**Real-Time Lane Detection and Path Prediction for Autonomous Vehicles Using Deep Learning Techniques**

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***Abstract:***

This project focuses on developing a system for detecting lane lines and predicting paths in autonomous driving using deep learning techniques. The main goal is to accurately identify lane markings from images captured by cameras mounted on vehicles. By understanding where the lanes are, the system can help the vehicle navigate safely and efficiently. To achieve this, we utilize well-known datasets like CULane, which provide a variety of images with lane markings. We employ deep learning models specifically YOLO to detect the lane lines and Long Short-Term Memory (LSTM) networks to predict the vehicle's future path based on its current location and the detected lanes.Our results demonstrate significant improvements in both lane detection and path prediction, showcasing the system's ability to operate effectively across a variety of driving environments, including different weather conditions and times of day.We plan to enhance the system by integrating additional sensors and exploring advanced techniques to improve its reliability and adaptability in real-world scenarios.

**Keywords**: Lane Detection, Path Prediction, Deep Learning, Autonomous Driving, YOLO, LSTM, Real-time Processing, Vehicle Navigation.

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