

Object Detection using Deep Learning with Hierarchical Multi Swarm Optimization

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Abstract—Till now there is a huge research had in the field of visual information retrieval, but with the growth of data and with less processing speed we are not meeting the needs of current problem. The main focus of this paper is to identify the objects with salient features and object highlighting. Till now object identification is done with the pixel based or with the region based. Different methodologies are compared in this work and they will be processed with the learning work. Multi scale contrast is one of the pixel based technology where object borders are identified but not the object. This can be done with the histogram contrast. Still it is not covering all the features of the object and it is not clear in identifying the objects at high contrast regions. To solve this issue region based contrasting method is used which is the better solution for all this object identification. After extracting the features and identifying the object, now auto classification or identification of the object should be done. The other part of the work mainly concentrates on the learning system which uses most popular neural network algorithms. Identifying the drawbacks of neural network algorithms and proposing the new methodology identify the objects is done in this paper.

Keywords-component; Visual attention model, saliency model, Region based, Pixel, Histogram

I. INTRODUCTION

In the current generation there is a huge growth of data in the field of medical science, image processing and in other areas where identifying the object is getting difficult with the existing methodologies. To overcome all the issues in the existing methodologies, it uses the salient object detection model. This model not only evaluates the saliency image regions but also performs the segmentation of the image for auto classification. An object which should be classified will contains different noise, back ground, high contrast and illumination effects. This type of images should be handled by applying different methods so that the content of the object should be analyzed properly and should be organized to identify the object. In the current area of information search and retrieval there is a huge need of new concepts for achieving the better results in both the search and retrieval process. To meet the current need there exists two new methodologies which are known as cross traditional retrieval process and the algorithmic approach.

Visual attention mechanism of humans other recognizable living things will selects the object from the scene within a glimpse. Similarly, the same process is implemented here in the visual attention model with the help of saliency information. This model not only concentrates on the process description to compute the attention model but also concentrates on the inputs of the image to know the image comparison. The main drawback of this feature is, it does not

consider the new behavior or observed behavior to predict the falsifiability. To reduce the false prediction there exists different computing methodologies that should be applied. As per the analysis it is clear that prediction is not only depending on the methodologies we apply, but it also depends on the type feature which we will be extracting. For extracting the features, research work mainly concentrates on 3 different mechanisms which include pixel based, region based and global level object.

In the pixel based approach, it considers only the lower level features of the object where pixel is considered as a unit in the lower level features. Pixel approach uses two different methods to extract the features which are known as Multi scale contrast and Histogram contrast methods.

In the second approach which is Regional based where it identify the better regions of the image or object with three different methods like Region based, color contrast based and structure based. For getting the better results, generally neural networks will be used which will be solving more difficult and complex problems. As we all know there is a huge growth in the data and to solve the problems of image retrieval there should be an appropriate method to solve this. Here we will be applying the neural networks for knowing the result set and then we can find the accuracy of the neural networks.

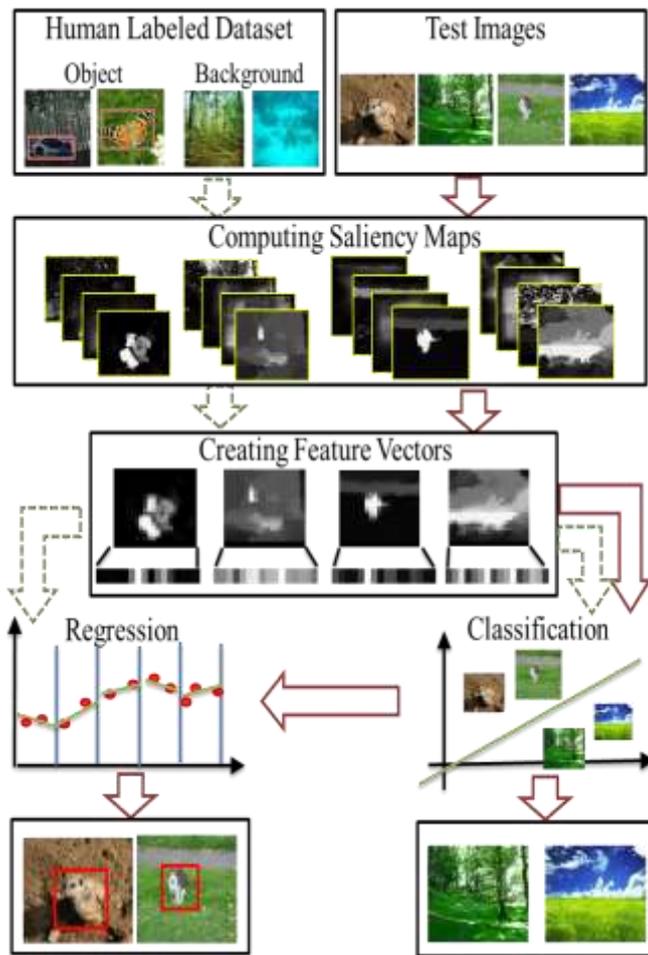


Figure 1: visual attention model

II. RELATED WORK

From the different available neural networks model RBF –NN model is considered for this research work. This method mainly concentrates both on linear and non-linear problems. This model mainly uses the radial basis function which is used to classify the images and built with the factors like Color, Texture, and Wavelets as input features. The main drawback of using this method is to define the centroid values. Because of defining the centroid values randomly and selection of centroids randomly it is not giving the accurate results. Some of the clustering algorithms uses this method to improve the accuracy. These algorithms are divided into 3 categories which include DBSCAN, Agglomerative Hierarchical Clustering, and K-means Algorithm.

To overcome the drawback of RBF-NN we will be considering the K-means RBF – NN to classify and retrieval of the images. This mechanism divides the data into K clusters and each cluster contain the same amount of data. This mechanism mainly concentrates on identifying the exact centroid from the given set of training data. By applying this method we can see

the accuracy when compared to the RBF – NN but it uses the inversion matrix method to compute the weights and bias values.

To have the better accuracy, another approach is implemented which is known as swarm optimization where this is one of the best numerical algorithms when compared to other algorithms like genetic algorithms. Our of different Swarm optimization algorithm, this research work mainly concentrates on the particle swarm optimization(PSO), where it has proved as most prominent method for optimization problems. The main reason of selecting the PSO is it will define the weights between the hidden layer and the output layer. By this point it is clear that PSO RBF-NN is clearer and gives the accurate values when compared to the K-means RBF-NN algorithm. Still there exists some drawbacks with this PSO RBF-NN approach that it does not consider the dynamic optimization problems.

III. PROPOSED WORK

The current research work mainly focuses on the PSO and the advanced implementation of PSO which are named as MSO (Multi Swarm Optimization). Here these methods are used to assess the classification efficiency of PSO and MSO. As we have seen the drawback with the PSO RBFF-NN that it won't suit for dynamic optimization problems and now to eliminate that drawback a new algorithm should be implemented which is known as Multi Swarm Optimization. As the name says it contains Multiple Swarms and every swarm is having multiple particles. These particle are dynamic in nature and changes its position on the basis of calculated error. This research mainly calculates the updated particle values and these will be treated as weights for RBF networks. These weights will be used for classification of images in the later stages. Again there is a drawback with RBF neural networks that this algorithm is not always gives the positive results when it is solving the hierarchical problems. To solve the issues which will be having in the hierarchical problems a new method is proposed which is known as deep learning.

Another area of this research work is concentrating on the deep learning, where the Single RBF –NN is not suitable for all problems. With the help of deep learning a new methodology which is known as Deep convolution Neural Networks which works similar to the functionality of the human brain. As this methodology is very much suitable for current large data sets and concentrates more on the new behavior of the image so that it is overcoming the disadvantage of Visual attention model and gives the accurate results.

The algorithms of neural networks have been applied for thousands of times in getting detecting the accurate data objects. But still all the algorithms are failed in giving the

accuracy for detecting and retrieval of images. Even in the CNN model, it is having the slow process and the detection object will be slow. As per the previous study it was clearly understood that alone neural network algorithms and the CNN model is not suffice to get the accurate values in detecting the objects. This research work proposes a new novel methodology which will suit for the current problems and gives the accurate results in the real time environment. Meanwhile this research work is also considering the deep learning concepts to take weights and bias values for getting more accurate results. Even it is proved that MSO is also not giving the accurate values for object detection. Figure 2 represents the proposed architecture for solving the issues.

MATLAB, So that we can know that research work have been achieved the perceived results or not.

Steps:

- One has to go through with the information available with the human visual information retrieval, analyze all the information related to the false prediction methodologies etc.
- It is very clear with the literature that the accuracy of the prediction is dependent on the type of the feature which is extracted and the type of methodology which is used for the predicting the accuracy of object detection.
- To find the drawbacks of existing algorithms and to know how to overcome the drawbacks. Proposing the new algorithms or modifying the existing algorithms for getting the accurate results. Here the current research work concentrates on implementing the latest and best algorithms like Histogram Contrast and Multi-scale Contrast for Pixel Based feature extraction from datasets, Region based contrast to highlight the regions for identifying the object etc.
- After reviewing the existing literature, it is understood that RBF-MSO for classification of natural images from data sets, Deep Learning MSO and HMSO is giving the better results for object identification and retrieval of the images.
- Analyze human Visual Information classification of the images by using RBF Neural Network Classifier. RBF Neural Network is developed using MSO.
- To retrieve the human Visual Information a new method is proposed known as Deep Learning algorithm. This algorithm is developed by considering the two mechanisms known as MSO and HMSO.
- To know whether the implementation has achieved the better results or not, research should compare with the existing algorithms and should prove that the proposed one is giving the better results when compared to the existing one.
- The current research is considering different data sets for testing the implementation part and it is considering the MSRA10K Salient Object Database and finally our research work will concludes the better solution to have the automatic analysis of human visual information system.

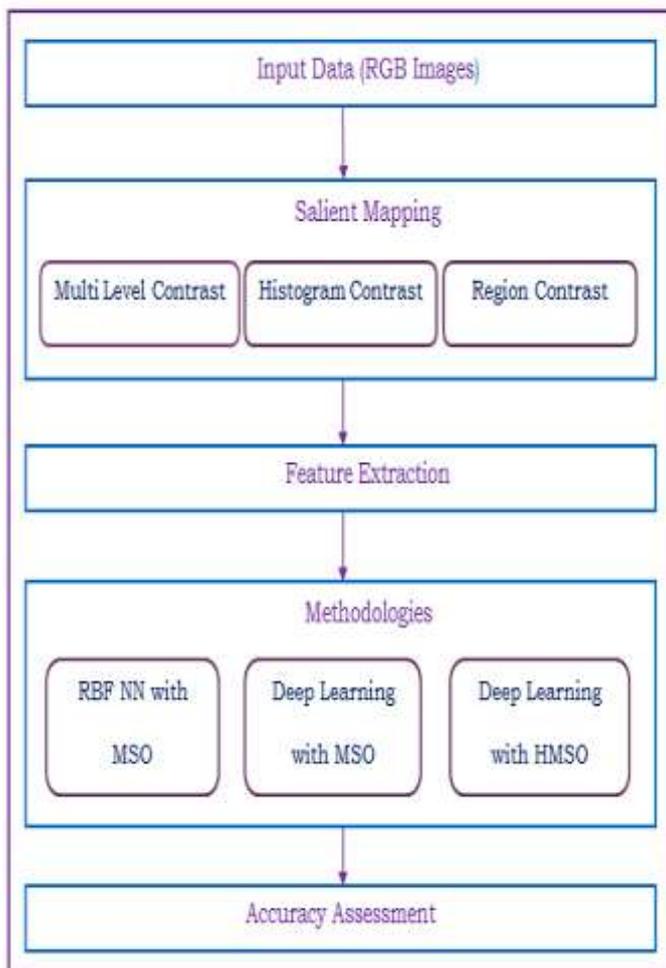


Figure 2: Proposed Methodology Architecture

IV. HIERARCHIAL MSO

Till now it is very clear that, the main objective of this research is to have the object detection and identification of the object. To achieve this solution, research considers different feature extraction models and machine learning algorithm for getting the better results. To implement the solution the following steps should be implemented in

V. CONCLUSION

This paper mainly concentrated on the different issues which are giving the problems for identifying the objects. To know the information with the existing methodologies, a clear survey had been done and got the information about the

feature extraction models and neural network algorithms. Then this research work concentrated more on the methodologies to overcome all those issues. Even in the proposed new methods, the current research work identified different drawbacks. Even though this research work is continued in identifying the solution for the given problem and at the end this work has been identified a solution which overcomes all the disadvantages and gives the best results when compared to the existing methodologies. To know whether it is working well or not, it should be implemented by using any of the programming language. Mostly the implementation will supported by the MATLAB software.

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