A Survey on Object Detection using Deep Learning Techniques

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Abstract - *Object detection and tracking will be done usually by surveillance camera or any kind of sensors. We are going to do detection and tracking using surveillance camera and also mobile camera. Mobile phones have become handy and improved in many aspects, so that detection and tracking in mobile camera will be useful. This project will mostly depend on deep learning algorithm. Algorithm that is specifically used in this project will be convolution neural network. We will develop a user interface to access the detection of objects as well as tracking.*

Key Words: **Object detection, Object tracking, Deep learning, Surveillance camera, Mobile camera**

1. INTRODUCTION

Object detection and tracking has become a major part in today's technology. Object detection is the process of finding the instances of real-world objects such as faces, bicycles, buildings and many real time objects. Object detection is the task of detecting the object and drawing a bounding box around them, i.e. localizing them. Object tracking is used to track the particular object or many objects at same instance in the given camera range. Real time object detection and tracking has played an important role in major researches because of its increased commercial applications such as surveillance system, Mobile robots, Border security, People counting, Wild animals monitoring and many more.

1.1 Object Tracking:

Object tracking is the process of locating a moving object over time using a camera. Object tracking can be a time consuming process due to the amount of data that is contained in video. Object tracking can be done by splitting a video source into multiple sub frames.

1.2 Object Detection:

Object detection is the process of finding the instances of real-world objects such as faces, bicycles, buildings and many real time objects. Object detection is the task of detecting the object and drawing a bounding box around them, i.e. localizing them.

1.3 Face Recognition:

Face recognition is a widely used technology in various security applications. Face recognition is the basic technology used in emotion recognition and also used to verify a person's authenticity.

2. LITERATURE SURVEY

S.NO	TITLE	AUTHOR	CONCEPT	YEAR
1	Application of deep learning in object detection	Xinyi Zhou, Wei Gong, WenLong Fu, Fengtong Du	DATASETS: ➢ ImageNet ➢ PASCALVOC ➢ COCO METHODOLOGY: ➢ R-CNN ➢ SPP-net ➢ Fast R-CNN ➢ Faster R-CNN	978-1-5090-5507-4/17/\$31.00 ©2017 IEEE ICIS 2017, May 24-26, 2017, Wuhan, China 2017
2	An Efficient approach for object detection and object tracking	B. Maga	MODULE: ➢ Kernel Method and Training ➢ Feature based tracking method	2017 Third International Conference on Science Technology Engineering and Management

		➢ Template Generation TECHNIQUE: ➢ Template Matching ➢ Later Based Tracking	
3	Object detection based on deep learning of small samples	Ce Li, Yachao Zhang	KEY STEPS: ➢ Foreground objects extraction ➢ Background selection and fusion processing ➢ Object Semantic-relevant Detection	2018 Tenth International Conference on Advanced Computational Intelligence (ICACI) March 2018, Xiamen, China
4	A Learning algorithm for model-based object detection	Chen Guodong, Zeyang Xia, Rongchuan Sun, Zhenhua Wang, Zhiwu Ren and Lining Sun	KEY STEPS: ➢ Object detection ➢ Shape Matching ➢ Image Segmentation ➢ Shape Fragment PROPERTIES: ➢ Rotation invariance ➢ Scale invariance ➢ Noise robustness	2011,8th International Conference on Ubiquitous Robots and Ambient Intelligence
5	Object detection and tracking	K. Rasool Reddy, K. Hari Priya, N. Neelima	KEY STEPS: ➢ Incremental Multiple principle component analysis ➢ Frag Track ➢ HOG - LBP Detector ➢ Generative and Discriminative Trackers ➢ Semi Supervised Support Vector Machines	2015 INTERNATIONAL CONFERENCE ON COMPUTATIONAL INTELLIGENCDE AND COMMUNICATION NETWORK
6	Modelling from an object and multi-object tracking system	Afef SALHI, Yacine MORESLY, Fahmi GHOZZI, Ameni YENGUI, and Ahmed FAKHFAKH	KEY STEPS: ➢ Block-matching ➢ KLT algorithm (Kanade Lucas Tomasi) ➢ Meanshift algorithm (MA) ➢ Camshift Algorithm (CA)	2016, Global Summit on Computers and Information Technology
7	Object detection in sports video	M. Buric, M. Pobar, M.Ivasic-Kos	METHODOLOGY : ➢ Mask R-CNN ➢ YOLO object detector ➢ Mixture of Gaussians method	MIPRO 2018, May 21-25, 2018, Opatija Croatia
8	Object Tracking Camera	Priyanka Pacharne, Sanket Kotkar, Neha Darekar	KEY STEPS : ➢ Colour Model ➢ Object Tracking ➢ Image Acquisition ➢ Background Subtraction	IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 03, 2015	ISSN (online): 2321-0613

9	A Survey on Object Tracking in Video	Snehlata Raisagar, Ashish Tiwari	KEY STEPS : ➢ Video Sequence ➢ Object Detection ➢ Object Recognition ➢ Tracking	2017, IJSRD - International Journal for Scientific Research & Development
10	Detection and Tracking of Moving Object in Video - A Survey	Dhaval Deshpande, Nikhil Aatkare, Prof.Reena Somani	STATISTICAL METHODS : ➢ Background Subtraction ➢ Temporal Differencing ➢ Correspondence Based Matching Algorithm ➢ Kernel Tracking	2016, || National Conference on Technological Advancement and Automatization in Engineering

3. PROPOSED SYSTEM:

In our proposed project, we are going to provide multi-purpose security system that can be used in various applications like surveillance security in military, animal monitoring, people counting in crowded places, drowsiness detection etc., This process can be done using deep learning techniques like convolution neural network, YOLO framework and Single Shot Detector . The usage of technique is based on the needed application. Entire project has been developed in OpenCV platform and python programming language.

3.1Object Detection Methods:

- **Faster R-CNNs**

    Faster R-CNNs is the method for object detection using deep learning, even with the faster implementation R-CNNs (where the "R" stands for "Region Proposal") the algorithm can be quite slow, on the order of 7 FPS.

- **You Only Look Once (YOLO)**

    YOLO has the faster implementation capable of processing 40-90 FPS on a Titan X GPU. The fast variant of YOLO can even get up to 155 FPS.

- **Single Shot Detectors (SSDs)**

    SSDs, originally developed by Google, are a balance between the two. The algorithm is more straightforward than Faster R-CNNs. SSDs also tend to be more accurate than YOLO.

4. CONCLUSION

In our project we have created a simple way of using the object detection and tracking. This detection and tracking will be fully automated. Purpose of doing the detection and tracking using mobile camera is because of growth of the mobile phone technology. Statistics show that the number of mobile phone users in India has risen from 524.9 million to 813.2 million from the year of 2013 to 2019. So, providing the detection and tracking technology using mobile phone will have a great part in developing technology.

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