PEDESTRIAN DETECTION PREVENT VEHICLE ACCIDENTS

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Abstract - Autonomous Vehicles (AVs) have the potential to solve many traffic problems, such as accidents, congestion and pollution. However, there are still challenges to overcome, for instance, AVs need to accurately perceive their environment to safely navigate in busy urban scenarios. The aim of this project is to review recent articles on computer vision techniques that can be used to build an AV perception system. AV perception systems need to accurately detect non-static objects and predict their movement , as well as to detect static objects and detect the information they are providing. This project , focuses on the computer vision techniques used to detect pedestrians and vehicles. There have been many projects and reviews on pedestrians and vehicles detection so far. However, most of the past projects only reviewed pedestrian or vehicle detection separately. This review aims to present an overview of the AV systems in general, and then review and investigate several detection computer vision techniques for pedestrians and vehicles. The review concludes that both traditional and Deep Learning (DL) techniques have been used for pedestrian and vehicle detection; however, DL techniques have shown the best results. Although good detection results have been achieved for pedestrians and vehicles, the current algorithms still struggle to detect small, occluded, and truncated objects. In addition, there is limited research on how to improve detection performance in difficult light and weather conditions.

I .INTRODUCTION

In recent years, many countries around the world have been facing road traffic issues such as accidents, congestion, and pollution. According to WHO, in 2016, the number of fatalities due to road traffic accidents reached 1.35 million, and approximately 20 to 50 million people are injured each year. In addition, it was reported that road traffic accidents are the primary reason for the deaths of children and young adults. Human error and imprudence, for instance, fatigue, drink-and-driving, using mobile phones while driving and speeding, are two of the main factors that contribute to these extreme numbers . In order to decrease road traffic accidents and fatalities, the following measures were presented: enforce legislation to avoid human error and imprudence, improve vehicle safety to avoid or mitigate collisions, and post-crash care to increase the chance of saving lives. The advanced driver assistance system (ADAS) is one of the proposed solutions to make vehicles safer and to reduce driver error.

II Literature survey

Edges characterize boundaries and are therefore a problem of fundamental importance in image processing. Edges in images are areas with strong intensity contrasts – a jump in intensity from one pixel to the next. Edge detecting an image significantly reduces theamount of data and filters out useless information, while preserving the important structural properties in an image.

Based on these criteria, the canny edge detector first smoothens the image to eliminate noise. It then finds the image gradient to highlight regions with high spatial derivatives. The algorithm then tracks along these regions and suppresses any pixel that isnot at the maximum using non-maximum suppression. The gradient array is now further reduced by hysteresis to remove streaking and thinning the edge

Sample Input and Output of Canny Edge Detection Algorithm:

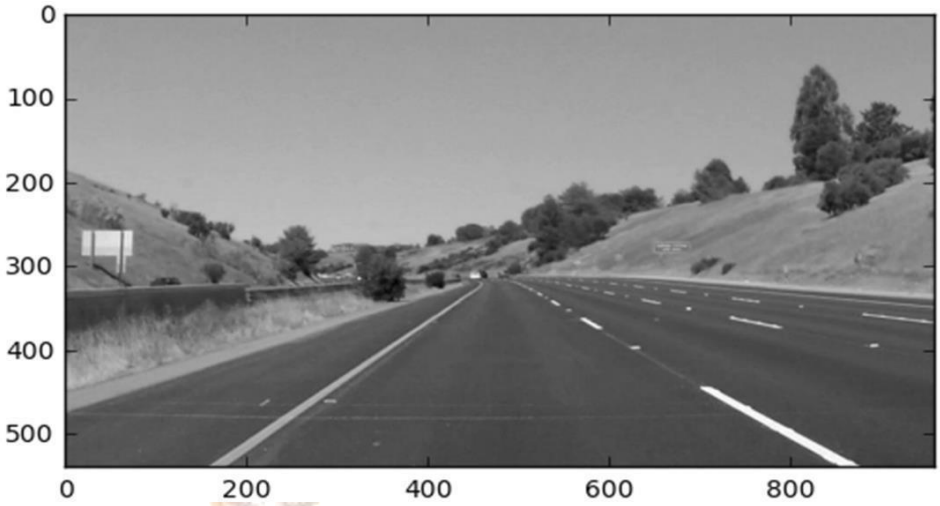


Figure 1a: Describing the Input Image

Figure 1b.: Describing the Output Image

III .EXISTING SYSTEM

Camera usually does not provide depth information. Depth information can be acquired but make the system more complex (e.g., stereo camera). Main target is pedestrian but can get confused with hot air from the exhaust pipe or other objects that generates heat. Sonar Sensor has Short range, it is commonly used for automated parking and blind spot detection feature The Hough transform is only efficient if a high number of votes fall in the right bin,so that the bin can be easily detected amid the background noise. This means that the bin must not be too small, or else some votes will fall in the bins, thus reducing the visibility of the main bin. Also, when the number of parameters is large (that is, when we are using the Hough transform with typically more than three parameters), the average number of votes cast ina single bin is very low, and those bins corresponding to a real figure in the image do not necessarily appear to have a much higher number of votes than their The complexity increases at rate with each additional parameter, where A is the size of the image space and*m* is the number of parameters. (Shapiro and Stockman, 310) Thus, the Hough transform must be used with great care to detect anything other than lines or circles. Finally, much of the efficiency of the Hough transform is dependent on the quality of the input data: the edges must be detected well for the Hough transform to be efficient. Use of the Hough transform on noisy images is a very delicate matter and generally, a

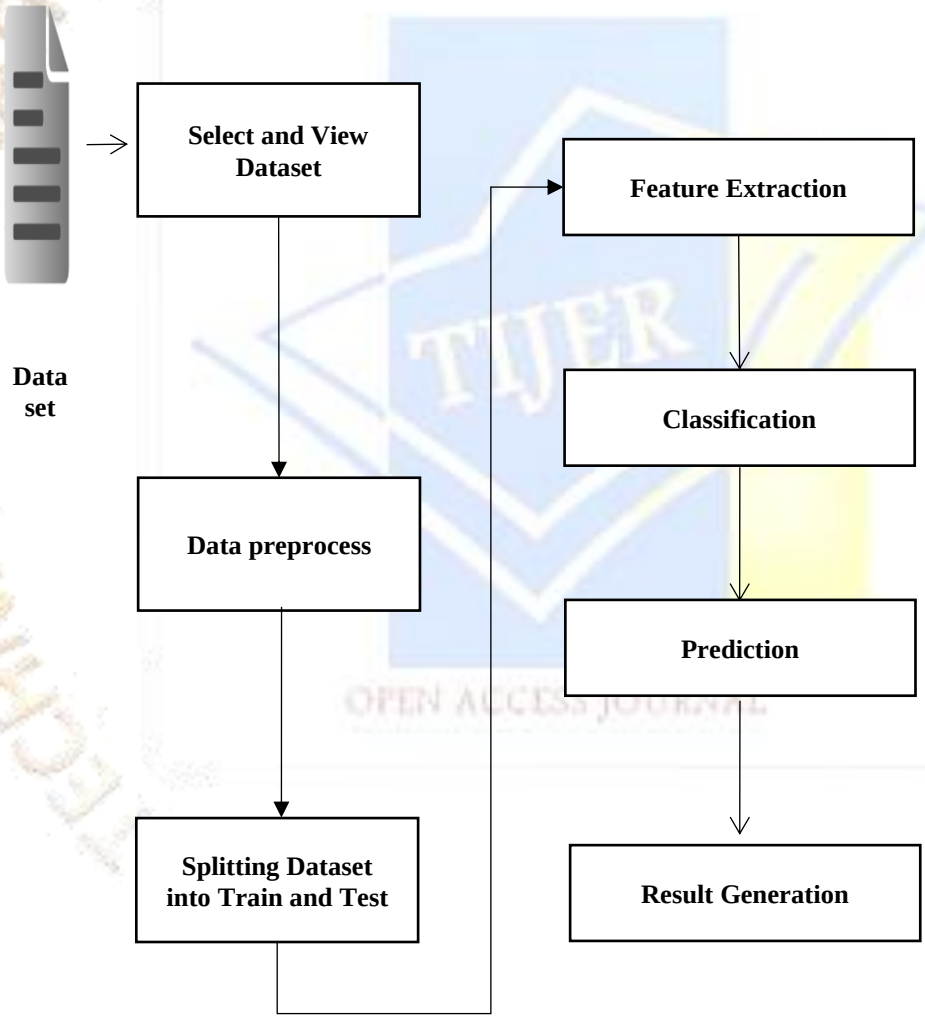
stage must be used before. In the case where the image is corrupted by speckle, as is the case in radar images,the Radon transform is sometimes preferred to detect lines, because it attenuates the noisethrough summation.

IV. PROPOSED SYSTEM

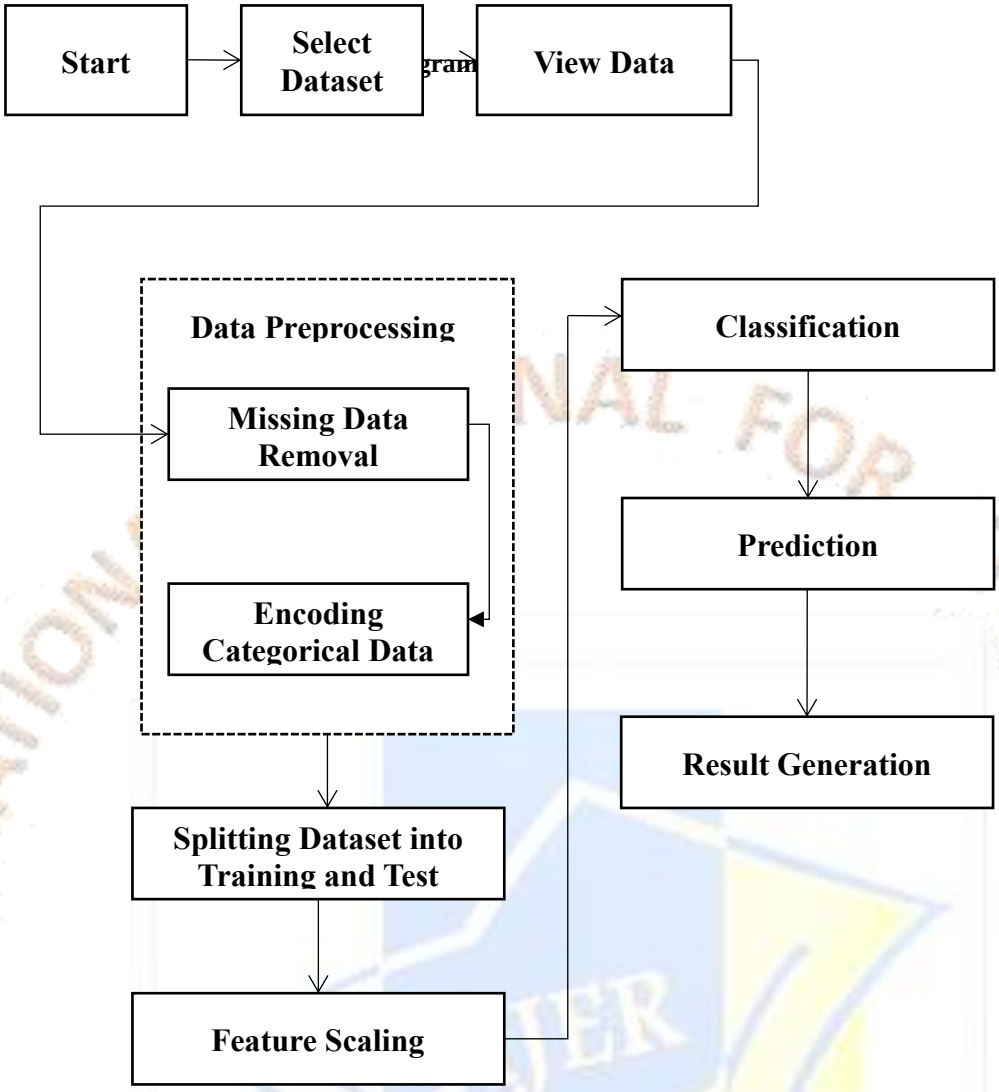
Its performance is not affected in bad weather or low light conditions. It has long range (up to 300 m). It provides accurate distance, position, and speed . It can be used during the day and night-time. Performs 360-degree view of the environment and shows wide field of view.

- High accuracy.
- Low cost .
- Less chance to be affected by interference from another vehicles.

V.SYSTEM ACHITECTURE



Block Diagram



Flow Diagram

VI . CONCLUSION

Pedestrians and vehicles are important objects that AV perception systems must detect. Hence the purpose of this review was to survey the most relevant pedestrian and vehicle detection algorithms. Since several pedestrian and vehicle detection algorithms made use of the same or a modified version of the methods used in generic object detection algorithms.

VII .REFERENCES

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