Noise Tolerant Fine-Grained Visual Categorization with Fine Tuned Segmentation Via Deep Domain Adaption

Caroline El Fiorenza, B. Sai Praneeth, B. SaiSumanth, M. Venkata Vijaya Rama Raju, S. Teja Venkata Rama Raju

Abstract--- Image analysis techniques are playing a vital role in several applications.In general the applications involve the automatic extraction of features from the image which is further used for variety of classification purposes. In this paper we are going to propose an algorithm which will extract the image from the web and recognizes it and differentiates whether it is a living object or not and then classifies the image into different types using fine grained visual categorization and deep domain adaption. As a special topic in computer vision fine grained visual categorization has been attracting and getting attention these years, which is a advanced level problem for distinguishing between similar sub-ordinate classes.The algorithm will identify object and specifies whether it is a living or non-living object and then classification is done based on the object.

Keywords--- Fine-Grained Visual Categorization, Data Scale, Artificial Neural Networks, Image Classification, Neural Networks, Medical Researches.

I. INTRODUCTION

Traditional visual categorization problem typically focuseson basic-level object classification, e.g. differentiating birdsfrom cats. In contrast, FGVC is the task of distinguishingbetween subordinate-level classes, e.g. identifying differentbirds. FGVC is a more challenging task because similarclasses can only be distinguished by the appearance of localizedand very subtle details. There exist many meaningfulwork in this difficult but important field, among whichthe most promising methods are usually basedon the combination of global features and fine semantic partfeatures.ds at one place in which we have the account.[10]

Why Fine-Grained Visual Categorization?

FGVC in our analysis of the proposed semi supervised and webly-supervised learning algorithm, in part because of the effectiveness of part-based methods and lack of strongly supervised training data for FGVC, asdiscussed above. Furthermore, we find that the properties of web images obtained for FGVC are noticeably different from those in generic object recognition, leading to some interesting discoveries when conducting webly-supervisedlearning. [9]

Noise Distribution: In general, web data noise can be classified into two categories: label flip noise, where a sample is mislabeled from category A into category B, and outlier noise, in which irrelevant data are retrieved. In practice, most of the noise in webly-supervised FGVC falls into the outlier category. The remaining label flip noise, however, needs to be accounted for by experts using some kind of active learning approach.

Data bias: It is argued that webly-supervised learning suffers from visible domain differences between the target domain of test images and the source domain of web images. For example, the top images returned from the Google image search engine usually contain a single object in the center with a clean background and a canonical viewpoint, which can be significantly different from standard user uploaded images. Nevertheless, due to the specificity of FGVC tasks, the associated domain bias is usually muchlower since the names of fine-grained categories seldom represent abstract concepts. Meanwhile, test images for FGVC usually also follow similar object-in-the-center priors.

Data scale: The supply of web data is often believed to be nearly endless. However, this may not always hold true for all subordinate categories. For example, the bird category “Crested Auklet” only has 243 results on Flickr, which makes every image important for classifier learning. These findings suggest that, for webly-supervised FGVC problems, the focus should be on removing outlier noise and better exploiting each training sample. Data bias plays a relatively minor role in system performance. We have, therefore, designed our method taking these assumptions into account.

II. LITERATURE SURVEY

A: Natural Object Classification Using Artificial Neural Networks

The classification of different natural objects is done with the application of artificial neural networks. The results are correctly identifying twelve natural objects in scenes are compared across ten folds of cross validation study. Both at identification of objects from the combination of objects can be done with high efficiency with artificial neural networks. The results show that Hermite functions pride an effective methodology for texture measurement in FLIR imagery. [1]

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Caroline El Fiorenza, Assistant Professor, SRM University, Chennai, T.N, India.(e-mail: caro.fiorenza@gmail.com)
B. SaiPraneeth, UG Scholar, SRM University, Chennai, T.N, India. (e-mail:saipraneethbrg19@gmail.com)
B. SaiSumanth, UG Scholar, SRM University, Chennai, T.N, India. (e-mail:sai.sumanthbattula@gmail.com)
M. VenkataVijaya Rama Raju, UG Scholar, SRM University, Chennai, T.N, India. (e-mail:mandapativijay43@gmail.com)
S. TejaVenkata Rama Raju, UG Scholar, SRM University, Chennai., T.N, India. (e-mail: stvramaraju@gmail.com)

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B: Machine Learning Framework for Image Classification

The object classification was done by evaluating classical SURF technique with that of global extraction technique such that this will be embedded to robots by which they will recognize the signs and perform the particular command related to the sign. The expectations proofed that using SURF local feature extractor method and a SVM training classifier perform best average accuracy. [2]

C: Color Texture Analysis of Natural Scenes Using Neural Networks

The analysis of various natural objects can be done with the high efficiency by using color texture features. The neural networks and large scene analysis method is used to get the output which was compared with grey-scale features. So, the classification of natural objects can be done with ease. The Neural networks used, played the role of classifiers and also as selectors to find which color and which grey-scale features together give the best results by evaluating the strength of weights on various connections. [3]

D: A Novel Self-Assessed Approach for Classification of Man-Made Objects and Natural Scene Images from Aerial Images

The categorization of different combinations of objects can be divided as man-made objects. This approach will be in 3 stages. In first stage the edges of the image are extracted from the input grey image. Then in second stage Gabor filter applied to compare Gabor energy feature and finally in the third stage wavelet decomposition technique is applied to get the correct size.Thus the objects are classified into man-made structures and natural structures. [4]

E: Noise Tolerant Classification of Aerial Images into Man-Made Structures and Natural Scene Images Based on Statistical Dispersion Measures

The aerial images are classified into manmade and natural structures with the help of novel noise tolerant approach with statistical dispersion technique. The statistical dispersion methods are standard deviation, median absolute deviation and mean absolute deviation. Then this was applied to PNN (probabilistic neural network) for classification of the aerial images into that of manmade and natural structure. [5]

F:Performance Evaluation of Feature Extraction Methods for Classifying Abnormalities in Ultrasound Liver Images Using Neural Network

The analysis of image techniques has played a major role in the medical operations. This technique will be used for the finding out the difference between the normal and abnormal tissues. Here auto correlation method, Gabor wavelet and edge frequency methods are used. Here 3 ultra-sonic liver images (Normal, Cyst, Benign) are used for classifying abnormalities. Since the ultrasonic image is degraded by speckle noise and appearance of lesion overlaps enough with the sonogram the result is less in ultrasonic liver image. [6]

G: Hierarchical Part Matching for Fine-Grained Visual Categorization

The large Inter-object similarly between various objects made the classification has to be done by comparing different parts of the particular object. So the Hierarchical Structural learning (HSL) and Geometrical Phrase Pooling (GPP) are used for the purpose of Hierarchical parts matching of objects for the purpose of efficient classification. This implies a Hierarchical classifier; on which we could apply various techniques such as transfer learning for fine grained understanding. [7]

H: Fine Grained Visual Categorization with Fine-Tuned Segmentation

The classification will be done only for a certain species. Such that there will be a large inter-class similarity. So here fine turned segmentation will be used for the classification of objects by comparing all the parts separately without any noise. This algorithm provides a significant accuracy gain on the dataset based on unsupervised part alignment, and achieves competitive performance with both Fisher vectors and deep conv-net features. [8]

I: Webly-Supervised Fine-Grained Visual Categorization Via Deep Domain Adaptation

Fine grained visual categorization technique is used for classification of different objects from that of the same species. The knowledge of strongly supervised image classification is taken and was added to the weakly supervised objects and each part of object will be compared as there was many inter-class similarities. [9]

III. ANALYSIS& RESULTS

1.Total Number Of Images has been calculated using below Formula:

Avg(i) = T(i) / T(w)

Avg(i) : Average Number of Images per web page

T(i) : Total Number Of Images available

T(w): Total Number Of Webpages available

2.SharePercentage is calculated by Using The below formula

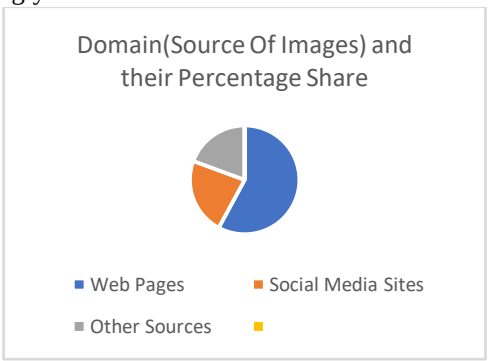
Share(%) = N(i) / T(i)

N(i) : Number of Images of The current category

T(i) : Total Number of Images from all the category

Domain (Source of Images)	Average Number Of Images Used	Percentage Share
Web Pages	365	57.9
Social Media Sites	143.67	22.69
Other Sources	121.2	19.41

Table depicts the Number of Images Available on an average within a single webpage, Social Media Sites like Facebook, Twitter and their total share in percentage accordingly to a scale of 100.



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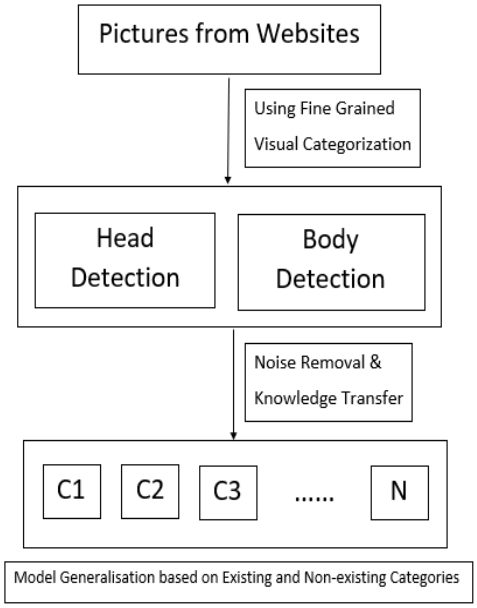
This Pie Chart Depicts the Visual representation of calculated share of images from various sources as shown from the table.

The pictures that are taken from the websites are classified by using fine grained visual categorization techniques.The object parts are classified and are compared separately as there will be Inter class similarities between the objects. the knowledge from strongly divided objects was taken and imposed on the weaklydivided objects. the noise filter will remove noise from the images. Then this system will divide the objects into different categories such as existing and non-existing. The non -existing categories will be created automatically and that object will be added to that.

Architecture diagram



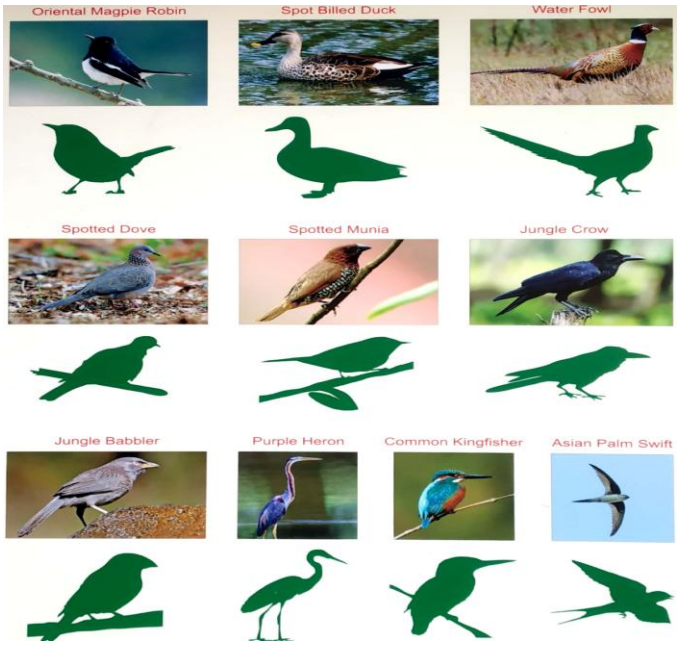
IV. PROJECT OUTCOME

The birds are characterized by feathers, toothless, beaked jaws, laying of hard-shelled eggs, high metabolic rate, four chambered heart and hollow bones for flight. There are around 10,000 species of birds around the world. Birds can be easily identified easily if one gets familiarized with Shapes, Beaks, Claws/Feet.

Based on the feet of bird it can be classified easily with the unique characters

Bird Name	Specialty
Night Hawk	Week foot, not used perch: bird crouches on flat surface
Marsh Wren	Perching foot, 3 toes forward, 1 long toe backward
Scaup Duck	Webbed foot, used like a peddle for swimming & diving
Osprey (fish hawk)	Catching holding foot, long sharp claws
Ptarmigan	Snowshoe foot, heavily feathered for walking on snow
Road Runner	Large foot for running, 2 toes forward, 2 toes backward
Sapsucker	Climbing foot of woodpecker, 2 toes forward, 2 toes backward

Based on the shape of beak the particular work can be identified by which birds can be classified. Some birds can do some unique work and by this shape that bird can be identified.



A specific breed or type of birds will have specific shape and size. Based on the size and shape they will be classified into their breed and by further comparison of other parts particular bird can be identified.

V. CONCLUSION

Fine grained visual categorization is the best technique to classify objects that being to a particular object type. Knowledge of best categorized objects will be transformed to the weakly categorized objects. This object classification will be used in many real-life situations like medical researches and artificial intelligence.

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