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KERAS DEEP LEARNING PACKAGE IN PYTHON: A REVIEW

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Abstract:
Python's popularity is growing. It is a member of the languages that are used most frequently, having supplanted a lot of others in the in the workplace. Python is well-known among developers for a lot of reasons, one of which is because it offers an exceptionally wide groups of libraries that people can utilize. This document gives an up-to-date assessment of Keras, an Application Programming Interface (API) for deep learning built on the Tensor Flow machine learning framework and developed using Python. The mentioned package utilizes Tensor Flow, and others, to integrate deep learning models such as neural network graphs for identifying medical problems, and others. The purpose of this paper is to guide readers to Keras, a library which offers exceptionally strong and abstract building blocks for deep learning networks.

Keywords: Keras, PyTorch, Tensor Flow, CNN, neural network graphs, Deep learning.

Introduction

A rise of machine learning techniques over the past few decades has resulted in widespread use in a variety of industries. Significant increases in terms of training set quantity and available resources for processing have led in the development of a new generation of applications. As the outcome of this advancement, the use and spread of deep learning has grown[1][2]. There are many languages of programming provide packages and tools for populating neural networks that are artificial. Yet, Python has emerged as the clear winner in this arena[3]. Python is a straightforward and easy-to-use computing language with several scientific packages such as Num, Scipy, Keras, and others for performing particular simulations, regression analysis, and determining basic differential equations[4]. The field of deep learning is a subfield of Machine Learning that employs artificial neural networks to solve issues with big datasets. Additionally, the technology is influenced by the functioning of the human brain. Furthermore, without human interaction, artificial neuron networks evaluate enormous data sets to uncover underlying patterns[5].

Deep Learning approaches gives a solid foundation for Supervised Learning. The learning model presents greater accuracy of labeled image data by adding more layers. The capabilities of hardware expanded for computer processing, the rising size of data needed for training the model, and the developing advancement in research to ML algorithms and information handling are

three key causes driving the growing acceptance of deep learning today. Deep learning applications include, but are not limited to, machine vision, recognition of speech, natural language processing, and other associated fields. [6][7]. On top of the Tensor Flow machine learning framework, Keras is a Python-based deep neural network API. It was designed to allow for speedy experimentation while also providing a delightful development experience. Keras's goal is to provide every one that wants to have an unfair advantage in shipping ML-powered apps[8]. This paper is organized as follows: First, we introduce Python, its packages and deep learning. Second, we will describe the theoretical concepts which represents in related works. Third, we show what is a keras with its goals, advantages and disadvantage. Finally, we offer a conclusion for this paper.

1. Related work

In [9].This work investigates the problem of Arabic script identification in the context of OCRing-based recognition. Utilizing Keras and Tensor Flow, an innovative design is suggested that combines the Rapid Gradient Sign Method (FGSM) with adversarial image creation throughout the training phase. Furthermore, the research uses deep learning to improve the OCRing accuracy of picture improvement, position, layout analysis, and recognition in multilingual systems. A specially trained deep learning algorithm that uses bounding box regression trained using Keras and Tensor Flow will be used to detect RoIs. Using the reinforcement strategy, this subject studies a modification of the Page Segmentation strategy (PSM) to enhance OCRing parameters and the precision of an Arabic OCRing system.

In[10].The first stage of this method is Region of Interest Segmentation, which is based on the color space segmentation methodology and employs a pre-set color range to separate pixels (hand) from the background (pixels not in the targeted area of interest). The images with segments are then sent into a Convolutional CNN model for categorization of images in the system's second phase. For picture training, we used the Python Keras library. The system highlighted the significance of picture segmentation in the recognition of hand gestures. The best model has an efficiency of 58 percent, meaning it is approximately 10% more than the precision obtained without image segmentation.

This article [11]. The TSFEDL library is shown. It brings together 22 cutting-edge methods enabling time series feature extraction and estimation, using convolution and recurring deep neural networks for use in a wide range of data mining situations. Tensor Flow + Keras and PyTorch modules are used in the library, which is licensed via the AGPLv3 license. The efficiency of the assessment of the designs given in the suggestion validates the utility of the Python module.

In[12]. They suggest AI that identifies facial expressions by utilizing the multiple layers of CNN. Deep Face Emotion Recognizer (FER) evaluation, which includes datasets and methodologies to provide light regarding these fundamental difficulties. Initially the FER plan for obtaining advice at each level is implemented, which includes necessary historical data. The FER challenge dataset from kaggle was used for the experiment. The development context includes the Python libraries keras, Tensor Flow, and cv2.

In [13]. Their goal in implementation this system is to research and evaluate (ML) methods for recognition and identification of individuals sporting fa Masks in pre-recorded movies is their project's aim., images, or real-time (real-time) based on Keras. The suggested approach employs PCA, or principal component analysis, and using HAAR Cascade Algorithms.

In [14]. SciANN is presented as a Python instrument for deep learning with artificial neural networks based on physics and computational science. SciANN builds deep neural network and algorithms for optimization using the well-known deep learning packages Tensor Flow and Keras, gaining features from Keras like batch optimization and modeling repetition for learning by transfer. They demonstrate ways the structure can be utilized for fitting curves on separate information, as well as resolving and finding PDEs in both weak and strong forms, through a number of cases.

In [15]. They propose a Tensor Flow-Keras model implementation of graph convolution and graph pooling layers that allows for Integration that is both seamless and adaptable into normal Keras layers to put up graph in a functional manner. They created the Keras Graph CNN, which is built based Tensor Flow and Keras and focuses on a transparent tensor structure transmitted among layers as well as user-friendliness.

In[16]. This study formalizes the challenge by augmenting the well-known Keras Python framework with the concept of Composed Neural Networks (CpNNs). In Keras, CpNNs formalize the simultaneous building of many interacting neural networks. Furthermore, They enable modular compilation from a given CpNN to C code utilizing the proposed semantics. The resulting code can be used to do Worst-Case Execution Time (WCET) analysis. For the comparisons they provided, their method exceeds Esterel with a median WCET reducti on of 64.06% and Tensor Flow Lite with a median measurable WCET reduction of 62.08%.

In [17]. They began by providing a quick introduction to the field of deep learning (DL) before going on to evaluate the prominent options for scalable platforms for DL research. They examined the Keras ecosystem thoroughly for insight into what makes it distinctive, as well as sample code to determine how straightforward the framework is to use for building DL models. They produce digital elevations information for a segmentation framework using the Keras package, instead of standard human processing processes such as tiling rasters to samples of masking samples out the study's area, and applying digital elevation model dependents.

In [19]. Regarding distributed neural network learning over numerous GPUs or CPUs, they offer a compact Python platform. The well-known Keras machine learning library. To coordinate the training process, the (MPI) protocol is employed, and the system is well suitable for task give at supercomputing locations

2. Keras

Keras is a free more advanced neural network toolkit written in the Python which may be used on Theano, Tensor Flow, or CNTK. François Chollet, a Google developer, designed it. It was created to be user-friendly, extendable, and modular for the purpose to allow for faster experimenting with deep neural networks. It not only supports Convolutional and Recurring Network alone, as well as in combined. Keras gives explicit feedback when an error occurs, reducing the amount of user activities for the vast majority of frequent use cases.: Simple to learn

and apply, Extremely adaptable.Keras gives all of its programmers a lot of freedom through the integration of low-level machine learning languages like Tensor Flow or Theano, which means that everything written in the language of origin may be executed by Keras [5][8][20][21][22]. Keras is intended to lessen cognitive strain by accomplishing the following objectives:

- Provide simple, consistent user interfaces.
- Reduce the amount of actions required for typical use cases.
- Give clear and relevant messages of error.
- Follow the principle of gradual complexity disclosure: It's simple to get started, and you may acquire as you go to finish complicated workflows.
- Assist you in writing clear, readable code

3.1 Keras benefits include the following:

- The speedier deployment of network models is simple to grasp and incorporate.
- It has a large market community support because most AI businesses want to use it. It supports several backends, which means you can use either of Tensor Flow, CNTK, or Theano with Keras as a backend depending on your needs.
- It also supports cross-platform due to its ease of deployment.
  Keras may be installed on iOS and CoreML, Tensor Flow on Android Android Web browser with.js support Cloud engin and the Raspberry Pi
- It allows data parallelism, which means Keras may be trained simultaneously on several GPUs.
- It allows information parallelism, which implies that Keras may be taught on several GPUs at the same time, shortening train time and interpreting large amounts of data.

3.2 Keras' disadvantages

The only drawback is that Keras has a number of pre-configured layers and will not allow you to establish an abstraction layer because it is unable to handle minimal APIs. Only high-level APIs executing on front of the back processor (Tensor Flow, Theano, and CNTK) are supported.

4. Conclusion

With the fast growth of machine learning in numerous domains, large corporations and research groups have created autonomous and one-of-a-kind tools. Deep Learning with Python teaches thousands of readers how to fully utilize deep learning's possibilities.Current deep learning breakthroughs provide interesting new software capabilities such as automatic language translation, image recognition, and more. Deep learning is increasingly becoming required expertise for every software developer, and new technologies such as Keras and Tensor Flow are making it possible. Keras is a Python-based free higher levels neural network package that can operate on Theano, Tensor Flow, or CNTK. To make deep neural network programming simpler, Keras offers numerous implementations of frequently used neural network building blocks like layers, objectives, activation functions, optimizers, and a plethora of tools for working with image and text data.

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