# SmartTrafficMonitoringSystembasedonvehiclecounts.

**group04**

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*ThetrafficManagementsystemisthekeystoneofasmartcity. Ifthenumberofvehiclesthataretobepassedthroughacrowdedjunctioncanbepre-estimatedintime,traffic blockagecanbemanagedeffectively.Inthispaper,amethodisdemonstratedtocontrolthetrafficsignalsbasedonthecount ofautomobilesandpedestrians.Thedatafromboththeses systems are given to the Node MCU board. The proposedmethod presents a framework, which will optimize the timingintervalofthetrafficsignalpurelydependingonthenumberof vehiclesonthatparticularroadside.Thenumberofvehiclespassin g through an area well before the preferred trafficjunction can be estimated using the help of image processingtechniques. Further, the monitoring information can be sharedtoadistantcontrollingcentersituatedanywhereinthecityvi a internet usage. The decrease in waiting time for drivers tocrosssignalwillbethemajoradvantageofthisproposedsystem.I nthismodel,weareusingOpenCVforimage processingandvehicledetection.Theinputofthesesystemsisvehicl escountsoneachsideoftheroadfromthecrossingsignalandthisinp utwillbedeterminedbyhowmuchtimeis tobeprovided.*

**:**Traffic ManagementSystem(TMS),OpenCV,NodeMCU,ImageProcessing,VehicleDetection.

***KeyWords***

## 1. INTRODUCTION

TrafficCongestionisanexcessiveandconspicuoushassle, properly controlled via the use of website onlinetrafficalerts,andadependablewaytoperformintersections insidetheeverydaywebsitevisitorsworldwide.numerous breathingtroublessuchasbronchialasthmaandbronchitisdue toexposuretoavenuedustandautomobileemissions.inaddition,trafficpoliceandpedestriansareatmultipliedriskoflung maximumcancersbecauseofpublicitytoairpollutantsthat WHOhasclassifiedascarcinogenic.

Manytroublesariseduetothenormalindividualtimer.

They repeattheidenticalsegmentseriesandnolongeruse the shoppingforandpromotingduration.similarly,the long-preparedtimeofthecarintheusageofmodeendsininefficientgasconsumptionandmultiplied environmental pollution.

Indiaismanyofthe10countrieswiththemaximum web pagetrafficcongestion.Mumbai,Bangalore,NewDelhi. human beings are under pressure to spend hours withsite visitors and waste valuable time commuting. cutting-edge web page traffic mild controllers use tough, speedytimers and do not adapt to real-time site visitors on theroad.toalleviatetrafficcongestion,wehaveadvanced anadvancedtravelermanagementtoolthatcouldautonomouslyadapttothevacationer'sscenarioonTrafficsymptomswithintheshapeofacomputerimaginativeandprescient-primarilybasedtrafficmildcontroller.



### 1.1 ExistingSystem:

In India the existing traffic system is for each red signal60 seconds willbegiven,whetherthetrafficonthat particular roadisheavyorlight,withthisthewastageoftimewill be highandtrafficinotherlaneswillbeincreasing.

### 1.2 ProposedSystem:

Themainobjectiveoftheprojectistodesignatrafficlight system based onthevehiclecountsinthatcurrentsituation.Heretheproposedsystemtakesthelive streaming frompublicsurveillancecamerasattrafficjunctions and detectingthevehiclesatthesignalsetsthegreensignal time.

Herevehicleswillbeclassifiedsuchascars,bikes, buses/trucks,andrickshawstoobtainamoreaccurateestimateof the greensignal time.

Our proposed system will pass the live streaming from public surveillancecamerasfromthetrafficjunctions.In the cloud,thealgorithmwillprocessthelivecamfeedand every framefromtheliveisprocessedandwillgothrough the OpenCVfiltersanddetectsthecontoursandmovements of objectsonthelane(road)inthefeedandconsiders and distinguishesitasvehicles,animalsandhumanbeings which are takenintoaccountanddensityofthetrafficis defined and the magnitude of the instantaneous density andincrem ntindensityissenttotheon-boardvehicle manager andvehiclestrafficmanagementalgorithmwilldecide which lan trafficlightwillglowfirstandforhowmuchofthe time willbeneededtothatparticularlaneandupdatethe red signaltimesoftheothersignals.

**dTe2.IMPLEMENTATION**Example:

1st lane = 30 Vehicle

Counts2ndlane=40VehicleCo

unts3rdlane=60VehicleCount

s

so,thetimedividedistothelanesislike

Green light time for 1st lane = [30/ (30+40+60)] *120

secGreenlighttimefor2ndlane=[40/(30+40+60)]*120secGr

eenlighttimefor3rdlane=[60/(30+40+60)]*120sec

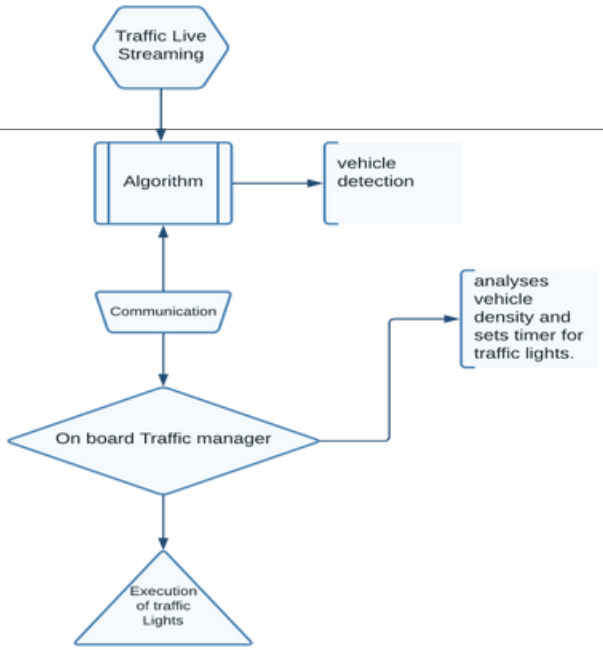


**Fig.1.ProposedTrafficmodelsystem**

Traffic Management System is to get the vehicle counts inreal-timebyusingOpenCValgorithmsinthecloudherewearedetecting themovingobjectsinthelivecamusing backgroundsubtractionalgorithmslikeMOG,MOG2,GMG

InourcriteriaweusedMOGtoeasilydetectthemovements andtogetridofshadowandnoiseweusedgaussianblurandalsoconvertedthevideoframesonebyonetogreyscaleand then passed through the Image subtraction MOGalgorithmsotheupperlayeroftheframeshasbeendetected and then the algorithm will mark it with rectangle frame forevery moving objects so an if loop will count the number ofrectanglesbyaddingadotintherectangleandthenwehavecreatedavirtuallineintheframesothenumberofdotswhichwillcross theline isthecount ofvehicles.

Fornow,thecloudimageprocessingisdone.Fromherewe havetotransferthenumberofvehiclesineverylanesdatatotheon-boardtrafficmanagingunitwhichisanIoT-basedmicrocontrollerNodeMCUthetransferofdataisdonebyTCP/IpusingpythonURLandHTTPSlibrariesheretheIPaddressoftheNodeMCUofeverylaneisprovidedtothecloud in a table or a datagram so that the data is sent to therespectiveon-boardtraffic managementunits.

Theon-boardunitwhichisNodeMCUwillcalculatethetime tobeallocatedtoeverylanetrafficsignalaccordingtothedensityby dividingthe2-minutetimeframetoeverylaneaccordingtothepercentageofdensityontherespectivelanes.

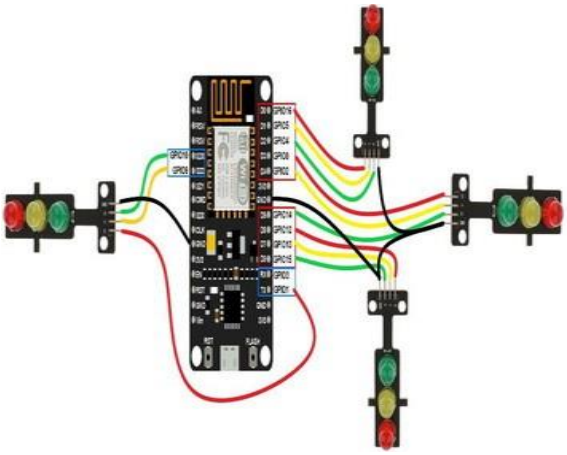

**Fig.2.NodeMCUInterfacing**

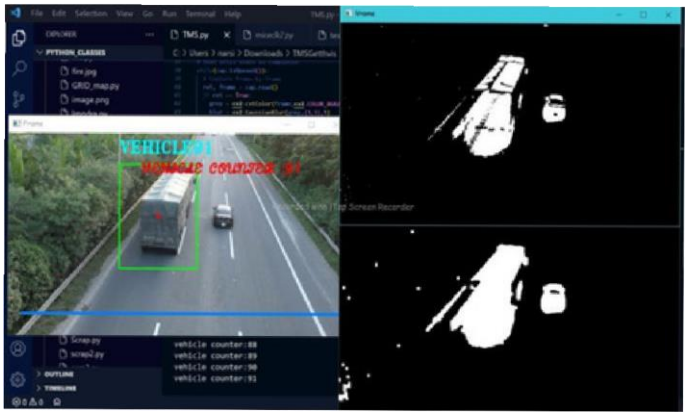

**Fig.2.Real-timeoperation**.

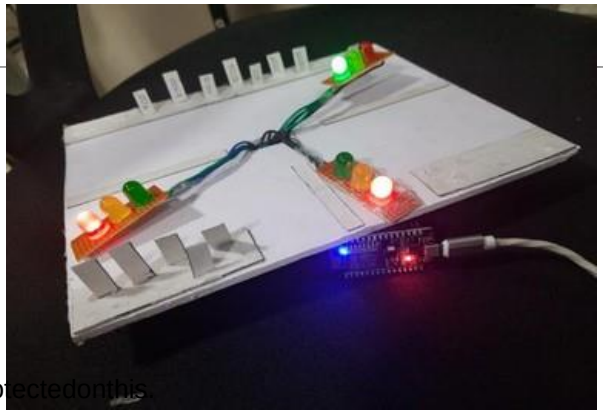

**Fig.2.Trafficlightsignalinaworkingprocess**.Synchronizationofsitetrafficsignalsthroughoutmorethan oneintersection.Synchronizingindicatorsalongastreetcan

## 3. CONCLUSIONS

gainthecommutersassoonas avehicleenterstheroad,it cancontinuewithminimalprevention.

Wearesuccessfulinclassifyinghumans,vehicles,and animalsaspreciselyaspossible.Detectionofthese at objects willvaryaccordingtotheweatherconditionsas wellasdayandnightduration,wearetryingtoimprove oursystemforeveryweatherandlightingconditionasthewhol esystemdependsuponthequalityofvideocaptured by the cameras like exposure, saturation, hueand color temperature. Our algorithm divides the trafficlighttimingefficientlysentaspossible.So,ourwhole trafficmanagementsystemworksnearly96%efficientlywhen comparedtopresentworkingtrafficmanagement systems.

## 4. FUTURESCOPE:

Becauseofthenon-stopincreaseofthepopulationinside the global, it is an extraordinary challenge for theimminent generation to manipulate the Traffic system. agood deal of improvement will come in the future. Tomanipulate the conventional transport device, we mustconsideranintelligentandautomatedmannerofcontroll ing the machine. as the population increases, itwill increase the range of motors also. to manipulate thehuge wide variety of vehicles intelligent methods ought tobe followed. For future purposes, we can use the picturesensororimager.Itdoesitsworkbygeneratingphotos oftheroads.Itcreatestheimagewiththeaidofchangingthe variable attenuation of mild into a sign that conveysthephotograph.

The venture can be further increased to consist of thefollowingfunctionalitiestoenhancetrafficmanagement and conveydown congestion:

Identityofautomobilesviolatingtrafficregulations:The motorsgoingforwalkspurplelightingfixturescanbediagnose dinaphotographoravideomoveusing

definingaviolationlineandtakingpicturesthewidevarietyplate ofthephoto ifthat line iscrossed whenthe sign ispink.

Lane changingcanalsoberecognizedinaddition.thesemay be accidentorbreakdowndetection:Intersectionsalsotendto revelinintensecrashesbecausenumeroussortsofinjuriouscras hes, consisting of attitude and left-flip collisions,commonlyoccurthere.consequently,accurateandac tivateddetection of injuries at intersections gives remarkableblessings of saving houses and lives and minimizingcongestionanddelay.thiswillbeachievedwiththeaid offiguring out the vehicles that remain desk-bound for a longterm in an inappropriate function together with within themiddleofthestreet,sothatparkedautomobilesarenot protectedonthis.

Adaptingtoemergencymotors:Emergencycarssuchasan ambulancewanttoacceptfasterpassagethroughthetrafficindic ators.Themodelcanbeeducatedtohituponnolongerjustcarsbu tadditionallybeabletorecognizethatitisan emergencyvehicleandhenceadaptthetimerssuchthatthe mergency vehicle is given priority and may cross the sign the earliest.

## REFERENCES


[1]A.Kanungo,andA.Sharmaintheyear2014, proposed a solution using video processing. The videofrom the live feed is processed before being sent to theserverswhereaC++-basedalgorithmisusedtogeneratetheresults.Hardcodeand Dynamiccodedmethodologiesarecompared,inwhichthedy namicalgorithmshowedanimprovementof35%.

[2] SakunaProntri,andPongpisitWuttidittachotti,inthe yearof 2015,proposedafuzzylogic-controlledtrafficlight canbeadaptedtothecurrenttrafficsituations.This system makesuseoftwofuzzycontrollerswith3inputsand one outputforprimaryandsecondarydriveways.A simulation was donеusingVISSIMandMATLABandforlow traffic density,itimproved trafficconditions.

[3] SiddharthSrivastava,andRajKamalintheyear 2016, proposedtheuseofadaptivelighttimercontrolusing image processing techniques and traffic density. This systemconsistsofamicrocontroller-controlledtrafficlighttimer,high image sensing devices, MATLAB, and transmissionusing UART principles. However, this system fails toprioritizetheauthorizedemergencyvehiclesnorto detect accidentsattheintersection.