AMAL JYOTHI COLLEGE OF ENGINEERING, KANJIRAPPALLY

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**FINAL PROJECT**

**SMART ROAD CONDITION MONITORING AND ROUTING SYSTEM USING YOLOv11**

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**Abstract**

Road conditions, especially the presence of potholes, significantly impact driving safety and vehicle health. Our project introduces a **SMART ROAD CONDITION MONITORING AND ROUTING SYSTEM** using the advanced YOLOv11 object detection algorithm to detect, map, and respond to various road conditions in real time. By leveraging computer vision and deep learning, this system detects road anomalies such as potholes and provides real-time alerts to drivers, helping them avoid potential hazards.

The **YOLOv11** algorithm is chosen for its superior speed and accuracy in identifying potholes and estimating their severity and location relative to the vehicle. This enables drivers to take corrective actions promptly. In addition to real-time detection, the system includes a dynamic mapping feature that continuously updates the location of detected road hazards. These maps are then used by an optimal routing system, which suggests safer and more efficient routes, avoiding areas with damaged roads.

The integration of real-time detection, mapping, and routing makes this system a comprehensive tool for improving road safety. Its adaptability allows integration into various vehicle platforms, ensuring real-time responsiveness in diverse driving environments. Future developments will focus on enhancing detection under variable conditions such as poor lighting and inclement weather, aiming to further improve the system's accuracy and reliability.

In conclusion, the **SMART ROAD CONDITION MONITORING AND ROUTING SYSTEM** using **YOLOv11** represents a significant leap in road safety technology by helping drivers avoid road hazards, leading to safer, smoother, and more efficient driving experiences.