International Journal of Innovative Research in Engineering
Volume 4, Issue 3(May-June 2023), PP: 259-262.
www.theijire.com ***ISSN No: 2582-8746***

Density Based Traffic Control System

U.L.Sindhu[1], Sandhiya.S[2], Visalatchi.T[3]
[1] M.E (CSE), Assistant professor (IT), VSB College Of Engineering And Technical Campus /Anna University, Tamilnadu, India.
[2,3] B.Tech(IT), VSB College Of Engineering And Technical Campus/ Anna University, Tamilnadu, India.

How to cite this paper:
U.L.Sindhu[1], Sandhiya.S[2], Visalatchi.T[3], "Density Based Traffic Control System", IJIRE-V4I03-259-262.

https://www.doi.org/10.59256/ijire.2023040384

Abstract: *Traffic congestion is biggest problem in many major cities and high traffic places across the world and it has become a nightmare for the commuters in these cities. The current system has fixed time given to each side of junction which cannot be varied as per varying traffic density. Junction timings allotted are fixed. When higher traffic density at which side then that side has longer green signal is allotted. The IR sensors are placed at the of every 5 meters of road side which can sense the object.*

Key Word: *Road Safety, Traffic Congestion, Vehicles, Smart City, Intelligent Transportation.*

I.INTRODUCTION

Now days, the absolute volume of road traffic affects the safety and efficiency of traffic situations. Around million people are killed each year in road accidents. Road traffic safety has been a stimulating problem in traffic management. One probable way is to deliver the traffic information to the vehicles so that they can use them to analyse the traffic environment. It can be accomplished by exchanging the information of traffic situation among vehicles. All the vehicles are traveling in environment , hence a mobile network is needed which can be self-organized and proficient of operating without infrastructure support. Complete comparison analysis of all the models developed in for all branches have been done to highlights the plus and minus points of these developed management system and based on their gaps in the literature have been highlighted in traditional industries. Smart transportation is playing an important role for the implementation of smart city. On one hand, more intensive effort is needed to be put into traffic control and management research as the urban congestion problem is becoming an increasingly major issue, both in developed countries and emerging new powers. Proteus was initially created as a multiplatform(DOS, Windows, Unix) system utility to manipulate text and binary files and to create CGI scripts. The language was later focused on Windows, by adding hundreds of specialized functions for: network and serial communication, database interrogation, system service creation, console applications, keyboard emulation, ISAPI scripting (for IIS). Most of these additional functions are only available in the Windows flavor of the interpreter, even though a Linux version is still available. 45 Proteus was designed to be practical (easy to use, efficient, complete), readable and consistent.

II.LITERATURE SURVEY

A.S.Dhatrak , Dr.S.T.Gandhepropose a concept " Automatic Traffic Signals in Smart Cities for Speedy Clearance of Emergency Vehicles", 2018. Traffic jams are the main issue in cities of developing Countries like India, China. The second-class families now 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA) become economically strong and the population of second class families is also more which results in more vehicles in numbers. Due to space problems roads are small which results in traffic block and chaotic condition. In the Green Corridor System, all the red signals which come in the track of emergency vehicle becomes green, means it creates a green track to the emergency vehicle. A 'green corridor' is the part of traffic control system. With a'green corridor' setup, an emergency vehicle does not get any red signal because as the vehicle comes near to the traffic signal, the signal becomes green and create a green track to the vehicle [15]. GPS is placed on the vehicle do not have any problem. The disadvantages of the green corridor system are when the wave gets disturbed the whole system gets collapsed. If the emergency vehicles reach late at the signal the traffic jam condition can occur. Till now these type of system is developed using strobe light Emitting System, The mobile Infra-Red Transmitter (MIRT) System, Acoustic Systems, RF Systems and usingGPS system, In all the above systems the GPS system is mainly used because the GPS is easy to install and working over it is some how easy. the high light emitting device is fixed over the ambulance at various positions like at top and in the middle. These light is going to transmit the high-intensity light at the signal. The strobe light receiver is fixed over the traffic signal, which

receives the high-intensity light at as per that it can go to recognize the direction of the ambulance and then it will clear the traffic signal. This system is having a disadvantage like it emits high intensity light, so it can go to distract the other vehicle drivers due to whi h the accidental conditions can occur. Using Automatic traffic signal changes based on GPS system we an control the traffic. By this system, the traffic jam problem faced by the peoples can be reduced. Also in some condition where the emergency vehicles get fixed in a traffic jam, such hectic situations can be avoided using this system. So in cities of countries like India, where the road is small and vehicles are more the automatic traffic signal control system can become more useful.

N.Prakash E.Udayakumar N.Kumareshandescribe a concept, "Arduino Based traffic congestion control with automatic signal clearance for emergency vehicles and Stolen Vehicle Detection",2020. Arduino Based traffic congestion control with automatic signal clearance for emergency vehicles and Stolen Vehicle Detection. IR sensor is used to fastening the density of path be contingent on this density the signal timing alterations automatically [8]. When the ambulance forthcoming the junction, the particular path switch is identified by ambulance driver, where RF transmitter is positioned in the ambulance. The RF receiver receives the signal, which is located with the microcontroller. From that ambulance will be permits smoothly [10]. Whenever any person buys a vehicle, one first wants to get his or her vehicle recorded at the RTO office. RTO On the other hand, whenever any vehicle owner registers a complaint to RTO office concerning theft individual entry is made in the file. With the help of this stolen vehicle can be easily identified by RFID technology. The Automatic Traffic control system is calculated could repeatedly detect the density of the vehicle. The system could mechanically open and close the gate. The gate closed suggestion is signified by buzzer sound. The ambulance can also permit smoothly. These were the major attainments met in the project, among other purposes also achieved which include congestion control, ambulance permission and stolen vehicle detection. Reading things and objects in motion can be done correctly using RFID. A system advanced with high security and the overall cost of employing the system may seem high but after a year of administration the system, very high profits will be realized. The need for an adaptive traffic light system requires a predefined hardware with a set time for green and red light. To boost this we have a basis for a network of smart traffic mechanisms. We have generally seen that the modern traffic light system does not rely on the traffic density. So we have suggested a system in which the time period of green light and red light is determined depending on the amount of the current traffic at the moment. This can be done through the investment of IR sensors. With the aid of ATMEL 89C51 microcontroller, the glowing period of green light is allocated once the density is measured. The up-to-date sensors on either side of the road must detect the vehicle presence and send the information to the microcontroller. Based on that data the decision will be made by the microcontroller. a RFID and GPS based Automatic Lane Clearance for Ambulance. The focal point of this technique is to diminish the postponement in apple.

S. L. Mak, W. F. Tang C. H. Li, W. H. Chiu, H. S Chan, and C. C. Lee propose a concept "The Development of Smart Traffic Analysis System"2018. In this paper, some traffic monitoring measurements systems are included. Vehicle tracking algorithms are one of the systems that can provide traffic data, and the system can be configured to project visual images for analysis. Congested transportation is a key issue in Hong Kong. Being able to collect traffic density data for analysis can provide effective an substantive data for sustainable development. To provide unobstructed traffic, thereby reducing lane density and reducing obstruction to emergency services. There are video processing methods to understand traffic conditions. These systems can only capture different traffic conditions to evaluate traffic details. The system will install a mounted monitor camera that focuses on the traffic scene and captures the actual image into the video frame. Use Lab VIEW to extract useful and accurate traffic information from the image, such as speed, and traffic density, through appropriate image processing and data analysis programs. LABVIEW is a graphical programming software that takes commands, and provides a platform for pre-processing and post-processing data. Using the visual aids with LABVIEW software, that can analyze traffic from various obstacles and from data analysis, create complex algorithms and evaluate measurement accuracy. To facilitate the data analysis process, it is necessary to have a traffic field in the background subtraction application, and the moving foreground object and the video segment of the initial background reference frame N need to be used to track the object. There are many different monitoring and measurement technologies have been developed to measure traffic data and analyse real-time traffic conditions. It is difficult to chase vehicles to generate actual traffic information in crowded and dense traffic situations. In chaotically traffic condition, the monitor system allowed to record vehicles movement. It found that many vehicles are in substantial clutter situation. This system uses probabilistic inference to evaluate the rate of traffic flow by estimates the lane of traffic. To use the Virtual Instrumentation software of LABVIEW to estimate the density on the traffic road from the image analysis of the chaotic traffic conditions in Hong Kong. This data is very helpful to improve traffic. Due to the accurate rate, the system is able automatically calculate traffic density and provides comprehensive images in real time to provide sufficient and accurate traffic information. Video Processing through image analysis, the system functions can automatically the traffic monitoring functions, which reduces the manpower to monitor and reduce human errors, thus reducing the cost of the traffic monitoring system. All in all, the accurate availability of traffic information and its practical application will be of great help to future extension works.

VAN-THUAN TRAN AND WEI-HOTSAI introduce a "Acoustic-Based Emergency Vehicle Detection Using Convolutional Neural Networks",2020. A convolutional neural network (CNN)-Based ensemble model (Siren Net) with two network streams is designed to classify sounds of traffics ound scape to siren sounds, vehicle horns, and noise, in which the first stream (Wave Net) directly processes raw waveform, and the second one (ML Net) works with a combined feature formed by MFCC (Mel-frequency cepstral coefficients) and log-mel spectrogram. Our experiments conducted on a diverse dataset show that the raw data can complement the MFCC and log-mel features to achieve a promising accuracy of 98.24%in

the siren sound detection. MODEL FOR ACOUSTIC-BASED EVD With an assumption that the features directly learned from raw waveforms and handcrafted features like MFCCs and log-mel spectrogram may contain different patterns and information of a given sound, we explore the complementary relationship between these kinds of features by building a CNN-based ensemble model based on these two feature inputs and assessing the proposed model's performance in classifying siren sounds, vehicle horns, and noises. Such an ensemble model is called Siren Net. The proposed architecture consists of two parts: a 2D-CNN stream and a 1D-CNN stream, which are referred to as ML Net and Wave Net, respectively. The Wave Net works directly with raw waveform, while the ML Net is trained with aggregated features formed by image-based features (MFCC, and log-mel spectrogram). Then, the prediction results (soft max values) derived from ML Net and Wave Net are combined using the Averaging method to make the final predictions. As a necessity for building the network, the length of the input samples must be equal. At each training epoch, we select different segments of the same recording, but the segments have the same label. This process naturally increases the number of training samples so that it also plays the role of sample-level data augmentation. We test the network using the majority voting approach, in which we also split a test sample to various fixed-length segments and then input them to the network and perform majority voting of the predictions corresponding to all input segments. Extracted from raw waveforms and handcrafted features. Also, the Siren Net requires a short inference time of 27ms, which is well acceptable for real-time detection. The results of this work lay a good foundation for future development and applications. Although we have achieved promising results in this work, future work is still needed to improve the detection performance and to meet the need for reliable and convenient emergency vehicle detection systems. For example, the primary focus in our future work could be the localization of siren sources so that the detection system could also provide information about the direction of the emergency vehicles to drivers.

III.METHODOLOGY

Existing Method:

In the existing system, each traffic signals have a traffic polices to control the traffic manually. So it leads to large number of traffic policies are needed in real time, but it not possible to allocate each signal for one traffic police. Many traffic signals junction, one path is may have heavy traffic but the signal will work on fixed time only so it leads to heavy traffic in the cities.

Proposed Methodology:

In this proposed methodology we will provide solution to congestion, traffic clearance to ambulance and other emergency conveyances and tracking. The traffic management is done based on traffic density in lane. At particular side, sometimes even if there is zero traffic, people have to wait. Because the traffic light remains red for the preset duration, the road users should wait until the light turn to green. The solution of this quandary is by developing a system which detects traffic flow on each road and set timings of signals accordingly. Moreover, synchronization of traffic signals in adjacent junctions is withal bligatory. From present situation, an efficient solution to the quandary is not yet obtained. Hence in order to provide efficacious solution this archetype is designed. In this proposed methodology we will provide solution to congestion, traffic clearance to ambulance and other emergency conveyances and tracking.

Features:

Easy interface to all microprocessors
Operates ratio metrically or with 5 VDC or analog span
Adjusted voltage reference
No zero or full-scale adjust required
8-channel multiplexer with address logic

IV.WORKING

When sufficient voltage is applied to the electrodes the liquid crystal molecules would be aligned in a specific direction. The light rays passing through the LCD would be rotated by the polarizer, which would result in activating/highlighting the desired characters. The power supply should be of +5v, with maximum allowable transients of 10mv. To achieve a better/suitable contrast for the display the voltage (VL) at pin 3 should be adjusted properly. A module should not be removed from a live circuit. The ground terminal of the power supply must be isolated properly so that voltage is induced in it. The module should be isolated properly so that stray voltages are not induced, which could cause a flicking display. LCD is lightweight with only a few, millimeters thickness since the LCD consumes less power, they are compatible with low power electronic circuits, and can be powered for long durations. LCD does not generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. LCDs have long life and a wide operating temperature range. Before LCD is used for displaying proper initialization should be done. LCDs with a small number of segments, such as those used in digital watches and pocket calculators, have individual electrical contacts for each segment. An external dedicated circuit supplies an electric charge to control each segment.

This display structure is unwieldy for more than a few display elements. Small monochrome displays such as those found in personal organizers, or older laptop screens have a passive-matrix structure employing super-twisted pneumatics (STN) or double-layer STN (DSTN) technology—the latter of which addresses a color-shifting problem with the former—and color-STN (CSTN)— wherein color is added by using an internal filter. Each row or column of the display has a single electrical circuit. The pixels are addressed one at a time by row and column addresses. This type of display is called passive-matrix addressed because the pixel must retain its state between refreshes without the benefit of a steady electrical charge. As the number of pixels and correspondingly , columns and rows increases, this type of display becomes less feasible. Very

slow response times and poor contrast are typical of passive matrix addressed LCDs. Highre solution color displays such as modern LCD computer monitors and televisions use an active matrix structure. A matrix of thin-film transistors (TFTs) is added to the polarizing and color filters. Each pixel has its own dedicated transistor, allowing each column line to access one pixel. When a row line is activated, all of the column lines are connected to a row of pixels and the correct voltage is driven onto all of the column lines. The row line is then deactivated and the next row line is activated. All of the row lines are activated in sequence during a refresh operation. Active-matrix addressed displays look "brighter" and "sharper" than passive-matrix addressed displays of the same size, and generally have quicker response times, producing much better images. A general purpose alpha numeric LCD, with two lines of 16 characters. So the type of LCD used in this project is16 characters * 2 lines with 5*7 dots with cursor, built in controller, +5v power supply, 1/16 duty cycle.

V.CONCLUSION AND FUTURE SCOPE

In this design work, a density predicated traffic light control system was developed for traffic control at road intersection to minimize nonessential time wastage and minimize road traffic casualties which the subsisting conventional traffic light control system has failed to ignore traffic signals. Lastly, the objectives of the design were achieved Concretely, it demonstrates a working software solution for controlling traffic predicated on the density of traffic on each lane at the intersection.

References

1. *J. Fei, X. Fei, L. Lei, and W. Xin-Dong, "Latent event-related burst detection in social networks," Acta Automatica Sinica, vol. 44, no. 4, pp. 730–742, 2018.*
2. *F.-Y. Wang et al., "Where does AlphaGo go: From church-turing thesis to Alpha Gothesis and beyond," IEEE/CAA J. Automatica Sinica, vol. 3, no. 2, pp. 113–120, Apr. 2016.*
3. *F.-Y. Wang, "Artificial intelligence and intelligent transportation: Driving into the3rd axial age with ITS," IEEE Intell. Transp. Syst. Mag., vol. 9, no. 4, pp. 6–9, Oct. 2017.*
4. *A. P. Athreya and P. Tague, "Network self-organization in the Internet of Things ," in Proc. IEEE Int. Conf. Sens., Communication Network. (SECON), Jun. 2013, pp. 25–33.*
5. *Z. Zheng, W. Wu, X. Chen, R. Hu, X. Liu, and P. Wang, "A traffic sensing and analyzing system using social media data," Acta Automatica Sinica, vol. 44, no. 4, pp.656–666, 2018.*
6. *I. Sirmatel and N. Geroliminis, "Economic model predictive control of large-scale urban road networks via perimeter control and regional route guidance," IEEE Trans. Intelligence Transp. Syst., vol. 19, no. 4, pp. 1112–1121, Apr. 2018.*
7. *H. Liu, J. Qi, J. Wang, P. Li, C. Li, and H. Wei, "EV dispatch control for supplementary frequency regulation considering the expectation of e v owners," IEEE Trans. Smart Grid, vol. 9, no. 4, pp. 3763–3772, Dec. 2016.*
8. *H.-M. Chung, W.-T. Li, C. Yuen, C.-K. Wen, and N. Crespi , "Electric vehicle charge scheduling mechanism to maximize cost efficiency and user convenience," IEEE Trans. Smart Grid, vol. 10, no. 3, pp. 3020– 3030, Mar. 2018.*
9. *H. Liu, K. Huang, N. Wang, J. Qi, Q. Wu, S. Ma, and C. Li, "Optimal dispatch for participation of electric vehicles in frequency regulation based on area control error and area regulation requirement," Appl. Energy, vol. 240, pp. 46–55, Apr. 2019.*
10. *A. C.Melhorn, K. McKenna, A. Keane, D. Flynn, and A. Dimitrovski, "Autonomous plug and play electric vehicle charging scenarios including reactive power provision:*
11. *C. Peng, J. Zou, and L. Lian, "Dispatchingstrategies of electric vehicles participating in frequency regulation on power grid: A review," Renew. Sust. Energy. Rev., vol. 68, pp. 147–152, Feb. 2017.*
12. *Z. Guo, Z. Zhou, and Y. Zhou, "Impacts of integrating topology reconfiguration and vehicle-to-grid technologies on distribution system operation," IEEE Trans. Sustain. Energy, May 2019.*
13. *H. Zheng, X. He, Y. Li, and S. Peeta, "Traffic equilibrium and charging facility locations for electric vehicles," NETW SPAT ECON, vol. 17, no. 2, pp. 435–457, Sep.2017. [17] A. Y. Lam, J. James, Y. Hou, and V. O. Li, "Coordinated autonomous vehicle parking for vehicle-to-grid services: Formulation and distributed algorithm," IEEE Trans. Smart Grid, vol. 9, no. 5, pp. 4356– 4366, Jan. 2017.*
14. *Z. Guo, J. Deride, and Y. Fan, "Infrastructure planning for fast charging stations in a competitive market," Transp. Res. Part C Emerg. Technol., vol. 68, pp. 215–227, Jul. 2016. [19] Z. Chen, W. Liu, and Y. Yin, "Deployment of stationary and dynamic charging infrastructure for electric vehicles along traffic corridors," Transp. Res. Part C Emerg. Technol., vol. 77, pp. 185– 206, 2017.*
15. *M. H. Amini and O. Karabasoglu, "Optimal operation of interdependent power systems and electrified transportation networks," Energies, vol. 11, no. 1, p. 196, Jan. 2018.*
16. *M. H. Amini, J. Mohammadi, and S. Kar, "Distributed holistic framework for smart city infrastructures: tale of interdependent electrified transportation network and power grid," IEEE Access, vol. 7, pp. 157 535–157 554, Oct. 2019.*
17. *S. Zhou, Y. Qiu, F. Zou, D. He, P. Yu, J. Du, X. Luo, C. Wang, Z. Wu, and W. Gu, "Dynamic e v charging pricing methodology for facilitating renewable energy with consideration of highway traffic flow," IEEE Access, vol. 8, pp. 13 161–13 178, Dec. 2019.*