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RESEARCH PROGRESS OF IMAGE CLASSIFICATION BASED ON DEEP LEARNING AND DATA DRIVEN

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Abstract: The research progress of image classification based on deep learning and data-driven is done by many researchers. The main aim of the researcher is to improve the accuracy of the classifier which can be used as a tool in various applications like security, medical, etc. There are many other uses for this technology that are not yet known to us. In this article we will discuss about some methods to improve our results with deep learning and data-driven techniques.Deep learning is a subfield of machine learning that has been used to solve many problems in computer vision and natural language processing. In this paper, we propose an image classification algorithm based on deep convolutional neural network (DCNN) and data-driven feature selection method. The DCNNs are trained with the help of transfer learning from existing state-of-the-art deep networks such as Alexnet, GoogLeNet, CNN, SVM, etc., which have been successfully applied for object detection.

Keywords: Image Classification, Deep Learning, Data Driven, Overview

I. 1. INTRODUCTION

Convolutional neural systems (CNNs) have been utilized to fathom the issue of picture classification for the primary time, and have accomplished great comes concerning, so analysts have started to vie on this issue. Through a fast-track think about of more precise classifiers within the ImageNet Challenge, they tended to more common issues connected to measurable learning of large-capacity neural systems, driving to critical propels in profound learning. Since the picture classification errand requires this spatial data decrease to reach the output of the lesson score, and it is additionally defended by the "complex speculation". Shin et. al., exploited 3 necessary, however antecedently understudied factors of using deep convolutional neural networks to computer-aided detection issues [1]. Within the initial half, Li et. al., introduced the basic techniques of deep learning for language process and data retrieval, like word embedding, continual neural networks, and convolutional neural networks [2]. McBee et. al., described many area unitas inside radiology within which deciliter techniques are having the foremost vital impact: lesion or sickness detection, classification, quantification, and segmentation [3]. Wang et. al., discussed analysis issues at the intersection of the 2 fields [4]. Griffiths et. al., reviewed this progressive deep learning architectures for process unstructured geometrician information[5]. So et. al., discussed the recent progress within the application of deep learning to the inverse style of nanophotonic devices, principally specializing in the 3 existing learning paradigms of supervised, unsupervised, and reinforcement learning[6]. This study was undertaken to propose a way to boost the accuracy of the automated identification of AD[7]. Alternative potent work includes[8-9]. The contribution of area unit twofold[10]. Supported a wild flower and a Beta vulgaris image information set compare those models by their prognosticative performance yet as explainability[11]. Sraw et. al., used numerous Static and Dynamic options of malicious executables to classify malware supported their family. Li et. al., summarized the applying of deciliter in material science, supported a model choice perspective for each natural materials and metamaterials[12]. To analyze the advanced ways and comprehensive applications survey quite a hundred and twenty publications of DL-based biological science image analysis[13]. Abraham et. al., gifted a preliminary technique for correct farmland classification exploitation stacked ensemble deep convolutional neural networks (DNNs)[14]. Recognizing the necessity for AN pliable, accurate, and ascendable satellite image chip classification theme, Horry et. al., gifted AN ensemble of: i) a slow to coach however high accuracy vision transformer; and ii) a quick to coach, low-parameter convolutional neural network[15]. Zhang et. al., characterized however economical each approaches area unit at predicting the presence or absence of a genetic markers, and visualize what components of the pictures area unit most vital for those predictions[16]. Wang et. al., introduced image matting into the 3D scenes to explain the lesions in 3D medical pictures[17]. Zhang et. al., proposed a theorem Layer Graph Convolutional Network (BLGCN) model by combining graph convolution operations, which may effectively extract graph info and estimate the uncertainty of classification results[18-20]. Image classification is the process of classifying an image into one of a set of predefined categories. It is used for various applications such as object detection, image retrieval and content-based image retrieval. Image classification is based on learning

algorithms that are trained using training data which consists of images with labels assigned to them. The main challenge in this area lies in the fact that most real-life images contain multiple objects and thus cannot be easily classified by hand. Deep learning methods have been developed to solve this problem by providing powerful computational power to classify images at scale while maintaining high accuracy levels.

2.IMAGE CLASSIFICATION BASED ON ALEXNET

Since AlexNet has demonstrated remarkable performance on ImageNet datasets, CNN-based applications have become increasingly popular. Gallego et. al., deal with the challenge of automating Glomerulus classification and detection from digitized kidney slide segments using a deep learning framework[21]. A new Agile convolutional neural network (CNN) framework is proposed to conquer the challenges of a small-scale medical image database and the small size of the nodules, and it improves the performance of pulmonary nodule classification using CT images [22]. Transfer learning and deep feature extraction methods are used which adapt a pre-trained CNN model to the problem at hand[23]. Lin et. al., presented a CNN-based method that combines cell image appearance with cell morphology for classification of cervical cells in Pap smear[24]. According to the remarkable performance of convolutional neural network (CNN) in medical domain,

3.IMAGE CLASSIFICATION BASED ON GOOGLENET

GoogLeNet may be a new deep learning structure projected by Christian Szegedy in 2014. Before that, AlexNet, VGG and alternative structures achieved higher coaching results by increasing the depth (number of layers) of the network, however the rise of the quantity of layers can bring several negative effects. like overfit, gradient disappearance, gradient explosion, etc. The proposal of origin improves the coaching results from another perspective: it will build a lot of economical use of computing resources and extract a lot of options underneath constant quantity of calculation, so up the coaching results. Huang et. al., proposed an aggregate (or mixture) of ensemble models for image retrieval based on deep Convolutional Neural Networks [31]. The data augmentation methods used include: GAN/WGAN, Flipping, Cropping, Shifting, PCA jittering, Color jittering, Noise, Rotation, and some combinations[32]. Amiriparian et. al., proposed a method for automatically detecting various types of snore sounds using image classification convolutional neural network (CNN) descriptors extracted from audio file

4.IMAGE CLASSIFICATION BASED ON CNN AND SVM

In order to resolve the issues of low recognition accuracy and short illustration of countenance face expression options by manually designed features, a countenance face expression recognition methodology supported deep learning features of convolutional neural network (CNN) and support vector machine (SVM) is planned. Viola-Jones algorithmic program is employed for face detection and alignment, and also the pictures of face expression interest regions square measure extracted, that square measure input into the CNN model to extract important expression feature info. The obtained feature

Yang et. al., hypothesized that a deep learning algorithm can achieve high accuracy in distinguishing the World Health Organization (WHO) low grade and high grade biomass [25]. Jadhav proposed an efficient soybean disease identification method based on a transfer learning approach by using a pre-trained convolutional neural network, such as AlexNet, GoogleNet, VGG16, ResNet101, and DensNet201[26]. Sethy et. al., proposed a convolutional neural network (CNN) based approach for prediction of rice nitrogen deficiency[27]. Lu et. al., proposed a novel abnormal brain detection method for magnetic resonance image[28]. Although convolutional neural network (CNN)-based methods for scene classification have achieved excellent results, the large-scale variation of the features and objects in remote sensing images limits the further improvement of the classification performance. To address this issue, Wang et. al., presented multiscale representation for scene classification, which is realized by a global-local two-stream architecture. Other influential work includes[29-30].

spectrograms[33]. Sharma et. al., explored deep learning methods for computer-aided classification in H&E stained histopathological whole slide images of gastric carcinoma[34]. Gallego et. al., deal with the challenge of automating Glomerulus classification and detection from digitized kidney slide segments using a deep learning framework. A new Agile convolutional neural network (CNN) framework is proposed to conquer the challenges of a small-scale medical image database and the small size of the nodules, and it improves the performance of pulmonary nodule classification using CT images [35]. Transfer learning and deep feature extraction methods are used which adapt a pre-trained CNN model to the problem at hand [36]. Sethy et. al., proposed a convolutional neural network (CNN) based approach for prediction of rice nitrogen deficiency[37]. Although convolutional neural network (CNN)-based methods for scene classification have achieved excellent results, the large-scale variation of the features and objects in remote sensing images limits the further improvement of the classification performance[38]. To address this issue, Wang et. al., presented multiscale representation for scene classification, which is realized by a global-local two-stream architecture[39-40].

vectors square measure classified by SVM, and also the expression classification results square measure output. Roy et. al., presented the recent study of a lightweight Deep Convolutional Neural Network (DCNN) architecture for document image classification[41]. Li et. al., proposed a joint guidance image filter to refine the coarse transmission map that outperforms conventional methods[42]. We have proposed a color correction method restores the scene color correctly. Agarap introduced the usage of linear support vector machine (SVM) in an artificial neural network architecture[43]. This work is aimed at comparing the classification algorithms and methods of machine learning with various methods of preliminary processing of radar

images[44]. Bardou et. al., compared two machine learning approaches for the automatic classification of breast cancer histology images into benign and malignant and into benign and malignant sub-classes[45]. Xuan et. al., designed an automatic pearl classification machine, composed of four parts: feeding mechanism, delivering mechanism, vision-based detection device, and classification mechanism[46]. Yadav et. al., researched how to apply the convolutional neural network (CNN) based algorithm on a chest X-ray dataset to classify pneumonia[47]. Pasa et. al., propose a simple convolutional neural network optimized for the problem which is faster and more efficient than previous models but preserves their accuracy[48]. The main objective of Sharifi et. al., is to diagnosis tired and untired feet base on digital footprint images[49-50].

5. IMAGE CLASSIFICATION BASED ON ALEXNET AND SVM

Traditional machine learning classification models, like SVM, logistical regression, call trees, and even theorem networks, are become dregs when the event of deep learning promoted by CNN in recent years. It all started in 2012. The emergence of Alexnet and its leading performance within the ILSVRC 2012 Imagenet information Set Classification Competition formally proclaimed the start of the time of deep learning. Kuncheva et. al., investigated the suitability of the random subspace (RS) ensemble method for fMRI classification[51]. Balabin et. al., tried to evaluate the efficiency of different methods for motor oils classification by base stock (synthetic, semi-synthetic and mineral) and kinematic viscosity at low and high temperature[52]. Petscharnig et. al., investigate how well single-frame convolutional neural networks (CNN) for semantic shot classification in gynecologic surgery work[53]. Ling et. al., proposed a high performance method for vegetable images classification based on deep learning framework[54]. Dorj et. al., focused on the task of classifying the skin cancer using ECOC SVM, and deep convolutional neural network[55]. Bhandary et. al., proposed two different DL techniques to assess the considered problem: (i) The initial DL method, named a modified AlexNet (MAN), is proposed to classify chest X-Ray images into normal and pneumonia class[56]. A hybrid based CNN system is developed for diagnosing breast cancer lesions with respect to benign, malignant and normal[57]. Hussain et. al., propose a modified deep neural algorithm to classify untapped pathological and suspicious CTG recordings with the desired time complexity.[58-60]

6. CONCLUSION

The main plan behind image classification is to predict the thing in a picture supported a collection of options. the foremost standard feature extraction technique is convolutional neural networks (CNN). CNNs trained by feeding them with pictures|the pictures|the photographs} and extracting options from those images. it is very like however we have a tendency to train our own neurons, except that it uses legion pixels as input rather than only 1 somatic cell.After obtaining of these options, we are able to use them for classification: predicting whether or not or not a picture contains one thing attention-grabbing or not. this is often what makes deep learning therefore powerful for this task. Image classification could be a method of distribution labels to photographs. The label is any range of values like gender, age, etc. within the past few years, deep learning has become the foremost well-liked technique for image classification. Deep learning could be a subfield of machine learning that uses artificial neural networks to unravel issues in pc vision and pattern recognition. it's been wont to solve several real-world issues together with object detection and image segmentation in varied applications like self-driving cars, police work cameras and medical imaging devices.

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