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My code have 3 steps : detecting ; filtering ; colour-coding.

Firstly, I smooth the picture to reduce the effect of noise. Then I calculate the difference of each pixel from different frames in the same position and store the difference in pMat1. Then transform the pMat1 to binary mat. All moving pixel's value are assigned to 255. I tried several times and finally determined to set the threshold to 30. Although the shape of moving objects distort, the reflection in the bottom right is removed. Then I replace the background mat with the new frame with a coefficient 0.01. I had set it to 0.05 , but the moving object will remain a big influence on the next frame. Actually , at this step, I had tried to implement a histogram for each pixel, then I can decide whether adopt this pixel as background or foreground. But the program ran very slow. So I abandoned that code segment. Then I tried to divided each frame to 25 parts. But it doesn't work. For example, a small part of the moving car is divided into another part. If I set the threshold a little high , the small part will be regarded as noise. If I set the threshold low, a lot of noise will come out. So I abandoned this method as well.

Secondly, I use morphological method to remove noise. I found a procedure that erode 2 times , dilate 8 times and erode 6 times back is pretty useful to remove all noise and get a regular shape of moving object.

Thirdly, I use the connected component labeling method to colour the object. Unfortunately, I cannot implement this method perfectly. I only three colour : blue, green and red. But there are some pitfalls in my code. So you will find the car some times will have different colour in different parts.