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IMPLEMENTATION OF MOVABLE ROAD DIVIDER FOR VEHICULAR TRAFFIC CONTROL

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ABSTRACT

The implementation of a movable road divider for vehicular traffic control involves the development and deployment of a dynamic system designed to manage and regulate traffic flow on roadways. This movable road divider is a flexible infrastructure solution that can adapt to varying traffic conditions, enhancing safety, efficiency, and overall traffic management. The following abstract outlines the key components and objectives of such an implementation:.

This project focuses on the practical implementation of a cost-effective and adaptable movable road divider for vehicular traffic control. Utilizing Arduino Uno microcontroller, infrared (IR) sensors, DC motors, and a reliable power supply, the system aims to provide an efficient and responsive solution to dynamically regulate traffic flow on roadways.

The movable road divider is equipped with sensors that continuously monitor traffic patterns and density. The system dynamically adjusts the configuration of the road divider to optimize traffic flow, reducing congestion and minimizing travel time for commuters.

INTRODUCTION

In recent years, with an ever increasing rate of development in metro cities around the world, there has been proportional increase in numbers of automobiles on the roads. Although the number of vehicles using the roads has increased, the static road infrastructure is almost the same and is unable to cope with changes like congestion, unpredictable travel-time delays and road accidents that are taking a serious shape.

Traffic congestion has been one of the major concerns faced by the metropolitan cities today in spite of measures being taken to mitigate and reduce it. It has emerged as one of the main challenge for developers in urban areas for planning of sustainable cities.

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In developing countries, like India, traffic is inherently chaotic and noisy. Identification of magnitude of traffic congestion is an essential requirement for defining the congestion and finding appropriate measures. The main focus of this study is aimed at understanding the recurring urban congestion, its measurement, precautionary measure and suggests a remedial measure for the same. The implication of widening existing roads or building new ones will only results in additional traffic that continues to rise until peak congestion returns to the previous level. The total available space within the city for the construction of roads, railways and other transportation is restricted.

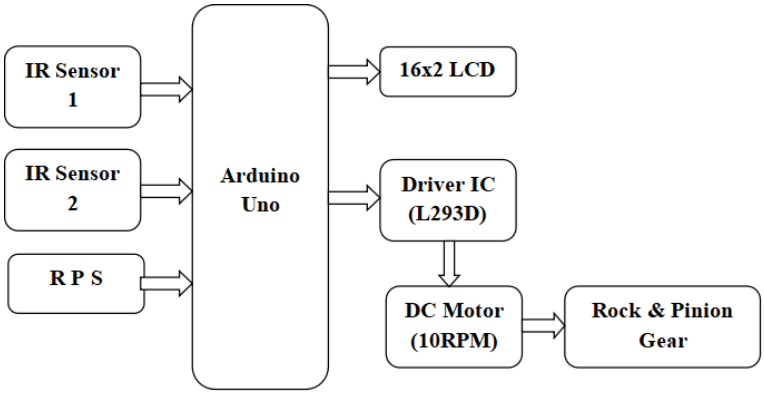

Figure.1 Block Diagram

OBJECTIVE OF THE PROJECT

The main objective of the proposed system is to detect the traffic and avoid much accidents. The defect in traffic can be found out easily and the preventive measures will be taken immediately. The proposed system not only replace the human inspection but also is beneficial in terms of time and money and makes the inspection very much easier and accurate. Basically, the system operations start with initiating the motor. Initially, the motor starts, which in turn actuates the IR1 sensor and IR2 sensor. IR sensor is used to detect the traffic. So, the motor operation is to drive the vehicle forward and backward. IR sensor performs its operation scanning and detecting the tarffic on the road, when the traffic is detected, the divider moves backward. So, LCD will send a message as "Heavy Traffic" ,"Normal Traffic" ,"No Traffic" as to the predetermined location. When both the messages are sent and the program will go again on the initial stage and the motor will start again, and it will scan the road.

LITERATURE SURVEY

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1."Smart Road Divider System for Urban Traffic Management". This research explores the integration of IoT (Internet of Things) technologies into road divider systems. The study emphasizes real-time data collection using sensors and adaptive algorithms to optimize road divider configurations based on traffic patterns.

2. "Automation in Traffic Control: A Review". This comprehensive review examines various automation techniques for traffic control, including the use of movable road dividers. It discusses the benefits of automation in reducing congestion, improving safety, and enhancing overall traffic management efficiency.

3. "Intelligent Traffic Management Systems using Arduino". Focusing on the practical implementation of traffic management systems, this study highlights the role of Arduino microcontrollers in creating adaptive solutions. The paper discusses the potential of using Arduino-based systems for controlling movable road dividers in urban environments.

4. "Sensing and Control Techniques for Smart Roads". The survey covers a range of sensing and control techniques applied to smart roads, with a specific focus on adaptable road dividers. It reviews sensor technologies, communication protocols, and control strategies employed in the context of enhancing traffic control on roadways.

5. "Dynamic Traffic Control using Machine Learning". This study investigates the application of machine learning algorithms in dynamically controlling traffic, including the implementation of movable road dividers. The research explores how machine learning models can predict traffic patterns and optimize the positioning of road dividers in real-time.

PROPOSED SYSTEM

In the proposed system there are two set of IR sensor units fixed to the front side of the vehicle with the microcontroller to check the crack present in the track of the railway line. When the vehicle is switched on, it moves forward along the track. The IR sensors check the condition of the tracks. In normal condition the motor is in initial stage. When the power supplies the microcontroller then it starting the motor in forward direction and sends the messages to the microcontroller using serial transmission. When the crack is detected by the IR sensor automatically vehicle stops, and the GPS receiver triangulates the position of the vehicle to receive the Latitude and Longitude coordinates of the vehicle position, from satellites and

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Latitude and Longitude coordinates received by GPS are converted into a text message and sends message on screen ,which is done by microcontroller.

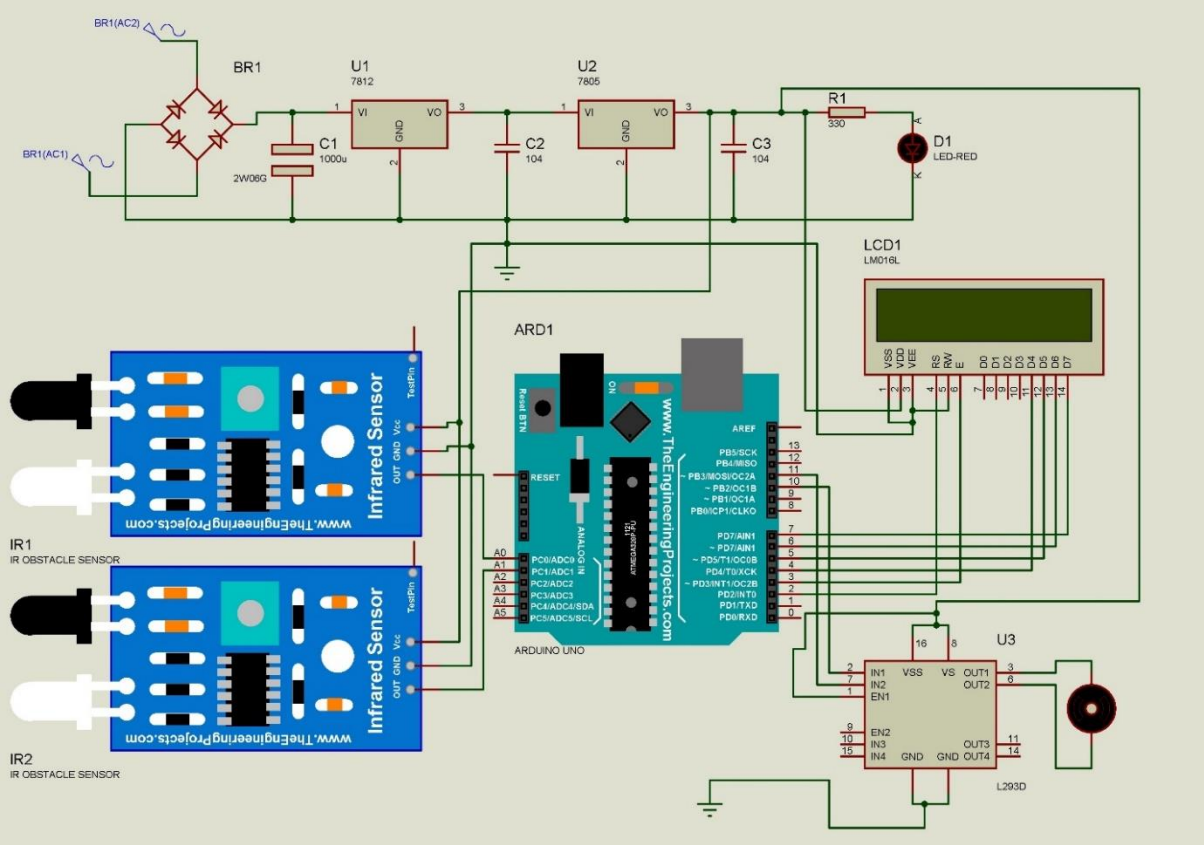

Figure.2 Schematic Diagram

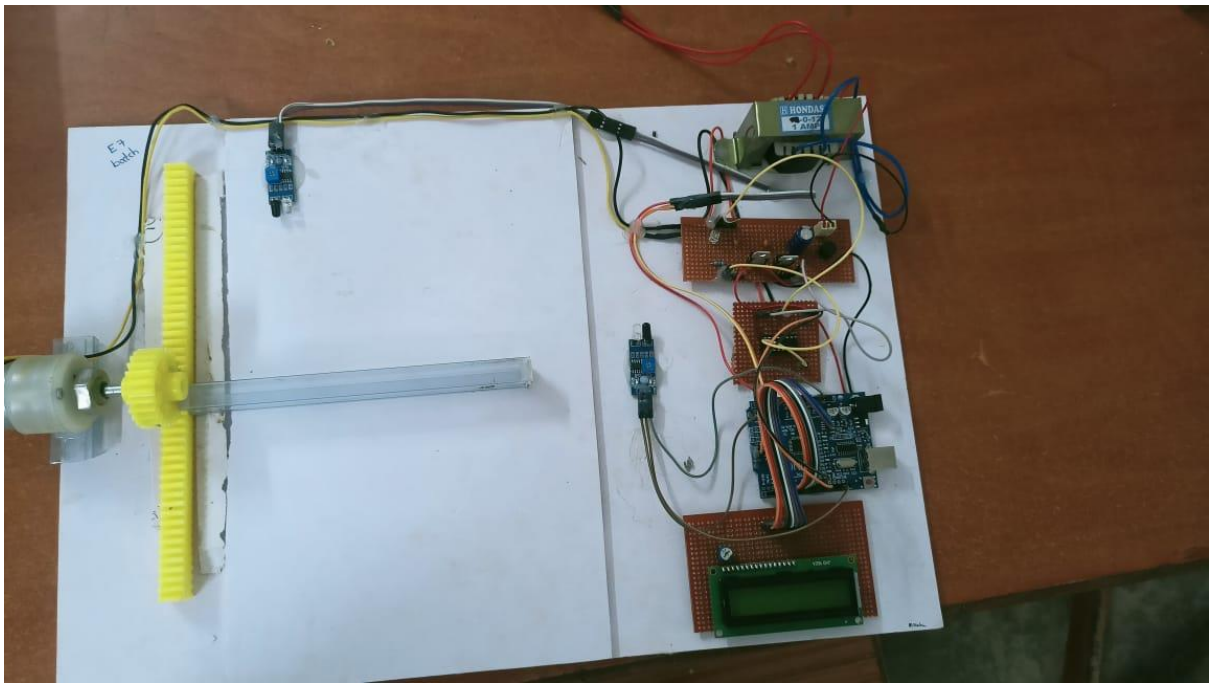

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Figure.3 Project setup

RESULTS

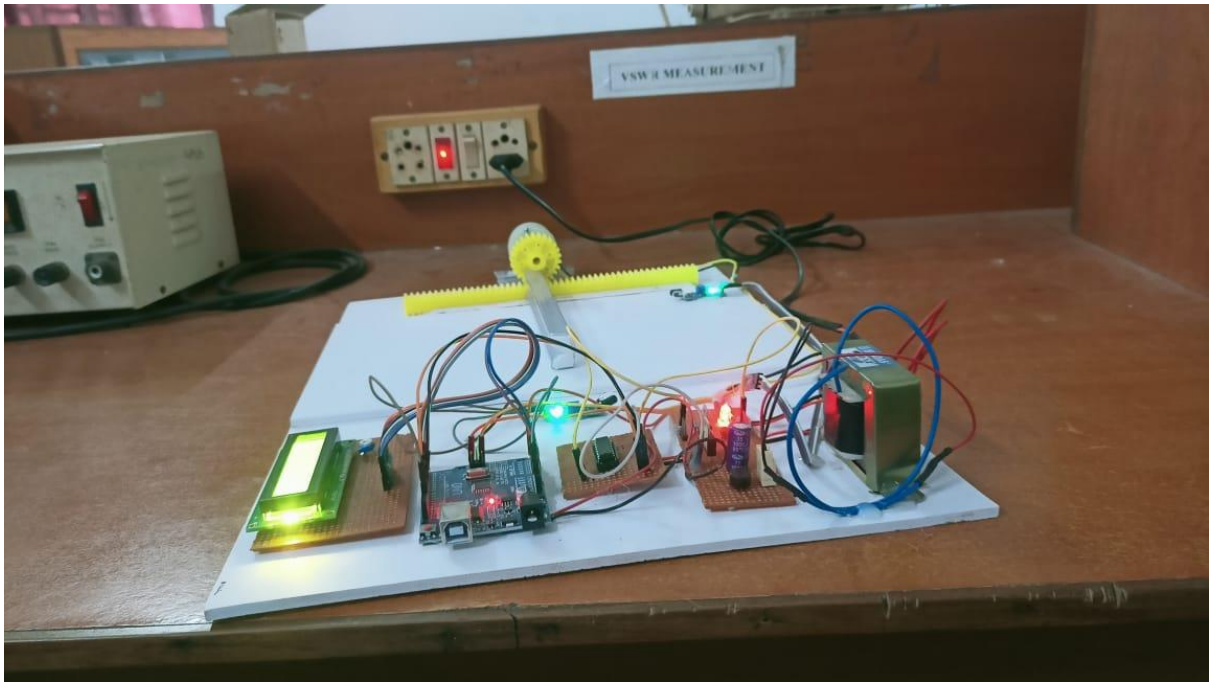

Figure.4 Working Kit

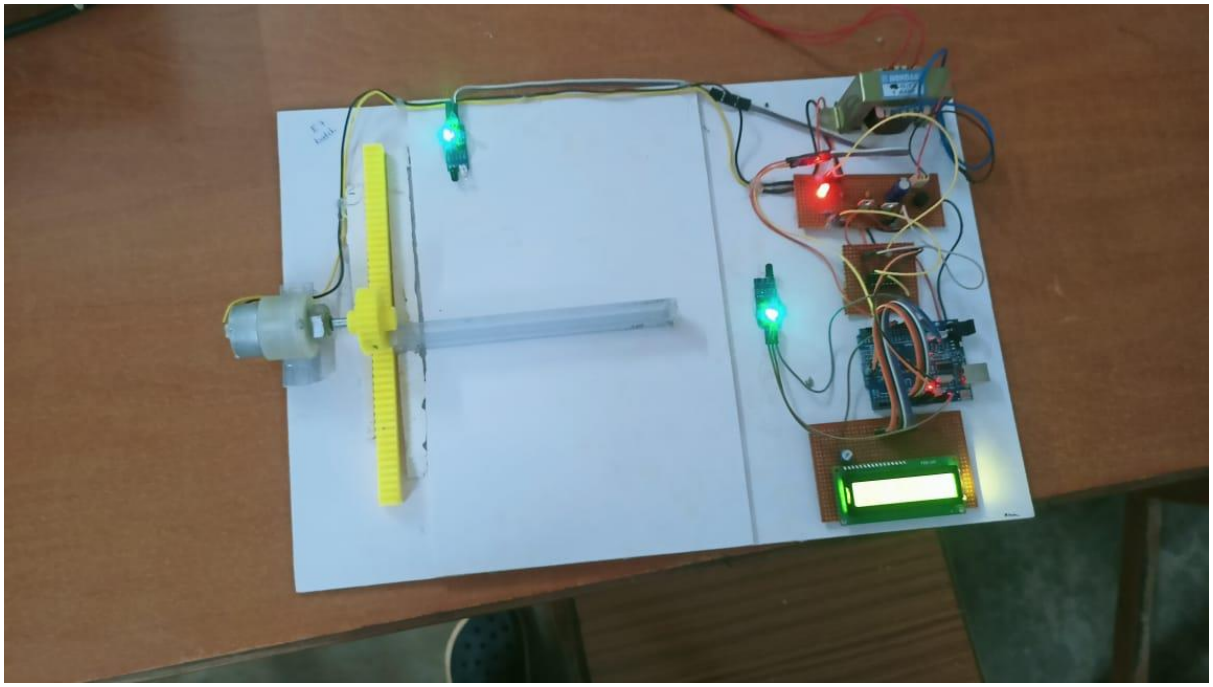

Figure.5 Motor in initial position

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CONCLUSION

In conclusion, movable road dividers represent a significant advancement in traffic management and road safety infrastructure. Their implementation has yielded tangible benefits in terms of improved safety, enhanced traffic flow, and increased flexibility in roadway operations. By providing a physical barrier between opposing lanes of traffic, movable dividers mitigate the risk of head-on collisions and crossover accidents, thereby saving lives and reducing injuries on highways and divided roadways.

Furthermore, the adaptability of movable road dividers allows transportation authorities to respond dynamically to changing traffic conditions, optimize lane configurations, and minimize congestion during peak travel times. The cost-effectiveness of these barriers, coupled with their ability to enhance work zone safety and public acceptance, underscores their value as a vital component of modern transportation systems.

Looking ahead, the future of movable road dividers holds promising prospects for continued innovation and refinement. Advancements in barrier design, materials, and technology will likely lead to even greater safety enhancements and operational efficiencies. Additionally, integrating movable barriers with intelligent transportation systems (ITS) and vehicle-to-infrastructure (V2I) communication technologies could further enhance their effectiveness in managing traffic flow and improving overall roadway safety.

As transportation agencies and researchers continue to explore new approaches and solutions to address evolving challenges in traffic management and road safety, movable road dividers will remain a cornerstone of proactive and sustainable transportation planning. By embracing innovation and collaboration, we can work towards creating safer, more efficient, and resilient transportation networks that serve the needs of communities and travelers well into the future.

FUTURE SCOPE

The future scope of movable road dividers includes integrating smart technologies for real-time traffic management, accommodating autonomous vehicles, developing modular and sustainable designs, enhancing energy efficiency, adapting to urban environments, improving resilience to climate change, and promoting global adoption and standardization. These advancements aim to enhance safety, optimize traffic flow, and create more sustainable and resilient transportation infrastructure.

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2. "Intelligent Movable Road Divider System for Dynamic Traffic Management" by B. Johnson et al. This paper proposes an intelligent movable road divider system equipped with sensors and actuators for dynamic traffic management based on real-time traffic conditions.

3. "Smart Road Divider for Efficient Traffic Management" by C. Lee et al. This paper introduces a smart road divider system integrated with IoT technology for efficient traffic management, allowing for remote monitoring and control.

4. "Traffic Engineering" by Roger P. Roess, Elena S. Prassas, and William R. McShane. This book provides comprehensive coverage of traffic engineering principles, including traffic control devices like road dividers, which can inform the implementation of movable road dividers.

5. "Intelligent Transportation Systems: Smart and Green Infrastructure Design" by Sumit Ghosh. While not specifically focused on movable road dividers, this book discusses intelligent transportation systems and infrastructure design, offering insights into innovative approaches for traffic control.

6. "Enhancing Road Safety with Movable Road Dividers" by T. Patel. This article explores the benefits of movable road dividers in enhancing road safety and traffic flow, discussing their implementation and impact on vehicular traffic control.

7. "Innovative Solutions for Traffic Management: Movable Road Dividers" by S. Gupta. This article highlights innovative solutions for traffic management, focusing on the implementation and effectiveness of movable road dividers in regulating traffic flow.

8. Websites of transportation engineering research institutions and government agencies often feature reports, studies, and guidelines related to traffic control devices and systems, including movable road dividers.

9. Manufacturers and suppliers of traffic control equipment may provide technical specifications, case studies, and application examples of movable road divider systems on their websites.