International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-8 Issue-6, March 2020

"A Learning Method for Object Detection from Low Resolution Image"

Yash Munot, Mrunalinee Patole, Chetan Jadhav, Abhijeet Raut, Namita Rode

Abstract: ***Object recognition the use deep neural networks has been most typically used in real applications. We propose a framework for identifying items in pics of very low decision through collaborative studying of two deep neural networks. It includes photo enhancement network object popularity networks. The picture correction community seeks to decorate images of much lower decision faster and more informative images with the usages of collaborative gaining knowledge of indicatores from object recognition networks. Object popularity networks actively participate in the mastering of photograph enhancement networks, with skilled weights for photographs of excessive resolution. It uses output from photograph enhancement networks as augmented studying recordes to reinforce the overall performance of its identity on a very low decision object. We esablished that the proposed method can improve photograph reconstruction and classification overall performance.***

Keywords: Image acquisition, Image Segmentation, Feature Extraction, Artificial Neural Network.

I. INTRODUCTION

The current work for object detection is based entirely ogle-Net, through which objects are ideon perception models such as Alex-Net and Gontified and identified. The first challenge is for the image enhancement network to convert an image of low resolution to high resolution. After obtaining the image of high resolution, it then applied object recognition and recognition. Hence an object detection system is needed for a low resolution image based on machine learning for better accuracy and higher reliability[1]. We are going to invent low resolution image object detection and prediction frameworks based on machine learning and image processing. We are going to work on different types of image datasets. We are using convergence neural networks to achieve high accuracy in object detection.

Manuscript received on February 10, 2020.
Revised Manuscript received on February 20, 2020.
Manuscript published on March 30, 2020.
* Correspondence Author
Yash Munot*, Department Of Computer Engineering R.M.D. Sinhgad School Of Engineering,Warje,Pune 411058
Mrunalinee Patole, Department Of Computer Engineering R.M.D. Sinhgad School Of Engineering,Warje,Pune-411058
Chetan Jadhav , Department Of Computer Engineering R.M.D. Sinhgad School Of Engineering,Warje,Pune-411058
Abhijeet Raut, Department Of Computer Engineering R.M.D. Sinhgad School Of Engineering,Warje,Pune-411058
Namita Rode, Department Of Computer Engineering R.M.D. Sinhgad School Of Engineering,Warje,Pune-411058

The purpose behind this system is to increase its recognition performance on very low resolution objects using output from image enhancement networks as augmented learning data[2]. Our motivation is to propose methods that can improve image reconstruction and classification performance. The current implementation scope is to develop systems for real-time object recognition such as real-world objects such as individuals, vehicles, animals, fruits, etc.
The current implementation scope should be used in an efficient solution for very low resolution object recognition field work. . The proposed framework can be applied to other low resolution problems, such as faces and letters, which will be done in future studies[3]. Implementing this system to detect real-world objects using computer vision and machine learning. To develop a real-world based object and text detection framework that will overcome the existing accuracy problem. Our system aims to achieve high recognition accuracy for low resolution images[4]. We are going to invent image reconstruction and classification frameworks using deep neural networks.
Artificial Neural Network (ANN) is going to used for future recognition in which we having the input unit of training data set of different image dataset[5]. Next we have hidden unit which acts upon this training dataset to evaluate the output unit results train model. This entire ANN is works by considering the factors namely matrix feature of images for drafting into a train model for object recognition. We are going to face limitation while working with real time object detection will not give accurate results. In future, we are going to work with real time dataset to overcome this limitation.

II. LITERATURE

No	Paper name	Concept	Advantages	Problems identified
1.	Karen Simonyan, "VERY DEEP CONVOLUTIONAL NETWORKS FOR LARGE-SCALE IMAGE RECOGNITION" ICLR 2015	In this work we investigate the effect of the Convolutional network depth on its accuracy in the large-scale image recognition setting. Our main contribution is a thorough evaluation of networks of increasing depth using an architecture with very small (3×3) convolution filters.	They have made our two best-performing Conv-Net models publicly available to facilitate further research on the use of deep visual representations in computer vision.	The bad initialization can stall learning due to the instability of gradient in deep nets.
2	Christian Szegedy, "Going Deeper with Convolutions", CVF IEEE, 2015.	They propose a deep Convolutional neural network architecture codenamed Inception that achieves the new state of the art for classification and detection in the Image Net .	The main hallmark of this architecture is the improved utilization of the computing resources inside the network.	No new data sources were used for training.
3	Kaiming He , "Deep Residual Learning for Image Recognition", LSVRC 2015.	Deeper neural networks are more difficult to train. We present a residual learning framework to ease the training of networks .	They showing that these residual networks are easier to optimize, and can gain accuracy from considerably increased depth.	But experiments show that our current solvers on hand are unable to find

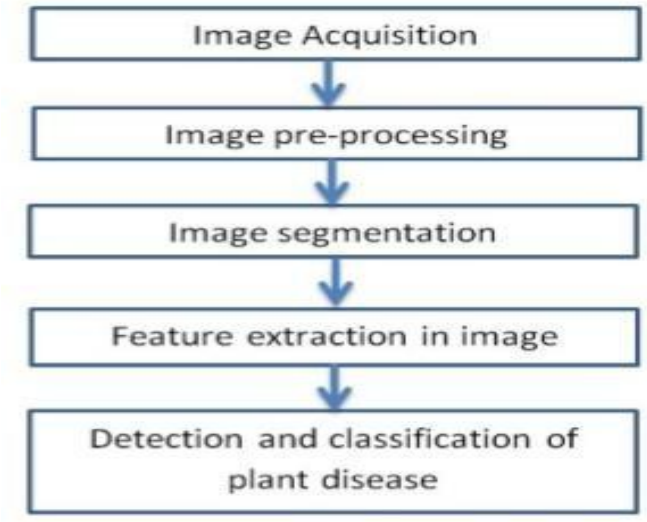


Fig. Existing System

III. EXISTING SYSTEM APPROACH

There are different approaches to object detection that have been used previously. Different object images from the dataset are used for further processing. Digital image processing is an area that analyzes image processing methods. Mathematically, the image is a form of light intensity over a two-dimensional field. The image to be processed by the system or computer, an image with numerical value must be presented statistically[6]. A digital image can be said by a two-dimensional matrix F (M, N) consisting of M columns and N rows. Color image processing [RGB], are different models such as hue and saturation, value (HSV) models[7]. This model is used with an object in which a certain color can be identified and the intensity of unwanted light from the outside can be overcome. Further tests on the pictures used six types of colors, such as brown, yellow, green, blue and black and white.

Images containing objects or text are found through a system dataset of text or object images[8]. This image mainly consists of color combination of RGB (Red, Green and Blue) form. A color transformation structure is created for the RGB image, and then, a device-independent color space transformation is applied to the color transformation structure[9]. To remove noise in image or other object removal, various pre-processing techniques are considered. Image grabbing is done using grab cuts like methods, namely cropping the object image is to get the image area of interest. Smoothing filter is commonly used for image smoothing[10]. The contrast enhancement of the image is for smoothing images. Image segmentation refers to the separation of a set of images based on the basis of the image feature and nothing else. Partition can be done using various methods like Otsu's method, k-means clustering, converting RGB image to HIS model.

IV. PROPOSED SYSTEM APPROACH

In a planned system, we have a tendency solution over existing work done by providing most interesting visual programming learning techniques. In proposed work we are going to invent object detection framework for extremely low resolution image data set as well as high resolution datasets. We are going to train our system into two phases first is to train by using low resolution image data set. Second high resolution dataset trained separately using high resolution images same as low resolution image data count. In last case we are combining low resolution image (LRI) and high resolution image (HRI) dataset to train our model. After training our model drafted

Accordingly class labels which we are going to train. The whole process is done under network named image enhancement network (IEN). For train purpose we are using neural network and tensor flow framework of machine learning to gain high accuracy over object detection. In testing phase we are giving image of different objects like cars, animals , humans, and real world objects etc. After getting image inputs of low resolutions it will be converted into a high resolution images by using pre defined image enhancement network. After getting high resolution input image get recognized and detected objects from it with the help of our trained model.

2) Image Processing

After getting object image it will send for image processing module. In image processing image gets converted in gray format by removing noise in it using Gaussian filter. After gray conversion image thresholding by setting RGB colour values to zero and preserving only black and white [0 and 1] values. Gray to binary conversion is done by using OTSU's method. After getting black formatted image hand shape get extracted from image. The exact shape of hand will get by drawing edge using canny edge detection method. After processing unit extract exact objet area from input image.

3) Feature Extraction

After getting exact shape of object area features get extracted from it by using pixels weight calculations. The image pixels get drafted in matrix by using weight gradient functions only on drawn area of object detected. Feature extraction done on all image dataset for training model creation and drafting. The train model creation done by using deep learning (ANN) algorithm.

V. FEATURE MAPPING & MODEL GENERATION

The image dataset is going through image processing and subsequent phases of feature extraction. After getting image features these statistical features get mapped on machine file which is nothing but trained model. The runtime testing image gets matched with pre trained model and respective outcomes will be generated. After outcome generation those results is nothing but our desire object and text recognition results

VI. IMAGE ENHANCEMENT

Image enhancement is a technique that have a trained high resolution image.

VII. ALGORITHM

Artificial Neural Network

Srep 1: Pick a Network Architecture (i.e. Connectivity Pattern among the neurons)
Number of input gadgets = size of functions x(i)
Number of output units = variety of classes
Number of hidden gadgets consistent with layer = usually greater the better (ought to stability with value of computation as it will increases with more hidden gadgets)
Defaults: 1 hidden layer. If you've extra than 1 hidden layer, then its miles recommended that you have the same number of devices in every hidden layer
Step 2: Random Initialization of the Weights
Step 3: Implement Forward Propagation to induce intial prediction for any x(i)
Step 4: Implement the value oprate for the Systematic Neural Network (ANN)
L = total variety of layers in the network
sl = number of units (not counting bias unit) in layer l
K = number of output units/classes
Step 5: : Implement back-propagation to compute partial derivatives to reduce our price operate J using an optimal set of parameters in theta.
Step 6: Use gradient checking to verify that your back-propagation works. Then disable gradient checking.
Step 7: Use gradient descent or a intrinsic optimization oprate to reduce the price oprate with the weights in theta

VIII. EXPERIMENTED RESULTS

A) Training Models

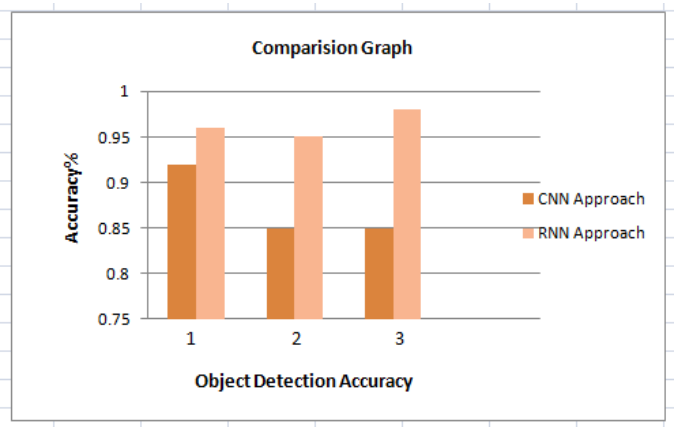
In object recognition work we are used tensor flow for training and validating our models dataset. In which real time 100 categories of object image samples are trained for object recognition models. We have used image enhancement network with predefined machine learning and image processing libraries for enhancement of images. Finally plot files generated as an output of our trained model.

B) Testing Models

In final phase of data testing in which real time low resolution and high resolution image dataset used to test our model accuracy. The low resolution images get accurately recognized get 95% accuracy. The high resolution images get above 95% accuracy while object recognition.
In our experimental setup, In table 1 describe our system modules and respective generated output.

Sr. No.	Real time object Images	Testing dataset Object recognition
Recognition rate	91.05%	96%
Accuracy	90%	98%

C) Comparative Study Graph



D) Accuracy Rate of Object Recognition

All object sample images trained by our trained model based on YOLO. The object images trained based on 100 groups of objects, so we have been conclude the accuracy rate above 95%. We achieved 95% accuracy in low resolution object detection model. For high resolution image object detection get achieved nearly 98% accuracy.

IX. CONCLUTION

We are palnning to invent the planned systematic collaborationbetween deep networks can function an green answer for to the challenge of verylow resolution object popularity.To resolve object quali ty downside , the planned framework perhaps carriedout to totally different low resolution issue, consisting of faces and letters.

FUTURE WORK

Our future work will used for developing solutions for detection of objects from video contents

ACKNOWLEDGEMENT

This work is supported in a crop promotion research field in India. The authors are grateful to the Faculty of Engineering and Technology (FET), Savitribaipule University of Pune, Pune for facilitating research work.

REFERENCES

1. K. Simonyan and A. Zisserman, "Very deep convolutional networks for large-scale image recognition," in Proc. Int. Conf. Learn. Represent., 2015, pp. 1–14.
2. C. Szegedy et al., "Going deeper with convolutions," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., Jun. 2015, pp. 1–9.
3. K. He, X. Zhang, S. Ren, and J. Sun, "Deep residual learning for image recognition," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., 2016, pp. 770–778.
4. C. Szegedy, V. Vanhoucke, S. Ioffe, J. Shlens, and Z. Wojna, "Rethinking the inception architecture for computer vision," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., 2016, pp. 2818-2826.
5. K. He, X. Zhang, S. Ren, and J. Sun, "Delving deep into rectifiers: Surpassing human-level performance on imagenet classification," in Proc. IEEE Int. Conf. Comput. Vis., 2015, pp. 1026-1034
6. S. P. Mudunuri, S. Sanyal and S. Biswas, "GenLR-Net: Deep Framework for Very Low Resolution Face and Object Recognition with Generalization to Unseen Categories," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit, Workshop, 2018, pp. 602-611.

7. Z. Wang, S. Chang, Y. Yang, D. Liu and T. S. Huang, "Studying Very Low Resolution Recognition Using Deep Networks," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., 2016, pp. 4792- 4800.
8. X. Peng, J. Hoffman, S. X. Yu and K. Saenko, "Fine-to-coarse knowledge transfer for low-res image classification," in Proc. IEEE Int. Conf. Image Process., 2016, pp. 3683-3687
9. J. Kim, J. K. Lee, and K. M. Lee, "Accurate image super-resolution using very deep convolutional networks," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., 2016, pp. 1646–1654
10. C. Szegedy, V. Vanhoucke, S. Ioffe, J. Shlens, andZ. Wojna, "Rethinking the inception architecture for computer vision," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., 2016, pp. 2818-2826.

AUTHOR PROFILE

Yash Munot, B.E. Computer , R.M.D.Sinhagad School Of Engineering yashvmunot@gmail.com

Mrunalinee Patole, R.M.D.Sinhagad School Of Engineering Mrunalinee.Patole@sinhgad.edu

Chetan Jadhav, B.E. Computer , R.M.D.Sinhagad School Of Engineering jadhavchetan68@gmail.com

Abhijeet Raut, B.E. Computer R.M.D.Sinhagad School Of Engineering abraut17@gmail.com Second

Namita Rode, B.E. Computer, R.M.D.Sinhagad School Of Engineering namitarode638@gmail.com