**VEHICLE DETECTION MODEL**

In this model, we’ll detect the moving vehicles and count them using deep learning.

We want our model to detect the moving car in the video. The moving car is detected and it is highlighted.

In this we’ll focus on the unsupervised way of object detection in videos and technique of frame differencing .

**Frame Differencing Method:**

**A video is a set of frames stacked together in the right sequence. So, when we see an object moving in the video, it means that the object is at different location at every consecutive frame.**

**If we assume that apart from the moving objects other things are still then the pixel difference of the first frame from the second frame will highlight the pixels of the moving object. In this way, we’ll have pixels and coordinates of the moving car. This is how this method works.**

After frame differencing we’ll use image thresholding in which the pixel values of a grayscale image are assigned one of the two values representing black and white colors based on a threshold.

This results in the removal of the major unwanted area of the image.The resultant image is the binary image as there are only two colors in it.

Next we’ll find contours to identify the shape of an area in the image having the same color and intensity.

Since there are two colors black and white, to remove the unnecessary elements in the white region we’ll use image dilation, which is a convolution operation on the image wherein a kernel is passed over the entire image.

In the model, all the these steps are performed on one frame then on all the frames and we found the desired contours. Then shortlisting is done which fall in the detection zone and saving the frames along with the final contours. Then we stacked up all the frames and created the video.

I chose unsupervised way of object detection in the videos i.e., object detection without using any labeled data using frame differencing as this method is easier to implement and we can visualize it more accurately.

We can use supervised learning approaches wherein we first train a deep learning model for object detection or we can pick a pre-trained model and fine-tune it, but they would require labelled data to train the object detection model.