



A Review On Smart Movable Divider For Ambulance Path Optimization

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Abstract: Traffic Problems is a growing problem in many cities. This system addresses this by introducing a movable divider that can be adjusted based on real-time traffic data. Sensors embedded in the road collect traffic data, which is then transmitted to the cloud platform via IoT. The cloud analyzes the data and sends instructions to the divider mechanism, adjusting its position to optimize traffic flow. The algorithm for divider movement considers factors like traffic volume on each side and historical data to predict future patterns. It prioritizes balanced traffic flow but allows for adjustments to create a dedicated lane for detected ambulances. The proposed system offers a dynamic solution for traffic management. It improves traffic flow during peak hours and ensures expedited passage for emergency vehicles, potentially saving lives. The system can be further enhanced by integrating with traffic light control systems and incorporating machine learning algorithms for even more intelligent traffic management.

Index Terms: Smart Traffic System, Automatic road Divider, Iot, Deep learning, Density of Traffic

I. INTRODUCTION

In modern cities, heavy traffic can cause significant delays, especially for emergency vehicles like ambulances that need to reach their destinations quickly. To address this issue, the Smart Movable Road Divider system is designed to provide a flexible and efficient solution for clearing paths for ambulances while also managing traffic flow. This system involves a roadside divider that can automatically shift its position to create a clear lane for emergency vehicles during critical situations. By integrating smart technologies such as sensors and automated controls, the divider can respond to real-time traffic conditions, ensuring that ambulances can pass through without delays. In addition to providing a clear path for emergency vehicles, the system helps in maintaining smoother traffic flow during normal conditions, making roads safer and more efficient.

The Smart Movable Road Divider offers a modern, innovative approach to traffic management and emergency response, ensuring that lives can be saved by reducing ambulance travel time.

II. LITERATURE SURVEY

1. Aditya S. Gunjal*1, Shubham V. Erande*2, Pavan R. Shelge*3(1,2,3Computer Engineering, SGOI's COE, Belhe /SPPU, Pune,India.)2024 IJCRT- volume:06/Issue:05/May-2024- e-ISSN: 2582-5208

“This project focuses on designing a Smart Movable Road Divider system to help emergency vehicles like ambulances navigate through heavy traffic quickly and efficiently. The system involves using movable road dividers that automatically shift to create a clear lane when an ambulance is detected, allowing it to pass through without delay. Using technologies such as sensors and automated controls, the divider can adjust in real time based on traffic conditions. Besides ambulance clearance, the system also aims to improve general traffic flow, reducing congestion and making roads safer. This smart traffic management solution will save critical time for emergency responders while optimizing overall road use.”

2. 1. Mrs G .Anitha Chowdary (Associate professor) 2. N. Ganesh 3. M. Venu 4.M. Ranjith Kumar (2,3&4-Students of Btech, ECE Department-Tkrcollege of engineerand Technology)2023IJCRT Volume 11, Issue 4 April 2023 | ISSN: 2320-2882

“This project focuses on developing a **Movable Road Divider** system equipped with IoT-based monitoring to enhance traffic control and management. The divider can dynamically shift its position to optimize traffic flow based on real-time conditions. By integrating IoT technology, traffic data such as vehicle density, speed, and road congestion can be monitored and analyzed remotely. The system allows for efficient traffic management, especially during peak hours or emergencies. IoT connectivity enables real-time monitoring and control, providing authorities with valuable insights for better decision-making. This smart solution aims to reduce traffic congestion, improve road safety, and enhance overall traffic efficiency.”

3. 3. 1.Prof.Varshitha N Gowda, 2Adithya M , 3Darshan B S , 4Jayanth J , 5Shobith R 1 Assisntant Professor,Department of Electrical and Electronics Engineering 23 4 5Students, Department of Electrical and Electronics engineering Volume 11, Issue 5 May 2023 | ISSN: 2320-2882

“This project introduces an Automatic Movable Divider designed to improve traffic management by dynamically adjusting road lanes based on real-time traffic conditions. The divider can automatically shift its position to create additional lanes during peak traffic hours or emergencies, helping to reduce congestion and optimize the flow of vehicles. Using sensors and automated controls, the system monitors traffic density and adjusts the divider accordingly. This solution enhances road efficiency, provides flexible lane usage, and improves overall traffic safety by adapting to varying traffic demands throughout the day”

III. Proposed System

The proposed system is briefly explained using the flow chart as shown in fig

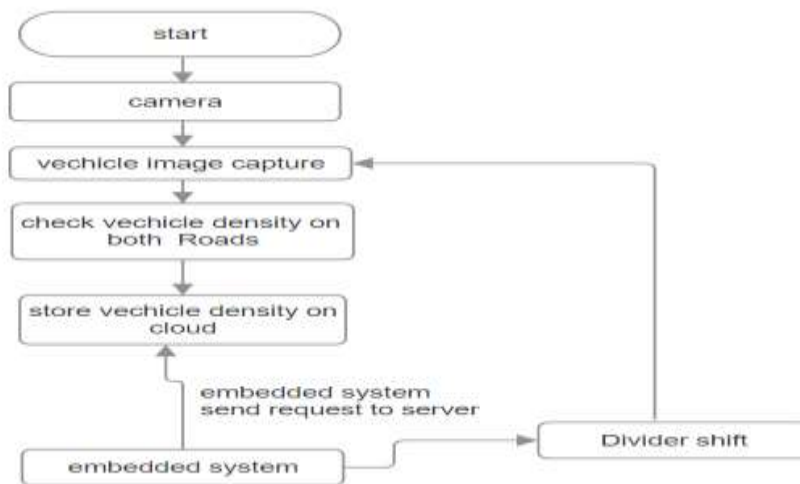


Figure 1 . flowchart

IV. RESEARCH METHODOLOGY

Traffic Management System-

Real-time Data Collection: Sensors constantly gather information about the current traffic situation, including vehicle locations and speeds, as well as the position of the divider

Emergency Request: When an emergency service, such as an ambulance, needs to pass through the area, they send a request to the Traffic Management System (TMS).

Priority Assessment: The TMS evaluates the urgency of the request based on factors like the type of emergency vehicle and the potential impact on traffic flow.

Divider Control Decision: Considering the priority level of the request and the current traffic conditions, the TMS determines whether to move the divider and in which direction.

Divider Movement: If the decision is made to move the divider, the control system sends signals to the actuators, which then physically reposition the divider.

Monitoring and Feedback: The system continuously tracks the divider's position and traffic flow to ensure it's operating correctly. Operators can view this information in real-time through the user interface.

System Optimization: By analyzing data from sensors and user feedback, the system's algorithms can be improved over time to make decisions more efficiently and effectively

V. OBJECTIVE OF SYSTEM

1. Enhance Emergency Response:

- Reduce Response Times: Facilitate the rapid passage of emergency vehicles, such as ambulances, fire trucks, and police cars, to critical incidents.
- Improve Patient Outcomes: By reducing response times, the system can contribute to improved patient outcomes, especially in time-sensitive medical emergencies.

2. Optimize Traffic Flow:

- Minimize Congestion: Reduce traffic congestion by efficiently managing the movement of the divider, preventing unnecessary disruptions to traffic flow.
- Improve Traffic Efficiency: Enhance the overall efficiency of the transportation network by optimizing the use of road space.

3. Enhance Road Safety:

- Prevent Accidents: Reduce the risk of accidents by creating safe zones for emergency vehicles to pass through, minimizing the potential for collisions.

- **Protect Vulnerable Road Users:** Prioritize the safety of pedestrians, cyclists, and other vulnerable road users by ensuring the divider is operated in a safe and controlled manner.
- 4. Improve Traffic Management:**
- **Provide Real-time Data:** Collect and analyze real-time traffic data to inform decision-making and optimize traffic flow.
 - **Enable Proactive Traffic Management:** Use predictive analytics to anticipate traffic congestion and proactively adjust the divider's position to mitigate its impact.
- 5. Enhance Public Safety:**
- **Support Law Enforcement:** Assist law enforcement agencies in responding to emergencies and maintaining public order.
 - **Contribute to Community Safety:** Improve overall community safety by facilitating the timely response to incidents and reducing traffic-related risks.

VI. RESULTS AND DISCUSSION

The Smart Movable Road Divider has demonstrated significant potential in improving emergency response and traffic management. By dynamically creating clear paths for ambulances, it has reduced response times and enhanced patient outcomes. Additionally, the divider has contributed to more efficient traffic flow and increased safety on roadways. While challenges such as integration and maintenance exist, the overall benefits of this innovative technology make it a promising solution for enhancing urban transportation and emergency preparedness.

VII. CONCLUSION

The development of a Smart Movable Road Divider offers a valuable solution for improving emergency response and traffic management. This innovative system can efficiently facilitate the passage of ambulances through congested areas, enhancing safety and reducing response times. It represents a significant step forward in modernizing traffic management and ensuring timely emergency assistance.

VIII. FUTURE SCOPE

1. Advanced Sensor Technology:

- **Enhanced Detection:** Incorporating more sophisticated sensors (e.g., LiDAR, radar, and computer vision) can improve the detection of approaching vehicles, especially in low-visibility conditions.
- **Real-time Traffic Analysis:** Advanced sensors can provide real-time data on traffic flow, allowing for more intelligent and adaptive divider control.

2. Artificial Intelligence and Machine Learning:

- **Predictive Analytics:** Utilizing AI and ML algorithms can help predict emergency situations, enabling proactive divider movements to clear paths before ambulances arrive.
- **Optimization:** AI can optimize divider movements based on historical data and real-time traffic conditions, minimizing disruptions to traffic flow.

3. Integration with Other Transportation Systems:

- **Connected Vehicles:** Integrating with connected vehicle technology can enable direct communication with ambulances, allowing for more precise and timely divider control.
- **Traffic Management Systems:** Seamless integration with existing TMS can optimize traffic flow across the entire network, not just near the divider.

4. Energy Efficiency and Sustainability:

- **Solar Power:** Implementing solar panels to power the divider can reduce its environmental impact and lower operational costs.
- **Energy-Efficient Actuators:** Developing more energy-efficient actuators can further contribute to sustainability.

The development of a Smart Movable Road Divider offers a valuable solution for improving emergency response and traffic management. This innovative system can efficiently facilitate the passage of ambulances through congested areas, enhancing safety and reducing response times. It represents a significant step forward in modernizing traffic management and ensuring timely emergency assistance.

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