Object Detection in Real Time using AI and Deep Learning

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Abstract - *In object detection it is very challenging task to track movements of objects and generate high efficiency results. Our main focus area of object detection is to enhance the E- commerce business and to provide a better experience to customer. We are trying to make a model which will be beneficial for user as well as provider. In this survey, we have studied the working of various algorithms and methods used for object detection. For this work, we did make a collection of various methods and after that we applied the content-based approach of to recommend the products.*

Key Words: **Object Tracking, Computer vision, Image Retrieval, Recommendation, E-commerce etc.**

1. INTRODUCTION

In today's world, most of the people are using social media and watch different videos. If anyone like any object or product in video we can directly provide link through recommendation. As the processing data is huge so we can use cloud based system [7]. In case of video data the background is constantly changing and it is challenging task to detect the object [6]. To deal with this we used novel based approach [6, 8]. To solve the problem of silent object detection in video, we used the concept of virtual border and guided filter and embedding topological features into a deep neural network for extracting semantics [3, 4]. Sometime the data is very complex or crowded and for detecting those complex objects we can use video interlacing to improve multi-object tracking [9]. In many cases it is possible that high amount of time is required for detecting objects. To deal with this issue we use YOLO (You Look Only Once) algorithm [1].

2. LITERATURE SURVEY AND RELATED WORK

Based on the YOLO network author propose a real-time object detection algorithm for videos. Here, author train the fast YOLO model by eliminating the influence of the image background by image pre-processing [1].It is challenging to detect salient objects.

In [2] author paper describes about a high-speed video salient object detection method at 0.5s each frame. In [2, 8] author make use of two models, the initial spatiotemporal saliency module and filter based salient temporal propagation module.

We can also use [3] embedding topological features into deep neural network for extracting semantics which author use for a salient object detection. Segmentation of input image and compute weight for each region with low level features. Here, the weighted segmentation result is called a topological map and it provide additional channel for CNN. By making use of virtual border and [4] guided filter author trying to propose a novel method for salient object detection in videos.

Classification plays an important role in improving object detection. Author used a novel multi-task framework [5] for object detection. A novel multi-task framework uses multi-label classification as an auxiliary task which will improve object detection and can be trained and tested end-to-end. In some cases there may be moving cameras which results into variable background. In [6] author is using novel approach for detecting and tracking objects in videos which are captured by cameras. It is a challenging task to separate actual moving object from the background as both background and foreground changes in each frame of the image sequence. In object detection we need to handle data which may be huge or small. In [7] author make use of automated video analysis system to process large number of video streams. On can get access to huge amount of data using cloud based system. Cloud provide us unlimited storage which results into saving of hardware cost. Some video data frames consist of complex and multiple objects which is sometimes difficult to track. In [9] author is using Multi-Object Tracking-by Detection which is based on a spatio-temporal interlaced encoding video model and specialized DCNN.

**Table -1:** Summary of literature survey

Year	Title	Author
2019	A real-time object detection algorithm for video	Shengyu Lu, Beizhan Wang, Hongji Wang.
2019	High-speed video salient object detection with temporal propagation using correlation filter.	Qi Qi, Sanyuan Zhao, Wenjun Zhao, Zhengchao Lei.
2019	Using multi-label classification to improve object detection.	Tao Gong, Bin Liu, Qi Chu, Nenghai Yu.
2018	Object Detection by Spatio-Temporal Analysis and Tracking of the Detected Objects in a Video with Variable Background.	Kumar S. Ray, Soma Chakraborty.
2017	Cloud based scalable object detection and classification in video streams.	Muhammad Usman Yaseen, Ashiq Anjum, Omer Rana, Richard Hill.
2019	Spatio-temporal object detection by deep learning: Video-interlacing to improve multi-object tracking.	Ala Mhalla, Thierry Chateau, Najoua Essoukri, Ben Amara.

3. EXISTING SYSTEMS AND ITS LIMITATIONS

1. In case of existing systems we make use of different methods and algorithms like YOLO, MOT-bD, topological maps, novel framework and guided filter.
2. By making use these techniques and methods we are able to solve many problems but still there is a scope to improve to the existing system in some areas.

3. We can improve our system in multi-class detection. Sometimes there are many class present in image of video and it is challenging to detect multiple classes.
4. Efficiency of the methods we are using in real time system is less in present situation which can be improve by trying some different approaches.
5. Existing object detection systems also contains some limitations.
6. In mean shift when the background is similar to target then tracking problem may arise.
7. In contour tracking it is difficult to handle entry and exit of objects.

4. PROJECT DIAGRAM NOVEL ARCHITECTURE
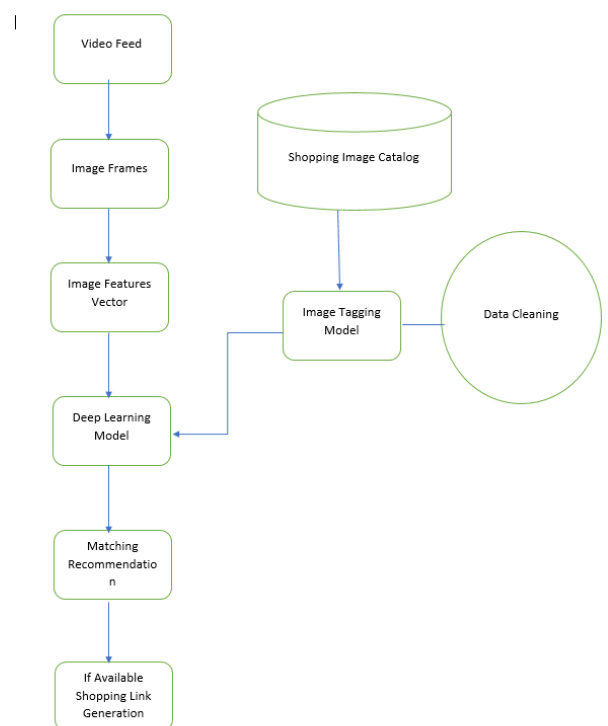
Fig -1: Name of the figure

5. NEED FOR OBJECT DETECTION

Object detection techniques are useful for make processing faster and simpler. We need object detection in a variety of areas including surveillance, medical image analysis, human computer interaction and robotics. There is a big demand for object detection where we use 3D space. It is necessary to detect or track all movements in that 3D space. We can depend on object detection algorithms to not only detect objects in an image but to do that with the speed and accuracy. We need object detection to improve the workplaces, to increase security and for automated vehicle system.

6. ADVANTAGES

Object detection is advantageous in computer vision and image processing. It is useful in detecting various objects and tracking movements.

1. In object detection Kalman filter is a method by which we can track points in images which are noisy.

2. Particle filter gives us optimal results when evaluation of the image takes place at the hypothesis object position.

3. In object detection mean shift is applicable for situations with dominant colors.

4. Using CamShift we can apply resizable search windows.

5. We can use KLT tracker for time efficient and robust occlusions.

6. By using object detection techniques we can handle complex models for rigid and non-rigid objects.

7. CONCLUSIONS

In this paper, we did survey on current object detection techniques which are useful in tracking objects and their movements. We proposed the idea of using object detection technique by giving video input which can be used for recommendation purpose and studied the drawbacks of each system and tried to suggest the additional functionality to the existing system.

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