SURVEY ON OBJECT DETECTION AND COUNTING BY IMAGE PROCESSING

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Abstract: Object detection and counting by image processing have greater prominence in acquiring a clear image through the prevailing algorithm. The main objective of the paper is to get a flabbergasting clear vision of accuracy to reach its quality in image processing. The image classifier anatomy is organized by input image, pre-processing, deep learning-based feature algorithm and label assignment to obtain accurate vector plans. This algorithm uses HOG, SVM and 2D Vector plans to acquire a perfect image in a short span of time. The python codding and 2D vector plans were explored to assist the available database of the image by output verification. The anticipated approach accomplished the exactness of ninety-five percent on image processing through object detection.

Keywords: Object detection, image processing, HOG, SVM and 2D Vector plans.

Introduction:

For accurate tracking and detection, widespread trending technology has been evolved in the current scenario. The previous approaches practiced for tracking are not up to the mark and they failed to resolve the drifting target. To evaluate the object position accurately is the crucial problem faced in object detection and tracking. The computer software system to locate and identify each object in the image at an exact form is object detection. The computer vision of object detection is widely worked in the face and vehicle detection, web images, pedestrian counting, driverless cars and security system. The semantic objects of digital videos and images are detected by image processing through cars, buildings and human. Moving object detection by computer algorithm is

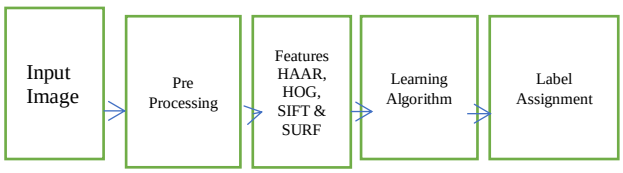
the prime technology lately used to unravel the problem. The various applications applied in the computer vision algorithm are medical imaging, military application and video analysis.

To detect object accurately Care applications and Machine Vision applications are broadly utilized. The specific location of objects is gathered by input information by motion interpretation, moving object classification and counting, Feature extraction is explored by colour and texture.

Paul Viola and Michael Jones invented face detection by the proficient algorithm in the year 2001. Viola and Jones algorithm implemented to recognize the face through webcam and got stunning computer vision. In 2005 Navneet Dalal and Bill Triggs' paper on *Histograms of Oriented Gradients* (HOG) outclassed the prevailing algorithm. Deep Learning by Alex Krizhevsky, Ilya Sutskever, and Geoffrey Hinton's mainstream computer vision on ImageNet Large Scale Visual Recognition Challenge (ILSVRC) surpassed the decades of achievement in 2013. Then, multiple Convolutional Neural Network (CNN) is evolved in 2015 on deep learning gave astounding computer vision with an accuracy of ninety-five percentage. Then, for image recognition, Deep learning through image processing becomes vital and inseparable in the modern world. For faster multiple object deduction R-CNN produce is employed. For image recognition a.k.a image classifier algorithm is progressed. It helps to recognize algorithm input and output contents of the image. a.k.a image classifier algorithm consists of thousands of images to recognize the objects and classes definitely. It will focus on the binary classifiers. The image classifier deducts the face and background of the image in a systematic way.

Image Classifier Anatomy:

The traditional image classifier follows the steps of uploading input image, preprocessing by engaging HAAR, HOG, SIFT and SURF features. Then, the learning algorithm is applied by SVM, Random, Forests and Ann. Finally the image reached the ultimate Label Assignment by the background or the object is given below.



Countless traditional computer vision image algorithm track the above pipeline for Deep learning based algorithm.

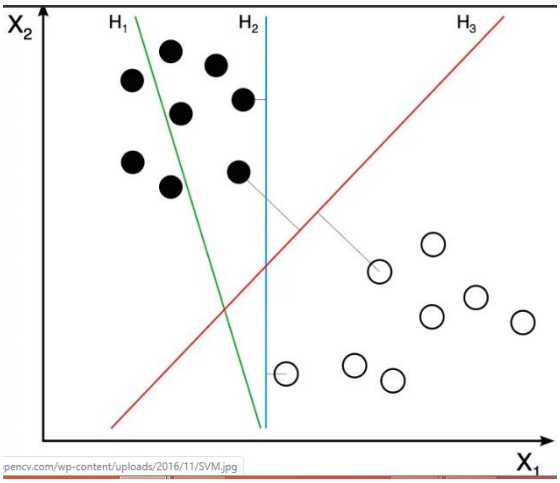
The first step followed to classify Image processing, an output image of Preprocessing is normalized to distinct the clarity effect of the image. The common step followed to calculate the processing is Subtract the Mean intensities and divide by standard deviation. Gamma correction, Colour image and space transformation may assist to spring better results. The image is cropped and resized in preprocessing would perform a fixed-size image in Feature extraction.

The second step applied is Feature extraction. In the first step, the image is extracted and in the second it simplifies the image by minimizing unimportant information. For example to differentiate the images of court and shirt button the simplification of the image can be done by edge deduction. It not only captures the circular shape of the button but also provides information on how to differentiate from other circular objects like a car tyre and cycle wheel. Viola and Jones' Haar-like features, Speeded Up Robust Feature (SURF), Scale-Invariant Feature Transform (SIFT) and Histogram of Oriented Gradients (HOG) etc.

In HOG feature image extraction algorithm converts the feature vector to a fixed size. HOG feature descriptor calculates the image for a 64x128 patch the return vector size will be 3780. The original dimension of the image is 64x128x3=24,576 and it is minimized to 3780 by the HOG descriptor. For perfect output Gradient Calculation method, Cells calculation, a histogram of gradients calculation, block normalization, Vector feature would improve the quality of an image.

The third step surveyed is Learning Algorithm for Classification. In the former steps, the image converted to the feature vector is analyzed. In this step, the classification of algorithm through input and output class label is analyzed. Before the classification of algorithm thousands of images are processed and get its general principle by higher-dimensional space belongs to the same class on the side of the plain surface.

Support Vector Machines (SVM) is implied to simplify things that were introduced by Cortes and Vapnik in the year 1963 and the current version updated in 1995. In the previous HOG, visualizing higher-dimensional space is inaccurate and it is simplified by two dimensions.



In the above diagram 2D points represents two classes of images. The black dots represent one class and the white dots denote the other. It coordinates both dots by Different learning algorithm. In the above figure H1, H2 and H3 are three lines 2D space. H1 is not considered to be a good classifier because it does not separate two lines. Meanwhile, H2 and H3 separate the two classes. Comparing to H2, H3 is considered to be the better classifier. As H2 is closer to black and white dots, in the meanwhile H3 is chosen the maximum distance between the two classes. In the future, the 3D vector plans are to be implemented to obtain the appropriate hyper-plane.

Image processing through object deduction is applied in Unmanned Ariel Vehicle (UAV) at the border security by implementing open CV python codding of Haar Cascade algorithm. The object detection in attacking target have unwanted collisions in order to avoid such discrepancies Voila-jones algorithm is used to track humans. It improves the quality of object detection and the processing time code is reduced. By implementing a python code would enhance the video database image and the output data.

Conclusion

In this paper unique approach for object detection through image processing is evaluated by the HOG image tracking algorithm and with elevated vector plans. The moving image is classified by preprocessing, Feature extraction and surveyed image through classification learning through SVM. The 2D vector plans are categorized to classify the image processing and evolved transparent image by 3D vector plans. The proposed approach reached its quality of an image by

implementing and practicing upcoming feature algorithms to sustainable clarity with global features.

Reference

1. Broussard, Randy P., et al. "Physiologically motivated image fusion for object detection using a pulse coupled neural network." IEEE transactions on neural networks 10.3 (1999): 554-563.
2. Jalled, Fares, and Ilia Voronkov. "Object detection using image processing." arXiv preprint arXiv:1611.07791 (2016).
3. Ranganath, Heggere S., and G. Kuntimad. "Object detection using pulse coupled neural networks." IEEE Transactions on Neural Networks 10.3 (1999): 615-620.
4. Viola, Paul, and Michael Jones. "Rapid object detection using a boosted cascade of simple features." Proceedings of the 2001 IEEE computer society conference on computer vision and pattern recognition. CVPR 2001. Vol. 1. IEEE, 2001.
5. Balaji, S. R., and S. Karthikeyan. "A survey on moving object tracking using image processing." 2017 11th international conference on intelligent systems and control (ISCO). IEEE, 2017.
6. Jain, Anil K., Nalini K. Ratha, and Sridhar Lakshmanan. "Object detection using Gabor filters." Pattern recognition 30.2 (1997): 295-309.
7. Malagón-Borja, Luis, and Olac Fuentes. "Object detection using image reconstruction with PCA." Image and Vision Computing 27.1-2 (2009): 2-9.
8. Stockman, George, Steven Kopstein, and Sanford Benett. "Matching images to models for registration and object detection via clustering." IEEE Transactions on Pattern Analysis and Machine Intelligence 3 (1982): 229-241.
9. Smereka, Marcin, and Ignacy Dulęba. "Circular object detection using a modified Hough transform." International Journal of Applied Mathemetics and Computer Science 18.1 (2008):85 -91.
10. Lim, Jae S. "Two-dimensional signal and image processing." ph (1990).
11. Abràmoff, Michael D., Paulo J. Magalhães, and Sunanda J. Ram. "Image processing with ImageJ." Biophotonics international 11.7 (2004): 36-42.
12. Schalkoff, Robert J. Digital image processing and computer vision. Vol. 286. New York: Wiley, 1989.
13. Pitas, Ioannis. Digital image processing algorithms and applications. John Wiley & Sons, 2000.
14. Papageorgiou, Constantine P., Michael Oren, and Tomaso Poggio. "A general framework for object detection." Sixth International Conference on Computer Vision (IEEE Cat. No. 98CH36271). IEEE, 1998.
15. Redmon, Joseph, et al. "You only look once: Unified, real-time object detection." Proceedings of the IEEE conference on computer vision and pattern recognition. 2016.