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RESEARCH ARTICLE

DETECTION AND RECOGNIZING OF OBJECTS USING K-MEANS CLUSTERING ALGORITHM AND FASTER R-CNN

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ABSTRACT

With the growth of computer vision, digital image processing is necessary to provide a clear image to the user. In existing technique only improve detect the main components of an images of FERET data sets of different versions but In proposed research we are try to improve the detection of main components of an image and recognize it and also try to improve the accuracy and transparency of the various images of different versions.

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INTRODUCTION

Analysis of 2D and 3D objects two processes performed that is detection of an object and second recognize of an objects for clearly showing the features of an image. In an image, many features are common. Some time detection of an image become difficult to find the important or highlighted features because of similar attributes of objects. For finding important features, we use clustering algorithm for form a cluster of similar type of objects and after forming the clusters in an object for detection and recognizing of an object using faster RCNN algorithm.

Object detection and Recognition: Analysis of 2D and 3D objects two processes performed that is detection of an object and second recognize of an objects for clearly showing the features of an image. In an image, many features are common. Some time detection of an image become difficult to find the important or highlighted features because of similar attributes of objects. For finding important features, we use clustering algorithm for form a cluster of similar type of objects and after forming the clusters in an object for detection and recognizing of an object using faster RCNN algorithm

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Steps for object detection and recognition in an image:

- Then consider every region as a different image.
- Select the object, which you want to detect and in which it is present an Pass all regions to CNN.
- Once each region into corresponding class combines the whole regions and form a original image.

LITERATURE REVIEW

Various authors in the past have done studies related to object detection, Deep Learning Algorithm and clustering algorithm. Few studies reviewed by me concerning my research proposal as follows:

- **Marcin Wo ´zniak , Dawid Połap (2018)** focused on only 2D object detection via clustering algorithm which only detect and recognize the 2D object with CNN Algorithm. It only detect the clustered features but sometimes it show difficulty to show clear objects in an image.
- **Wenging Chu et.al(2018)** focused on object detection with the combination of R-CNN with CRF. It detects those objects, which are inside the image, but is also work on regions. By using CRF on R-CNN for improve the accuracy. In addition, make object detection regions more visible and divided into categories.
- **R. B. Girshick**s **(2015)** examined Fast Region Based Convolutional network method (Fast R-CNN) for improve

Figure 1. Fast R-CNN image

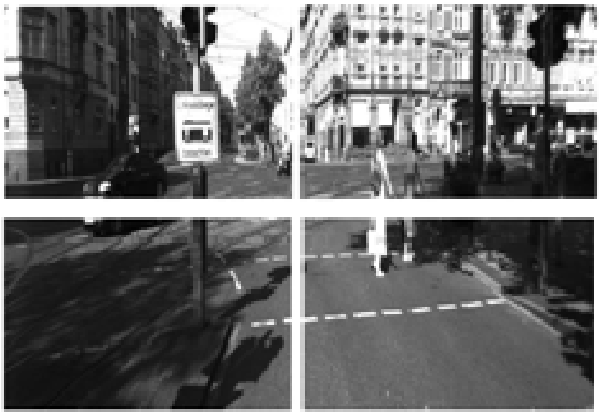


Figure 2. Region based Fast R-CNN

Figure 3. Ehanced region using Fast R-CNN

the testing speed and training and improve the detection accuracy of the object. It trained the VGG16 network for improvement in speed, less time complexity and also 9times faster than the previous algorithm R-CNN.

- **Shi Na *et al.* (2016)**found that clustering analysis method is one of the main analytical methods in data mining, the method of clustering algorithm will influence the clustering results directly. This paper discusses the standard k-means clustering algorithm and analyzes the shortcomings of standard k-means algorithm, such as the k-means clustering algorithm has to calculate the distance between each data object and not all cluster centers in iteration make the efficiency of clustering is high. This paper proposes an improved k-means algorithm in order to solve this question, requiring a simple data structure to store some information in iteration, which used in the next iteration. The improved method avoids computing the distance of each data object to the cluster centers repeat, saving the running time. Experimental results show that the improved method can effectively improve the speed of clustering and accuracy, reducing the computational complexity of the k-means.
- **SH Tsang (2018)** researched the how faster R-CNN is better and how it give the useful results of the data. It used for improving the accuracy of regional based image and detect the object clearly.
- **Ajeet Ram Pathak *et al* (2018)** found the various steps in deep learning for object detection. It showed the different applications where the deep learning using CNN used and how to detect the image. It also told how deep learning is different from the other detection technique in detection of running car and robots.
- **Sandeep Kumar *et al* (2017)** used EASYNET model in digital image processing for detection and reorganization object in images. It detected those images, which captured by single shot while it is clear or blur. It only detects the front object and subtracts the background image. Thus, it only detects the front objects.
- **Khushboo Khurana (2013)** found the technique for detect the multiple objects from an image either the object at the front or in the background. This researcher used the Scale-Invariant Feature Transform (SIFT) technique for detecting the multiple objects from a single object. But this technique is not much useful in real life it did not detect the clear objects and drawback of this technique it did not detect the clear objects.
- **Ross Girshick (2015)** proposed Fast R-CNN and SPPnet technique for object detection and recognize the objects. It improves the quality of detection and improves the threads in previous results. But this technique is too costly for detection because it used two technique.
- **Şaban Öztürk *et al.* (2018)** studied extraction algorithm in object detection how to extract the useful results. Object detection detect the all objects which are not useful this technique is use only those which object are useful by using GLCM, LBP, LBGLCM, GLRLM and SFTA technique and image parts are classified by SVM, KNN, and Boosted tree. This technique is very time consuming and very costly.
- **Kamran Kowsari *et al.* (2016)**proposed a unsupervised technique for object detection. It detect the 3D objects by using a single RGB-D camera for detecting the objects. But this unsupervised method is very time consuming and it needs large memory space for storing the content of object and detect a single object from clusters of objects in image.
- **Jun Sang *et al.* (2018)** proposed a vehicle detection and recoginzation technique by using YOLO technique which showed the result of what type of vehicle is and clearly detect all the parts of the vehicle with using K-means technique for forming clusters of database which is showed in the form of boxes.

- **Juan Du (2018)** performed the difference between the faster R-CNN technique and YOLO. It observed that R-CNN technique use the traditional technique of CNN family and easy to understand and improve the accuracy of the image in very easy and understanding way while in YOLO technique it observed that it is new fashioned technique for detecting the image but in this image is divided into different boxes then find the what object we want to detect while in faster R-CNN detection of image is directly performed rather than forming boxes in image.
- **Zhong-Qiu Zhao *et al.* (2017)** showed a detailed object detection method by using deep learning in which it used the CNN technique for better detection of image start from small pipe line which is minor part in an image and next detect the other objects by using traditional CNN techniques and found a result which traditional gave better result and it concluded faster R-CNN is better for object detection.
- **Liwen Zheng (2017)** proposed a SSD technique for object detection to extend the shallow of the object which increase the area of detection with SSD image is divided into parts within single shot detection of the object.
- **Wenging Chu *et al.* (2018)** focused on object detection with the combination of R-CNN with CRF. It detects those objects, which are inside the image, but is also work on regions. By using CRF on R-CNN for improve the accuracy. In addition, make object detection regions more visible and divided into categories.
- **Joseph Redmon** found a new deep learning approach YOLO for object detection. YOLO process the image in 45 frames per second. It performs all method including DPM and RCNN for wide margin between the regions of the image.
- **Z. Shen *et al* (2014)** found an edited version of CNN for maximum entropy for a particular vector. The particular vector not connected to image category it differs from the image features. This advance version used when limited training data is available for improve the generalization. It improved the mean average precision with SVM.
- **R. B. Girshicks (2015)** examined Fast Region Based Convolutional network method (Fast R-CNN) for improve the testing speed and training and improve the detection accuracy of the object. It trained the VGG16 network for improvement in speed, less time complexity and also 9times faster than the previous algorithm R-CNN.
- **Spyros Gidaris *et al.* (2016)** proposed a novel object localization technique by use LocNet architecture. LocNet provides the information of boundary of the object inside the search region.It improved on mAP for IoU thresholds on PASCAL VOC2007. Thus, it provides the independent box proposal method for set of sliding window by the use of LocNet

Proposed Work: In this, we discussed the implementation of new algorithm for detection and recognition of K-MEANS and Faster R-CNN algorithm.

Object Detection and recognize methods: For object detection and recognize two methods used:

- Machine Learning
- Deep Learning

Machine Learning: Machine Learning is a method in which we first recognize the features then perform the CNN.

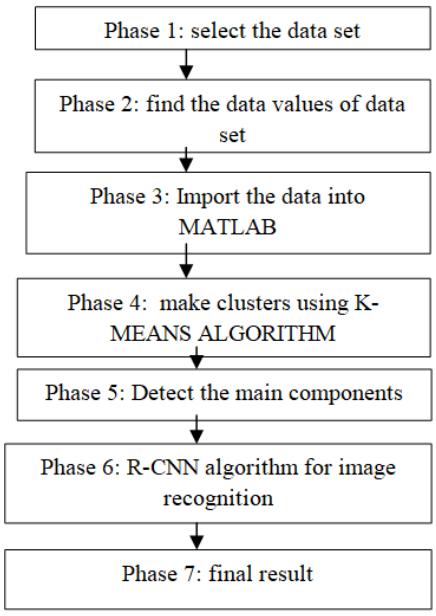


Figure 3.1. Steps of current research

Deep Learning: Deep Learning is a method in which features are not important to define first that what type of features is required to recognize and detection of which feature of an objects. Deep Learning based on convolutional neural network (CNN).

CNN (convolutional neural network)

Convolutional Neural Network is Deep Learning based method. Convolutional neural network is different from the neural network (4). In Neural Network input transform through hidden layer while CNN input depends upon the three dimensions:

- Height of the object
- Width of the object
- Depth of the object

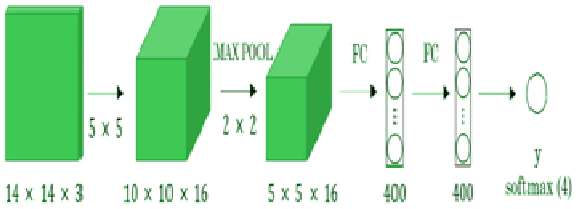


Figure 1.3.1. sliding window into Convolution layer

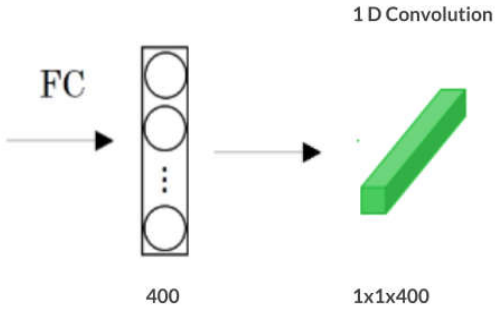


Figure 1.3.2. A fully connected layer into convolutional layer

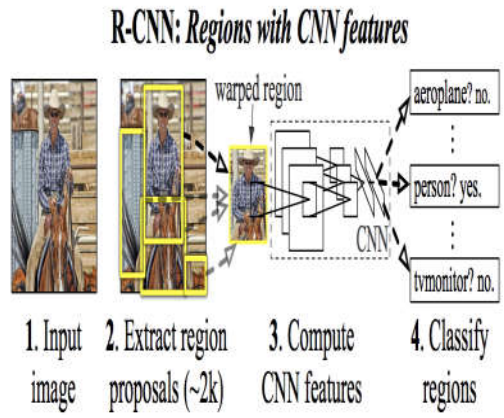


Figure 1.4.1 regions wirh R-CNN

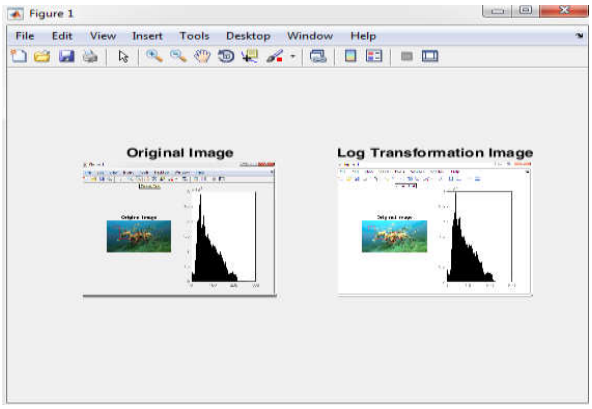


Figure 5.1 Comparison between real image and ehnaced image

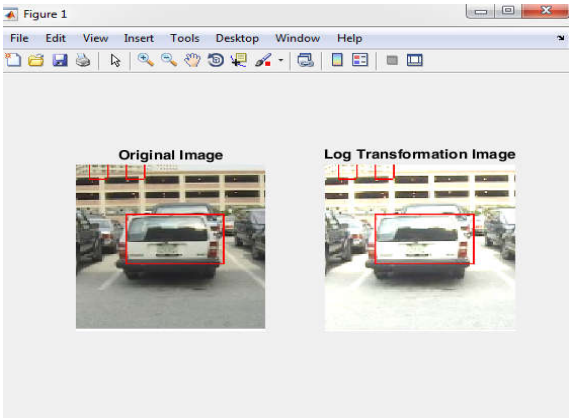
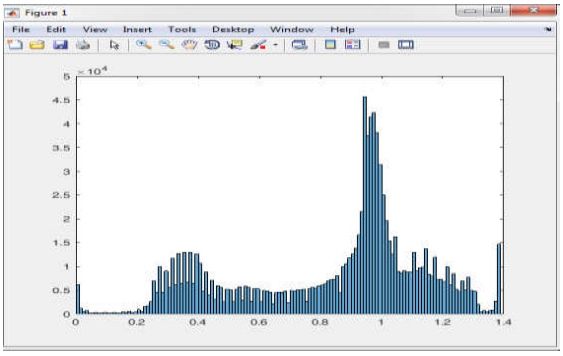


Figure 5.2 compare the accuracy of the image



- Now we analyze how a full connected layer divided into Convolutional layer or we can a idea how an image is divide into exact object which you want to detect.
- Exact image of detected image:

Approaches of CNN

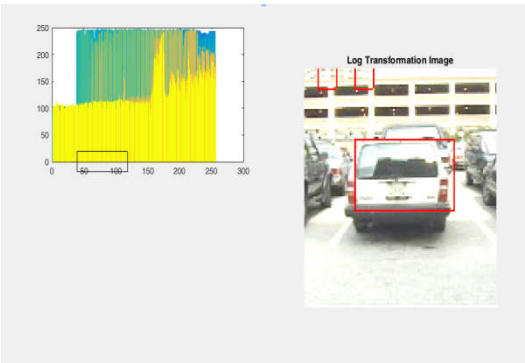


Figure 5.3 Histogram of an enhanced image

Region Proposals: The following are Region Proposal approaches:

- R-CNN: Ross Girshick proposed a method which work on huge region data. This Model work on an image, which divided into 2000 regions.
- Fast R-CNN: It is the enhancement of the previous model by same research. In this, we did not need of 2000 regions. It directly works on convolution operation sson image and feature map generated.
- Faster R-CNN: This model is same as upper region based model only difference in this it takes less time and give high speed for image detection, face recognition etc

RESULT AND CONCLUSION

In this experiment, we had done the work on images of animal, car and mixed detection recognition of an images. In this by the use of Faster R-CNN we try to improve the image quality of an image in which we the detected and recognized parts clearly.

Compare the animal image

Future scope:
With the growth of Digital image, processing it is required of every field having knowledge of digital image processing. In this research, we try to improve the image recognition and detection of FERET Data base of different years, which improved with R-CNN. We tried to enhance the image with exactly which points are important for recognition and detection with the help of K-MEANS and FASTER R-CNN algorithm. In future augmented reality experiments are not longer imaginary futuristic dream with the help of image recognition it will become reality very soon, which is not possible in virtual experiments

REFERENCES

Albert Soto i Serrano" YOLO Object Detector for Onboard Driving Images" , ESCOLA D'ENGINYERIA (EE), UNIVERSITAT AUTONOMA DE BARCELONA (UAB)

An Advanced Moving Object Detection Using K-Means Clustering Algorithm.

Gidaris , S., Komodakis, N. Locnet:

Girshick. R. B. 2015. Fast R-CNN. CoRR, abs/1504.08083,.

Girshick. R. B. 2015. Fast R-CNN. CoRR, abs/1504.08083.

Joseph Redmon University of Washington pjreddie@cs.washington.edu Santosh Divvala Allen Institute for Artificial Intelligence" You Only Look Once: Unified, Real-Time Object Detection"

l-time object detection with region proposal networks. In: NIPS. 2015.

Marcin Wo Zniak, Dawid Połap "object detection and recognizing via clustering"

Na S., XuminL., Yong G. 2010. "Research on k-means Clustering Algorithm: An Improved k-means Clustering Algorithm". Third International Symposium on Intelligent Information Technology and Security Informatics, pp.63-67

Pulkit Sharma" A Step-by-Step Introduction to the Basic Object Detection Algorithms (Part 1)".

SH Tsang" Review: Faster R-CNN (Object Detection)"

Shen Z. and Xue. X. 2014. Do more dropouts in pool5 feature maps for better object detection. arXiv preprint arXiv:1409.6911.

Wei Liu1, Dragomir Anguelov2, Dumitru Erhan "SSD: Single Shot Multi Box Detector" UNC Chapel Hill 2Zoox Inc. 3Google Inc. 4University of Michigan, Ann-Arbor 1wliu@cs.unc.edu, 2drago@zoox.com.

Wenqing Chu, Deng Cai " Deep feature based contextual model for object detection" Neurocomputing 275 (2018) 1035–1042

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