



IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY



VOLUME : 2 ISSUE : 12 Print / Issue Publication Date: 06-Jul-2018



ISSN : 2455-2143



Indexed In



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TRAFFIC LIGHT CONTROL SYSTEM FOR EMERGENCY VEHICLES

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Abstract— The project is designed to widen the green time and also put a robust auto traffic signal control system in place for safe and efficient navigation. Traffic congestion is one of the major problems for commuters across the world. The consequences of traffic congestion include longer travel time, increased queue lanes, traffic jams and road rage. Appropriate and accurate signalling system that calculates the traffic density and number of vehicles at either junction on the roads through automatically regulated traffic signs is the need of the hour. The proposed system ensures to reduce the prospects of causing traffic jams by a competent traffic light system, thus allowing the route with higher density of conveyances that in turn gives the authorization to the emergency conveyance to move ahead. The proposed methodology of traffic control abstains from quandaries that conventionally appear with existing common traffic control solutions, particularly those cognate for the image processing technique and also beam interruptions technique. This Radio Frequency identification (RFID) approach deals with multiple circumstances. It provides a highly effective time management pattern, wherein a real-time time schedule will turn out in authentic time for the passage of every traffic column. The authentic time operation of the Traffic management system imitates the decision of a real traffic policeman on obligation.

Keywords—Traffic signal Controller, RFID sensor, Transportation, Traffic jams, Auto traffic signal control system

I. INTRODUCTION

The rapid increase in vehicles movement on the road day by day, activity clog and delays in transporting on urban arterial roads are expanding around the world. In this way it is for all intents and purposes critical to create, check and approve straightforward yet effective models that offer assistance in planning and enhancing the security and productivity of vehicle transportation. It is a critical concern to control movement of lights in the road-vehicle frameworks. The primary reason is that movement signs are utilized to oversee clashing prerequisites for the utilization of street space –

frequently at street intersections – by distributing the right half of an approach to diverse arrangements of commonly good activity developments amid unmistakable time interims. The movement light control frameworks direct, caution and guide transportation with the end goal of enhancing the wellbeing and productivity of pedestrians and vehicles. There are numerous written works to create different procedures and they are characterized into two classes: settled time procedures and activity reaction methodologies. Nowadays, greater parts of the industrialized nations are utilizing settled time systems for urban activity control. Moreover, the point of activity sign control can be isolated into two classes: figuring out which flag sign grouping advances the framework execution and discovering how to execute the sign control rationale. This paper brings together on the second class with a movement sign timing plan that is forward.

The proposed RFID movement control maintains a strategic distance from issues that as a rule emerge with standard activity control frameworks, particularly those identified with picture preparing and shaft interference systems. This RFID system manages a multivehicle, multilane, multi street intersection range. It gives a proficient time administration plan, wherein a dynamic time calendar is working progressively for the section of every movement segment. The continuous operation of the framework copies the judgment of an active traffic policeman. The quantity of vehicles in every segment and the steering are deficiencies, upon whatever the figures and the judgments are positioned.

Signals require a perfect synchronization and control to ascertain the continuous and safest flood of the vehicular traffic. Additionally, there is a risk for the emergency conveyances to get stuck in the traffic. Consequently, there is a desideratum for the real-time management of the traffic during the peak hours. Hence, the need for perspicacious traffic signal controller is discussed further in this study.

The main objectives of this work are:

- To design a dedicated intellectual auto traffic signal control system.
- It reduces the waiting time of emergency vehicles at traffic signals.
- Automatic traffic signal controlling in response to the arrival of the emergency vehicles.



- Implement traffic control system in 4 lane junction.
- Low cost implementation with RFID sensors.
- Create database to store the data and manage.

II. LITERATURE SURVEY

Satya Priya Biswas et al.[1] has proposed a system that improve the traffic control system. It focuses on computing measurement of conveyance in transit for free flow of vehicles without obstruction and to provide precedence based signalling system which gives more priority to vehicles (2015).

M.Vemuri et al.[2] has developed a hybrid model in which fixed priority (FP) and earliest deadline first (EDF) algorithms to deal with specific traffic scenarios to provide a more effective solutions (2014).

G.Sahail et al.[3] has proposed on enhancing the judgement of channel option technique for vehicles based on the information transfer productivity and reliability and an optimized algorithm has been proposed as a principle to allocate the next available channel based on priority data (2008).

Baradwaj et al.[4] has proposed an enhanced traffic control system by providing dynamic limits for time at traffic signal intersection. They use sensors to locate the traffic situations to control the traffic dynamically (2013).

Yuma Monoi et al.[5] has proposed a technique of minimizing the time required for urgency vehicles to proceed to their designated locations by authorizing such vehicles to travel in transit with a high priority and simulation system evaluates the proposed system by taking the average time of travel (2015).

Naseer et al.[6] proposes a system which will provide easy travel for the emergency vehicles like ambulances to their destinations by reducing the time delay caused due to traffic jams. The emergency traffic light control system works by controlling the traffic lights to allow emergency vehicles, stopping and conflicting vehicles with less response time (2015).

Jaiswal et al.[7] has proposed to improve the traffic control system by focusing on ambulance, vehicles priority and density of traffic. This will increase the green light duration for the lane which is having high density of traffic and lending free path to the emergency vehicles (2013).

Suresh Sharma et al.[8] have described a self-established traffic control system which remedies to simplify emergency response action. In the proposed vtl-pic scheme vehicles clear the traffic conflicts at crossway by themselves and provide a priority based scheme that can order emergency vehicles at crossways (2013).

Hussain et al.[9] has described an approach which works on the basis of microcontroller installed at each signal junction that obtains data from the sensor installed beside the road side to determine the density of traffic. The microcontroller employs the optimized algorithm to accomplish the traffic control in effective manner (2013).

Dakhole et al.[10] proposed traffic control system using ARM7 for several traffic lights which controls and monitors traffic jams and also it reduces the possibility of traffic jams caused by traffic lights. The Processing is done using ATmega16 and ARM7 (2014).

III. PROPOSED SYSTEM

The proposed enhancement endeavours to reduce the probability of traffic jams which are due to traffic lights, to a certain extent by allowing the roads for conveyances having higher density and withal providing the road clearance for the emergency conveyance. The proposed system for traffic control eschews quandaries that conventionally occur as a result of standard traffic monitoring system. The RFID method deals with a multiple circumstances. It provides a highly effective time management solution, in which a real-time schedule is worked out in authentic time for moving forward of each traffic column. The authentic time operation of the Traffic management system imitates the result of a real traffic policeman on obligation.

- Use of Single Powerful Sensor with Active RFIDs (Cost Efficient): 4 sensors in each respective signal it would be expensive because to increase the power of the sensor to detect the presence of the vehicle even from a quite farther distance. To reduce this expense it is implemented with a single powerful sensor which is intelligent enough to detect from which direction the emergency vehicle is approaching and act accordingly.

Even the actively tagged emergency vehicle appends the appropriate lane number to the tag code in real time.

- Use of Information at traffic signals and find shortest route over time: As time passes the data collected at each traffic signal is stored in a central shared database which is incorporated with an algorithm to find the shortest path based on the previously collected data. Because the locations of each signal would be known to the database and it maps the shortest routes accordingly and this is intimated to the emergency vehicle drivers.
- And developed a Database for further analysis and data storage.

B. System Architecture

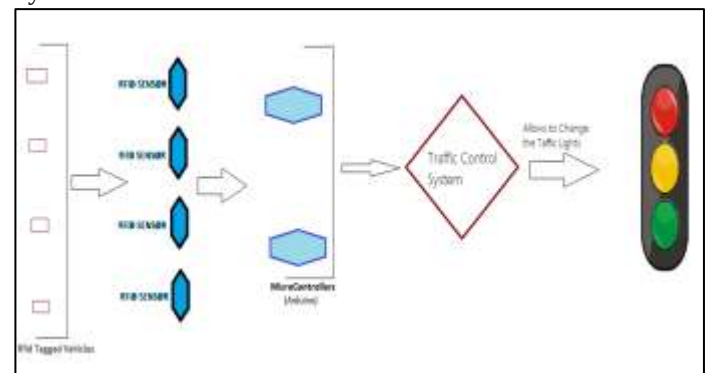




Fig 1. System Architecture

The figure1 shows how the RFID tagged vehicles emit radio frequencies which are captured by RFID sensors installed in the traffic signal. This RFID sensor communicates with microcontroller and communicates the appropriate decision the traffic signal which changes to green.

C. Hardware and Software Requirements

Arduino Uno, a controller.
 RFID (Radio-frequency identification) sensor.
 Circuitry board with LED and connectors
 RFID tags for reporting sensor data.
 Aurdino Uno software interface
 Mysql

D. Implementation

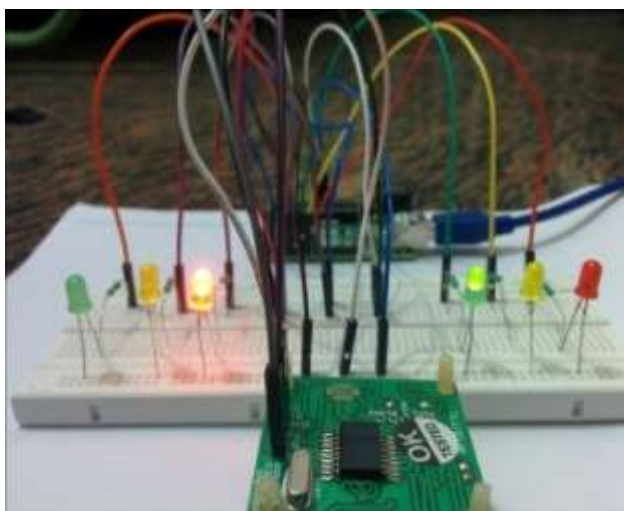


Fig.2. Snapshot of the circuitry

The figure2 shows the implementation circuitry connections of hardware and its connectivity. It is tested with the hardware devices with demonstration results. Figure 3 shows the software Aurdino Uno interface with algorithm and its implementation. The proposed system endeavours to reduce the occurrences of traffic jams, due to the traffic lights by allowing the road with higher density of conveyances and withal provides the clearance for the emergency conveyance

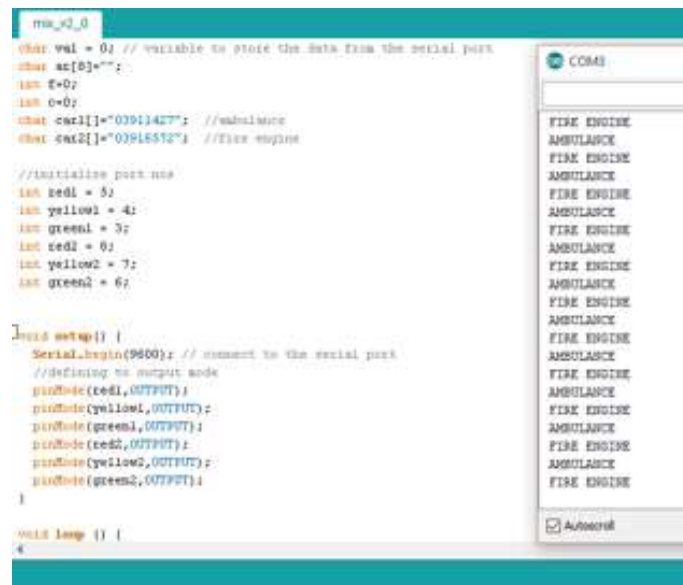


Fig. 3. Snapshot of the Arduino interface

IV. CONCLUSION

The proposed solution as an intellective auto traffic control solution that makes easy for emergency response operations (that is facilitating quicker movement of emergency vehicles through traffic in urban areas). In the proposed solution the vehicles can resolve the emerging conflicts at road junctions by themselves and implement a priority based solution that can prioritize emergency vehicles at road junctions. Our approach to the solution is based on a RFID tagging of traffic signals to communicate their information to the car. The proposed system showcases promising results as the active RFID technology enables to detect the existence and distinction of the traffic signals reliably and adequately in advance. It helps to facilitate emergency response operations. This is done with the help of RFID tagging.

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2455-2143