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# Night Time Vehicle Detection And Approximate Colour Detection Using Image Enhancement Techniques.

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## ABSTRACT :

Deep learning's recent advancements have opened up a slew of new possibilities for solving the challenge of vehicle detection. Night vehicle detection has been a tough problem that has become a threat to safe highway driving. To address the problem, we propose this framework based on Image Processing that will recognise nighttime cars and allow us to effectively tackle the problem. Scientists are interested in detecting items in low-light situations. We chose night as the challenge in this project to determine the type of vehicle and also to detect theft vehicles by using the number plate. To enhance the image, image preprocessing procedures such as contrast stretch, RGB to grey scale, filters (gaussian, canny edge, median), and HSV-channel were employed. k-means image segmentation.

## INTRODUCTION :

Vehicles are no longer only modes of transportation; they now give the highest level of security and convenience to drivers through the use of cutting-edge technological technology. Advanced driver assistance systems (ADAS) such as automobile navigation systems, autonomous cruise control systems, and lane departurewarning systems have recently been created to help prevent traffic accidents. In addition, advances in computer vision are propelling the rapid development of ADAS. This study focuses on vehicle detection at night, which is one of many ADAS strategies..

Because detecting automobiles from low-exposure images is difficult, traditional algorithms rarely give good detection accuracy at night.

## EXISTING SYSTEM :

The rear lamp detection strategy [1] and the learning-based detection approach [2] are two types of night-time vehicle detection algorithms. The red hue of normal lighting and twin rear lamps has been used in previous rear lamp recognition methods. Lamp pairing is the process of detecting light candidates with red hues on the HVS domain and examining correlation between nearby lamp candidates. The most likely lamp pairs are detected via lamp pairing. These methods are effective in low-light situations where image properties like edges aren't present. Then, using off-line vehicle sample photos,learning-based vehicle detection

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algorithms like [2] train a specific classifier. The trained classifiercan be used to recognise cars in the on-the-fly detection stage. Because image properties such as edges are not available in low-light situations, this technique is typically weak.


## 1. PROPOSED SYSTEM :

Preprocessing is used in this paper to address the disadvantages of traditional learning-based detection algorithms. To begin, we use a contrast enhancement method [3] to enhance low exposure training photos in preparation. Second, for the pre-processed photos, learning is carried out, and a trained classifier is obtained. Every frame of an input near-real-time video is pre-processed in the test stage in the same way as it was in the learning stage. Finally, by using the trained classifier, we can detect vehicles accurately.

Object detection has become one of the most important challenges in computer vision and computer science in recent decades. Deep learning-based algorithms have obtained high results for the vehicle detection challenge, as well as other problems, as computer hardware has improved and data has grown. The advancement of vehicle detection has accelerated the development of smart cities. Instead of a sophisticated neural architecture, it is based on the idea of a simple information representation that is straightforward to understand. In actuality, standardising a sequence of convolution layers based on an object's shape and aspect ratio suggests using the anchor box (prior box) obtainedautomatically when running k-means clustering (k = 5) on ground truth.

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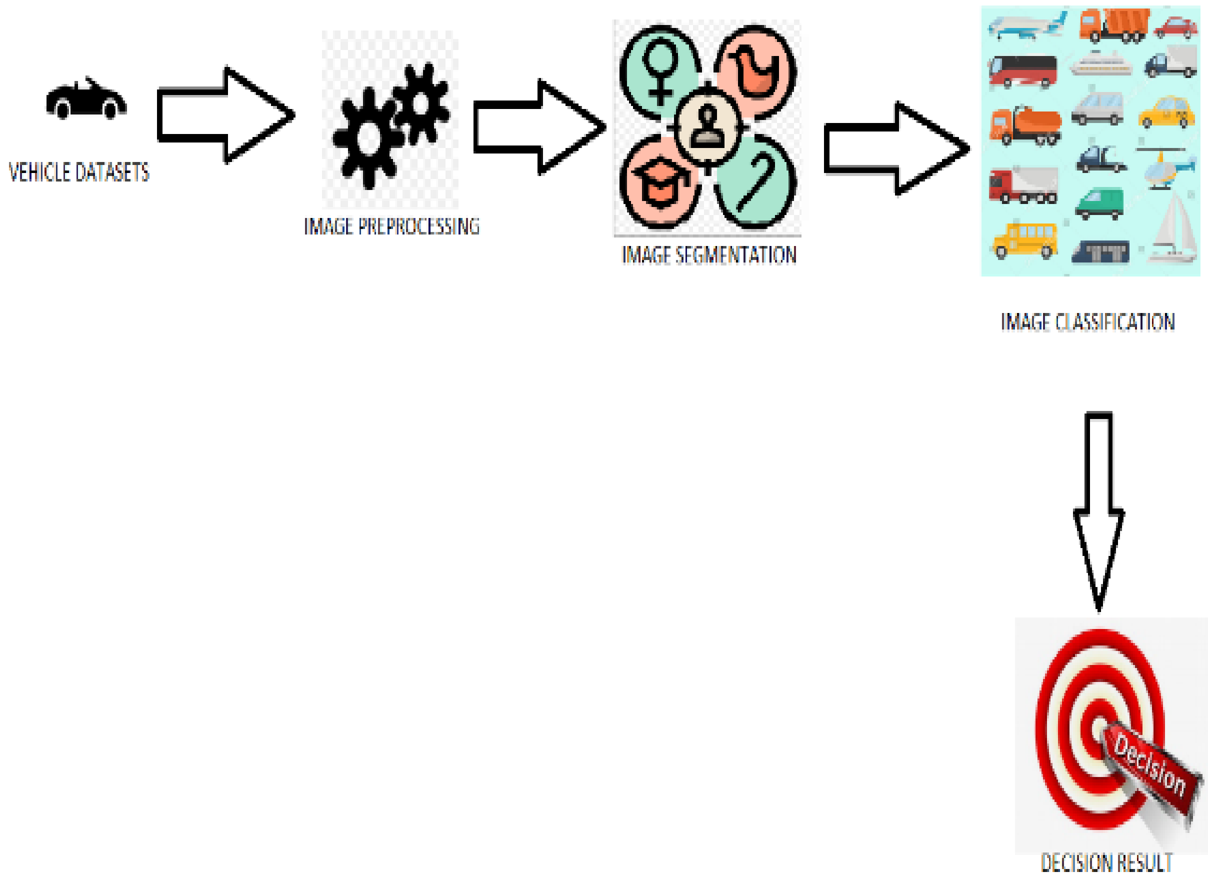
## ARCHITECTURE DIAGRAM:




### 1.1. IMAGE PREPROCESSING :

Image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image.

Although geometric transformations of images (such as rotation, scaling, and translation) are classified among pre-processing methods here because similar techniques are used, the goal of pre-processing is to improve the image data by suppressing unwanted distortions or enhancing some image features important for further processing.

Images with poor contrast may be found in the dataset. It aids in the contrast adjustment of images.

Reduced size will save training time in half without sacrificing performance.

### 1.2. IMAGE SEGMENTATION :

The technique of dividing a digital image into many parts is known as image segmentation (sets of pixels, also known as super-pixels). The purpose of segmentation is to make an image's

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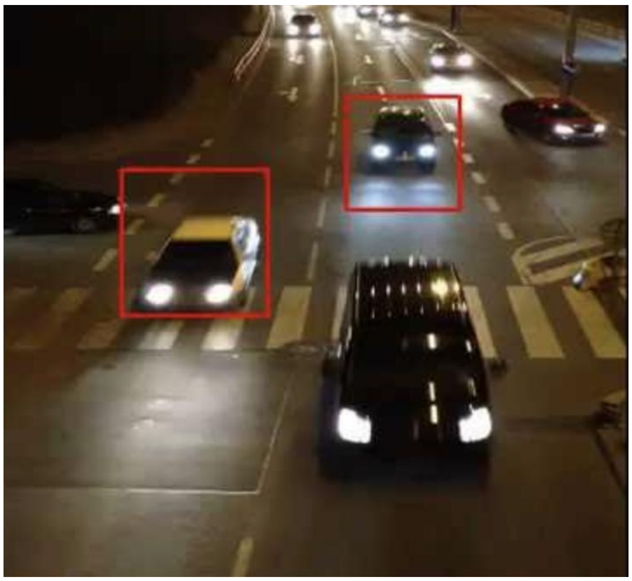
representation more meaningful and easier to examine by simplifying and/or changing it. In images, image segmentation is commonly used to locate objects and boundaries (lines, curves, and so on). Image segmentation, in more technical terms, isthe process of giving a label to each pixel in an image so that pixels with the same label share certain properties.



Here, k-means and YOLOv4 are used for image segmentation. A digital image is broken down in this image segmentation process, which aids in decreasing the complexity of the image for further processing or analysis. It separates an image into different zones based on pixel characteristics to identify objects or borders, making it easier to simplify and analyse a picture.

Because real-world photos don't contain just one object, this is a crucial stage in image processing. For self-driving automobiles, for example, the image might contain roads, cars, trains, and other objects, thus we might need to employ segmentation to separate them and evaluate them separately.


## 1.3. IMAGE CLASSIFICATION :

Different sorts of vehicles, such as cars, motorcycles, and trucks, can be spotted and categorised using this categorization method.

It entails extracting features from an image in order to spot patterns in the data.

In this case, we utilise a Convolution Neural Network to categorise photos, which is one of the finest deep learning models for image classification**.**.

Here it has six layers of classifying the image:

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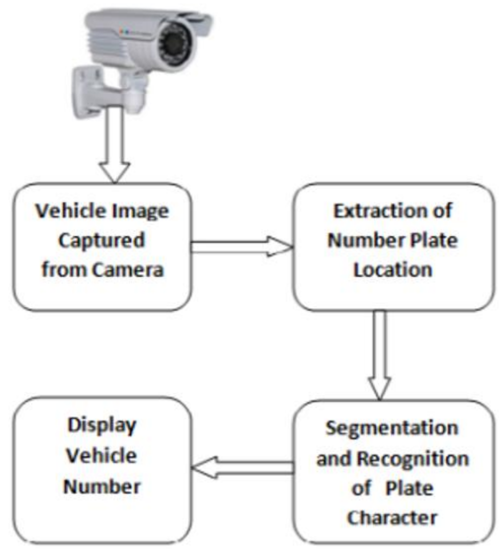
- Input Layer
- Output Layer
- Softmax
- Features
- Label
- Estimation

## GLCM-

GLCM stands for Grey Level Co-occurrence Matrix which is widely used for image classification.The features that are calculated for this image classifications are:

- Contrast
- Corelation
- Energy
- Standard Deviation
- Entrophy
- RMS
- Variance
- Kurtosis

## 1.4. NUMBER PLATE RECOGNITION:




Her

So


## RELATED WORKS:

**a) An automated night-time vehicle detection system for driving assistance based on cross-correlation,Ibtissam Slimani ,2019**

Recently, real-time vehicle detection become an important task and big challenge in Driver Assistant Systems (DAS), such as collision mitigation and avoidance and dimming of the headlights. However, the most researchers in the field carried out their research in daytime with good light conditions. In this paper, we propose an efficient night-time vehicle detection method in real-time based on image processing.

### b) Night-time vehicle detection using low exposure video enhancement and lamp detection,Byung Cheol Song,2019.

This paper proposes a vehicle detection algorithm using pre-processing and lamp detection at night-time. First, we present a vehicle detection using contrast enhancement. By applying a specific contrast enhancement to night-time images with low exposure, we can enhance salient features even at dark night-time. Next, we detect a pair of rear lamps from the pre-processed image(s). Finally, we can find forward vehicle(s) by lamp pairing. Experimental results show that the proposed algorithm provides reliable detection accuracy.

### c) Night Time Vehicle Detection and Tracking by Fusing Vehicle Parts From Multiple Cameras,Xinxiang Zhang ,2021

Because of the low visibility at night, detecting and tracking vehicles with typical visible light cameras is difficult. At night, current state-of-the-art systems treat automobiles as a pair of headlights or taillights, with no ability to discern the vehicle's contour or occupants. As a result, this research provides the first nighttime framework for localising vehicle shapes that incorporates both vehicle headlights and taillights.

### d) Feature Selection Based on Tensor Decomposition and Object Proposal for Night-Time Multiclass Vehicle Detection, Hulin Kuang,2018.

We offer a novel multiclass vehicle detection system that uses tensor decomposition and object proposal in this research. Typical features like the histogram of directed gradients and the local binary pattern frequently yield meaningless image blocks (regions), resulting in poor detection performance. As a result, after tensor decomposition, we pick blocks based on feature ordering and extract just features from these blocks.

### e) A Survey of Intelligent transportation systems based Modern Object Detectors Under Night-time Conditions,Stephen Galea ,2020

With the rise of self-driving cars and intelligent traffic management systems, accurate vehicle detection in a variety of lighting conditions has become critical. This paper compares and contrasts four cutting-edge models. Faster R-CNN, RetinaNet, YOLOv3 and YOLOv4 on how precise they detect vehicles under day and night-time scenarios.

## APPLICATIONS:

There are various applications in which thisback end can be used:

- Autonomous Driving Vehicle
- Advanced Driver Assistance System
- Smart Traffic Management System
- Highway Security Systems
- Automatic Surveillance Monitoring System

## FUTURE GOALS :

Our future goal is to make this back end process to also work for the survillence cameras and some other video recordings evidences.

## CONCLUSION:

Here we can detect a night time vehicle images, by using this back end process and also we can alter the code according to the need.

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