A new era of transportation has been brought about by the quick development of autonomous driving technologies. With improved safety, efficiency, and accessibility, autonomous vehicles (AVs), which are built to function without human involvement, have the potential to completely transform how people move. A human driver is no longer necessary because to these cars' ability to navigate through challenging areas and make judgments in real time depending on their environment. As the need for self-driving technology grows, it is essential to create dependable systems that can safely navigate cars across a range of locations, road types, and traffic situations. Autonomous cars have the ability to significantly minimize human error on the road, which would reduce the amount of accidents brought on by driving while intoxicated or distracted. Artificial intelligence (AI) algorithms and sophisticated sensor systems are key components of the technology underlying driverless cars. Data regarding the environment around the vehicle is continually gathered by sensors including LIDAR, radar, cameras, and ultrasonic equipment. Artificial intelligence (AI)-driven systems evaluate this sensor data, analyze it, and decide how to move the car, including how to brake, accelerate, and steer. The car's perception system, which interprets sensor data and allows the vehicle to respond appropriately, is what gives it the capacity to comprehend and navigate its surroundings. In order to offer safe and dependable navigation for autonomous cars, a variety of research disciplines, including computer vision, machine learning, and robotics, are involved in the development of these perception systems. Lane detecting is one of the most important functions for any autonomous car. Finding and monitoring a road's or lane's limits to make sure a car continues on its intended course is known as lane detection. Because it immediately affects the vehicle's operating safety and dependability, particularly on highways or multilane roads, this work is highly crucial. In order to recognize lane markers, lane detection systems usually employ cameras or LIDAR sensors to take pictures or create point clouds of the road surface. The car then makes use of this information to stay in its lane and steer clear of hazards or other cars. Advanced driving assistance systems (ADAS), which support semi-autonomous cars that need human supervision, depend on lane detection. Due to weather factors like rain, snow, or fog, as well as wear and tear over time, road markings may become hidden or deteriorated, making lane recognition extremely difficult. Furthermore, depending on the area and kind of road, lane markers might differ in width, color, and design, making them not always uniform. Furthermore, lane recognition may become much more challenging due to elements like dim lighting, steep bends, and intricate crossings. Therefore, creating reliable and flexible lane detecting algorithms is essential to guaranteeing the secure functioning of self-driving cars under a variety of driving circumstances. Numerous strategies have been put out to address these issues. Robust lane change recognition and tracking in urban settings was investigated in one noteworthy work [1]. The challenges of lane recognition in dynamic environments—such as city streets with frequent lane changes, pedestrians, and other vehicles—are highlighted by this study. The study emphasizes how crucial real-time lane change recognition is to guaranteeing that the car can react to its surroundings quickly and safely. To increase detection accuracy, the suggested approach combines more sophisticated machine learning models with more conventional image processing methods like edge detection and Hough transformations. The study tackles the requirement for adaptive systems that can manage complicated situations where lane markers may not always be effective by concentrating on urban surroundings. In a similar vein, [2] introduced a vertical lane finder system for vision-based lane detecting. This technique makes use of computer vision to better accurately and efficiently identify lane markers. The strategy can improve the vehicle's lane identification capabilities by concentrating on vertical lane finders, particularly in difficult-to-reach areas where conventional horizontal lane detection techniques would not work. The study shows how advantageous it is to use image processing methods like gradient analysis and edge detection to identify lane borders even in low light. The paper emphasizes how these methods might enhance lane detecting systems in both urban and rural settings, guaranteeing that the car can stay in its lane even under challenging circumstances. [3], which focuses on using artificial intelligence (AI) to enhance lane recognition for self-driving cars, makes another noteworthy contribution. The use of AI techniques, especially deep learning models, for lane identification and other computer vision applications has grown. The authors of this paper suggest analyzing road photos and precisely detecting lane markers using convolutional neural networks (CNNs). The study investigates how machine learning models can identify patterns and characteristics that are suggestive of lane borders by learning from big datasets of road photographs. More flexible and adaptive lane detecting systems that can better manage changes in environmental elements and road conditions are made possible by the application of AI. This study shows how lane detecting systems driven by AI may greatly increase the dependability of autonomous driving systems, enabling them to handle more challenging driving situations. The use of image processing methods to identify lane boundaries for self-driving cars was investigated by the authors in [4]. The study looks into a number of techniques to increase lane detection accuracy, such as edge detection, thresholding, and Hough transform. The scientists improved the system's resilience by combining several image processing methods, which reduced the likelihood of false positives and false negatives. The study also emphasizes how crucial it is to construct lane recognition algorithms with the geometry of the road and the speed of the vehicle in mind. The results highlight the necessity of real-time lane marker detection and tracking technologies to keep cars in their lanes even in difficult situations. The application of deep learning models is a relatively recent development in lane detection, as investigated by [5]. In this work, deep convolutional neural networks (CNNs) are used for multi-lane detection. In order to operate autonomous cars on highways or roads with several lanes, the research presents a technique for concurrently identifying lanes. Because deep CNNs can automatically learn hierarchical features from raw picture data, they are especially well-suited for this purpose. This eliminates the requirement for manually created features. The study shows that even in challenging driving situations, deep learning models can distinguish numerous lanes with high accuracy. According to the research, deep learning-based lane recognition systems will be essential to autonomous driving in the future as they will make it easier and safer for cars to traverse more intricate road networks. To sum up, lane detection is an essential part of autonomous car technology that makes sure the car stays in its lane and drives safely in a variety of situations. The studies discussed in this paper show how machine learning algorithms, deep learning models, and conventional image processing approaches are being used to enhance lane detecting systems. The use of these cutting-edge technologies will be essential for developing lane detecting systems that are more robust, adaptable, and dependable as autonomous cars continue to develop. Researchers are clearing the path for safer and more effective autonomous cars by tackling the difficulties presented by changing road conditions, environmental elements, and complicated driving situations. The advancements in this area demonstrate how autonomous driving technologies have the potential to revolutionize transportation and raise everyone's level of road safety.