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RESEARCH ARTICLE

SMART TRAFFIC MANAGEMENT USING IOT

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Abstract

From year to year there is an extended in the number of vehicles on the road that causes heavy traffic. Traffic overcrowding is a growing that everyone is facing in their daily life. To avoid this traffic the manual traffic officer has not proven to be efficient. So, to decrease the traffic we will be using devices to control. The devices such as camera, laser sensor or ultra sonic sensor and raspberry pi. The laser sensor detects the automobiles as it can set signal time rely upon the quantity of vehicles on the road as it can control the traffic and this can be monitored by traffic police just by sitting in a place and they have supervisory role in this traffic management. The city should run smart without any hindrance by applying this kind of devices. The improper maintenance of road and potholes are major cause to road accident which may cause traffic on roads. The traffic overcrowding is because of the large density of automobiles that travels on the road as individuals use their vehicles for travelling short distances instead of using public transport which greatly reduce both pollution and traffic. A traffic management plan typically includes several elements such as identifying the type of traffic present, determining the routes they will take to prevent measures to control traffic flow in a place. Traffic jam fill the streets, road and cause emergency vehicle problem. Sometime it takes about 2 -3 signals time to travel just 1 km. So, this becomes every day routine if we don't take a preventive measure.

Introduction:-

Traffic control management is the design, auditing and implementation of traffic control plans at worksites and civil infrastructure projects. Traffic Management can be included: flagging, lane closures, full freeway closures, pedestrian access, traffic plan and side walk closures.

The traffic overcrowding is a problem everyone is facing in the everyday life that overcomes a city development, Soto succeed in controlling above problems we will be using devices like camera, ultrasonic sensor and raspberry pi. Without using this component, we can't think of traffic management. There are many ways to overcome these problems, so we are using this type of devices to manage the traffic to overcome this problem.

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So, we will be going ahead of this smart traffic controls that includes smart system with some known components i.e. camera, ultrasonic sensor or laser sensor that inputs the large digit of vehicles as it can set signal time as if the output will be given by raspberry pi. This can be monitored and controlled by traffic police. Such devices receive traffic data that minimizes the heavy traffic.

Fig. 1.1:- Traffic Stock for Vehicle.

This system will also control the traffic by sensing the traffic density. The system deals with an innovative idea of IOT based traffic monitoring and controlling system.

The improper maintenance of road and potholes are major cause to road accident which may cause traffic on roads. The traffic overcrowding is due to the number of vehicles that runs on the road as individuals travel with their vehicles for travelling short distances instead of using public transport which greatly reduce both pollution and traffic. This is the major causes for the traffic overcrowding that people are facing in their every-daily life as they reach late to the place because of the heavy traffic. So we have come with an idea to solve this problem in a simple way as it can help people by using the above said devices.

It is very important the traffic flow on roads should be efficient safe and rapid. Traffic controlling includes the techniques that use to make movement of goods and humans become easier by using the existing road and direct road users towards a safer and more efficient of other existing infrastructure and also improve environment.

IoT is an environment of smart device which are always, anywhere while sending and receiving some data or information which can further be processed to generate meaningful analytical result. IOT as two main parts: Internet being the backbone of connectivity, things meaning object or devices. With the increasing number of vehicles owned by individuals, traffic overcrowded is an ever-rising problem.

Out of my many various reasons for traffic overcrowded, vehicles waiting for a longer time at a signal light also contribute significantly for the same. Emergency vehicles blocked by such huge traffic can put one's life in danger. There is currently no mechanism available for the clearance of traffic in the event of emergency. The existing system of manual control of traffic or predefined time for change traffic lights are insufficient.

This paper proposes a solution to solve the both traffic management using IOT controllers and also aims at providing priority to emergency vehicle stuck in the traffic.

Literature Survey:-

Internet of things can also be referred as internet of everything. A literature survey on traffic management involves reviewing existing research on topics related to traffic control, optimization and technology integration. Key areas

include smart traffic system, machine learning applications, dynamic signal control, integrated urban management, emerging technologies, crowd sourcing and sustainable approaches.

Researchers explores this domain to enhance traffic flow, reduce congestion(overcrowding) and improve overall transportation efficiency. In many cases, emergency patients need immediate treatment and will be hospitalize as soon as possible to beat this problem this paper focus on building a system which will ready to communicate signs and emergency vehicle. By intelligent traffic signal system.

The emergency vehicle reaches a particular distance, the signal will automatically detect the emergency vehicle and if there are other vehicle then the signal is going to be turned green, other road signs or red signal which can make traffic free. In this manner, the emergency vehicle will easily pass the traffic and once it passes the signal, all signal be back to normal.

Smart traffic system provides an overview of incorporating technologies like IOT and data analytics. Traffic flow modeling and control explores various mathematical models for understanding and controlling traffic flow. Crowd sourcing for traffic management explores the potential of crowd sourced data for real-time traffic monitoring and management.

Problem Statement:-

The improper maintenance of road and potholes which may cause to road accidents which leads to traffic.In our bustling cities, the increasing in number of automobiles has led to chaotic traffic conditions, causing delays, frustration, and safety concerns. The challenge is to develop effective and user-friendly solutions for managing traffic flow, reducing traffic overcrowding, and enhancing overall transportation efficiency, such as universities and hospitals face heavy traffic during peak hours this causes for the traffic overcrowding that people are facing in their every-daily life as they reach late to the place because of the heavy traffic.

Fig.3.1:- General Traffic Problem for Smart Cities.

Addressing the escalating issue of urban traffic congestion, the problem lies in developing pragmatic strategies and technologies that efficiently regulate traffic flow, minimize bottlenecks, and enhance overall transportation effectiveness, ultimately aiming to improve commuter experience and safety.

Proposed Solution:-

Introducing an intelligence of traffic system that uses real-time data to adjust traffic signals, ease congestion, and offer efficient routes, ensuring smoother and safer journeys for all commuters.

Traffic police can control and monitor sitting in a place. Such systems collect real-time traffic data and minimize the heavy traffic as a part road overcrowded.

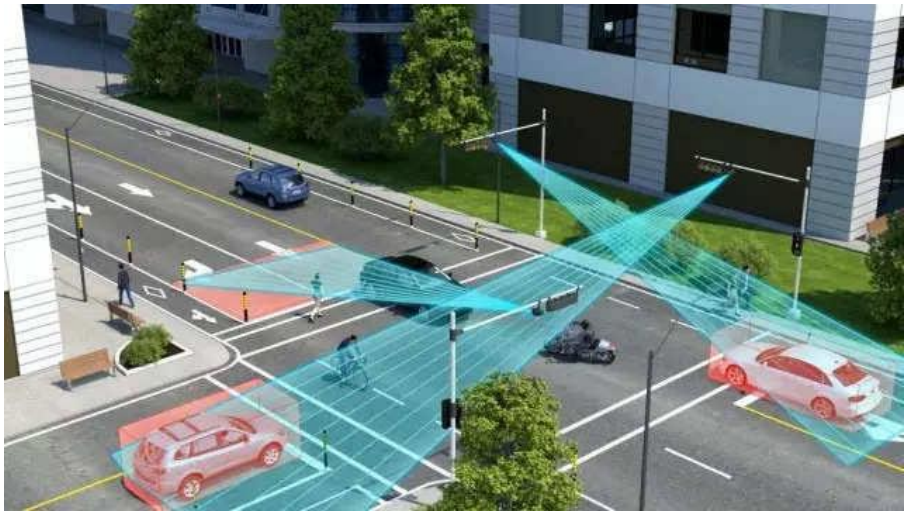

Fig.4.1:- Smart Traffic Management System.

Implementing an integrated traffic management system that leverages real-time data, smart traffic signals, and adaptive algorithms to dynamically optimize signal timings, reroute traffic during peak hours, and provide actionable insights for authorities. This solution aims to enhance traffic flow, reduce congestion, and improve overall urban mobility.

So we will be going ahead that includes smart system with integrated components i.e. camera, ultra sonic sensor or laser sensor that input the total number of vehicles as it can set signal time as if the output will be given by raspberry pi. This can be controlled by traffic police by sitting in a place. This is the major causes for the traffic overcrowding that people are facing in their every-daily life as they reach late to the place because of the heavy traffic.

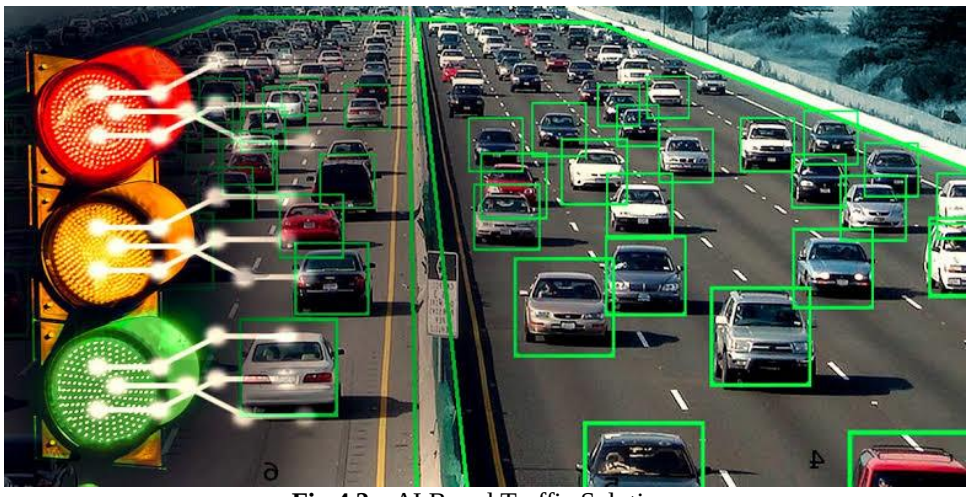

Fig.4.2:- AI Based Traffic Solution.

This system will also control the traffic by sensing the traffic density. The system deals with an innovative idea of IOT based traffic monitoring and controlling system.

Design:-

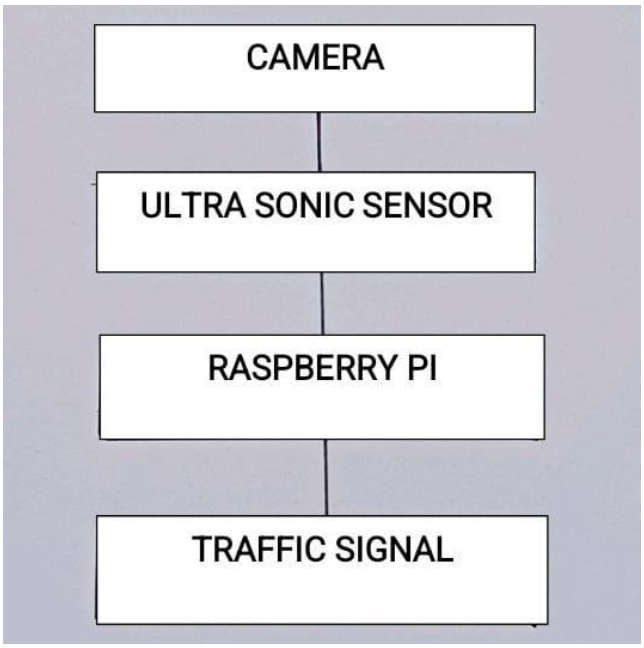

Fig. 5.1:- Block Representation Smart Traffic Management.

Working:-

The smart traffic system with some known components i.e. camera, ultrasonic sensor or laser sensor that inputs the large digit of vehicles as it can set signal time as if the output will be given by raspberry pi. This can be monitored and controlled by traffic police. Such devices receive traffic data that minimizes the heavy traffic.

Fig.6.1:- Camera Installation.

Fig.6.2:- Ultrasonic sensor.

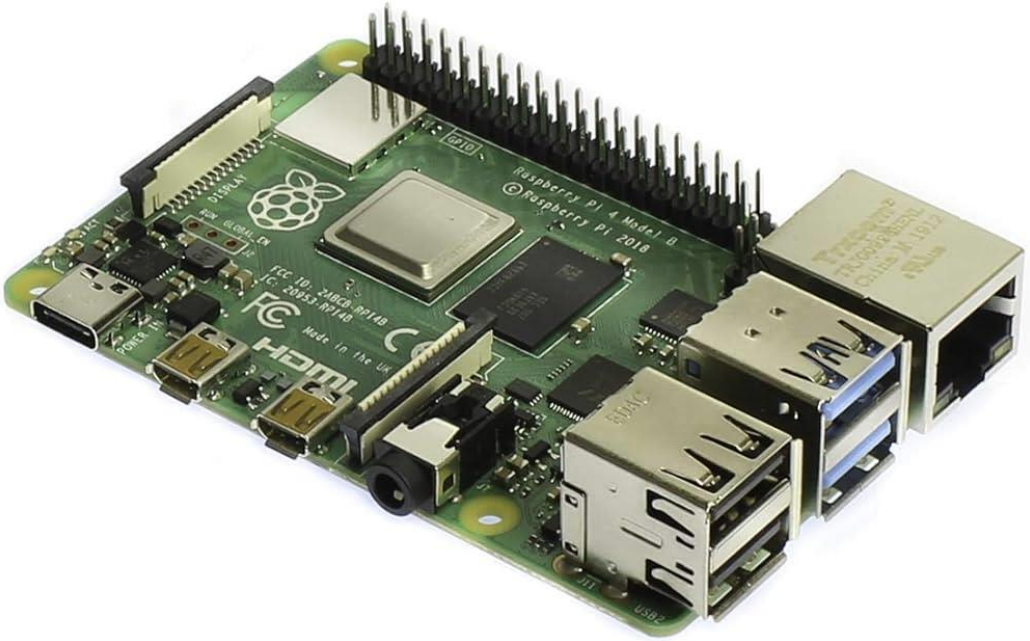

Fig6.3:- Raspberry PI.

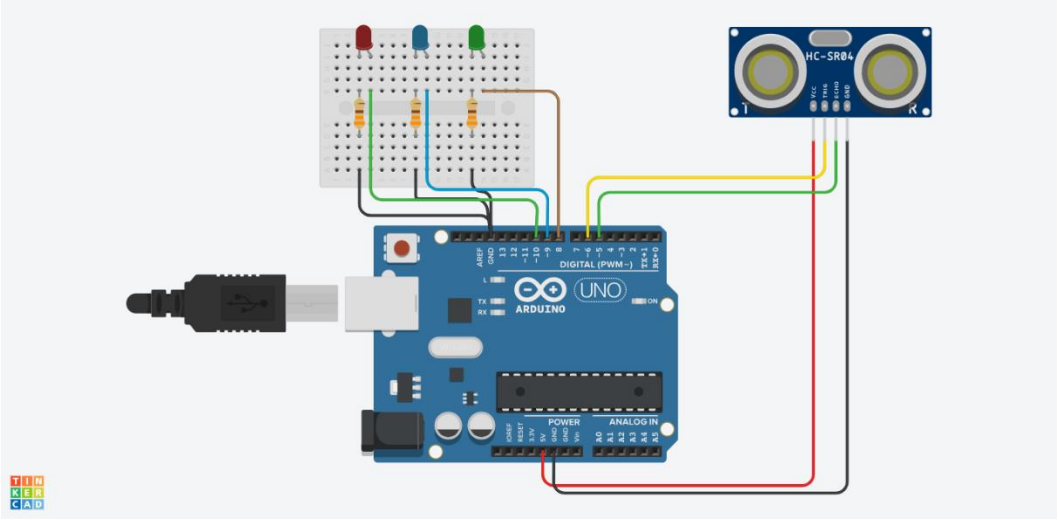

Fig 6.4(a) Output of ultrasonic sensor before execution

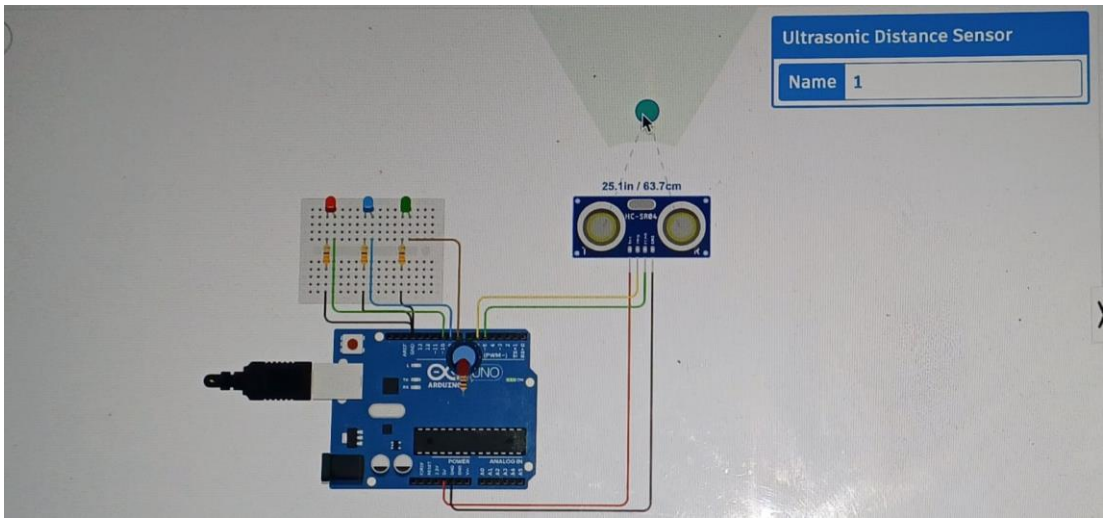

Fig 6.4(b) Output of ultrasonic sensor using LED lights

The ultrasonic sensor is executed by the components like breadboard, LED, Arduino and with the help some structural codes the LED light is blown by ultrasonic sensor and based on the size of the distance the three led light will ON or OFF according to their measured distances.

Conclusion:-

In conclusion, traffic management is crucial for addressing urban congestion and enhancing transportation systems. Integrating advanced technologies, such as smart traffic lights, real-time monitoring, and data analytics, can lead to improved traffic flow, reduced delays, and increased overall safety. Sustainable solutions and community for successful traffic management, ensuring the areas evolve with the ever-changing dynamics of transportation.

Implementing technologies for traffic management can significantly enhance overall efficiency and safety. Smart traffic lights, real-time monitoring, and predictive analytics contribute to smoother traffic flow, reduced congestion, and improved response to emergencies. However, successful implementation requires a comprehensive approach, considering infrastructure, data security, and public acceptance. Ongoing advancements in technology offer promising prospects for further optimizing traffic management systems.

Future Scope:-

The future of traffic management holds exciting prospects as technology continues to advance. Autonomous vehicles, connected infrastructure, and machine learning algorithms are likely to play pivotal roles. Integration of real-time data from various sources, including smart sensors and GPS-enabled devices, will enable dynamic traffic optimization. Additionally, the appearance of 5G connectivity may enhance communication between vehicles and infrastructure, further improving traffic efficiency. As cities embrace smart urban planning, the holistic integration of existence technologies is poised to revolutionize the landscape of traffic management, making transportation safer, more sustainable, and seamlessly interconnected.

Traffic overcrowding is a issues that evolve the development of a city. So we will be going ahead of this smart traffic manageable devices that includes smart system i.e. camera, ultra sonic sensor or laser sensor that inputs the vehicles as it can set signal time as if the output will be given by raspberry pi as utilizing this traffic system can be controlled.

Proper traffic management systems can help to reduce fuel consumption and emissions, which in turn can improve air quality and reduce the negative impact of transportation on the environment it is because of reduction in road accidents.

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