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IMPLEMENTATION OF MOVABLE ROAD DIVIDER FOR VEHICULAR TRAFFIC CONTROL

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ABSTRACT

A dynamic system is created and deployed to manage and regulate the flow of traffic on highways when a mobile road divider is used for vehicular traffic management. In order to improve traffic management, safety, and efficiency, this mobile road divider may be adjusted to fit different traffic situations. The following abstract explains the major components and aims of such an implementation:. An economical and versatile mobile road divider for vehicle traffic management is the subject of this project's practical application. The system is designed to provide a rapid and efficient approach to manage traffic flow on roads using an Arduino Uno microcontroller, infrared (IR) sensors, direct current (DC) motors, and a dependable power source. There are sensors installed on the moveable road barrier that keep an eye on the density and traffic patterns all the time. Commuters experience less congestion and shorter travel times as a result of the system's ability to dynamically alter the road divider's design for optimal traffic flow.

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.

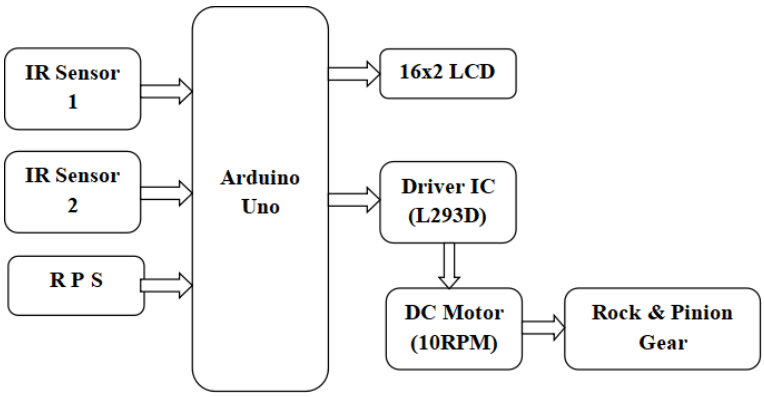

Figure.1 Block Diagram

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

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

Vol 11 Issue 01,Jan 2021
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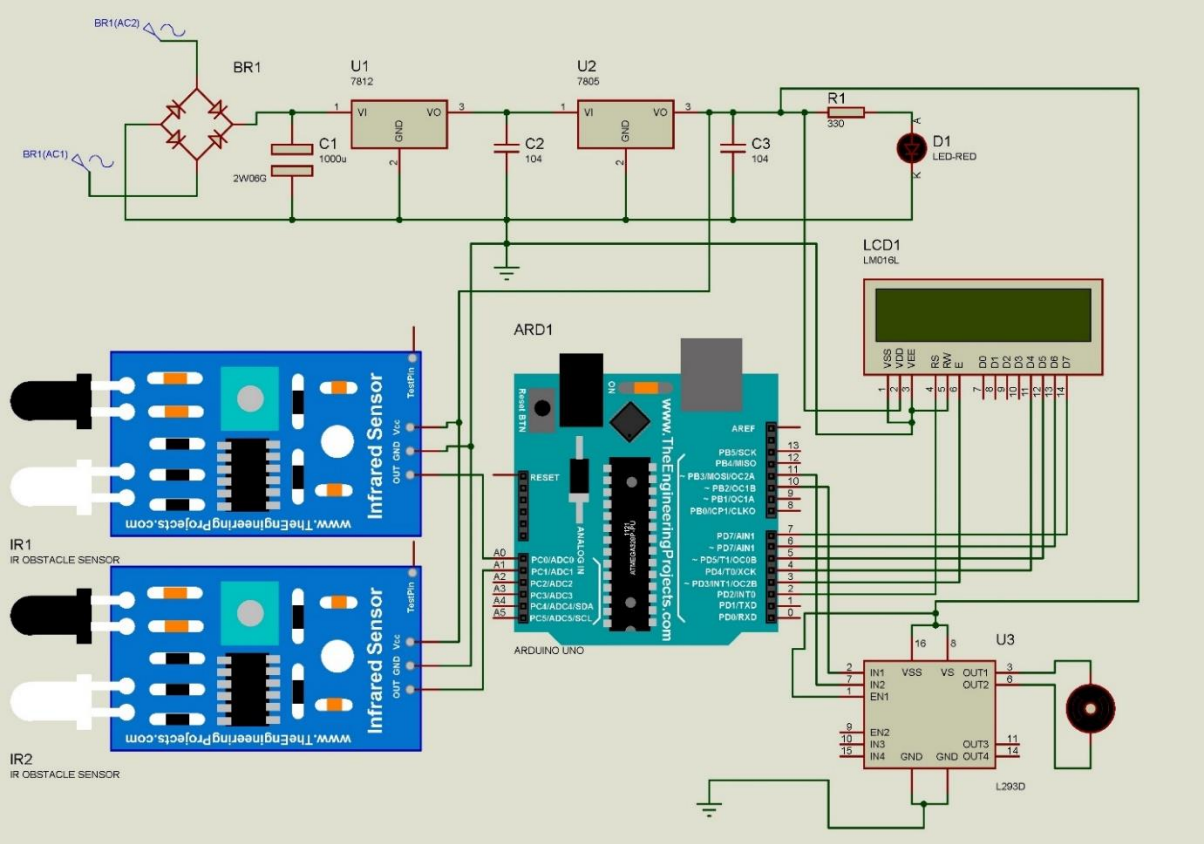

Figure.2 Schematic Diagram

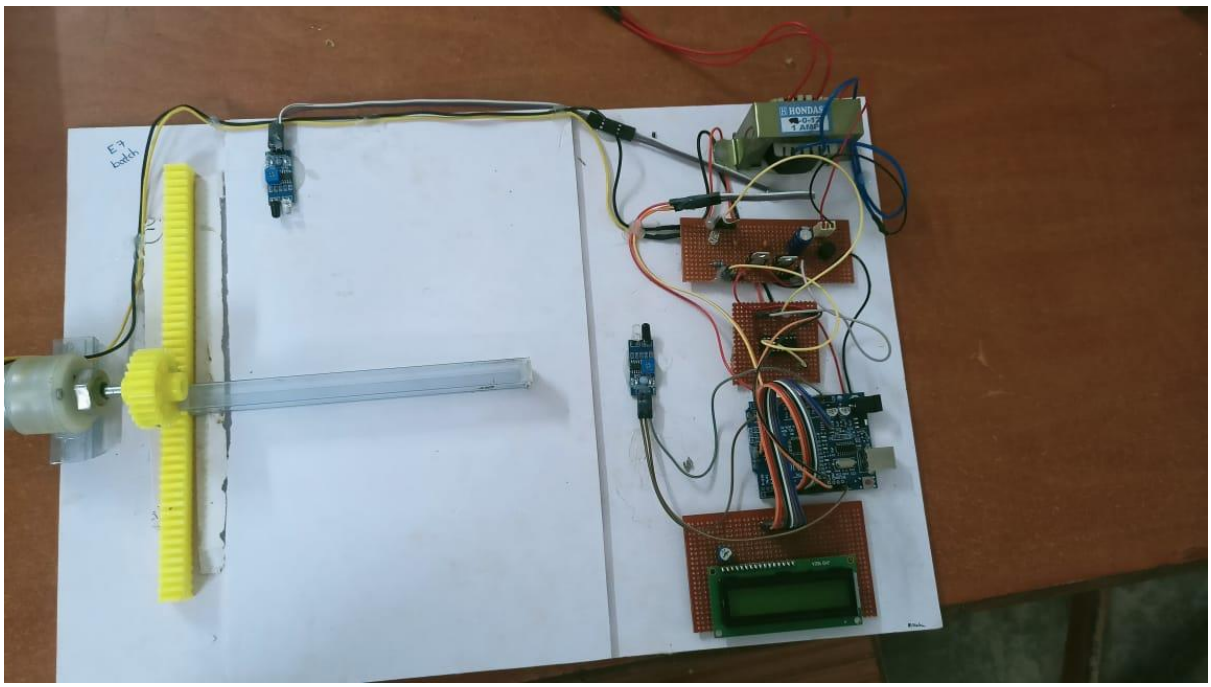

Figure.3 Project setup

Vol 11 Issue 01,Jan 2021
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RESULTS

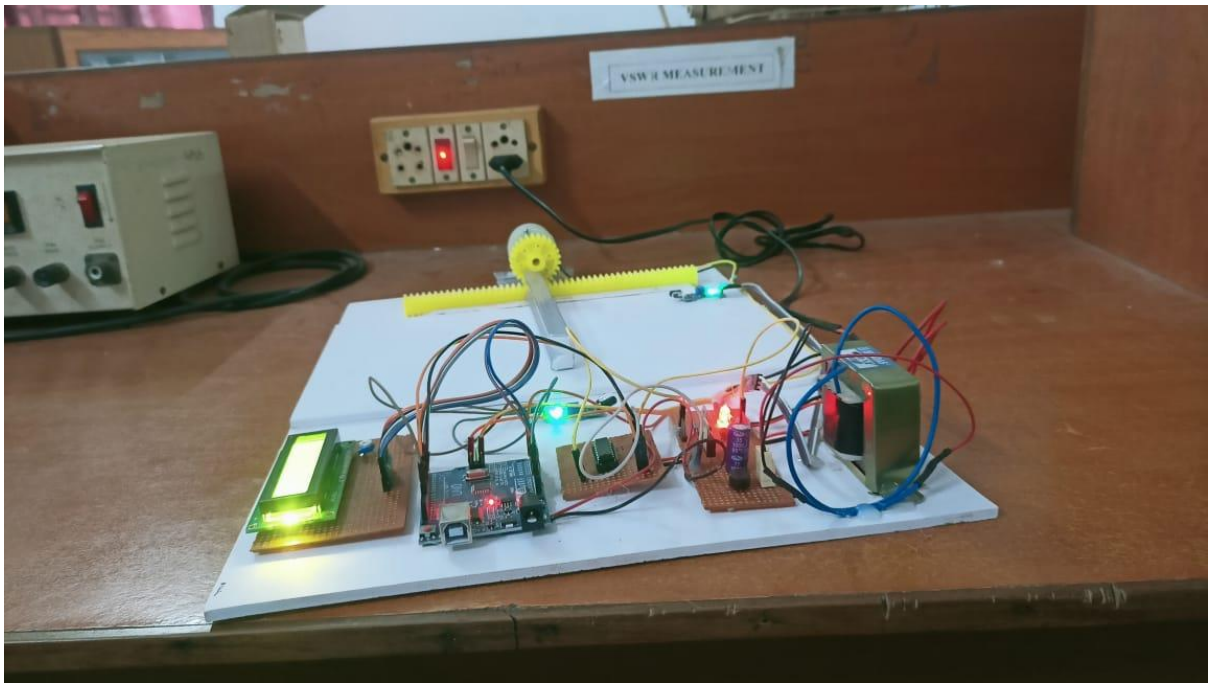

Figure.4 Working Kit

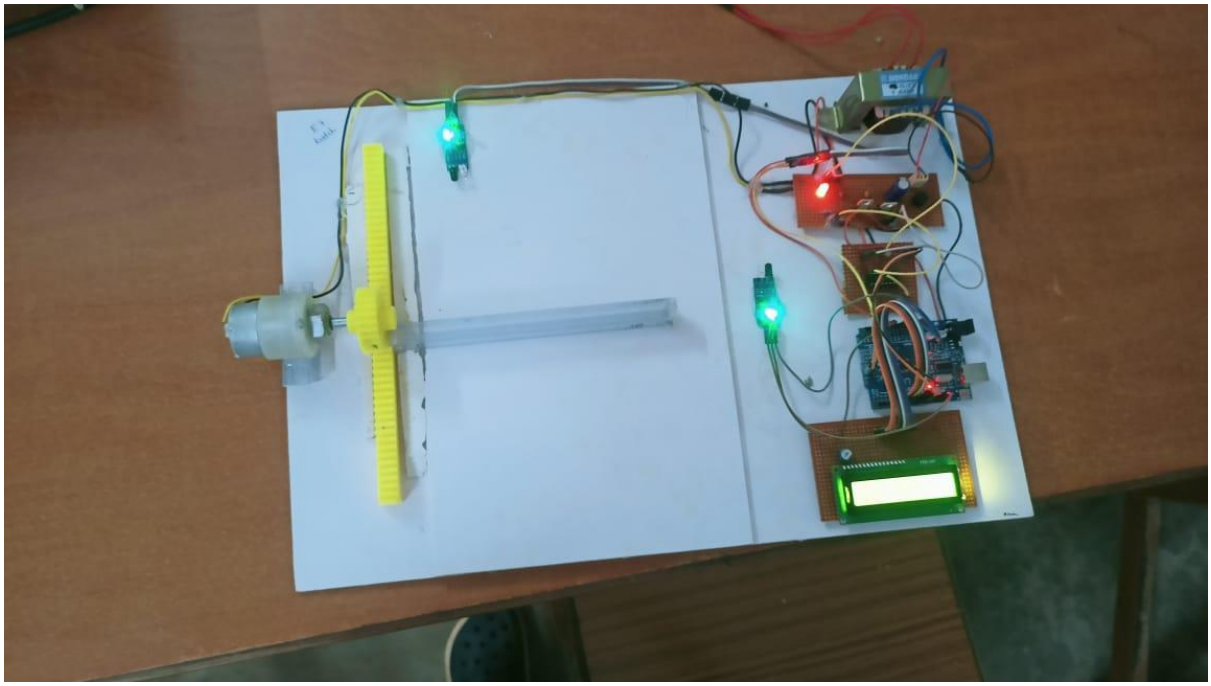

Figure.5 Motor in initial position

CONCLUSION

Finally, portable road dividers are a huge step forward in transportation safety and traffic management. Better safety, smoother traffic flow, and more operational flexibility are some of the concrete advantages that have resulted from their installation. Highways and split roads are safer places to drive because moveable dividers, which physically separate lanes of traffic, reduce the likelihood of head-on collisions and crossover incidents. Additionally, transportation authorities may optimise lane designs, adjust dynamically to changing traffic circumstances, and minimise congestion during peak travel hours with the use of moveable road barriers. Modern transportation systems rely on these barriers because they are cost-effective, improve work zone safety, and are well-received by the public. The future of mobile road dividers seems bright, with plenty of room for improvement and new developments. Even more significant improvements in safety and operating efficiency are projected to result from developments in barrier design, materials, and technology. To further improve their efficacy in traffic flow management and overall highway safety, moveable barriers might be integrated with intelligent transportation systems (ITS) and vehicle-to-infrastructure (V2I) communication technology. Movable road dividers will always be an important part of transportation planning that is both proactive and sustainable, even as academics and organisations look for new ways to handle the ever-changing problems of traffic management and road safety. Embracing innovation and cooperation may help us build transportation networks that are safer, more efficient, and more robust. These networks will meet the requirements of communities and travellers for years to come.

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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.

REFERENCES

1."Design and Implementation of a Movable Road Divider System for Vehicular Traffic Control" by A. Smith et al. This paper presents the design, development, and implementation of a movable road divider system aimed at enhancing traffic control and management.

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.