Novel Algorithm for Image Classification Using Cross Deep Learning Technique

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Abstract. The basic concepts of training and the model structure of deep belief networks (DBNs) in deep analysis are studied to apply image recognition in the area of deep learning. Random propound is provided with the parameter in the fine-tuning stage and the randomly hidden layer eliminated to maintain unchanged weights. The results show that the layered DBN training system reduces training problems and training times significantly. In the small sample, the deep faith network has improved significantly after introducing the down sample and random dropdown and effectively alleviates the over-fitting phenomenon. Design a new Deep Learning Image Recognition and Classification Algorithm. Novel Algorithm for Image Classification Using Cross Deep Learning Technique.

1. Introduction
As an interesting design tool for acquiring image information, Image classification has received extensive attention. It was widely used in different fields of engineering. While traditional methods of image classification are commonly used for practical purposes, low classification accuracies and poor adaptive capacity are present in the application process. This is because the designer's previous knowledge and cognitive understanding of classification tasks depend on this type of method. This approach also distinguishes the extraction and classification of image functions in two stages for classification operations in the deep learning model high learning capacity that combines the method of retrieval and classification into the whole method to complete the test for image classification, which will ultimately improve the precision of classification of image. The application process also has the following issues in deep learning based image classification: initially, the complexity functions of the deep learning model cannot be addressed in an effective manner. Second, a low accuracy classification is provided in the deep learning model. To this end, this paper uses a sparse representation with good multidimensional ability for linear data degradation and the deep structural benefits with multi-layer nonlinear mapping to incorporate the principle of a scarce representation into the architecture and the complex approximation function in the deep-learning model. It provides a deep research model with adaptive approach capability that solves the issue of approximation of the deep learning model structure [1].
At the same time, it is suggested that a sparse representational classification system based on an optimized kernel function replaces the classification in a deep learning model to further increase the classification impact of a deep learning classifier. Improving the classification effect of the image. On the basis of this explanation, in this work image classification based work on the improved kernel function of the non-negative sparse representation packed, sparse coding depth learning model. The findings of tests indicate that the suggested approach not only has a better average accuracy than other conventional approaches, it can also be well applied to various datasets of images [2]. This can help tackle issues with complex function approximation and weak classifier effect in contrast to other deep learning approaches, thereby further enhancing the accuracy of the image classification. The Cross Deep Learning Technique model is analyzed in this document. In training methods, this structure differs from the past. The principle of hierarchy also improves the system's ability to communicate complex tasks. This paper describes the fundamental theory, structure of the model, and training method for Cross Deep Learning Technique. The relation between deep knowledge and conventional neural networks and CNNs and DBN are examined. In this paper on the formation process for profound belief networks, namely uncontrolled data are sophistication for semi-controlled learning. To the advantages and the inconveniences of the two are measured in the experiment. face recognition and scene recognition, is addressed primarily. First, to preface the image process and then extract the features, is the basic process of image recognition. The classification (classification) is eventually used to classify. The most critical aspect of image recognition is classifier preparation. Deep learning and ordinary shallow learning approaches should discuss their benefits and disadvantages. Deep learning is then hand-written, in facial recognition, in the recognition of the natural scenery, in the comparison and analysis of the superiority of the algorithm [3].

2. Related Work

We present the root of current algorithms and some deep network learning structures in this segment that are widely used in medical image processing. We'll then briefly add certain network principles.

Alenazy, W. M., et al. [1] To achieve higher-range relations between input variables and to recognize non-linear components, the key function analysis of the kernel is used. There are extracted data variables. For thorough classification of facial expression, the HOG characteristics derived from the lip patch provide the maximum importance.

Eventually, a comparative study to equate the suggested model to various machine learning models based on requirements for assessment. The results reveal that the DBN-GSA dependent classifier is more reliable than other classifiers.

Krig, S.. et al. [2] The Perceptron is the basis of many conceptual neural network artificial; particularly the perceptron weight adjustment model for learning features is the basis of convnets.

A single-layer Perceptron design limits simple problem to learning and accuracy. Many scholars originally postponed artificial neural network experiments for many years. The Multilayer Perceptron (MLP) has overcome many disadvantages of the single hidden layer Perceptron, nevertheless.

Ma, J. Ma, J. et al. [3] This paper explores the main methods for profound learning at this rapidly evolving time and discusses some of its primary innovations and cutting-edge findings. In the study of the medical picture for pulmonary pictures, statistics and benchmarks, the issues include recognition, sensing and segmentation activities. Finally, it explores how deep learning strategies are applied to the medical picture and analyzes their potential and possible challenges.

Revathi, M., et al. [4] The purpose of this study was to ling cancer are divided into lung-computed topographies considered by a new adaptive DNN are used for classifier based on MSPSO-IMFFA. Results obtained show the efficacy, in comparison with the other approaches, of the deep learning classification for the samples of lung samples.
Neethu, P. S. et al. [5] The adaptive histogram equalization process is used to improve each pixel's image contrast. In this paper, an algorithm for combined the tips of components analysis of the finger from the hand image. Classifying of the CNN to the image into different groups is provided for the segmented finger regions in the manual image. With the latest methods the hand gesture detection and recognition technique suggested in this paper uses the CNN enhancement technology.

Jun Li. et al. [6] The latest algorithm for classifying remote sensing images based on the PCA and the hidden random field theory of Markov is proposed in this paper. Since the picture data is two-dimensional, the possibility of a specific condition being added by the device is centered on the measurement method in two directions of the corresponding body, horizontal and vertical. We check the viability of the algorithm by means of the experimental review and the subsequent evaluation.

3. Application of Deep Learning in Image Recognition and Classification

In the field of image recognition and classification, profound learning is commonly used. The idea was to overcome the question of image detection and classification by a CNN based deep learning. LeNet was a groundbreaking project in the convolutions neural network, which defined the basic structure of the convolutional layer, pooling layer and complete link layer in the neural neighborhood, and provided the basis for a convolutional neural network. In Deep learning method image recognition and classification accuracy with the advancement of the ImageNet project. AlexNet promotes LeNet more thoroughly and broadly. ReLU is used as a main body of a convolutional neural network rather than Sigmoid, that not only speeds up the training but solves the problem of deep gradient distribution. Around the same time, the falling parameter is used to reduce neuron modification complexity and avoid excessive training problems in some measure [7][8][9][10]. However, the capacity of the model to describe and remove the image characteristics remains insufficient because of the limitation of the model depth. GoogLeNet, brand new, profound learning structure. The implementation of a starting stage, which can use resources more effectively to enhance the training effect, is noteworthy in contrast to the previous structure. The starting module is designed to allow an overlapping neural network to carry out a multitude of overlap and pooling operations on main image is input image are parallel of repeatedly stacking the overlapping layer and deepening the network to improve efficiency. In addition, in the competition, At the same time, the data size and sophistication of their images has increased dramatically with the development of CNN, and their application fields, including medical image analysis, face recognition, image recognition, objective sensing, are becoming more and more extensive [11][12][13].

4. Image Classification Technique

An information processing system is an artificial neural network and Deep learning can be formulated as three parts: the cell connection pattern, which is called the Deep learning structure; the connection weight measurement method, called a training or learning algorithm; and the non-linear "activation function."

![Figure 1. Deep Learning Algorithm](image-url)
A large number of simple neuron connections clearly consist of a Deep learning. Deep learning the corresponding weighted guided communication lines link each neuron with other neurons and weighing can be expressed as a knowledge of problem solving. Deep Learning algorithm model shown in Figure 1 [14][15].

- **The Cat Swarm Optimization (CS.O) Algorithm**

Quinlan made the CS.O decision algorithm real in 1998. It can bring up some decision-tree or rule-set. The CS.O requires obtaining knowledge to estimate the break at each tree interval node. CS.O model terms by breaking details into the field Run Clustering Groups Edit/Review Signatures Evaluate Classification that endows with the utmost knowledge advantage. The method replicates each branch defined by the first split again until the data cannot be further split.

The Chi-squared Automated Interaction Detection (CHAID)

This Method was developed by Kass in 1980. It's a sorting system utilising chi-square statistics to create the most favourable break to the decision tree. CHAID requires a Bonferroni correction for a complex set to the input data, thereby extenuating the prejudice against inputs with tonnes of values.

5. **Classification of Images is to Prepare Image Data in Advance**

The problem of approximating complex functions is solved and a profound paradigm of analysis with the capacity to adjust is solved. At the same time, along with the simple issue of image classification, this paper provides a deep learning model based on a stacked space-scattering encoder. This article then proposes to use the optimized kernel function's sparsely represented classification to replace a deep learning algorithm classifier to improve the classification effect of the deep learning process with the classifier. The effect of image classification is strengthened by this.

![Diagram](https://via.placeholder.com/150)

**Figure 2. Working of Proposed Model [1]**

Finally, kernal function based on the optimization method of the stacked sparse coding profile study model, a nonnegative, image classification algorithm is developed. To perform analysis and studies on comparable objects, the algorithm for image classification is used. By using two standard databases and two medical databases, this article checks the algorithm proposed and image classification
technique with compare to conventional network. The findings of studies indicate that not only does the new approach have a better average accuracy than other mainstream models, it can also be applied well to various collection of images as shown in figure 2.

6. Proposed Algorithm
This segment addresses several famous state-of-the-art CNN with DBN architectures. For certain models, some examples and pure convolutional (Pure Conv) Other options have been proposed, including GoogLeNet and more efficient advanced architectures with Inception units and Residual Networks. The core building elements (convolution and pooling) are exactly the same in these systems. There are several topological variations found in existing deep learning architectures, but AlexNet, GoogLeNet Dense CNN and Fractal Net, due to their state-of-the-art success on different object recognition task benchmarks, are commonly considered the most common architectures of the many DCNN architectures.

7. Results Analysis
We also seen a cross-deep learning approach in this paper that uses image classification and a combination of deep learning features to identify malware images using various state-of-the-art classifiers in different groups. The grayscale images are created in the first step using bytecodes from the malicious programmes. Then, to align the malware groups and resize the files, image augmentation is done in the second stage. The pre-trained network characteristics and best features are picked and merged in the last step. The chosen features are then transmitted to many iterations of the K-means Algorithm [16] Feed Forward Network [17] Deep Belief Network [18][19] Classifiers for malware image recognition. The main advantage of the new approach compared with the current approaches is the potential to obtain a high degree of classification accuracy. There is no stopping solution in the face of imbalanced data sets to enhance the prediction model's accuracy. We increase and balance the dataset and improve the performance of the suggested model in order to get rid of the imbalanced data sets problem. Malware classification based on deep learning implemented an exceptional enhancement relative to the current techniques, and the result of the experiment reveals the feasibility of the new strategy as the accuracy was increased and model loss was minimised. The proposed strategy obtained an accuracy of 92.32 percent on the classifier, which shows excellent efficiency relative to other established malware detection approaches.

Precision is of utmost importance in medical image processing because this is related to human lives. It is critical that noise is eliminated and the image quality enhanced before the proposed model for deep neural learning was implemented. Noise reduction is the preprocessing step as well as an enhancement of the image contrast. Gabor filters are used during the pre-processing phase and the picture is improved with adaptive histogram equalization for quality and appearance. The procedure for classification is then performed; lung nodule tissues are extracted from cancer cells and categorized into normal, and abnormal images are compared and collected. Simulated findings show their efficacy and relevance in contrast with current and other validated algorithms To delete the essential characteristics from the photos, feature selection is performed and the main characteristics are based on the expert judgement of a radiologist. Diverse features in image recognition technologies extraction methods exist systemic, computational, transformational, model-based extraction etc as shown in table 1 and figure 3.

| Algorithm                  | Classification Rate |
|----------------------------|---------------------|
| K-means Algorithm[16]     | 80.32%              |
| Feed Forward network [17] | 85.40%              |
Deep belief network[18]  87.52%
Proposed Algorithm  92.32%

| Algorithm                  | Classification Rate |
|----------------------------|----------------------|
| K-means Algorithm[16]     | 75.00%               |
| Feed Forward network [17] | 86.00%               |
| Deep belief network [18]  | 88.00%               |
| Proposed Algorithm        | 94.00%               |

**Figure 3.** Algorithm Based Accuracy Analysis

8. **Summary and Prospect**
Currently, image classification based algorithm to learning depth can work very well. Yet in some complex image processing the classification Algorithm mainly involves improvements to the face recognition, face movement, gesture posture, continuous adjustments and how to develop it, more efficiently, and more effectively. At present, marked data training still dominates in the area of functional learning. But the increasing amount of data makes it increasingly inoperative to apply tags to all data. Therefore, the automatic marking or training of the network through unmarked data is increasingly up. However, it is a main topic of the image and to speed up teaching thus maintaining precision of reconnaissance and classification. Certain training parameters are currently focused on human experience or testing in the convolutional neural network.

9. **Conclusion**
The K-means Algorithm, Feed Forward network, Deep belief network is studied in profound learning and the cross structure evaluated. Furthermore, the hierarchical training process of proposed algorithm is explored and the classification of proposed algorithm by SoftMax is added. The research was performed on the library of CIRAF-10 database. In addition, the use of deep learning is investigated on limited samples and the proposed algorithm device cooperative is proposed that includes random forest and reduced sampling. The results are show that the proposed algorithm detection rate is high and valuable, but the training period is shortened greatly. In the CIRAF-10 database, the proposed algorithm also has a strong level of recognition.

10. **Reference**
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