Cats vs Dogs Classification

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Fig. 1 Classification

Introduction

- The goal of this project is to find an object of a pre-defined class in a static image.
- This Model differentiates whether an image is of a cat or dog using Convolutional Neural Networks.
- Open-CV is the huge open-source library for computer vision, machine learning, and image processing

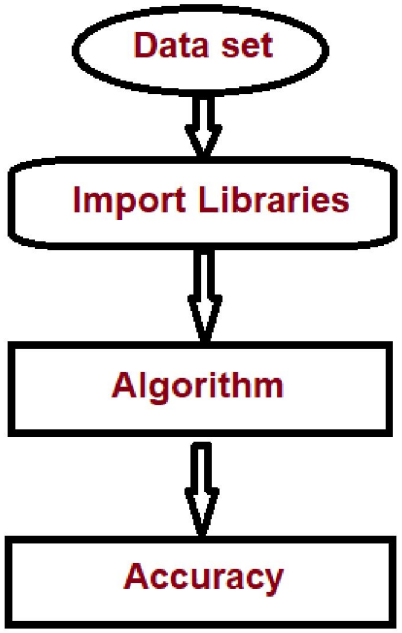

Fig. 2 Block Diagram

Objective

- The main purpose of this project is to classify dog or cat.
- It comprehensively includes a variety of important techniques, such as image processing, pattern recognition, artificial intelligence and machine learning.
- Develop a efficient algorithm in terms of low computational complexity ,with the maximum number of classifications and the minimum number of false alarms.
  - Keras – Tensorflow backend
  - OpenCV – Used to handle image operations

Problem Statement

- The goal was to demonstrate the classification capability
- The dataset is comprised of photos of dogs and cats provided as a subset of photos from a much larger dataset of 3 million manually annotated photos
- The important difference is the “variable” part. In contrast with problems like classification, the output of object detection is variable in length, since the number of images are there and quality is decent it made difficult for the classification

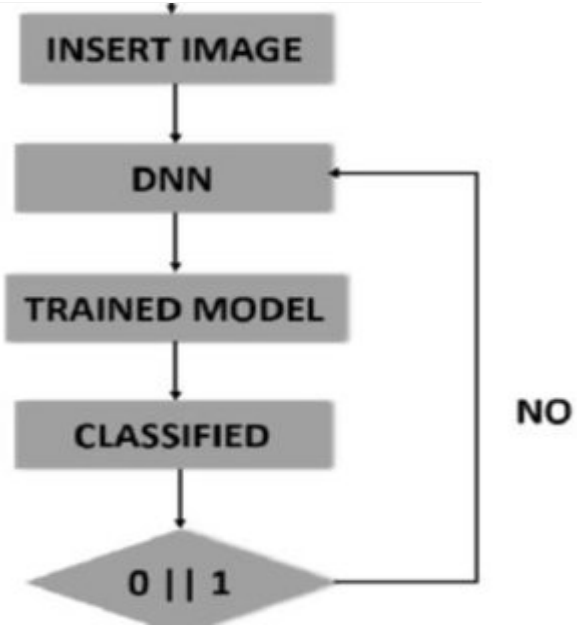

Fig. 3 Flow Chart

OPEN CV

- OpenCV is a great tool for image processing and performing computer vision tasks.
- It is an open-source library that can be used to perform tasks like face detection, objection tracking, landmark detection, and much more.
- It supports multiple languages including python, java C++
- OpenCV is extensively used in top companies, research groups, and governmental bodies. Top established companies like IBM, Sony, Honda, Google, Yahoo, Microsoft, Intel, Toyota employ this library.

Keras

- The Keras library in Python makes it pretty simple to build a CNN.
- Computers see images using pixels. ...
- This dataset consists of 70,000 images of handwritten digits from 0–9.
- The aim of the artificial neural network makes the convolutional neural network more advanced and capable enough of classifying images.
- Here we are using a dense class from the Keras library from creating a fully connected layer and output layer.
- The softMax activation function is used for building the output laye

CNN

A **Convolutional Neural Network** is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.

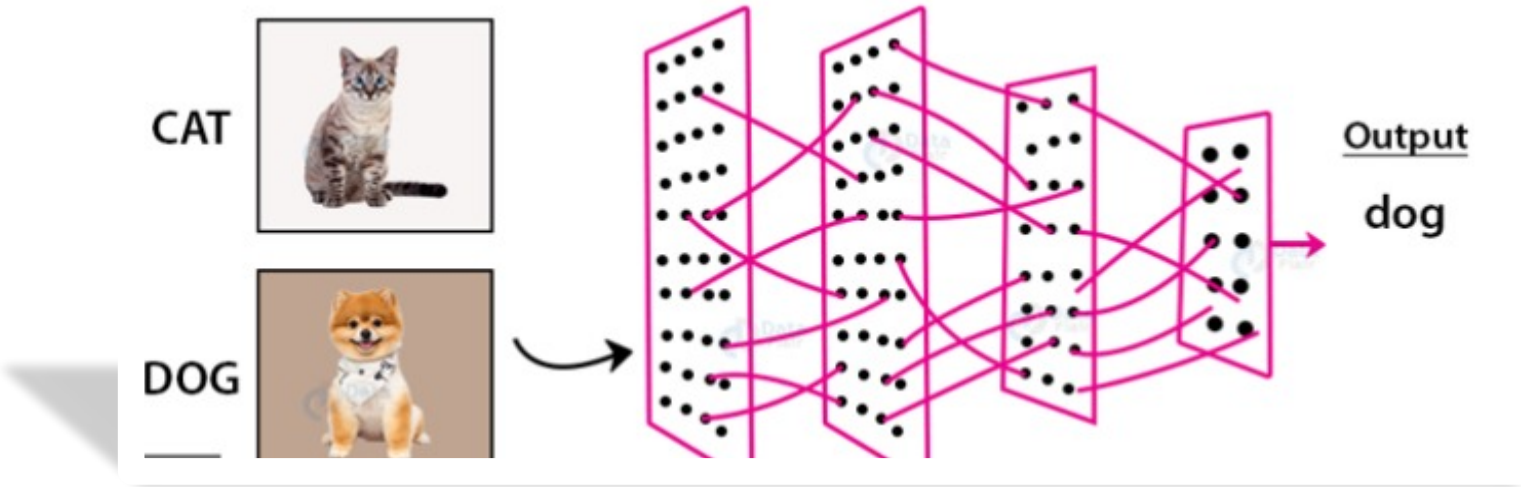

Fig. 4 CNN working chart

In deep learning, a convolutional neural network (CNN/ConvNet) is **a class of deep neural networks**, most commonly applied to analyze visual imagery.

Now in mathematics convolution is a mathematical operation on two functions that produces a third function that expresses how the shape of one is modified by the other

Fig. 4 CNN process flow

Methodology

- first, we have to import data with the help of os.
- the captured images is converted to proper size by using resize function.
- Then we apply CNN to our model and apply convolution metrices.
- It should be clear that the Viola-Jones algorithm is not restricted to face detection only.

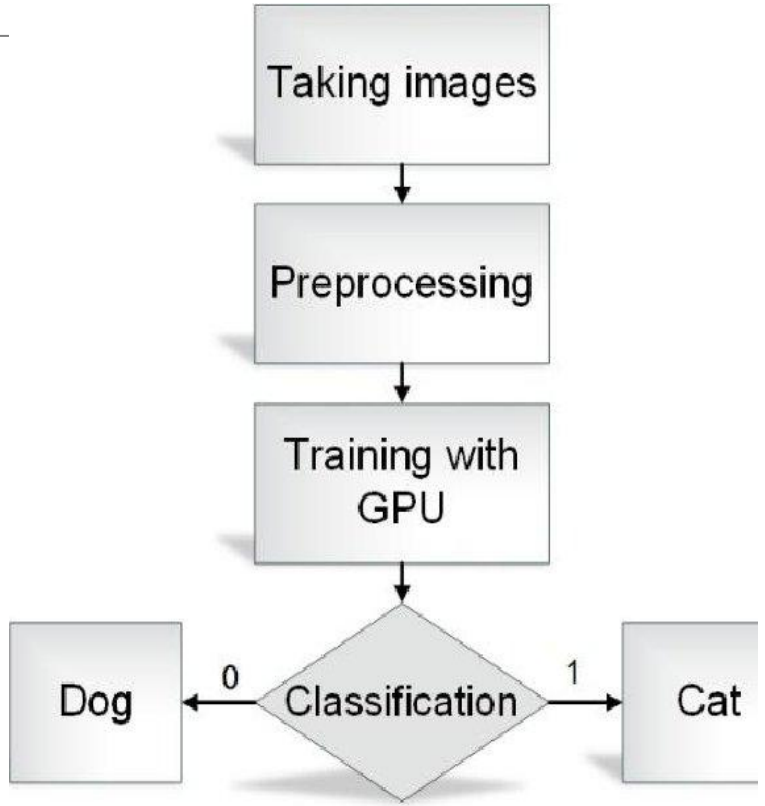

fig. 4 Classification

Applications

- CNN is mainly used in image analysis tasks like Image recognition, Object detection & Segmentation. There are three types of layers in Convolutional Neural Networks: 1) Convolutional Layer: In a typical neural network each input neuron is connected to the next hidden layer.

- Convolutional Neural Network is a type of deep learning neural network that is artificial. It is employed in computer vision and image recognition. This procedure includes the following steps: OCR and image recognition

Conclusion

- Through this project we can determine whether the image is of a cat or a dog using Deep Learning
- Convolutional Neural Network (CNN) is an algorithm taking an image as input then assigning weights and biases to all the aspects of an image and thus differentiates one from the other.
- The VGG-16 is one of the most popular pre-trained models for image classification. Introduced in the famous ILSVRC 2014 Conference, it was and remains THE model to beat even today.
- This technique plays very important role in identification of jacket with higher accuracy and at good pace

Refrences

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THANK
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