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## Lane detector for driver assistance systems

S.A. Sivasankari\*, R. Agilesh Saravanan, J. Bennilo Fernandes, K.T.P.S. Kumar

Department of ECE, Koneru Lakshmaiah Education Foundation, Greenfields, Vaddeswaram, Guntur, AP 522502, India

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## ABSTRACT

The challenging problem in the traffic system is lane detection. This Lane detection which attracts the computer vision community's attention. For computer vision and machine learning techniques, the Lane detection which acts as the multi-feature detection problem. Many machine learning techniques are used for lane detection. Driver support system is one of the most important features in the modern vehicles to ensure the safety of the driver and decrease the vehicle accidents on road. Road Lane detection is the most challenging task and complex tasks now-a-days. Road localization and relative position between vehicle and roads which also includes with this.

But in this journal, we propose a new method. Here, an on-board camera to be used which is looking outwards are presented here in this work. This proposed technique which can be used for all types of roads like painted, unpainted, curved, straight roads etc in different weather conditions. No need for camera calibration and coordination of the transform, may be any changing illumination situation, shadow effects, various road types. No representation for speed limits. This includes that the system acquires the front view using a camera mounted on the vehicles and detect the Lane by applying the code from the Python Programming process. This proposed system does not require any more information about roads. This system which demonstrates a robust performance for Lane detection.

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## 1. Introduction

Traffic accidents are most serious problem in today's world. Road transport which is one of the most used and cheapest mode of transport. It provides better connectivity among the other modes. The most of the accidents happened due to the negligence of the drivers. The number of vehicles which are increased day by day in real world.

The basic function of ITS is saving the lives of human beings and increasing safety of the human beings. ITS which provides the innovative services relating to traffic and transport management. This system provides user the better information, safety, comfort, co-ordination and smarter use of transport network [1].

The Lanes which reduce the road accidents number enormously. This lane which assists the driver in such a way that a driver can identify the road area and non-road area. The Lane which

reduces the traffic conflicts in such a way that it can be used by single line of vehicle to control and guide the drivers [1].

Most of the highways now-a-days which are separated by the divider and have multiple Lanes which are two wheelers, four-wheeler heavy and four-wheeler non heavy. Drivers have to check over these Lanes in a way that they are driving safely.

Lane direction is an area of computer vision [1] with application is autonomous vehicles and driver support systems.

Advanced Driving assistance systems (ADAS) which has the ability and it models the shape of road Lanes and localize the vehicle with respect to the road [2]. Intelligent vehicles are designing which improves the safety of the drivers and the others who are riders in the road ways. There are many more tasks to be carried.

The proposed technique which is the best one for the self-driving technique by the driver. The most important task of the driver is the road detection. Lane detections and the vehicle positions. The major cause for injuries and deaths in the national highway are vehicle crashes. The system which was designed or going to be designed provides a warning to a driver and it should be a better potential way to save a number of lives. In the ITS system the main

\* Corresponding author.

E-mail addresses: [s.a.sivasankari@gmail.com](mailto:s.a.sivasankari@gmail.com) (S.A. Sivasankari), [agileshece@gmail.com](mailto:agileshece@gmail.com) (R. Agilesh Saravanan), [bennij05@gmail.com](mailto:bennij05@gmail.com) (J. Bennilo Fernandes), [sathishkumar@kluniversity.in](mailto:sathishkumar@kluniversity.in) (K.T.P.S. Kumar).

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technology which comes in to the picture is computer vision. Since it is the powerful tool for the environment saving. Earlier days, the lane detection which was based on color lines is the roadways. But it may failure for detection once in the adverse weather. The main aim of this work is to provide better safety and intelligent function to drivers by using Electronic and information technologies [3]. For hostile road environments recognition detection of lane, traffic lights signs which are important is ADAS system. Road lane which are classified as two types as curved and straight. Generally, the near view of straight lane detection is easy.

But the far end view of straight line and mere end view of curved lane which are difficult to identify and recognize and hence the camera to be used in the self-driving vehicle where the images are caught by the camera which are showed to the driver. Thus, driver can identify and recognize every detail in a prompt way by using the proposed method. Due to the modernization the number of vehicles is increasing. If the roads are narrow, then the victims of the accident may increase due to car crash, inefficient lane detection and identification. ADAS which include Lane Departure Warning LDW [5]. Lane keeping Assist, Adaptive Cruise Control (ACC) [6] helps the people to analyze the current driving environment and provide feedback and alerts to the driver [4]. Lane detection is current topic in the field of AIANN machine learning and computer vision and in ITS [4]. Lane detection has 2 ways of representation as edge detection and lane detection [4]. In this paper the image from the road was proposed by using the Python and the result will be established.

The paper which are described as follows. Section 2 includes the overview of proposed system. Section 3 illustrates the proposed system methods and Section 4 where experiments, results and discussions were analyzed. Finally, Section 5 has the conclusion, the effectiveness, performance, pros and cons of the proposed methods are carried out.

## 2. Overview of proposed system

### 2.1. Hough transform

A Hough transform [1] which is used in image analysis and DIP. This transform which is used in the Lines identification i.e., Lane as well the position a shape of lines and roads. Edge detector also to be used in such a way that it identifies the geometric shape. Due to this reason the Hough transform are used adjunctions with the edge detector is such a way that the problem is refined.

### 2.2. Edge detection

The edge detection is the technique in which the image brightness changes are sharply noted. It is the basic method to be used in image processing. This method which filters is unwanted information from the images and preserve the needed information in the images.

The known edge detector algorithm is Canny edge detector [5] which is a multi-edge detector algorithm. Through the many number of steps, it discovered the optimal edge.

The advantages are good detection, localization and response Bilateral filter. This actually smoothens the image. The bilateral filter which works in a way that the images which are closed placed together and shared in to two as texture and structure. That's why named as bilateral filter.

There are many different algorithms which are different vision-based road detection algorithm developed and deployed in autonomous vehicles. Lane detection which is performed by finding the lane shape. Road marking are varied based on the region, road shapes, road surface, road structures etc.

## 3. Proposed methods

CCD camera is fixed which captures the road. Image of the camera can be adjusted. The color image which are converted as gray scale image, then processing time gets reduced. Then edge detector which detects the edges and by filter the needed and unneeded the parts of the images are segregated (Fig. 1).

### 3.1. Straight line detection and curved line detection

Hough transform which is used to detect the straight line and the curved line detectors. The near end images which are termed as straight-line detections and the far view images are as curved line detections. For near end images the straight line is used and the far end images the curved line are used.

### 3.2. Detection using Hough transform

The straight line which is detected by using the algorithm. The co-ordinates to be used and the co-ordinates which detects the straight line.

### 3.3. Detection for curved line

Parabolic model to be used. Boundary of both are matched.

### 3.4. Image capture

By using CCD camera the image which was captured including the road, side road, Lane other objects which are nearer. Lane detection system Algorithm python which studies about the image from the memory.

### 3.5. Conversion to gray scale

Edge detections will be difficult for color images. So, it must be the gray scale image. It minimizes the scale. Thus, time consuming.

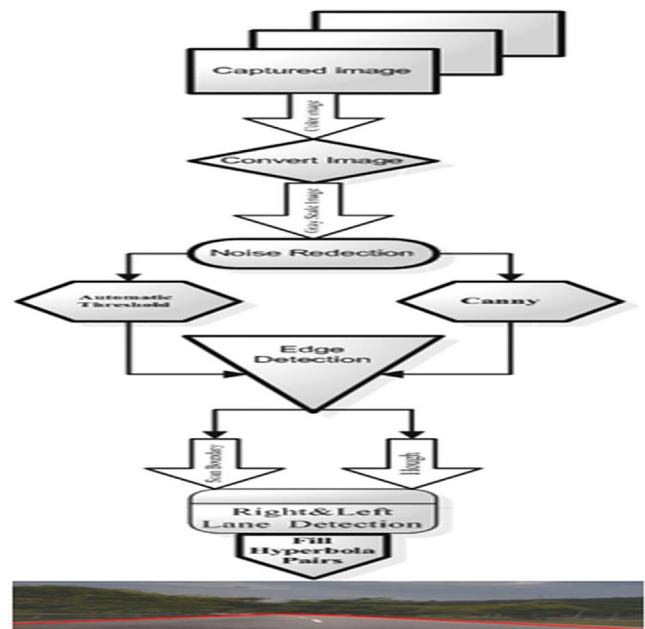
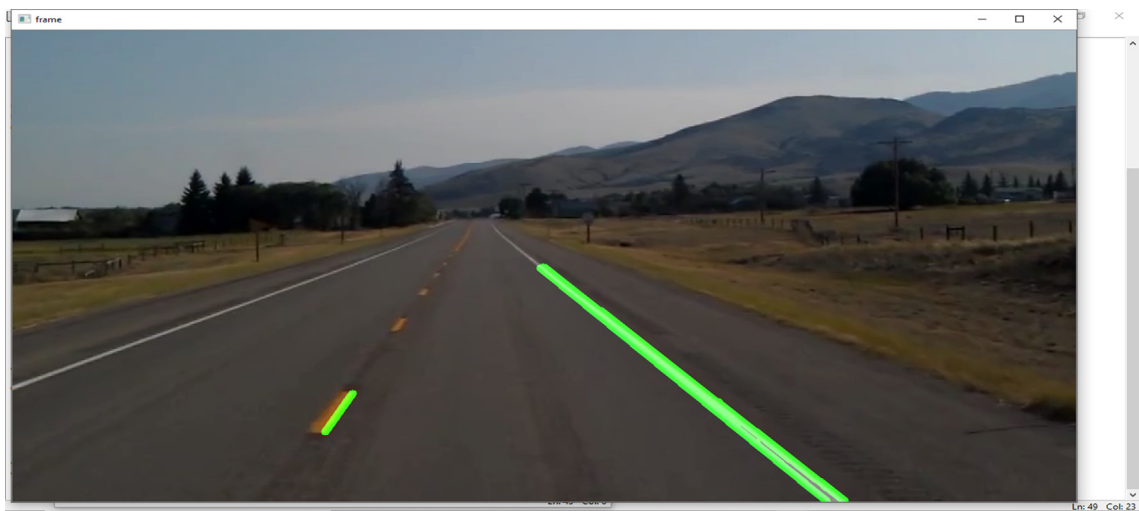


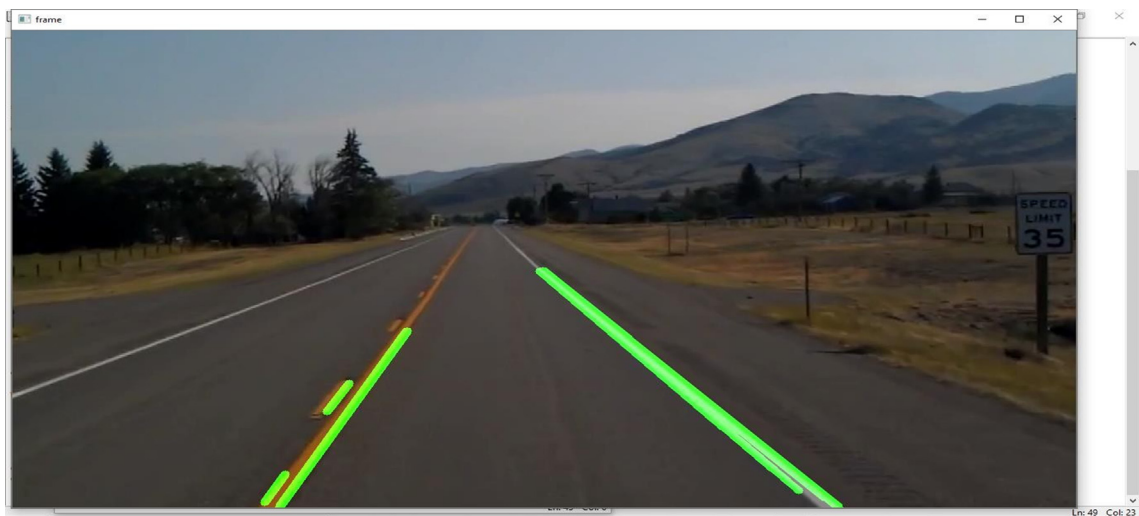
Fig.1. Flowchart for proposed method.



**Fig. 2.** Parallel Lane detection.



**Fig. 3.** Hough Transform.



**Fig. 4.** Canny detection.

### 3.6. Noise reduction

Noise which are unwanted signals. Everywhere and anywhere. So, the algorithms to be used for noise reduction. Noise is nothing the shadows available in general Gray scale image.

### 3.7. Edge detection

Edge detectors are very important since it shows the difference between wanted and unwanted images. Thus, the amount of learning data which can be reduced. The algorithm used here is canny edge detector.

### 3.8. Line detection

Here the algorithm which are used in Hough transform which was discussed earlier in this article.

## 4. Experiments, results and discussions

This section makes the evaluation for over all performance after filtering unwanted images. Performance of the algorithm is evaluated to the quantitative and qualitatively. The figure which shows for all the types of roads, all adverse weather (Figs. 2–4).

## 5. Conclusion

The Lane detection which is an efficient method to prevent accidents in ITS. But the adverse weather condition which will affect the efficiency. So, some more better techniques to be followed for the weather condition updation. Here a real time vision based on the Lane detection was proposed. The Camera which catches the images and it shows the area detect edges, the road shapes and all. The experimental results which shows that the system which can able to get the perfect and valuable information to the driver who is doing self-driving which ensures safety. But this proposed method not only for the Self driving, but also the advanced driver assistant systems for Smart cars also. In future we will

express and shown the more advanced Lane detection approach to improve the performance level.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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