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Vehicle Detection and Tracking System from CCTV Captured Image for Night Vision

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Abstract

Monitoring crime on the highway is crucial process. Vehicle Detection and Tracking System from CCTV captured image for night vision. In night time, it is very difficult to identify the vehicles due to unwanted light sources. In this paper we present a method to eliminate the outer light sources by using gray scale image, dilation and Edge Detection. The images are taken at night time from the CCTV mounted on the highway

Keywords – Vehicle Detection, tracking, Gray scale, Dilation, Edge Detection

1. INTRODUCTION

On-road vehicle detection and racking System from CCTV Captured Image using computer vision had been researched and developed for night time for better efficiency and reduces restriction. Most of on-road vehicle detection system uses only one camera for simplicity but this can be very complicated due to various postures and appearances of vehicle, uncontrollable and unpredictable surroundings, and problems with illuminations of outdoor environments. In additions, complex backgrounds such as long haul street lights, vehicle front lights and rear light, break lamps, buildings lights, traffic signals, also make this vehicle detection and tracking even more challenging problem.

2. DETECTION AND TRACKING

The system of the proposed method is mainly composed of two parts: vehicle feature extraction system and vehicle detection system by eliminating complex backgrounds lights.

Image processing, vehicle detection and tracking from CCTV captured for night vision are taken in the crime investigation to find the vehicle which violate the traffic rules, vehicle that make an accident in the highway, vehicle which are high jacked at the night time, make the investigation more critical because of traffic signal lights, street lights, vehicle headlight, rear lights, break light and around the light sources are recognised as the vehicle features.

In the test condition, the vehicle headlights to reflection on the road pose a serious concern. The headlight reflection is eliminating by adjusting the light parameters such as luminous or brightness, contrast and intensity. In order to extract the vehicle exactly the buildings lights, streetlights are to be eliminated by adjusting the light parameters.

The colour and intensity of pixels of the image depends on the properties and configuration of the camera. The target vehicle is highly dependent on its distance from the camera, the distance is an important factor for detecting, tracking vehicles.

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2.1 GRAY SCALE

Black and white (or monochrome) photography dates back to the mid-19th century. Despite the eventual introduction of color photography, monochromatic photography remains popular. The digital revolution has actually increased the popularity of monochromatic photography because any digital camera is capable of taking black-and-white photographs where as analog cameras required the use of special monochromatic film.

Monochromatic photography is some times considered the “sculpture” variety of photographic art. It tends to abstract the subject, allowing the photographer to focus on form and interpretation instead of simply reproducing reality. In binarization, RGB fames are converted into the binary image. It converts the input image to a binary image.

The output image BW replaces all pixels in the input image with luminance greater than level with the value 1 (white) and replaces all other pixels with the value 0 (black). For removing the noise in the binary image, we calculate the weight of the object. Most digital images are comprised of three separate colour channels: a red channel, a green channel, and a blue channel. Multiplying the different values with the these three channels we can get a gray scale image.

Fig.1 Gray Scale Image

2.2 DILATION

Dilation is a process of improving the image by filling holes in an image, sharpen the edges of objects in an image and joining the broken lines and increase the brightness of the image, it make edge sharper , the difference of the gray value between neighbouring pixels at the edge of an object can be increased.

Grayscale dilation with a flat disk shaped structuring element will generally brighten the image. Bright regions surrounded by dark regions grow in size, and dark regions surrounded by bright regions shrink in size. Small dark spots in images will disappear as they are `filled in' to the surrounding intensity value. Small bright spots will become larger spots. The effect is most marked at places in the image where the the intensity changes rapidly and regions of fairly uniform intensity will be largely unchanged except at their edges. Figure 3 shows a vertical cross-section through a graylevel image and the effect of dilation using a disk shaped structuring element.

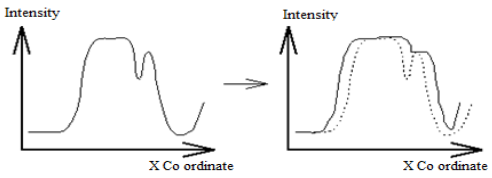

Fig.2 Gray Scale dilation

2.3 EDGE DETECTION

Convert the RGB image to gray scale image and then remove noise from the image then apply the canny edge detector on the image. The canny edge detection provides an exact detection of edges within the actual and provided edge. The boundary of the object is represented by edges. Edges are also used to identify areas and shapes of the object

- Human vision interprets a scene as a series of edges, and will interpret a line drawing of the same scene in the same way. Thus it may be argued that the human visual process when fed by its interpretation of a scene will give the same interpretation.
- If a process can be applied to its output with no change then its non-linear parts (e.g. thresholding) are functioning correctly.
- If a process is idempotent then it is clear that only one application of the process is necessary to achieve the maximum ``enhancement''

possible. This could be seen as signifying efficient design.

Canny edge detector is used to detect the edges in congested scenes ,because it has good detection, good localization and minimal response. Canny edge detector uses multi-stage algorithm to detect a wide range of edges in an image. Those stages are noise reduction, finding the intensity gradient of the image non maximum suppression and tracing edges.

Fig 3 Edge Detected

3. CONCLUSION

The proposed method has produced the vehicle detection and tracking systems in night time for identifying and classifying the moving vehicles in unwanted light sources. Initially the image is converted into gray scale and then it is dilated finally the edges of the objects are detected by using a canny edge detector. We have shown preliminary results, and intend to expand and improve the system. An important next step is to segment the image and track targeted vehicles in the image.

4. REFERENCE

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