IJITCE

ISSN 2347- 3657

International Journal of Information Technology & Computer Engineering

Email : ijitce.editor@gmail.com or editor@ijitce.com

International Journal of Information Technology & Computer Engineering
ISSN 2347–365
Volume 15,Issue 4,Dec 2023

ROAD TRAFFIC ANALYSIS USING YOLO-V4 & DEEP SORT

G.SWETHA[1],PONNALA SUSHMA[2], MASKURI SRIKANTH[3], MOHAMMED ABDUL MAZHAR[4], MD SOHEB[5]

[2,3,4,5,6] UG Students, Dept of CSE, MALLA REDDY INSTITUTE OF ENGINEERING AND TECHNOLOGY(AUTONOMOUS),Dhulapally,Secundrabad, Hyderabad, Telangana, India.

ABSTRACT:

Traffic congestion is becoming one of the critical issues with increasing population and automobiles in cities. Traffic jams not only cause extra delay and stress for the drivers, but also increase fuel consumption and air pollution. Although it seems to pervade everywhere, megacities are the ones most affected by it. And its ever-increasing nature makes it necessary to calculate the road traffic density in real-time for better signal control and effective traffic management. The traffic controller is one of the critical factors affecting traffic flow. Therefore, the need for optimizing traffic control to better accommodate this increasing demand arises. Our proposed system aims to utilize live images from the cameras at traffic junctions for traffic density calculation using image processing and AI. It also focuses on the algorithm for switching the traffic lights based on the vehicle density to reduce congestion, thereby providing faster transit to people and reducing pollution.

INTRODUCTION

In India traffic is enlarge four times faster than population. Nowadays, so many countries suffer from the traffic congestion issues that affect the transportation method in cities and cause serious trouble. Even though replacing traffic officers and custodian by automatic traffic systems, the optimization of the heavy traffic jam is still a big issue to be faced, especially with several junction nodes. Traffic jams also build many other critical issues and

[1] Assistant Professor, Dept of CSE, MALLA REDDY INSTITUTE OF ENGINEERING AND TECHNOLOGY(AUTONOMOUS),Dhulapally,Secundrabad, Hyderabad, Telangana, India.

problems which straightly affect the human routine lives and sometime reason for death for example if there is an emergency vehicle like ambulance on the roadway going with critical patient. In that situation if an ambulance gets stuck in a large traffic j am then there are high chances that the patient can't reach the hospital on time. It is very key to design an advanced traffic system which controls traffic intelligently to avoid accidents, collisions and traffic jams. If one path has less traffic and the other path with high traffic but the duration of green light for both paths is same then this is the waste of available time and is inefficient. By considering the above example if the path with higher traffic density should glow green signal light for a longer period than the path with lesser density. This technique is based on the calculation of the traffic density by correlating the live traffic image with a reference image. The large difference is, higher traffic density is noticed. However, the traffic problem is very tricky due to the involvement of various parameters. First, the traffic flow depends on the time of the day where the traffic high hours are generally in the morning and in the afternoon. On the days of the week where weekends reveal minimum traffic while Mondays and Fridays generally show heavy traffic oriented from cities to their outskirts and in reverse direction respectively and time of the month as leaves and summer. Secondly, now a days traffic light system executed with hard coded delays where the light glows time slots are fixed generally and do not depend on real time traffic flow. The third point is concerned with the state of one light junction that influences the flow of traffic at adjacent junctions. Also, the generally traffic system a crucial issue is related to the smooth motion through junctions of emergency vehicles of higher priorities such as ambulances, rescue vehicles, fire brigade, police and V.I.P persons that could get poke in the mob. The regular traffic system needs to improve to solve the severe traffic congestion, alleviate transportation troubles, reduce traffic volume and waiting time, minimized over all travel time and enlarge the benefits in health, economic and environmental divisions. This paper proposes a simple low budget, traffic light control system that aims to defeat many defects and improve that traffic management.

PROBLEM STATE MENT

The congestion of urban traffic is turning into one among the important problems with increasing population and vehicles in cities. Traffic jams not only cause further delay and stress for the drivers,

ISSN 2347–365
Volume 15,Issue 4,Dec 2023

however additionally increase fuel consumption, add transportation prices, and increase pollution. though it looks to interpenetrate everyplace, megacities area unit those most stricken by it. And it's increasing nature makes it imperative to understand the road traffic density in period of time for higher signal management and effective traffic management. The traffic controller is one in every of the important factors touching traffic flow. this traffic management systems that are in place area unit usually static, which implies that they do not regulate per the requirements of the traffic flow.

Proposed System

Our proposed system aims to present a traffic light controller based on Computer Vision that can adapt to the current traffic situation. It uses live video feed from the CCTV cameras at traffic junctions for real-time traffic density calculation by detecting the vehicles at the signal and setting the green signal time accordingly. The vehicles are classified as car, bus/truck, or rickshaw to obtain a more accurate estimate of the green signal time. We have used object detection like computer vision in order to detect the number of vehicles for each direction. We then set the timers of these traffic signals according to vehicle density in each direction and hence the system becomes adaptive. This helps to optimize the green signal times, and traffic is cleared at a far quicker rate than a static system, therefore reducing the unwanted delays, congestion, and waiting time, which in turn will reduce the fuel consumption and pollution.

METHODOLOGY

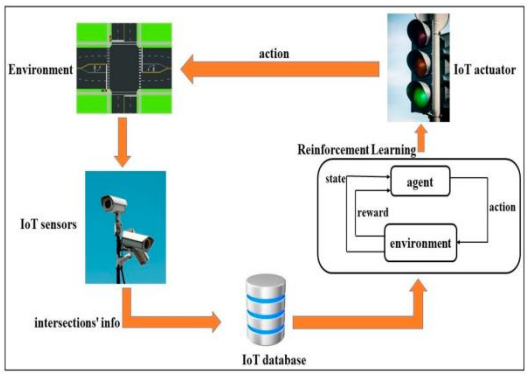
Now-a-days due to increasing number of vehicles it’s becoming difficult to manage traffic efficiently which leads to longer duration journey and maximum petrol consumption and to avoid this problem standard techniques was introduce such as manual traffic control which require more number of traffic person, static time traffic control which is not effective as it will use same timer for all lanes with heavy and light traffic and sensor based traffic management but this require heavy budget of sensor deployment to sense and manage traffic based on density. To overcome from above issues author of this paper is utilizing traffic cameras and YOLO object detection algorithms to estimate traffic density at all lanes and then adjust red and green signal time. Cameras will take snapshot of all lanes every five seconds and then estimate traffic at lanes and based on density green and red signal time will be adjusted.

International Journal of Information Technology & Computer Engineering
ISSN 2347–365
Volume 15,Issue 4,Dec 2023

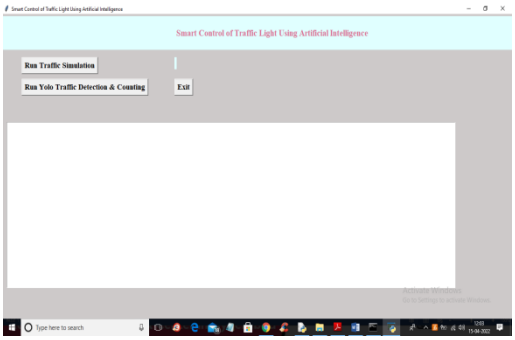
Proposed Methodology:

The number of vehicles of each class, such as car, bike, bus, and truck, is detected, which is to calculate the density of traffic. The signal switching algorithm uses this density, among some other factors, to set the green signal timer for each lane. The red signal times are updated accordingly. The green signal time is restricted to a maximum and minimum value in order to avoid starvation of a particular lane. A simulation is also developed to demonstrate the system's effectiveness and compare it with the existing static system

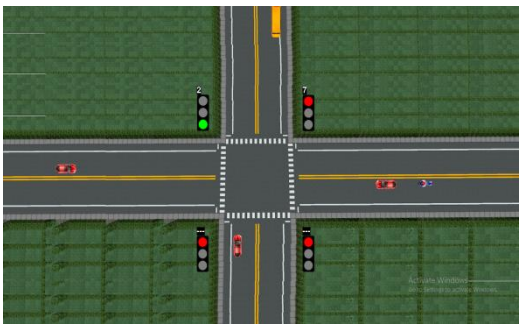
SYSTEM ARCHITECTURE :

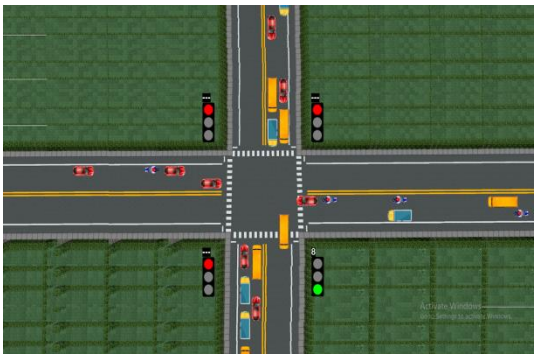


To run project double click on 'run.bat' file to get below output



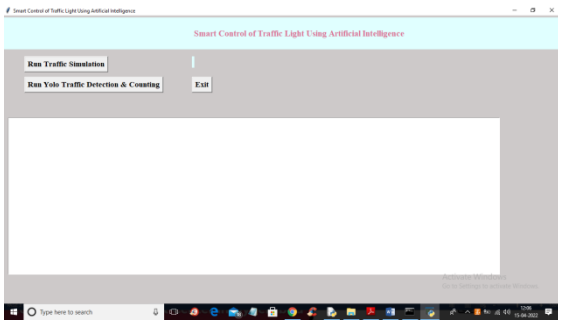
In above screen click on 'Run Traffic Simulation' button to start PYGAME simulation and get below output



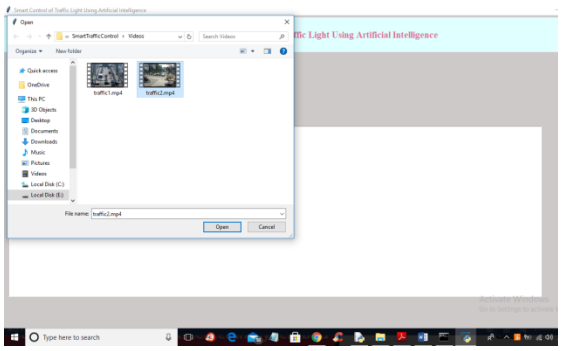


In above screen you can see PYGAME simulation output and at each lane traffic density is calculated and then adjust green and red line. This simulation run in INFINITE loop so you press 'windows' key from keyboard and then close application and then restart and run second YOLO module

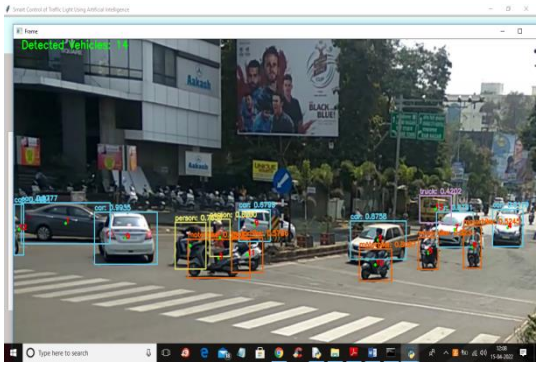
International Journal of Information Technology & Computer Engineering
ISSN 2347–365
Volume 15,Issue 4,Dec 2023



Now in above screen click on 'Run Yolo Traffic Detection & Counting' button to upload traffic video and then estimate traffic density



In above screen selecting and uploading 'traffic2.mp4' video and then click on 'Open' button to get below output



In above screen detecting traffic and then estimating its count and based on that traffic time will be adjusted. YOLO runs very slowly in normal laptop so let it finish all frame processing then u will get output.mp4 file which you can play as normal video with traffic density.

CONCLUSION:

In conclusion, the proposed system sets the green signal time adaptively according to the traffic density at the signal and ensures that the direction with more traffic is allotted a green signal for a longer duration of time as compared to the direction with lesser traffic. This will lower the unwanted delays and reduce congestion and waiting time, which in turn will reduce fuel consumption and pollution. According to simulation

results, the system shows about 23% improvement over the current system in terms of the number of vehicles crossing the intersection, which is a significant improvement. With further calibration using real- life CCTV data for training the model, this system can be improved to perform even better

REFERENCES :

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

[2] Khushi, "Smart Control of Traffic Light System using Image Processing," 2017 International Conference on Current Trends in Computer, Electrical, Electronics and Communication (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 Means of Fuzzy Logic," 2018 International Symposium ELMAR, 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," 2017 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), Aqaba, 2017, pp. 1-5, doi: 10.1109/AEECT.2017.8257768.

[5] Renjith Soman "Traffic Light Control and Violation Detection Using Image Processing”.” 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 density calculation using video processing," 2014 Recent Advances in Engineering and Computational Sciences (RAECS), Chandigarh, 2014, pp. 1-6, doi: 10.1109/RAECS.2014.6799542.

[7] Siddharth Srivastava, Subhadeep Chakraborty, Raj Kamal, Rahil, Minocha, “Adaptive traffic light timer controller” , IIT KANPUR, NERD MAGAZINE

[8] Ms. Saili Shinde, Prof. Sheetal Jagtap, Vishwakarma Institute Of Technology, Intelligent traffic management system:a Review, IJIRST 2016