IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

MANAGINGS TOP AND GO TRAFFIC WITH AI

Neerati Rachana[1], Shivakumaran A R[2]

M.Tech[1], Professor[2]

Department of Computer Science and engineering MALLA REDDY ENGINEERIN GCOLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India) Maisammaguda, Secunderabad–500100

Telangana-India

ABSTRACT

Congestioninbigcitiesisbecomingmoreproblematicas urban populations & automobileownership both grow. Everyone suffers inconvenient delays when traffic is backed up. motorists,but it does increase fuel consumption and pollution. Despite its apparent global prevalence, bigurbancentersare especially at risk. Therefore, it is becoming more vital to calculate trafficdensityinrealtimeinorder to optimize signal timing and manage traffic flow. The trafficcontroller plays a crucial role in the smooth flow of traffic. Therefore, there is an urgent need forenhanced traffic management to fulfill the expanding demands of the public. To measure trafficlevels, our system would utilize artificial intelligence and processing of images to examine livefeeds via cameras installed at crossings. The algorithm for adjusting the timing of traffic lights inresponse to traffic volumes is also highlighted in an effort to make travel more efficient forpassengers and reduce pollution.

INTRODUCTION

As the number of automobiles in urban areas continues to rise, congestion and a decrease in theLevel of Service are becoming problems on many road networks. Congestion is often caused bytraffic control systems that include rigidly timed signals. They repeat the same cycles over andoveragain,eachlastingthesame lengthoftime. As traffic numbers continue to rise, newapproachestotrafficmanagement are needed; that's where intelligent transportation systemscome in. Take the city of Bengaluru as an example. Bangalore has the highest traffic flow out theworld, according to a study recording the status of traffic in 416 cities across 57 countries, withMumbai

following in as number four. Travel times in Bangalore rise by an average of 71%duringpeakcommutetimes.InMumbai,thelengthoftimeis65%longer[1].Therearecurrentlythreemethodsfor controlling traffic that have gained widespread acceptance: In thefirst approach, called "manual controlling," traffic is controlled by the use of human labor. Inordertokeepeverythingundercontrol,thepolicehavestationsincertainareas.Thepoliceutilize a variety of tools, including signs, lights, and whistles, to control traffic flow. The secondcategory of traffic signals is similar to the design of conventional lights but makes use of statictimers.Apredetermineddurationisstoredinthetimer'smemory.Thelightswillblinkamongred and green at intervals determined by the timer setting. Finally, electronic sensors like sensingdevices and proximity sensors might be placed all along the route. This sensor reports on themovementofvehiclesontheroad.Sensordataisusedtocontrolthetraffic lights. Thesetime-honored methods aren't without their drawbacks. The work involved in the manual controlsystemissomewhatexpensive.Becauseof a lack of personnel, traffic police are unable tophysically regulate traffic in every area of a town or city. Therefore, a more efficient form oftraffic control is essential. Static traffic control, in contrast with dynamic traffic management,employs a traffic light
whose phases occur at regular intervals. As electronic sensors, includingdetectiondevicesorloopdetectors,relyoncomplicatedandexpensivetechnology,limitedbudgets will ultimately result in fewer facilities. In addition, an excessive number of sensors arefrequently needed to give enough coverage across a network of services because of the usual loweffectivereachamongmostsensors.Security,slopemetering,andprovidingdriverswithup-to-the-minuteinformationandupdatesarejustsomeofthemanyusesforvideosurveillanceandsecuritysystems,whichhavebeenmorecommonintrafficcontrol in recent years. Inaddition to keeping an eye on things, video surveillance systems may be used to assess trafficdensity and categorize cars, which can then be used to optimize the timing for the traffic signals.The primary objective of our proposed system is to develop an Artificial Vision-based trafficsignal system that can adapt to the volume of traffic. Surveillance camera data from congestedjunctions may be analysed in real time to ascertain traffic volumes, allowing for more precisetiming during the green light [16]. Vehicles may be divided into four groups—cars, bikes, trucks, andrickshaws—to more accurately predict how long the signal will be green.

YOLO is used by thesystem to calculate the flow of traffic in each direction and regulate the timing of the lightsappropriately. Compared to a stationary system, this enables for more efficient use of green lighttime and faster clearing of traffic jams, cutting down on wait times, congestion, and energyconsumption needed to keep cars moving.

WORKINRELATION

"AutomatedControlofTrafficLightswiththeHelpofImageProcessing"

As both the urban population and the number of vehicles increase, traffic congestion becomes anincreasingly pressing issue. Congestion not only negatively impacts drivers by increasing theirwait times and stress levels, but also the expense of transportation, the amount of carbon dioxidereleasedintotheenvironment,andtheamount of petroleum wasted. The controller plays acrucialrole in traffic management. Complex, nonlinear, and focused on duration rather thantraffic, traditional circulation patterns are difficult to understand and implement. In this study, wepropose a MATLAB-based traffic management system that uses image processing to determinethe optimal timing for each color light depending on the number and velocity of oncoming cars.
One Arduino UNO manages the green & yellow lights, while another handles the red. This is aprocess that never ends.

"ImprovedTrafficSignalTimingUsingFuzzyLogic,"

Increasingurbancongestionisadirectresultofmoreautomobilesontheroadeachyear.Becauseof this, traffic builds up, commute times lengthen, gas prices rise, and other transportation issuesarise. This study presents an adaptive roadway signal controller based on fuzzy logic, which isshowntoimprovetrafficflowefficiencyatasingleintersection.Aseriesoffuzzinghavebeendesigned to evaluate whether the next phase should be shortened or extended based on dataobtained from sensors on the road (queue time frame, arrival flow, or departure flow). That fuzzybasedcontrolapproachencompassesboththemain driveway and the minor driveway, whichsees far less traffic. In three scenarios with varied traffic demand, the suggested controller iscompared to a predetermined signal program to verify the produced decision criteria.

Titled"IntelligentTimingControlforTrafficLights,"

Congestion and accidents caused by it are a significant source of financial stress in metropolitanareas. Those who use a timer to detect when each light becomes green are doing it for the wrongreasons, since traffic lights are necessary for controlling vehicular flow by signaling when carsare authorized to enter and depart. As part of a system for intelligent transportation, this researchdevelops a self-regulating algorithm for traffic signals using AI techniques and photographs ofvehicles at crossings, and then checks its usefulness by comparing its results with those acquiredmanually. Using the proposed algorithm in the transportation system will increase efficiency anddecrease delays at junctions and while driving.

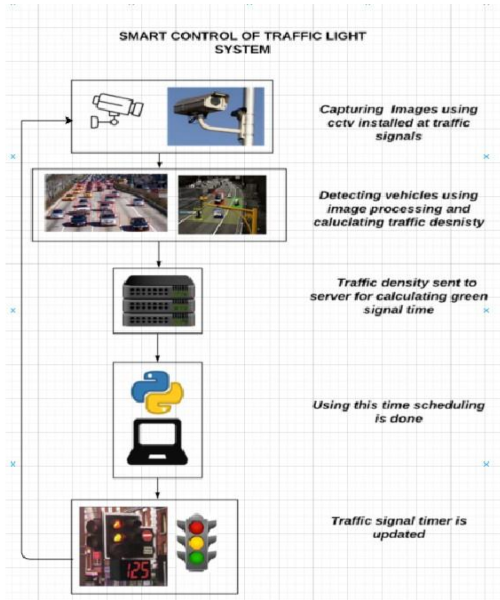


Fig. 1. Proposed System Model

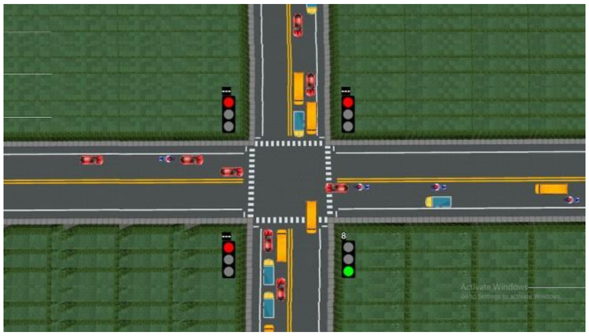
METHODOLOGY

Our proposed system takes use of data from CCTV cameras stationed at junctions to performreal-time traffic density analysis using image processing and object identification. As can be seenin Fig. 1, this image is then sent to the YOLO-based car recognition system for processing.Sensors monitor the number of vehicles on the road at any one moment (including automobiles,bicycles, buses, and lorries) to calculate traffic density. When deciding whether to provide greenlights to lanes, the signal switching algorithms take density into consideration along with otherfactors. The time of the red warning has been fine-tuned. The maximum and lowest values forthis period of time have been established to ensure that no single lane will ever be stopped by ared light. A simulator is built to demonstrate the system's efficacy and enable comparison withthe existing static system.

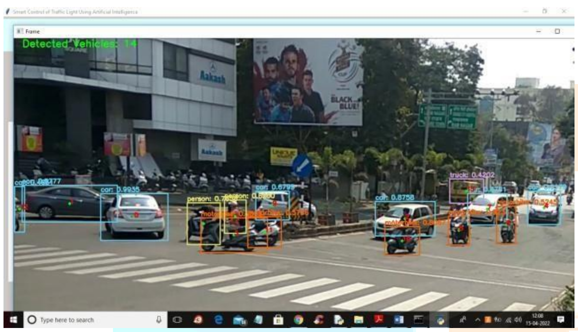
MotorVehicleDetectionSystem

The proposed system uses YOLO (You only look once) for vehicle detection, which achieves thenecessaryaccuracywhileprocessingtime.ThereisaspeciallytrainedYOLOmodelthatcandistinguishbetweenauto mobiles,motorbikes,buses,tractors,andrickshaws,amongothervehicle types.

RESULTANDDISCUSSION



The figure attached shows the outcome of a PYGAME simulated run; see how the blue and redlinesshiftwhenthe traffic density within each lane is calculated. To access the subsequentYOLO module in the simulation itself, you must close it down by using the Windows key, andthen launch it again.



You may adjust your departure and arrival timings based on the screen above, which displaystraffic conditions and estimates of the number of cars on the route. If you're using a regularlaptop,waitforYOLOtofinishprocessingeveryframebeforecheckingforresults.Ahigh-definitionMP4 videofile that maybe viewed onany standard videoplayer.

CONCLUSION

In conclusion, the proposed system favors the direction with the biggest amount of traffic bydynamicallyadjustingthedurationofthegreenlightdependingonthenumberofcarsapproaching the signal. green signal for a longer duration than the less-used path. As a consequence, there will be lesstraffic,shorterwaittimes,lessneedformorefuel,andlesspollutantsreleasedintotheatmosphere.

According to the results of the simulation, the number of vehicles using the junction will rise byaround 23% when compared with the current setup. Further calibration using data from realCCTVcamerasformodeltraininghasthepossibilitytomakethisapproachevenmoresuccessful.In addition, the proposed system is robust enough to compete with established intelligent trafficcontrol tools like Gravity Mats and Ir Sensors. The system requires little additional hardware,even at high-traffic intersections, since it uses footage from existing CCTV cameras attached totraffic lights. It may just take minor tweaks to the alignment to solve the problem. Pressure matsand similar traffic monitoring devices put on highways are expensive to maintain because of theconstant pounding they take from vehicles. Thus, the proposed system may be integrated withcitywide monitoring infrastructure to enhance TFM. The project might be expanded to includethefollowing elements to enhance traffic management anddecrease congestion:

1) By establishing a violation barrier and retrieving the registration number of the vehicle inquestion if the boundary is crossed during the signal's red phase, red light jumpers may be caughtin still images or live video feeds. Likewise, lane shifts might be recognized. Image processingtechniques like background subtraction might be useful here.

2) Accident and failure detection: Left-turn and angle crashes at intersections are particularlyhazardous because of the high volume of traffic. As a result, locating incidents at intersectionsquicklyandaccurately may save lives and property, as well as reduce congestion and delays.One solution is to provide a buffer zone between parked automobiles and those that sit still in adangerous area of the road, such as the middle of the lane.

3) Ambulances and other emergency vehicles need to be given precedence at intersections. Themodel may be trained to recognize the presence of not only automobiles, but also ambulances,and to change the timings such that the urgent evacuation is given priority and is permitted topass the alert at the earliest possible time.

REFERENCES

[1] TomTom.com,'TomTomWorldTrafficIndex',2019.[Online].Available:https://www.tomtom.com/en_gb/traffic-index/ranking/

[2] Khushi, "Smart Control of Traffic Light System using Image Processing," 2017 InternationalConferenceonCurrentTrendsinComputer,Electrical,ElectronicsandCommunication(CTCEEC),Mysore, 2017, pp. 99-103,doi: 10.1109/CTCEEC.2017.8454966.

[3] A. Vogel, I. Oremović, R. Šimić and E. Ivanjko, "Improving Traffic Light Control by MeansofFuzzyLogic,"2018InternationalSymposiumELMAR,Zadar,2018,pp.51-56,doi:10.23919/ELMAR.2018.8534692.

[4] A. A. Zaid, Y. Suhweil and M. A. Yaman, "Smart controlling for traffic light time," 2017IEEEJordanConferenceonAppliedElectricalEngineeringandComputingTechnologies(AEECT),Aqaba,2017, pp.1-5, doi:10.1109/AEECT.2017.8257768.

[5] RenjithSoman"TrafficLightControlandViolationDetectionUsingImageProcessing”.”
IOSR Journal of Engineering (IOSRJEN), vol. 08, no. 4, 2018, pp. 23-27

[6] A. Kanungo, A. Sharma and C. Singla, "Smart traffic lights switching and traffic densitycalculation using video processing," 2014 Recent Advances in Engineering and ComputationalSciences(RAECS), Chandigarh, 2014,pp. 1-6, doi:10.1109/RAECS.2014.6799542.

[7] Siddharth Srivastava, Subhadeep Chakraborty, Raj Kamal, Rahil, Minocha, “Adaptive trafficlight timer

controller" , IIT KANPUR, NERD MAGAZINE

[8] Ms.SailiShinde,Prof.SheetalJagtap,VishwakarmaInstituteOfTechnology,Intelligenttrafficmanagement system:a Review,IJIRST 2016

[9] OpenDataScience,'OverviewoftheYOLOObjectDetectionAlgorithm',2018.[Online].Available: https://medium.com/@ODSC/ overview-of-the-yolo-object-detection-algorithm-7b52a745d3e0

[10] J.Hui,'Real-timeObjectDetectionwithYOLO,YOLOv2 and now YOLOv3', 2018.[Online]. Available: https://medium.com/ @jonathan _hui/real-time-object-detection-with-yolo-yolov2-28b1b93e2088

[11] J.Redmon,'Darknet:OpenSourceNeuralNetworks in C', 2016. [Online]. Available:https://pjreddie.com/darknet/

[12] Tzutalin,'LabelImgAnnotationTool',2015.[Online].Available:https://github.com/tzutalin/labelImg

[13] Li, Z., Wang, B., and Zhang, J. "Comparative analysis of drivers' start- up time of the firsttwovehiclesatsignalizedintersections",2016J.Adv.Transp.,50:228–239.doi:10.1002/atr.1318

[14] Arkatkar, Shriniwas&Mitra, Sudeshna& Mathew, Tom. "India" in Global Practices onRoadTraffic Signal Control, ch.12, pp.217-242

[15] 'Pygame Library', 2019. [Online]. Available: https://www.pygame.org/wiki/about'TrafficSignalSynchronization'. [Online]. Available:https://www.cityofirvine.org/signal-operations-maintenance/trafficsignal-synchronization

[16] U. Kaur, A. T, P. Nalajala, S. Majji, S. Jaiswal and D. Jamthe, "Broadcasting of IoT-Connected Autonomous Vehicles in VANETs Using Artificial Intelligence," 2021 5th International Conference on Electronics, Communication and Aerospace Technology (ICECA), Coimbatore, India, 2021, pp. 516-521, doi: 10.1109/ICECA52323.2021.9676127.