Research on Image Processing Optimization Technology Based on Deep Learning Algorithm of Big Data Processing Technology

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Abstract: In the context of the era of big data, the application of deep learning algorithms in the field of machine learning has gradually expanded, and has achieved great achievements in image recognition, online recommendation and speech recognition. Applying the deep learning algorithm to the image processing process has a very good application effect and is beneficial to improve image quality. Therefore, based on big data processing technology, this paper deeply studies the image processing optimization technology of deep learning algorithm, which is beneficial to break the technical barriers of related industries and improve image processing efficiency.

1. Research Background

1.1 Literature review

The deep learning algorithm can be applied in different fields, combined with the teaching methods of higher vocational colleges, can play a good teaching effect.Through in-depth analysis of the deep learning algorithm, Wang Suhua explores a new online course learning method for different students' learning characteristics, which is of great significance to the improvement of teaching quality (Wang, 2018).Under the background of rapid development of Internet technology, Wang Nengyu and Yang Min have deeply studied the application of deep learning algorithm in image-cutting platform. It is found that with the help of deep learning algorithm, online payment mode can be generated, which is beneficial to the transformation and upgrading of the platform. It has important exploration significance (Wang and Yang, 2018).Zhou Linteng deeply analyzed the big data analysis method of neural network algorithm, studied a deep learning algorithm of “big data + neural network”, and analyzed the application effect of the deep learning algorithm in image feature extraction, and found that the algorithm has strong performance. Advantages and calculations (Zhou, 2018).Wang Yuanyuan et al. proceeded from the three models of deep learning algorithms, and deeply explored the application of deep learning algorithms in the field of medical image analysis. From the aspects of application development, model construction, big data wave and feature learning, the deep learning algorithm was prospected. It is conducive to filling the research gap in the academic field (Wang et al, 2016).

1.2 Purpose of research

With the gradual acceleration of computer hardware and software update, the information dissemination method has gradually shown a diversified development trend. In the process of information dissemination, images have become a mainstream form of communication (Ding et al, 2018).The image contains an intuitive and intense visual sense that some voice and text information cannot be compared. Intelligent processing of images with the help of computer technology has become the focus of the relevant field.The process of processing images by a computer is an operation flow for image recognition and classification by machine learning. The machine learning process is essentially a deep learning process. Deep learning algorithms are widely used in the fields of speech recognition and classification, natural language understanding and image recognition.However, in the field of speech recognition and natural language understanding, relevant scholars have conducted in-depth research on deep learning algorithms, effectively filling

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the theoretical gap of industry application. In the field of image recognition, only a few scholars have conducted in-depth analysis of deep learning algorithms, which is not conducive to the application of deep learning algorithms in related industries.Therefore, this paper deeply studies the image processing optimization technology based on the deep learning algorithm of big data processing technology, which has important research value for improving image quality.

2. Overview of image processing for deep learning algorithms

As we all know, deep learning algorithms are mainly produced in the context of the rise of big data technology. The generation of big data mainly requires a very large amount of data to support the orderly operation of related systems (Zhang et al, 2019).In the actual operation process, the expansion of data size and the sharp increase of continuous concentration have a certain influence on the recognition effect of deep learning algorithms. At the same time, the degree of image information features is also a key factor in speeding up the recognition speed of deep learning algorithms.The key factor of deep learning algorithm for data extraction is to use the original information data of the image, to classify the corresponding data by mining the salient features in the information, and then delete the unnecessary information and retain the effective information, which is beneficial to the redundancy in less relevant systems. Other information.For images recognized by the deep learning algorithm, a large amount of image data is required. Therefore, image information preprocessing plays an important role in the process of deep learning algorithm recognition. Preprocessing the image can effectively improve the image quality and highlight the salient features of the image. The depth learning algorithm recognizes the results and has a significant correlation to image quality.

In general, image data preprocessing accounts for almost 80% of all projects in some common pre-processing projects. Therefore, image processing plays a very important role in the deep learning algorithm. The standard of image data preprocessing is mainly to select specific image data in massive data. Mainly based on the images that need to be processed, the corresponding data sets are listed, and the position of different data sets is determined, and data preprocessing can be started.The image data preprocessing is mainly to solve these problems: First, it solves the problem that the image size is inconsistent with the model sample. Due to different factors, the image size may change greatly, which is significantly different from the requirements of the model. By using the deep learning algorithm, the differential data can be eliminated, which is beneficial to maintain the image size consistency.The second is to eliminate the difference in brightness between images. Therefore, each image contains many meaningless information, which is affected by different acquisition methods. Each image contains different noises, which results in a large difference between the brightness of the images after acquisition, and the data distribution is uneven. With the help of the deep learning algorithm, the image data information can be observed and acquired, and the related data can be whitened and normalized, which can effectively avoid the problem of large difference in image brightness.Therefore, before using the deep learning algorithm for image data processing, the corresponding image data must be collected and classified through the corresponding preprocessing process, so that the reaction speed and quality of the image data can be improved. In the actual application process, in order to display image information more accurately and extract the experimental and representative experimental data, it is necessary to use the deep learning algorithm to identify and preprocess the relevant data, which is beneficial to different environmental conditions. Corresponding preprocessing of the constructed image dataset greatly improves the image quality and is of great significance for the development of related fields.

3. Analysis of image processing characteristics of deep learning algorithm based on big data processing technology

Image dataset processing is a major component of deep learning algorithms. The depth learning algorithm recognizes the level of effect, mainly depending on the image data set. Therefore, the deep learning algorithm and the image data have an interdependent relationship, and the certain data

recognition between the two is beneficial to improve the image quality. In general, the number of image data sets processed by the deep learning algorithm is up to tens of thousands, and various types of image data are contained therein. In the deep learning algorithm, the image data mainly includes the following. One is the MNIST handwritten digital dataset, which was created primarily by Google Labs and New York University. Among them, about 60,000 images, and the test set includes about 10,000 images. In the process of deep learning algorithm recognition, the handwritten digital data set is an entry level and the basis for deep learning.

Imagenet is a data set that tests performance standards. This data set is mainly to classify, locate and test images. In the actual application process, a special team is needed to process and maintain the image data, present the corresponding document introduction, and the use process is very convenient and fast. The papers in the visual field are published, mainly based on this data set.

The COCO dataset, a dataset about image semantics, image segmentation, and new image recognition. It belongs to an open source dataset that is almost used to evaluate standard datasets in deep learning algorithms. In general, the data set mainly includes ten categories, and there are about 600 pictures in each category. Among them, about 500 pictures are used for training, 100 pictures are used for testing, and for deep learning algorithms, small-scale data sets are mainly used.

In the context of the Internet, the amount of data required for deep learning algorithms is enormous. However, in the actual application process, it is still impossible to directly use the image as a training data set and a test data set of a deep learning algorithm in a specific field. Moreover, in different contexts, due to the variety of formats and forms of image storage, some image features cannot be applied to other image features. For example, the GTSRB dataset for the German traffic sign contains approximately 30,000 images internally and approximately 8,400 images are required during the test. The expression dataset mainly uses the FER2013 database. The required images in the training process are about 35,000, and the number of images required during the test is about 3,500. From the image distribution, it is obvious that there is a big difference between the two data sets, but in fact, both data sets are model CNN using a deep learning algorithm. Originally, the same deep learning algorithm model CNN was used, but in the image processing process, it can be found that there are differences in the data sets used, and the recognition rate is also different. If you want to study image recognition in depth, you need to use the image dataset of a specific deep learning algorithm. This indicates to some extent that the deep learning algorithm cannot accurately describe the specific properties of different datasets in the first time, and some image information cannot be At the same time, all displays are performed. Therefore, when the corresponding image data is identified by the deep learning algorithm, it is necessary to accurately identify the image data set according to different environmental conditions, and pay attention to the use range of different data sets of the same model.

4. Image Processing Optimization Technology Based on Deep Learning Algorithm of Big Data Processing Technology

Based on big data processing technology, in the image processing process, it will be interfered by many factors, such as the atmosphere, rain, light, temperature, etc., which will affect the quality of image data processing. In order to more accurately utilize the deep learning algorithm and train the specific features of the image data set, it is first necessary to extract the data with more capacity under certain conditions. The deep learning algorithm mainly relies on massive data. Secondly, improving the quality of image processing mainly includes normalization processing and enhancement technology of data. With these two technologies, it is possible to extract obvious image features, which is beneficial to guarantee image quality and improve the recognition rate of deep learning algorithms. Again, it is necessary to increase the speed of operation of the image data. In the process of processing the previous image dataset, it takes a lot of time to use the parallel computing method to perform dataset preprocessing, which greatly improves the efficiency of the image data, and is conducive to the smooth development of subsequent work. In general, the image processing optimization technology based on the deep learning algorithm of big data processing technology mainly includes two aspects.

On the one hand, data amplification technology. In recent years, the image processing optimization technology of deep learning algorithm has been widely used in different research fields for two reasons. One is that the hardware servers in the current related fields have computer performance. The second is that the deep learning algorithm is mainly developed on the basis of big data, and the target data samples are relatively large. However, in the actual application process, the deep learning algorithm mainly has a problem, that is, by training a large number of data sets to obtain corresponding recognition results, if there is not a large number of data sets for support, it will cause over-fitting problems, resulting in a gradual decrease in data accuracy. The trained models are also difficult to be widely used in the corresponding scenes. The data amplification technique also preprocesses the image and expands the image dataset by changing the preprocessed image features, such as translation, rotation, and noise. At the same time, it is also possible to mirror the existing data to expand the new batch of data sets to achieve the purpose of image data amplification.

On the other hand, image quality optimization technology. Affected by different factors in the natural environment, the image contrast shot taken under different conditions is relatively small, resulting in the inaccurate and clear resolution of the detected image details, so the image data needs to be enhanced. Image data enhancement techniques can be used to improve image sharpness, remove noise, improve image recognition, and embody image features. In general, image quality optimization techniques include more methods, not only to improve image contrast, but also to avoid the impact of pixels on image quality. At the same time, since there are many ways to obtain images, in the process of acquisition, affected by different factors, the size of the images is relatively inconsistent. In order to improve the speed of image processing and ensure the accuracy of image data recognition, image data is needed. The set is normalized. The normalization process is a series of changes to the picture, converting the original image data that needs to be processed into a unique standard form to improve the overall image quality.

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