PRECLUSION OF ACCIDENTS BY DETECTING PEDESTRIANS AND VEHICLES IN TRAFFIC THROUGH COMPUTER VISION

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ABSTRACT

The project describes about an effective traffic surveillance system for detecting the pedestrian and vehicle in traffic scenes. The vision-based pedestrian detection systems are analyzed based on their field of application, acquisition technology, computer vision techniques and classification strategies. Three main application fields have been individuated and discussed: video surveillance, human-machine interaction and analysis. This method identifies vehicles by detecting headlights and taillights using image segmentation and pattern analysis techniques. The pedestrians are detected by using Histogram of oriented gradients, Local binary pattern algorithms and motion capture system. The results highlight the importance of implementing pedestrian and vehicle detection systems on beagle board processor.

Index words: Classification, K means algorithm, HOG, SVM.

I.INTRODUCTION

In 2017, in India, more than 6000 pedestrians were killed due to traffic crashes, one pedestrian dies every 1.6 hours due to car accident. Pedestrians are 1.5 times more likely than passenger vehicle occupants to be killed in a car crash on each trip. For these reasons, in the last decades, people detection and tracking has become an important research area in computer vision. The most important aspect is to achieve good trade off between accuracy and efficiency in detecting pedestrians and vehicles

II.OBJECTIVE

The goal of the project is to develop a system that can prevent accidents by predicting the pedestrians and vehicles in traffic and make alarms accordingly. There will be a camera that constantly takes images, a beagle board that implement image processing algorithm, and a feedback circuit that could generate alarm and a power supply system.

III.BLOCK DIAGRAM

A.Vehicle Detection

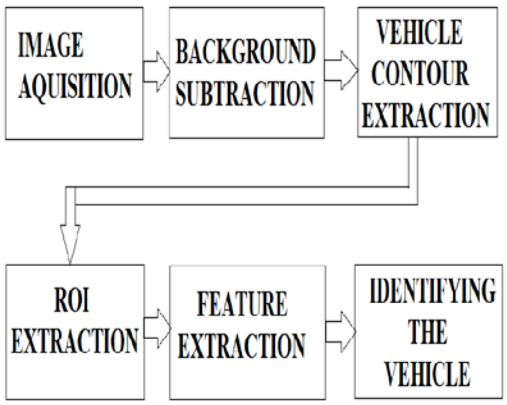

Fig 1.vehicle detedtion

B.Block Description

The vehicle detection and classification steps outlined in the block diagram are followed by the visual image classification systems. The first step is to subtract the foreground image from a corresponding reference background image. In the second step, we extract the headlight and grill areas. In the feature extraction step, we extract object features such as the color, texture, and shape. The fourth step is to compare the features of different objects, to identify them.

Finally, we classify the type of vehicle using CNN.

C.Methodology

Foreground subtraction is a general method used to separate foreground objects from the rest of an image. First, a reference image is produced based on the initial images. Then, the current image is compared to the reference image to identify the foreground. The vehicles are detected using the background modeling and subtraction (BGS) model. To make a robust, accurate model Gaussian background subtraction and filtering is performed. In the feature extraction step, Sobel edges are detected in the ROIs of two consecutive images and measure the vertical and horizontal projections in the grill and headlight regions using a median filter. With varying shapes, sizes, and position of each element, the vehicles can be detected.

IV.BLOCK DIAGRAM

A.Pedestrian Detection

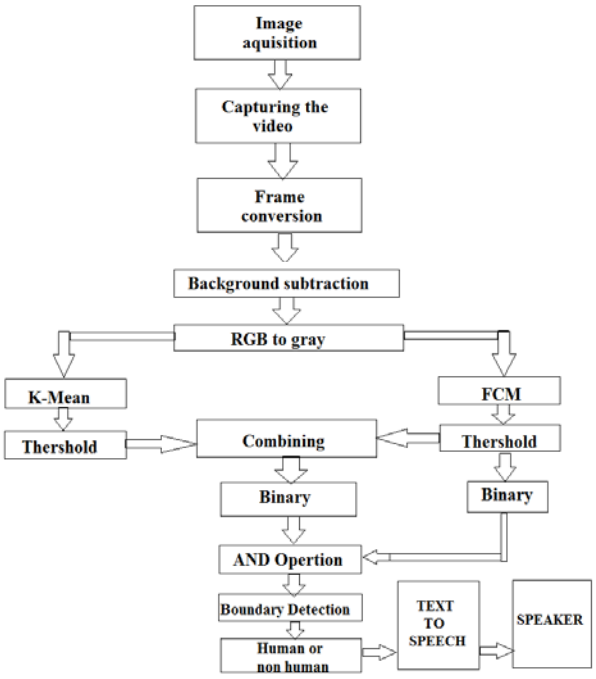

Fig2. Pedestrian detection

B.Block Description

The background without object is subtracted from the background with image. Each frame is subtracted from the first frame or only background frame of the video to extract only object in the form of RGB. Now, RGB image is converted to GRAY image. Next, FCM and k-means are applied on this gray image to find threshold selection. Gray image is converted to binary image by using FCM and k-mean threshold individually. After this conversion, logical operation is performed between two binary images and object is detected by using boundary selection process. Next step of this algorithm is to apply a feature to classify the detected object as a human or non-human.

C.Methodology

Here, three methods (i) otsu, (ii) k-means, and (iii) fuzzy c-means are discussed and different thresholding methods outputs are taken. In our algorithm, we are taking FCM threshold, as well as, k-means threshold separately for converting a grey image into binary one. Here, three fuzzy c-means and three k-means cluster centroid are used for thresholding purpose in each of the cases. After that, each of the images is logically ANDed for the generating final binary image of the object. Thereafter, boundary detection algorithm is used to detect the boundary of the object. So, by using our proposed method we can easily say that the detected object is human being or not.

V.EXPERIMENTS AND RESULTS

Three filtering techniques were studied and experiments were made for detecting edges. Those three filtering techniques are robertz, prewitt and sobel. Each of the filtering techniques were applied on dataset and the output is obtained. On comparing the output of these three filtering methods sobel edge detection was considered as efficient. So sobel method is used for detecting edges. The ouputs are shown below:

A.Comparison Of Roberts, Prewitt, Sobel Algorithm

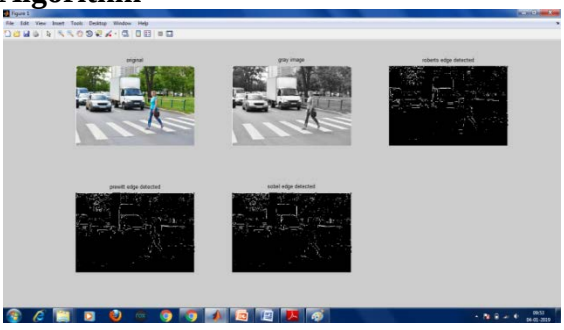

Fig3.Comparison Of Roberts, Prewitt, Sobel Algorithm

B. Sobel Edge Detection

Sobel filter, is used in image processing and computer vision, particularly

within edge detection algorithms where it creates an image emphasising edges.The Sobel–Feldman operator is based on convolving the image with a small, separable, and integer-valued filter in the horizontal and vertical directions and is therefore relatively inexpensive in terms of computations.

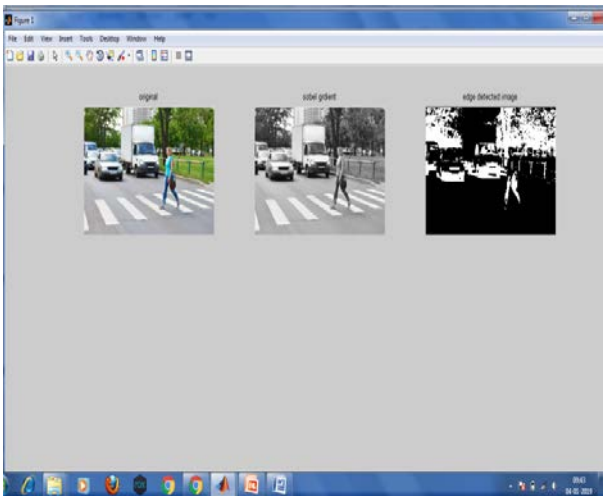

Fig 4. Sobel Edge Detection

C.K Means Clustering

The task of detecting pedestrians in images is challenging because of the variety of scenarios and illumination conditions that occur on urban scenes. Such a challenge requires a robust set of features to allow pedestrian discrimination, such as: BRISK,
GLOH, Haar-like and HOG. Several machine learning classifiers can be used to accomplish the pedestrian detection task. In our project we are using K-means clustering method for classification.

One of most used clustering algorithm is k-means clustering. The K-means clustering algorithm is used to find groups which have not been explicitly labeled in the data. It is simple and computationally faster than the hierarchical clustering. And it can also work for large number of variable. But it produces different cluster result for different number of number of cluster. So it is required to initialize the proper number of number of cluster, k2. Again, it is required to initialize the k number of centroid. Different value of initial centroid would result different cluster. So selection of proper initial centroid is also an important task.In this way the the segmentation process is done using the K-means algorithm and the output is shown below:

INPUT 1:

Fig 5 (a) .Input 1 for k means clustering
OUTPUT 2:

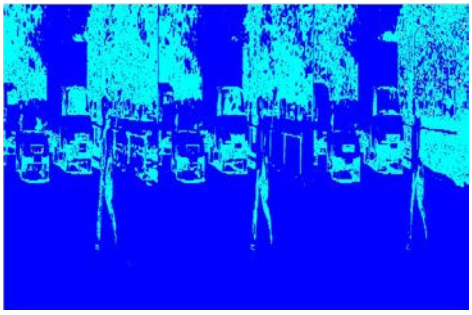

Fig 5(b). Output 1 for K means clustering
INPUT 2:

Fig 6(a).input 2 for K means clustering
OUTPUT 2:

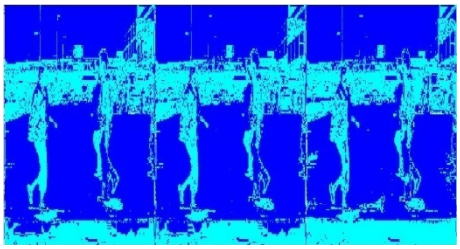

Fig 6(b).output 2 for K means clustering

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