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Object Detection using Convolutional Neural Network

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Abstract: ***We develop a new approach for detecting objects from images based on convolutional neural networks (cnns). Object detection from repository of images is challenging task in the area of computer vision and image processing in this work we present object recognition using contour and Gaussian Blur and Canny edge with intended classification and detection of images. So we used convolutional neural network on Contour with Canny Edge support the experimental results shows the time required to train, test and create the model in limited computing system. We train the system with some amount of images with CPU system. At the end of training accuracy is 96 percentage and the system can recognition input images based on train model and the output is respective label of images. In this model main focus is on discriminating properties of image. This model takes images as input and then it captures the properties of image and according to these it describes the contents present in that image and also generates the visual explanation of that image without any need of human intervention. Artificial Intelligence is nothing but the machine intelligence where machine behaves like human and also takes decision like human brain. So we propose a model using Artificial Intelligence for generating visual explanations of images.***
Index Term: Convolutional Neural Network (CNN), object detection, region proposal, regression, datasets.

I. INTRODUCTION

The Deep Neural Network (DNN) is the latest advancement in the deep learning made task simple for image recognition by as deeply as possible learning. Deep learning is a subdivision of neural network algorithms, which are excellent identifying patterns, but usually require more data. The most popular technique used in improving the accuracy of image classification is the Convolutional neural network (CNN). CNN is a special type of network that works just like the normal neural network, which initially has a convolution layer. Rather than bolstering the whole pictures as a variety of numbers, the pictures is separated into various tiles using the Gaussian blur, the machine at that point tries to predict what's in the image in view of the expectation of the considerable number of tiles. This enables the PC to parallelize the operations and recognize the object little heed to where it is located in the image. To begin with pre-processing, the pictures are extremely composed by the dataset and contain little to zero clamor, we have to include a tad of change to the information. It can be used for many applications like video surveillance, medical imaging, and robot navigation. Many algorithms can be used for this task like background subtraction, temporal differencing, optical flow, Kalman filtering, support vector machine, and contour matching.There are some recent approaches for object detection. In paper the authors developed a low shot transfer detector using a flexible deep architecture and a regularized transfer learning framework to address object detection using few training data

II. LITERATURE REVIEW

A. Mr. Sudarshan Duth and Mrs.Swati Raj, "Object Recognition in Images using Convolutional Neural Network", Proceedings of the Second International Conference on Inventive Systems and Control (ICISC), 2018.The extraction based object recognition systems are with limitations such as it can't be scalable for unknown data. A machine learning algorithms are used to simulate human intelligence to classify, recognize and group that data. This features modeled in object recognition with images. Given an image the system excepts an process the image and gives its category as an output. Extraction based systems are not associated with computational intelligence, but proposed system is modeled with intelligence.

B. Liang Ye, Zhiguo Cao and Yang Xiao, "Deep Cloud: Ground-base cloud image catagorization using deep Convolutional features" ,IEEE transactions on Geoscienceand Remote Sensing, 2017.Deep Cloud is proposed as a novel visual feature extraction approach for ground based cloud image classification. Being different from the existing state-of-the-art methods, it extracts the cloud image representation under the deep learning model rather than handcraft ones. To our knowledge, we are first to apply deep CNN to the domain ground-based cloud image categorization. Deep Cloud consistently outperforms the previous method, especially further find-grainad categorization cases.

C. Alex M. Kaneko and Kenjiro Yamamoto, "Landmark Recognition based on image categorization by segmentation point for Autonomous Driving ", 2016 SICE International Symposium on Control Systems (ISCS), 2016. A method for recognizing landmarks on basis of image categorization by segmentation point was presented. It could recognize 99.3 percent of the arrows, 100 percent of the stop lines and 100 percent of pedestrian crossing in the taken valid samples, which are higher rated then

existing methods. The proposed method could deal with partially occluded landmarks, recognizing their available features in the image and, substituting and verifying them with previously set Direction, Descriptor and Conditions stored in database We also proposed a novel concept of occlusion level based

D. Jiuwen Cao,Yanfei Zhao and Xiapaoing Lai, "Landmark Recognition via Sparse representation", International Conference on Information Science(ICIS), 2015. We have proposed a novel landmark recognition scheme based in the sparse linear representation algorithm. A two level spatial pyramid kernel based bag-of-words method(SPK-BoW) has been employed to generate the image representation vector. Two estimation algorithm in CS have been used to solve the sparse coefficient vector for the query landmark images.

E. Malay Shah and Rupal Kapadi, "Object Detection using Deep Neural Network", International Conference on Intelligent Computing and Control Systems ICICCS, 2017. Object detection has been a topic for challenge and many methodologies are applied. Object detection is detecting a specific object from an image of multiple and complex lines and shapes. Object detection is used in face detection, object tracking, image retrieval, automated parking systems

F. Wang Zhiqiang, Liu Jun, "A Review Of Object Detection based On Convolutional Neural Network", 36th Chinese Control Conference, 2017.The paper focused on the object detection based on CNN, the structure of CNN, the framework of object detection based on CNN and the methods of improving detection performance are introduced. CNN has strong ability in feature extraction, it can compensate for the drawback existing in hand-crafted features. CNN also has better advantage than conventional methods on real-time, accuracy, adaptability, but it still has lots of room for improvement

G. Meera M. K. , Shajee Mohan B. S., "Object Recognition in Images", International Conference on Information Science(ICIS), 2018. A SIFT feature based k-NN classifier and a GIST feature based SVM classifier are implemented. GIST feature based SVM classifier using Gaussian kernel showed better classifi- cation accuracy than SIFT feature based k-NN. Thus SVM classifier with Gaussian kernel is finalised for query image classification. In the second phase of this work, we will implement a k-NN classifier which will make use of SIFT feature based similarity matrix to retrieve the images containing the query image.

H. Christian Szegedy, Alexander Toshev and Dumitru Erhan," Deep Neural Networks for object detection", advances in Neural Information Processing Systems, 2017.

I. Zhong-Qiu Zhao, Peng Zheng and Shou-tao Xu, "Object Detection With Deep\Learning : A Review", 2014.Due to its powerful learning ability and advantages in dealing with occlusion, scale transformation and background switches, deep learning based object detection has been a research hotspot in recent years. This paper provides a detailed review on deep learning based object detection frameworks which handle different subproblems, such as occlusion, clutter and low resolution, with different degrees of modifications on R-CNN. The review starts on generic object detection pipelines which provide base architectures for other related tasks. Then, three other common tasks, namely salient object detection, face detection and pedestrian detection, are also briefly reviewed. Finally, we propose several promising future directions to gain a thorough understanding of the object detection landscape. This review is also meaningful for the developments in neural networks and related learning systems, which provides valuable insights and guidelines for future progress.

J. Xin Zhang, Yee-Hong Yang, Zhiguang Han and Hui Yang, "Object Class Detection A Survey", 2014. Object class detection, also known as category-level object detection, has become one of the most focused areas in computer vision in the new century. This article attempts to provide a comprehensive survey of the recent technical achievements in this area of research. More than 270 major publications are included in this survey covering different aspects of the research, which include: problem description: key tasks and challenges; core techniques: appearance modeling, localization strategies, and supervised classification methods; evaluation issues: approaches, metrics, standard datasets, and state-of-the-art results; and new development: particularly new approaches and applications motivated by the recent boom of social images.

III. PROBLEM DEFINATION

As we will demonstrate, convolutional neural networks are currently the state-of the- art solution for object detection. The main task of this thesis is to review and test convolutional object detection methods In the experimental part, we study how
easily a convolutional object detection system can be implemented in practice, test how well a detection system trained on general image data performs in a specific task and explorer, both experimentally and based on the literature, how the current systems can be improved. Object detection becomes an attractive topic in visual recognition area in the last decade. These features combined with SVMs have successfully detect the pedestrians from images. This method provides an idea that is solving localization by classifying region proposals of the images.

IV. PROPOSED WORK

Computer vision deals with the extraction of meaningful information from the contents of digital images or video. This is distinct from mere image processing, which involves manipulating visual information on the pixel level. Applications of computer vision include image classification, visual detection, 3D scene reconstruction from 2D images, image retrieval, augmented reality, neural vision and traffic automation. We divide the objects needed to detect in our project into classes. The entire algorithm is divided into the training step and detecting step. During the training step, we collect a large number of images with objects belong to the above classes and label them. Then, we design a deep convolution neural network and initialize the network with parameters which is obtained by pre-training on the large-scale data set. The above images are fed into the deep convolutional neural network to predict locations and classes of objects in them. In this proposed system, Finally we obtain the deep model for object confirmation as a result of the training step, which is used to initialize the deep convolution neural network in the detecting step used following technique:

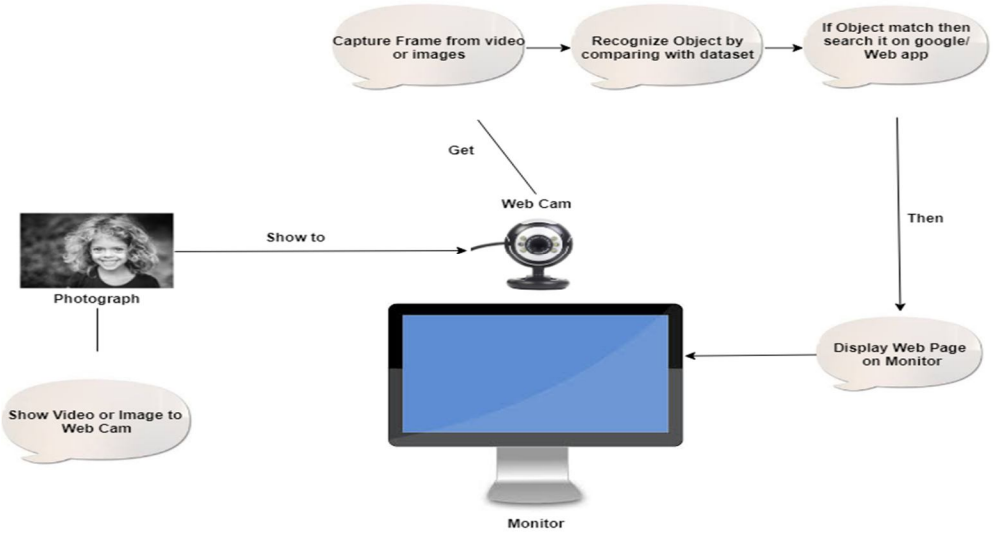


Fig: Architecture Diagram

1) *Contour:* We present a new proposal for image segmentation using deformable models, as an application of discrete-time cellular neural networks (DTCNN). This approach is based on active contours (also called snakes) which evolve until reaching a final desired location. The contours are guided by both external information from the image under consideration which attracts them towards salient characteristics of the scene, and internal energy from the contour image which tries to maintain the smoothness in the curve shape. The massively parallel processing in DTCNN and the use of local information permit a VLSI implementation, suitable for real time applications.
2) *Gaussian Blur:* In image processing, a Gaussian blur (also known as Gaussian smoothing) is the result of blurring an image by a Gaussian function (named after mathematician and scientist Carl Friedrich Gauss). It is a widely used effect in graphics software, typically to reduce image noise and reduce detail. The visual effect of this blurring technique is a smooth blur resembling that of viewing the image through a translucent screen, distinctly different from the effect produced by an out-of-focus lens or the shadow of an object under usual illumination. Gaussian smoothing is also used as a pre-processing stage in computer vision algorithms in order to enhance image structures at different scales—see scale space representation and scale space implementation.
3) *Canny Edge Detector:* Canny edge detection is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems. Canny has found that the requirements for the application of edge detection on diverse vision systems are relatively similar. Thus, an edge detection solution to address these requirements can be implemented in a wide range of situations. The general criteria for edge detection include:

a) Detection of edge with low error rate, which means that the detection should accurately catch as many edges shown in the image as possible
b) The edge point detected from the operator should accurately localize on the center of the edge.

4) Mathematical Model Let S is the System

S = {I, O, F, DD, NDD, Success, Failure}

I = Input to the system

I = {username, password, Capture Image, Trained Dataset}

O = Output of the system

O = {WebPage, ErrMSG }

F = Fusion in system

F = { admire(), admin login(), addSystem(), show Image(), captureImage(), compare ImageDataset(), searchObject(), showWebPage(), shower()}

DD = Deterministic data

DD = {image}

NDD = Non Deterministic data

NDD = {I, O}

V. CONCLUSION

The object recognition capability of the two state of the art models in CNN was successfully demonstrated. Base on the results of the experiments, there's a trade-off between accuracy and speed. Overall in this project, we have learned hands on experience in working with CNN such as debugging network, transfer learning and working. We also adopt the CNNs to solve the detection problem

and try to improve the exist model such as CNN. In this paper, we provide a new model for object recognition based on CNN. In this model, we use the

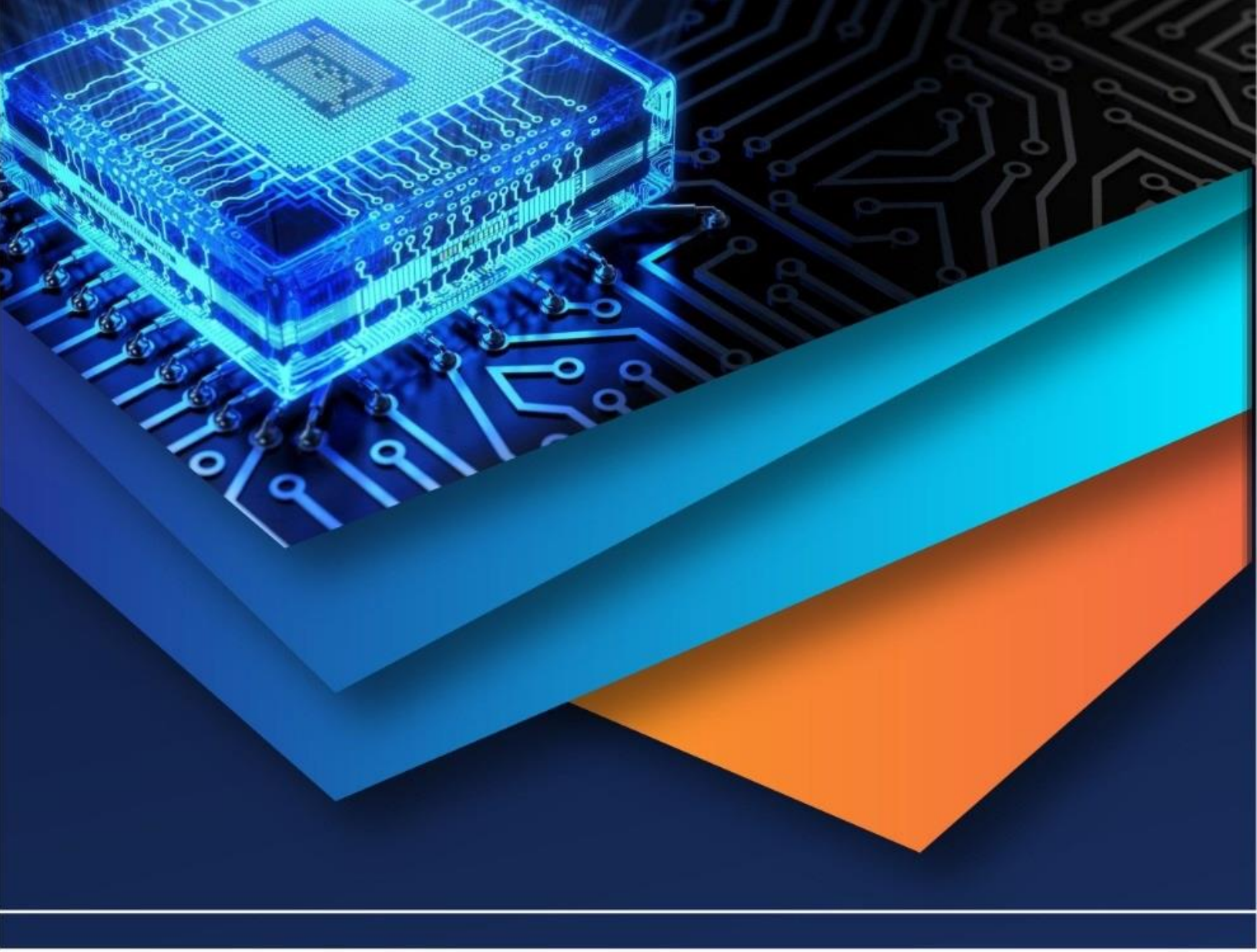
contour, Gaussian Blur, Canny Edge algorithm to generate proposals, and use a fine-tuned the Net model to generate the score for each proposals.The paper focused on the object detection based on CNN, the structure of CNN, the framework of object detection based on CNN and the methods of improving detection performance are introduced. The object recognition capability of the two state of the art models in CNN was successfully demonstrated. Base on the results of the experiments, there's a

trade-off between accuracy and speed. Overall in this project, we have learned hands on experience in working with CNN such as debugging network, transfer learning and working. We also adopt the CNNs to solve the detection problem and try to improve the exist model such as CNN. In this paper, we provide a new model for object recognition based on CNN. In this model, we use the contour, Gaussian Blur, Canny Edge algorithm to generate proposals, and use a fine-tuned the Net model to generate the score for each proposals.

REFERENCES

[1] Mr.Sudarshan Duth and Mrs.Swati Raj, "Object Recognition in Images using Convolutional Neural Network", Proceedings of the Second International Conference on Inventive Systems and Control (ICISC), 2018.
[2] Liang Ye,Zhiguo Cao and Yang Xiao, "Deep Cloud:Ground-base cloud image catagorization using deep Convolutional features" , IEEE transactions on Geoscience and Remote Sensing, 2017.
[3] Alex M. Kaneko and Kenjiro Yamamoto, "Landmark Recognition based on image categorization by segmentation point for Autonomous Driving ", 2016 SICE International Symposium on Control Systems (ISCS), 2016.
[4] Jiuwen Cao,Yanfei Zhao and Xiapaoing Lai, "Landmark Recognition via Sparse representation", International Conference on Information Science(ICIS), 2015.
[5] Malay Shah and Rupal Kapadi, "Object Detection using Deep Neural Network", International Conference on Intelligent Computing and Control Systems ICICCS, 2017.
[6] Wang Zhiqiang, Liu Jun, "A Review Of Object Detection based On Convolutional Neural Network", 36th Chinese Control Conference, 2017.
[7] Meera M. K. , Shajee Mohan B. S., "Object Recognition in Images", International Conference on Information Science(ICIS), 2018.
[8] Christian Szegedy, Alexander Toshev and Dumitru Erhan," Deep Neural Networks for object detection", advances in Neural Information Processing Systems, 2017.
[9] Zhong-Qiu Zhao, Peng Zheng and Shou-tao Xu, "Object DetectionWith Deep Learning : A Review", 2014.
[10] Xin Zhang, Yee-Hong Yang, Zhiguang Han and Hui Yang, "Object Class Detection: A Survey", 2014. SITRC, Department of Computer Engineering 2015 53
[11] Alex Krizhevsky, Ilya Sutskever, Geoffrey E. Hintotn, "ImageNet Classification With Deep Convolutional Neural Networks", 2016.
[12] Karen Simonyan and Andrew Zisserman, "Very Deep Convolutional Networks For Large Scale Image Recognition", 2015.
[13] Yann LeCun, Yoshio Bengio and Geoffrey Hinton, "Deep Learning : Nature", 2015.
[14] Ali Sharif Razavian, Hossien Azizpour, Josephine Sullivan and Stefan Carlsson, "CNN features off-the-shelf : an Astounding Baseline for Recognition", 2014.
[15] Jeff Donahue, Yangqing Jia and Oriyol Vinyals, "DeCAF : A Deep Convolutional Activation Feature For Generic Visual Recognition", 2016.
[16] Yann LeCun, Leon Bottou and Patrick Haffner, "Gradient -Based Learning Applied To Document Recognition", 2015.
[17] Kaiming He, Xiangyu Zhang and Shaoqing Ren, "Spatial Pyramid Pooling in Deep Convolutional Networks For Visual Recognition", 2015.

[18] Ross Girshick and Jian Sun, ”Faster R-CNN : Towards Real-Time Object Detection with Region Proposed Networks”, 2018.
[19] Haibing Wu and Xiaodong Gu,”Max-Pooling Dropout For Regularization Of Convolutional Neural Networks”, 2016.
[20] Jake Bouvrie, ”Notes On Convolutional Neural Networks,” 2017.
[21] Christian Szegedy,Wei Liu, Yangqing Jia, Pierre Sermanet, Scott Reed, Dragomir Anguelov, Dumitru Erhan, Vincent Vanhoucke and Andrew Rabinovich, ”Going Deeper with Convolutions, CVPR”, 2015.
[22] Ross Girshick, Jeff Donahue, Trevor Darrell1, Jitendra Malik and UC Berkeley,” Rich feature hierarchies for accurate object detection and semantic segmentation, CVPR”, 2014. SITRC, Department of Computer Engineering 2015 54
[23] Tsung-Yi Lin, Michael Maire, Serge Belongie, Lubomir Bourdev, Ross Girshick, James Hays, Pietro Perona, Deva Ramanan, C. Lawrence Zitnick, Piotr Dollar, ”Microsoft COCO: Common Objects in Context”, 2015.
[24] Wenling Shang, Kihyuk Sohn, Diogo Almeida and Honglak Lee, ”Understanding and Improving Convolutional Neural Networks via Concatenated Rectified Linear Units”, 2016.
[25] Kaiming He, Xiangyu Zhang, Shaoqing Ren and Jian Sun, ”Deep Residual Learning for Image Recognition, CVPR”, 2016.



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