

Optimizing Traffic Signal Using RFID

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Abstract- Further to site visitors jams as a result of clogged roads, different traffic problems consist of problems achieving emergency vehicles, jogging crimson lighting fixtures, and collisions that bring about road closures and fatalities. the availability for emergency car passage and car density-based visitors sign law are the areas of knowledge of formerly suggested smart visitors management structures. those forms of systems are constrained to one or two principal areas of awareness. A comprehensive device for traffic control that tackles all site visitors-associated issues, no longer clearly traffic jams, have to be advanced so that you can establish a rational metropolis. Our idea is to implement radio frequency identity (RFID) in a smart site visitors control system (STCS)

Index Terms -Traffic congestion, Smart Signal, Traffic, Traffic management, Traffic Control, RFID, Radio Frequency, Emergency

I. INTRODUCTION

Traffic lighting fixtures, with their 3-coloured indicators, have been an essential device for controlling site visitors go with the flow for the reason that its invention in 1912. however, because the variety of automobiles will increase exponentially, cutting-edge towns are confronted with ever-worsening site visitors congestion issues as a result of insufficient infrastructure improvement. conventional tactics, which includes building new highways or flyovers, offer quick-time period respite but don't cope with the complex dynamics of visitors. the amount of site visitors varies for the duration of the day, achieving its peak inside the mornings and afternoons and attaining its lowest point at the weekends. cutting-edge visitors sign structures are rigid and pre-programmed, which makes it hard to regulate to converting situations like injuries or creation. This makes the state of affairs worse. The want for adaptive

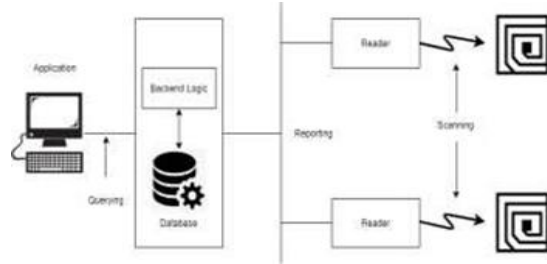
site visitors manipulate structures is highlighted by means of the disruptions to site visitors glide because of emergency cars and pedestrian crossings.

Contactless wi-fi communication is made feasible via RFID era, which includes tags and readers. This affords a promising solution. Its uses range from site visitors management to get right of entry to manipulate structures. Adaptive visitors lights, as adversarial to traditional pre-timed ones, dynamically adjust the timing of the sign in response to the presence of automobiles and pedestrians. Detectors are used by vehicle-actuated signals to assess traffic demands and alter signal timing cycle by using cycle. because the Seventies, adaptive visitors manage structures with state-of-the-art prediction and estimation modules were in operation. Worldwide improvement has produced some of adaptive site visitors manage structures, which include SCOOT, SCATS, and RHODES. the UK's delivery studies Laboratory created SCOOT in the early Eighties to enhance sign timing the usage of real-time visitors records. The Roads and traffic Authority of new South Wales, Australia, advanced SCATS in the early 1990s to coordinate site visitors indicators at crossings. The latest era, RHODES, complements visitors float performance by using applying hierarchical optimization strategies.

In conclusion, attempts to lessen visitors congestion and beautify metropolis mobility are pondered inside the evolution of site visitors manage systems, which moved from traditional pre-timed signals to adaptive RFID-primarily based definitely solutions. those developments highlight how crucial it is to embrace innovation and generation as a way to solve the complicated transportation troubles that modern towns anywhere in the global face.

In conclusion, attempts to lessen traffic congestion and enhance city mobility are pondered within the

evolution of visitors manipulate structures, which moved from traditional pre-timed indicators to adaptive RFID-based solutions. these developments highlight how crucial it is to embrace innovation and generation that allows you to remedy the complicated transportation problems that modern-day cities all over the global face. on the way to eventually replace barcodes in deliver chains, radio frequency identity tags have been first of all created. The microchip, antenna, case, and battery (for active tags most effective) are the additives of RFID transponders, or tags. We distinguish between 3 sorts of RFID tags: passive, semi-passive, and lively—based on how a lot strength or power they use. concerning frequency, there are 3 sorts of RFID tags



II.EXISTING SYSTEM

Our examine thoroughly examines the literature on vehicle tracking and visitors manage, concentrating on strategies and outcomes from many sources. The adaptive great-tuning method, which determines layout parameters for two interacting modules in the site visitors Responsive city manipulate (TUC) strategy, is one noteworthy technique that is investigated. huge-scale city avenue networks, inclusive of those determined in China and Greece, are the point of interest of this approach. through computer simulations, it is proven that as compared to the original TUC machine, the cautioned adaptive optimization method substantially improves network overall performance as indicated with the aid of each day suggest speed. while layout parameters are optimally high-quality-tuned, this enhancement is realized [1].

An resourceful machine that divides roadways into 3 classes—empty, normal, and crowded—is examined. It consists of the configuration of adaptive traffic lighting fixtures. This machine makes use of records from avenue video cameras to make real-time changes the use of a small associative memory. The gadget's

resilience and efficacy were demonstrated whilst it was examined at intersections on Penesa Island, Malaysia, in which it turned into able to differentiate among diverse roadway conditions beneath various atmospheric instances [2].

Some other essential vicinity is using subsequent-era synthetic intelligence structures to relieve city traffic congestion. To address this difficulty, a number of clever systems have been created using tender computing strategies. inspecting those techniques reveals their place in modern site visitors manage systems, demonstrating high-quality breakthroughs and non-stop improvements [3].

some other location of cognizance is site visitors glide sensing the usage of RFID generation. the usage of an RS-232 link, this technique sends traffic waft statistics straight to a control device. An extension technique is utilized by the sensor gadget to interpret this facts, which allows with green visitors glide control. additionally, ZigBee wi-fi generation is used to transmit site visitors situations to a distant monitoring gadget. This machine well-known shows capabilities in go with the flow manage, faraway transmission, traffic coincidence discount, and visitors put off time minimization [4].

Till a separate reader on a exceptional path notices the tag, the mild stays inexperienced, demonstrating a useful use of RFID in emergency reaction.[5]

Systems for managing traffic incidents (TIMs) are designed to quickly become aware of, cope with, and solve traffic troubles so as to enhance safety and visitors go with the flow. smart Transportation systems (ITS) were instrumental in the detection, verification, reaction, and communicate of site visitors accidents on a international scale throughout the last thirty years. Proactive and anticipatory methods, such the IT approach with reactive repayment (ITRC), have verified capacity in reducing network latency times and disposing of pointless car stops. by way of the usage of beyond data to predict habitual site visitors styles, these strategies alter nominal site visitors lighting fixtures through IT controllers. those alerts are similarly delicate via reactive compensation, which adjusts to non-repetitive site visitors aspects using a junction-based totally model predictive manage method (JMPC) [6].

III.HELPFUL HINTS

A. Figures and Tables

| Contributors | Dynamic Traffic Control | Emergency vehicle | Tracking of Stolen Vehicle | Alert for the Topping up the credit for Toll Booth. |
|--|-------------------------|-------------------|----------------------------|---|
| A. K. Mittal and D. Bhandari [10] | □ | | | |
| P. Maheshwari et al. [11] | □ | □ | | |
| M. Kumar et al. [12] | □ | | | |
| Ghazal et al. [13] | □ | □ | | |
| Younis et al. [15] | □ | | | |
| Intelligent Traffic Control using RFID | □ | □ | □ | □ |

Table -1: Comparison with previously proposed system.

IV. HELPFUL HINTS

Our traffic control technique involves the usage of an RFID reader at visitors intersections to examine every automobile's RFID tag and calculate the visitors density in real time. so one can lessen site visitors congestion on roadways, it additionally specializes in adjusting traffic lights in accordance with the density of motors on the path. As a result, less fuel may be used and less waiting time will occur. while an ambulance or other emergency vehicle is gift, a radio frequency module is applied to purpose the red traffic mild alerts to exchange to inexperienced, giving the emergency vehicles clear get admission to. large information may also be provided, with a view to resource in future have a look at and making plans for roads. additionally, it's applied to discover or observe stolen cars. additionally, it notifies the auto's proprietor when it is time to refill the credit score used on the toll sales space. in order to lessen traffic jams and promote free motion of site visitors, numerous visitors signals are regularly synced with one another inside the destiny. The RFID tag, that is examine by using the RFID reader, lets in the machine to identify the vehicles. One RFID reader is located subsequent to the site visitors mild, while some other is a few meters away from the sign. it'll record what number of motors are in that specific lane. RFID is a more effective

method of managing site visitors sign kingdom changes because it's miles required for all Indian vehicles.

It demonstrates that it could lessen traffic congestion and save you the time misplaced with the aid of a inexperienced sign on a deserted street. whilst estimating the lifestyles of cars, it's also greater positive.

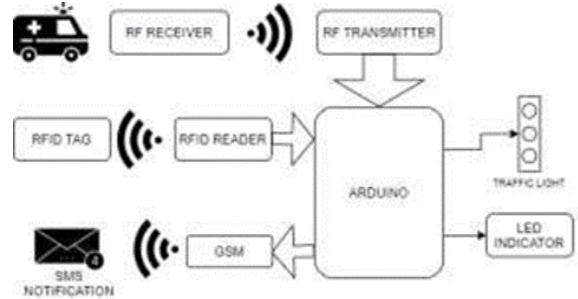


Fig-2: Overview of the Proposed System.

4.1 Dynamic Traffic control using RFID reader and tag

The STCS tracks cars the use of their VIN the use of a significant computing device (CCS) and two RFID readers for each path of the street. The CCS methods this information, extracts car facts, and manages visitors lighting. complicated calculations that take into account the type of car and different predetermined parameters are used to calculate traffic quantity. not just —M.I Put units in parentheses.

V. EXPERIMENTAL RESULTS

Vehicle priority: depending at the car's length, frequency of use on the crossing, time of day, and other variables, each type of vehicle is given a selected precedence.

The path of tour is given precedence; this is a critical attention when there's a distinction within the importance of the two roads that go on the crossing (including whilst a countrywide dual carriageway and an ordinary road intersect).

Timing: the day and time of the week. the quantity of visitors takes into attention the priority given to every car at that moment inside the day as well as the concern given to the intersection of the two roads at the crossing.

5.1 Emergency Vehicle Traffic clearance

On the intersection, each the aspect and the RF receiver might be enforced. whilst the car is utilized for an emergency, the bell will sound. In doing so, the sign will be transmitted from the RF transmitter to the RF module receiver. As a end result, the visitors sign will flip inexperienced. The site visitors mild turns purple and the ambulance stops receiving the RF sign after it crosses the signal.

The Arduino UNO micro controller, that's used within the hardware implementation, is used to attach the RFID readers internally. additionally attached to the Arduino is the GSM module used to transmit the SMS. A unmarried amp regulated energy supply powers each the Arduino and the GSM module. An lcd panel become applied to expose the junction's present nation. An Arduino is ready with an RF receiver to receive alerts transmitted through the ambulance's transmitter. A 9-volt battery powers the RF transmitter. An Arduino is used to simulate a site visitors sign the use of 4 LED lighting fixtures .

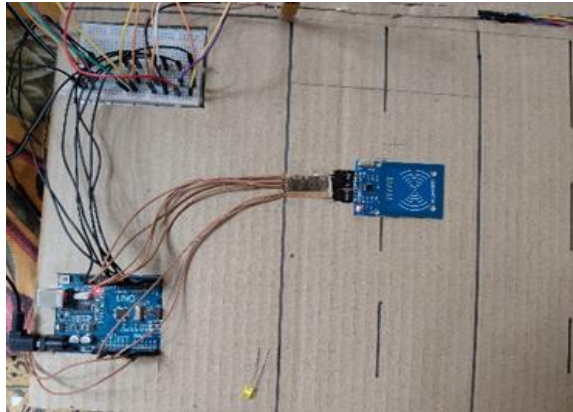


Fig-5: Hardware Implementation.

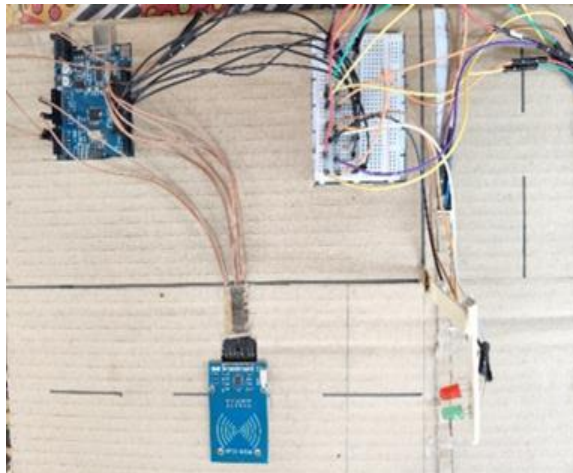


Fig-6: Components Of Model

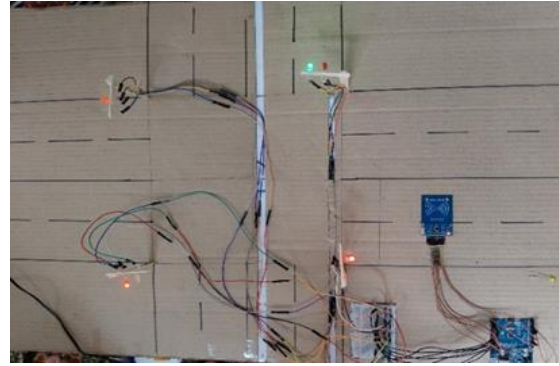


Fig-7: Working of Emergency Vehicle Clearance.

The prototype's effects suggest that when or extra tags are detected under the RFID reader, it interprets this as a high density and extends the green signal to that unique lane. when a tag that has already been identified as a theft car is scanned by an RFID reader, it will beep three instances and ship an SMS to the automobile proprietor's phone and the control room number. An SMS alert might be despatched to the car owner if the short Tag stability is less than the minimal amount when the tag is scanned.

The fast Tag stability is likewise checked when a tag is scanned, and if it's miles less than the minimum amount, the automobile owner will get hold of an SMS alert. A tag could be taken into consideration a rule violation if it passes via every other reader at the same time as the sign is in pink. The best might be subtracted from the balance on the quick Tag. The emergency car has an RF transmitter; by means of pressing the button, it will sign an RFID receiver, turning that precise lane green



Fig-8: Wireless Traffic Light Controller System

VI.CONCLUSION

The site visitors policeman's human exertions is reduced whilst automatic site visitors mild manage supports the traffic density along the course. The entire system calls for little or no human intervention due to

the fact it's far automated. The database has the car data, making it easy to discover the stolen automobile. moreover, SMS may be issued that will get equipped to understand the stolen car at any destiny intersections. Emergency vehicles, which includes hearth engines and ambulances, should get to their locations as soon as possible. the many human beings precious lives may also be in chance in the event that they spend loads of time caught in site visitors. Upon emergency car clearance, the traffic signal becomes inexperienced so long as the vehicle is waiting inside the site visitors unit. The visitors signal turns purple best after the emergency car has handed through it. furthermore, as although every automobile that runs a pink mild is robotically punished. testing prototypes with RFID readers with longer degrees regularly results in further upgrades inside the prototypes.

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