Journal of Science Engineering Technology and Management Science
Volume 01, Issue 01, December 2024
www.jsetms.com

Intelligent Traffic Control System Design

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To Cite this Article
Madhuri and Niharika, "Intelligent Traffic Control System Design", Journal of Science Engineering Technology and Management Sciences, Vol. 01, Issue 01, December 2024, pp:09-11

Abstract*: The number of automobiles is steadily rising worldwide. Additionally, automobiles are being sent to Bangladesh's major cities. As a result, there are massive traffic jams and congestion that are becoming worse every day. Due to traffic congestion, residents of metropolitan areas are wasting a significant amount of time. To reduce traffic system congestion, we create an intelligent traffic control system. This traffic signal will be automatically controlled by the system. The light for the congested portion of the path will be green, while the other portion will be red if a specific number of cars are stopped at the traffic signal. The first path will reach a specific number of cars on the initial attempts, and the second will change to green first, then red. Furthermore, our intelligent traffic control system has the ability to sense ambient temperature. A specific car bearer will receive this signal and temperature information via Short Message Service (SMS).*

Keywords*: Red Signal, Short Message Service (SMS), Vehicle, Intelligent Traffic Control system*

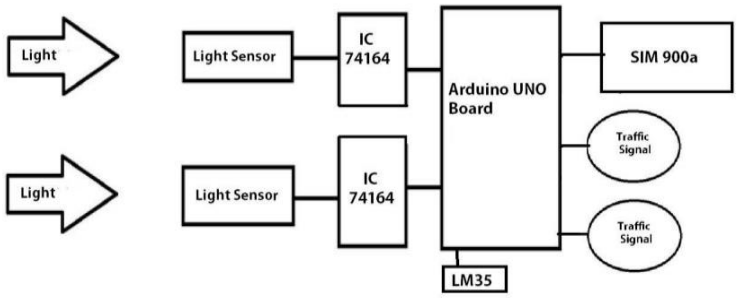
I. Introduction

When there are more cars than the road can handle, traffic system congestion happens. This causes the travel to be longer than necessary, especially when there are cars in queue. Another name for this is a traffic gridlock. Traffic jams may be caused by accidents, driving in the wrong direction, VIP passing, illegal parking, etc. Traffic jams can also be caused by poorly designed roads and a lack of knowledge about traffic laws. Numerous surveys and investigations have been conducted to determine that the traffic signal system is the primary source of everyday traffic jams and congestion. Another time waster in our daily routine is traffic congestion. They discovered that the majority of the traffic jams occurred both in the early morning and late in the afternoon. Students and employers are generally late for their offices or institutions approaching the traffic signal area because they are leaving for school, college, university, or the office at that time. Traffic intelligent control will be a significant concern in the future because to the growing number of road users over time and the lack of enough resources in the current infrastructures. It would be preferable to prevent traffic congestion, which is detrimental to the economy and the environment. In order to address the crippling issue facing the nation's metropolitan cities, our smart traffic light and congestion control system can assist reduce economic costs and save time by a small amount. If by reducing urban congestion, we can also cut down on unnecessary energy waste, such as CNG and petroleum for particular cases like electricity. With a GDP of 6% on average and foreign exchange reserves used for electricity and petroleum, densely populated developing nations like Bangladesh can scarcely afford to waste such a valuable resource.

By regulating traffic signals according to the present traffic density, a novel intelligent traffic control system is suggested. Traffic police officers manually operate Bangladesh's current traffic control system. Some of the city of Dhaka's roads have automated traffic signals. Another factor contributing to the congestion issue is the amount of time it takes for traffic to move from one side of the road to the other. Our intelligent traffic control technology provides a real-time solution to this issue. This system will assess the current traffic situation and decide which roads will close and which will stay open.

II. System Design and Analysis

This project's hardware design is really straightforward and effective. First, we designed the Dark sensor. In most cases, the dark sensor serves as a counter. Counter passes and signals continue after a significant amount of movement or signals are observed. Then, using a microcontroller, we created the entire circuit in bread band. The Arduino UNO board is the ideal option to increase the project's efficiency and ease of use.

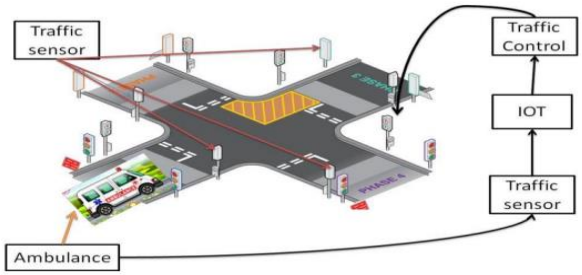


System Design and Analysis for Traffic control

To create this circuit for this control system, we merged a few fundamental parts. These parts are readily accessible at any electronics store or marketplace. Using a few simple parts, we created a light sensor that can be used for counting. The output of this circuit is connected to the traffic signal's yellow, green, and red lights.

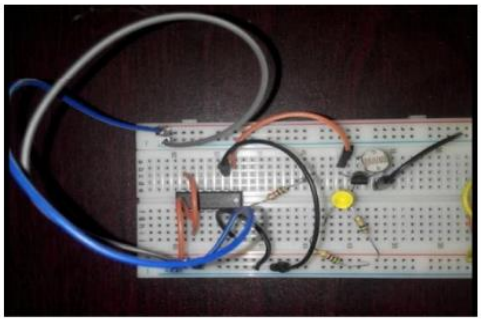
III. Implementation and Testing

Uploading circuit designs and code We inserted programming code for the Arduino UNO Board after connecting all the components in accordance with the circuit design diagram that we had uploaded. After uploading, we received a positive. As intended, the circuit functions as intended.



Layout Diagram for Traffic control

We have discovered that the count testing unit functions as intended. Error noise from the IC74164 SIPO shift resister still occasionally causes the counter to produce incorrect outputs. We combined it with the Arduino UNO Board after first testing the counter with an LED, which we know is functioning properly.



Bread Board Connection for Traffic control

We have constructed the entire system by integrating all the components after evaluating each one as a circuit design diagram and discovered that the application functions as intended. Once a predetermined number of cars have passed past the Dark sensor, one road begins to move, and the road on the other side comes to a standstill. We connected the Intelligent Traffic Control System to a test two-way road once all the circuits were completed, and it operated. Thus, we can say that our suggested traffic control system is prepared for market release.

IV. Conclusion

In order to lessen traffic jams or congestion brought on by traditional traffic management systems, the Intelligent Traffic management system was created. For this, a 5v and 3.3v Arduino UNO board has been utilized. We developed the dark sensor using an LDR and a BC547 NPN transistor. To count how many cars pass by the sensor, we used a dark sensor. Ultimately, we have resolved our issue by designing and developing an intelligent traffic control system based on microcontrollers. And we've done it at last. In this proposal, we have successfully reduced the traffic congestions caused by the fixed traffic signal system by using a microcontroller and an upgraded algorithm. It is dependent on the current time instead of set time. According to the observation, our intelligent traffic control system is significantly more efficient and has a very cheap production cost. The "Intelligent Traffic Control System" is therefore sufficiently suitable for business use.

IV. Future Scope

This project offers the chance to work on a bigger project later on. The applications and several demo applications are listed above. There is a great deal of potential for development in this project. In terms of time, the number of vehicles will rise in proportion to the roads' diminished capacity. Our two-way road intelligent traffic control system was first created with financial and temporal constraints in mind. To increase the project's efficiency, we can use infrared sensors. A dark sensor will not be a good substitute for that. This shows that there is a wide range of work in this field. We believe that we will be able to complete those features and create the ideal application in the not-too-distant future.

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