ENHANCED TRAFFIC SIGN AND LANE DETECTION FOR AUTONOMOUS VEHICLES USING SSLA

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ABSTRACT—
The Self-Driving Cars are also known as Autonomous Vehicles. This Car has the ability to sense around the environment. These sensed parameters are processed and according to it the different actuators in the car will work without any human involvement. An Autonomous car work like a normal car but without any human driver. Autonomous cars rely on sensors, actuators, machine learning algorithms and Software to perform all the Automated Functions. The Software part is very important for Autonomous vehicles. The Software architecture acts as a bridge between Hardware Components and Application. The Standardized Software for Automotive cars is AUTOSAR. The AUTOSAR is a Standardized Architecture between Application Software and Hardware. This Standardized Architecture provide all Communication Interfaces, Device Drivers, Basic Software and Run-Time Environment. There are two important modules in Self-Driving Cars. They are Lane Detection and Traffic Signal detection which works automatically without any Human Intervention. A Machine Learning Algorithm is proposed in this paper. This Algorithm is mainly used to train the shape models and helps to detect the shape for Traffic Sign detection and Lane Detection. These both tasks are programmed using python with Open cv2 library file, numpy library file and Hough Detection technique is used to detect the appropriate circles of the traffic signals. By using all these tools, all the shape models are trained using Supervised training Algorithm and the detection is performed in such a way to help Autonomous cars to detect the lane and traffic Sign.

Keywords—Lane Detection, Traffic Signal detection, Self-Driving Cars
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I.INTRODUCTION

Safety is the important aspect which must be noticed while driving vehicles. In a survey it is been published that more 10 lakhs of people die in the road accidents in a country [4] [14]. The Road accident happened due to Human Errors are about 98% [7]. So, to avoid this all over the world Autonomous Cars are under Research and Development. The term Autonomous Cars is that the car drives itself using various technologies without any Human intervention [1]. For Autonomous Cars Software task development is very much important [3] . The Software architecture acts as a bridge between Hardware Components and Application. The Standardized Software for Automotive cars is AUTOSAR. This Standardized Architecture provide all Communication Interfaces, Device Drivers, Basic Software and Run-Time Environment [10] [12].

There are two important tasks in Autonomous cars they are Lane detection and Traffic Sign Detection[11]. These two tasks are important because many accidents are due to malfunction of these two tasks.A New Algorithm SSLA (Shape Supervised Learning Algorithm) is proposed in this paper[5]. The Hough Line Transformation is the technique which is used to detect the Traffic Sign Detection.Matplolib and numpy is the library files in python used for Lane Detection. These two techniques are possible by Open CV, numpy libraries in python [6]. The Hough line Transformation is used to detect any shapes. In order to detect the Lane in which the car is to drive is by using various Edge detection techniques which makes use of colors in python [13].

II. LITERATURE SURVEY

In the existing work there are Automotive cars which work through Sensors, Actuators and an Embedded System Control. Here the Lane Keeping is very much important in terms of safety measures to prevent road accidents. In the Concept of Lane keeping the LiDar,radar and GPS is used in existing research work to keep the vechiles in the lane. Also,the lane keeping in the existing papers are achieved through ADAS based system with the help of Adaptive cruise control and this technique is performed thorugh Deep Neural Networks [15].The Simulation part is possible in Carla Software also.

III.PROPOSED SYSTEM

In existing research works and models the traffic sign and lane detection is done through SVM. Where thousands of images are put into training models to get an accurate output model.An Algorithm is proposed in this paper which is used to identify the appropriate shape. This Identification is possible through training model. The proposed Algorithm holds Hough line transformation technique which is used to detect any shape. Even the shape is broken also this technique works in an Efficient way. The shape which is detected in turned out in a mathematical form by using various formulae. The maximum Area of the shape is 64480. In this Paper, the circle shape is required to be detected because Traffic signals are in the shape of circle. Not all circles are detected. It is because the traffic sign is placed on the higher place.

IV.SCREEN SHOTS

FIGURE 1: The Red Color Traffic Signal is Detected.

FIGURE 2: The Yellow Color Traffic Signal is Detected.

FIGURE 3: The left and Right lanes are detected.

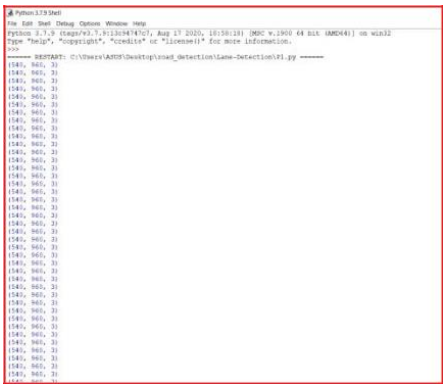

FIGURE 4: The Height,Weight,Color of the Hough Line.

V.CONCLUSION

The result of this paper is that the two important aspects Traffic signal and lane detected using Machine Learning Techniques. The learning is performed using image processing and detection using video data set for traffic sign and lane detection using python programming. The SSLA Algorithm is very useful for Autonomous cars in terms of safety and prevention.

FUTURE WORK

In future the same work can be extended by using Hardware and also various safety measures and challenges must be rectified for the Autonomous cars.

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