IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SMART TRAFFIC DENSITY MANAGEMENT AND MONITORING SYSTEM

Prof. Nanditha S R[1], Anusha N M[2], Pallavi S H[3], Aishwarya M[4] and Supriya S[5]

[1]Assistant Professor, Department of Electronics and Communication Engineering, Cambridge Institute of Technology (CITech),Bengaluru, India

[2,3,4,5]Student, Department of Electronics and Communication Engineering, CITech, Bengaluru, India

Abstract: This flexibility upgrades its viability in recognizing and neutralizing landmines in different geological areas, making it a profitable devicefor mine clearance operations around the world. With the use of cutting-edge sensors and technology, the Smart Traffic Density Management and Monitoring System maximizes urban traffic flow. By adjusting traffic lights dynamically in response to real-time density data, it minimizes traffic and travel time. It offers government and commuter interfaces that are easy to use while smoothly integrating with the current infrastructure. Reliability, scalability, and flexibility to shifting traffic conditions are guaranteed by embedded system architecture. The technology also improves safety by pointing out potential dangers and encouraging other forms of transportation during rush hour. All things considered, it's a creative way to successfully control urban traffic and promote sustainable travel.

Keywords: Traffic, congestion, traffic light, vehicles

I. INTRODUCTION

Many large cities across the world suffer greatly from traffic congestion, which has made commuting there a nightmare for residents. The goal of this project is to create a system that tracks traffic and displays the percentage of traffic density, which can be used to provide complete traffic control information. The hardware cost can now be down to 1/10 using this solution. One of the main areas of smart city development that has quickly expanded throughout India is urban transportation. Numerous articles on the application of a smart traffic management system to replace the conventional preset time period system which is mostly responsible for unwelcome traffic congestion have been presented during the past several years. The type of technology and sensors used to determine the traffic density in a particular lane are the main differences between the majority of the previous variants. All of them seek to construct a smarter system by utilizing a variety of sensors and

algorithms to overcome the drawbacks of the conventional system. The various sensors that are commonly used to determine the traffic density include Inductive loop detectors, piezoelectric sensors, ultrasound sensors, infrared sensors, sound sensors, acoustic sensors, image processing algorithms based on real-time camera feed, and other sensors are typically used to determine the traffic density.

II. LITERATURE REVIEW

Effective Data Transmission in Traffic-Traffic Monitoring Cars Writers: Niki Trigoni and Antonios Skordylis (2011) Research is done on the issue of effectively gathering and sharing traffic data in metropolitan areas. Here, they have developed a method for acquiring traffic data and investigated a mobile sensor network solution. Numerous economies around the world suffer greatly from the negative social and economic effects of traffic congestion and pollution. Investments in traffic information processing, distribution, and monitoring, in our opinion, should promote the use of public transportation and better strategic planning, both of which would reduce traffic and pollution. The issue of effectively gathering and sharing traffic data in an urban environment is examined in this research [1]. **Cooperative Vehicle to Vehicle Communications for the Detection of Road Traffic Congestion (2010) Written by: Joaquin Sanchez-Soriano, Javier Gozalvez, and Ramon Bauza** Systems for cooperative vehicles are being developed to enhance traffic control and safety. Efficient management techniques can help reduce traffic congestion on the roads. a greater chance of enhancing traffic efficiency and safety through the ongoing information sharing between cars (known as vehicle-to-vehicle, or V2V communications) and cars and infrastructure nodes (known as vehicle-to-infrastructure, or V2I communications). Cooperative automobiles would then turn into extremely useful mobile sensors that would be used to gather traffic data from infrastructure components positioned throughout the road network [2] . **Intelligent Traffic Management System with Emergency Vehicle Priority N P G Bhavani wrote this in 2018**. In large cities, traffic is the biggest issue. In order to give people a life free from pollution and with tranquil, problem-free driving, traffic regulation becomes more important. The goal of the project is to create a dynamic traffic light system based on density. As soon as the junction's traffic intensity is detected, the signal time automatically adjusts. There is a camera installed in the traffic system. The number of cars in the picture is determined by processing the image that the camera took. Additionally, the camera recognizes the siren and grants emergency vehicles such as ambulances and fire engines the green light. The picture in this article is processed using the masking technique, and discover the number of cars on the route. This algorithm hides the extraneous information and only displays the relevant area of the image [3] . **RFID and Cloud-Based Intelligent Traffic Signal Control System for Ambulance Authors: T. Subha, G. Vijayshri,and B.JananiSaradha (2017)**The primary idea of the paper is to minimize the delay caused by traffic congestion by ensuring a fluid flow that allows the ambulance to arrive at the hospitals on time. When it reaches a traffic light intersection, the micro controller-based RFID technology is utilized to change the traffic lights, perhaps saving a life at a crucial moment. A tiny electrical device called radio frequency identification is made up of an antenna and a small chip. Information on the patient's condition and the ambulance's current lane are included in the tiny chip. This data is retrieved from the RFID location by the traffic signal's RFID reader [4] . **IOT-based smart ambulance s5] IOT-based smart ambulance system Authors: Dattatray Waghole, Omkar Udawant, Nikhil Thombare,**

,and AkashHadke (2017) One of the major problems in India is traffic congestion, which has a significant impact on ambulance services. When ambulances arrive late, patients risk dying, and the frequency of these situations is rising daily. The idea of the "Green Corridor" ensures that patients receive the necessary care on schedule. A number of sensors, including heart rate, blood pressure, and electrocardiogram (ECG) devices, will be used in the smart ambulance to assess various critical indicators. The results of these sensors will be transmitted to the hospital's database in real time, and traffic signals will be controlled using GPRS messages delivered via the cloud. Following the acquisition of vital parameter status, hospital official [5] . **Amit kumar bhakata is the author of density-based dynamic control system (2016) "Density Based Dynamic Control System"** article published His goal was to create a "Density Based Dynamic Control System," in which each junction's signal timing would automatically adjust based on the amount of traffic. For road traffic analysis, the three most important factors are flow, speed, and density of traffic congestion. For the purpose of providing extensive geographical and temporal coverage of the road network, real-time estimate of space mean speed and density is necessary for high-performance road traffic management and control. In order to forecast route loss and connection failure, this research examined the dynamic traffic control system using a radio propagation model. In the final destination information, the author makes recommendations for estimating load traffic on the route to lessen congestion [6].

METHODOLOGY

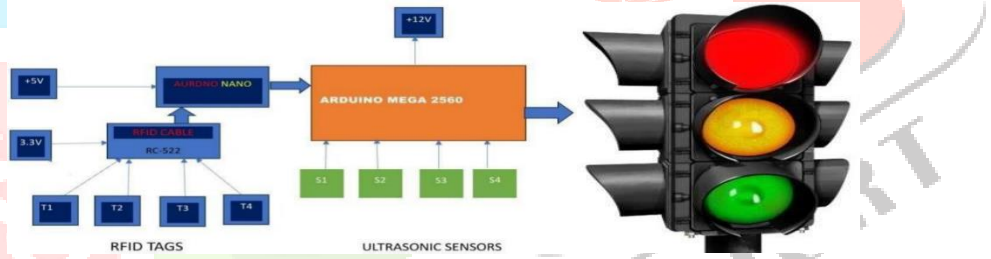

fig 1: Block diagram Smart traffic density management and monitoring system

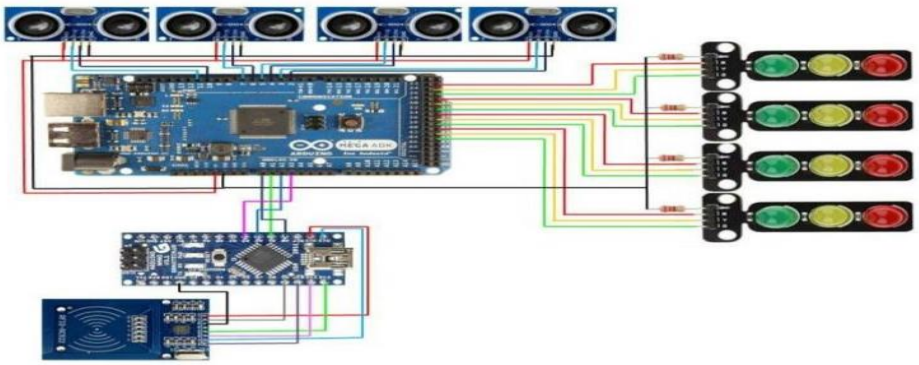

Fig 2 : Circuit diagram Smart traffic density management and monitoring system

Research and Planning: A particular methodology is used in the project for the smart traffic density management and monitoring system that uses Arduino Mega 250 and Arduino Nano.By sending and receiving sound waves,

the ultrasonic sensor interfaced with the Arduino Mega 2560 is crucial for vehicle detection at intersections. At the same time, the Arduino Nano is in charge of integrating an RFID reader, linked by RFID cables, which allows for the distinct identification of vehicles through RFID tags. The methodical hardware integration is described in the paper, along with the exact configuration of sensor connections with the Mega and RFID tag connections with the Nano.The distribution of tasks between Mega and Nano enables effective traffic signal control by utilizing the sensors' real-time data. Using an adaptive algorithm to dynamically modify signal timings in response is one aspect of this. to use RFID data for vehicle prioritizing or access control and information from the ultrasonic sensor to detect traffic density.The incorporation of hardware components, accurate data processing coding, and thorough testing procedures, Thorough examination and verification guarantee the system's dependability and efficiency prior to its possible implementation in real-time traffic situations. The paper emphasizes that rigorous testing, careful coding, and hardware integration are crucial components that guarantee the system's effectiveness and usefulness in controlling traffic density.

RESULTS AND DISCUSSION

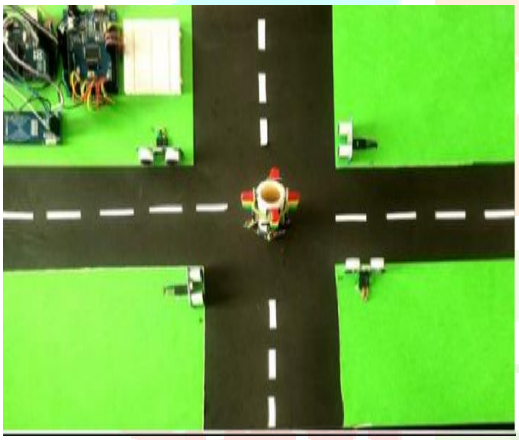

fig 3 model picture

1.During regular traffic, traffic signals use timers or sensors to detect cars, a central controller to time phases, coloured lights for vehicles, and pedestrian signals to regulate junctions by cycling through phases (green for go, yellow for prepare to stop, and red for stop). Together, the control traffic flow and provide security at junctions.

2.Dense traffic Using RFID modules and sensors, the smart traffic density control system keeps an eye on the presence of vehicles. In order to comprehend traffic density and flow, it evaluates this data. Through the analysis of this data, the system is able to better manage and alleviate traffic congestion, resulting in lower density and smoother traffic flow at some locations. It also improves the timing of the lights and may even redirect cars.

3.In the event of an emergency vehicle: Using its sensor and RFID technology, the smart traffic density controller and monitoring system reacts quickly to an emergency vehicle that approaches. The technology immediately modifies traffic signals to allow the emergency vehicle to drive through a green corridor after identifying it. It

talks to emergency services at the same time, sending them real-time traffic information that suggests the quickest path. This concerted effort prioritizes the emergency vehicle's passage through traffic, so clearing the way and minimizing disturbances to other motorists, ensuring the emergency vehicle moves quickly and safely.

The main goals of the suggested smart traffic density management and monitoring system are to increase traffic management effectiveness and better the commuter experience in general. Optimizing traffic flow and minimizing congestion on road networks is the main goal. This goal is accomplished by implementing intelligent traffic management techniques, dynamically adjusting signal timings, and using real-time data to influence decision-making. The system seeks to reduce travel times and enhance overall traffic efficiency by managing traffic flow. Enhancing traffic safety is another major goal. Through real-time monitoring, the system seeks to quickly identify any risks, problems, or accidents. Through the provision of prompt information to emergency services and traffic control authorities, the system enables prompt reactions, leading to effective crisis management.

III. CONCLUSION

To summarize, the combination of RFID modules, ultrasonic sensors, Arduino Mega, and Arduino Nano with a smart traffic density management system provides a complete solution for improving road safety, data collecting, and traffic flow optimization. Through efficient use of these parts, the system can minimize traffic jams and increase overall traffic efficiency by dynamically regulating traffic lights based on real-time density data. Furthermore, the system's capacity for data collection and analysis offers insightful information for well-informed decision-making in traffic management and urban planning. In the end, this creative strategy demonstrates the ability to completely transform urban traffic systems by providing flexible, data-driven solutions to deal with current traffic issues and open the door for safer and more effective road.

Future scope: Public participation ,education,5G connection, and integration of AI and machine learning.

VI. REFERENCE

1. Antonios Skordylis, Niki Trigoni, “Efficient Data Propagation in Traffic-Monitoring Vehicular Network”, IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 12, NO. 3, SEPTEMBER 2021
2. Ramon Bauza, Javier Gozalvez and Joaquin Sanchez-Soriano, “Road Traffic Congestion Detection through Cooperative Vehicle-to-Vehicle Communications”, 4th IEEE Workshop on User Mobility and Vehicular Networks, On-MOVE 2010, Denver, Colorado.
3. R Vani, N Thendral, J C Kavitha, N P G Bhavani, “Intelligent Traffic Control System with Priority to Emergency Vehicles”, IOP Conf. Series: Materials Science and Engineering 455 (2020) 012023
4. B. Janani Saradha, G. Vijayshri, T. Subha, “Intelligent Traffic Signal Control System for Ambulance Using RFID And CLOUD”, 2017 Second International Conference on Computing and Communications Technologies (ICCCT’20)
5. Omkar Udawant, Nikhil Thombare, Devanand Chauhan, Akash Hadke, Dattatray Wag hole, “Smart

Ambulance System using IoT", 2020 International Conference on Big Data, IoT and Data Science (BID) Vishwakarma Institute of Technology, Pune, Dec 20-22, 2020.

6. Amit Kumar Bhakata et al. (2016) aimed at designing a "density based dynamic control system International Journal of Advanced Engineering, Management and Science" (IJAEMS) [Vol-2, Issue-8, Aug-2016] Info gain Publication (Infogainpublication.com).