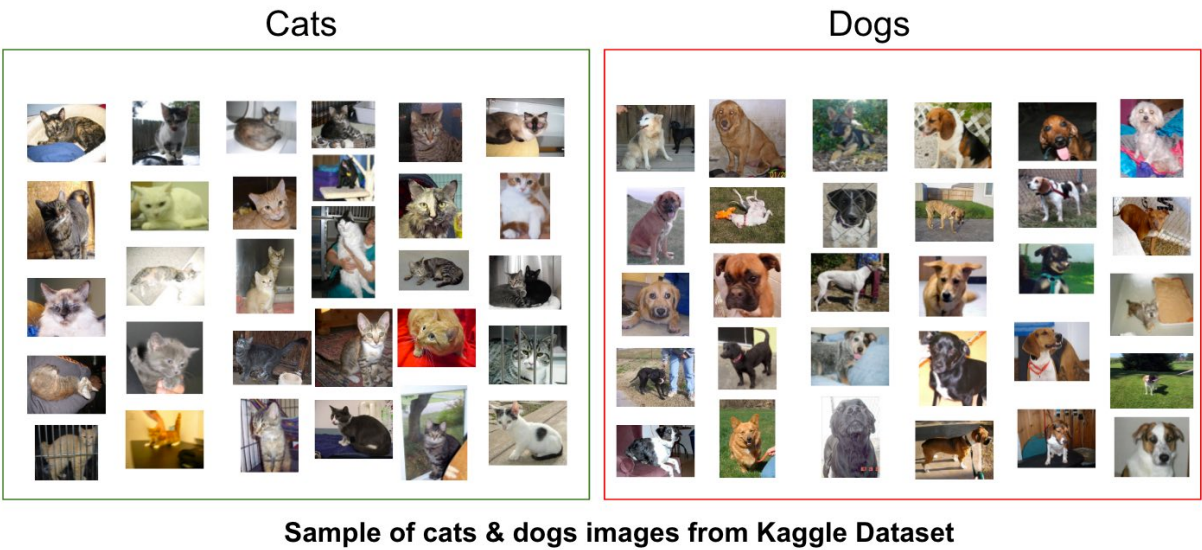
The source code for this tutorial can be found in this [github repository](#).

1. Problem Definition

In this tutorial, we will be using a dataset from [Kaggle](#). The dataset is comprised of 25,000 images of dogs and cats.

Our goal is to build a machine learning algorithm capable of detecting the correct animal (cat or dog) in new unseen images.

In Machine learning, this type of problems is called classification.



2. Classification using Traditional Machine Learning vs. Deep Learning

Classification using a machine learning algorithm has 2 phases:

- Training phase: In this phase, we train a machine learning algorithm using a dataset comprised of the images and their corresponding labels.
- Prediction phase: In this phase, we utilize the trained model to predict labels of unseen images.

The training phase for an image classification problem has 2 main steps:

1. Feature Extraction: In this phase, we utilize domain knowledge to extract new features that will be used by the machine learning algorithm. HoG and SIFT are examples of features used in image classification.
2. Model Training: In this phase, we utilize a clean dataset composed of the images' features and the corresponding labels to train the machine learning model.

In the prediction phase, we apply the same feature extraction process to the new images and we pass the



602
Shares

- 
189
- 
162
- 
14
- 
- 
- 