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A Review on Intelligent Traffic Flow Optimization with Automatic Movable Road Barriers

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Abstract: *Traffic congestion and inefficient road space utilization are major challenges in modern urban transportation systems. The "Automatic Movable Road Divider" project aims to provide a dynamic and intelligent solution to these problems by designing a road divider system that can be automatically repositioned based on real-time traffic conditions. This system employs sensors, microcontrollers (e.g., Arduino), and motorized mechanisms to detect traffic density in multiple lanes and adjust the position of the divider accordingly. During peak hours, the divider shifts to allocate more lanes to the congested direction, thereby optimizing traffic flow and reducing delays. The system can be controlled automatically through an embedded program or manually via remote control, ensuring flexibility and safety The design integrates infrared or ultrasonic sensors to monitor vehicle count and lane occupancy in real-time. A central microcontroller processes the sensor data and controls a series of motors or actuators that move the divider units along embedded tracks or wheels. Safety features such as emergency stop mechanisms, LED indicators, and obstacle detection ensure reliable and secure operation. The system is powered by either a mains supply or solar energy, promoting sustainability. This adaptable infrastructure can be especially beneficial in cities with varying traffic patterns throughout the day, such as near schools, business districts, or event venues. The project has the potential to replace traditional static dividers in metropolitan areas, offering a cost-effective, adaptive, and technologically advanced approach to traffic management.*

Keywords: Automatic Road Divider, Movable Barrier System, Traffic Management, Smart Traffic Control, Lane Optimization, Real-time Traffic Monitoring.

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