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Density based Traffic Light Control Using Retransmitted and Receiver

Arun Francis G[1], Kanishya A[2], Lalithambiga M[2], Niveka S[2], Nivedha E[2]
Assistant Professor[1], Student[2], Department of Electronics and Communication Engineering,
Karpagam College of Engineering, Coimbatore-641032.

***Abstract*—** The primary goal of our research is to reduce thesnarl-up crisis, which has become a major issue in recentyears.Thenewtrafficcontrolsignalscheme,asweallknow, consists of pre-programmed circuitry for stop and gosignals, as well as a set timer. To reduce this problem to amaximumextent,we'vedevelopedaprototypeforanintelligenttrafficsignalcontrolsystem.Typically,we'veshown that the regular traffic light system is unaffected bytraffic density. As a result, we prefer to project a patternthroughout that the amount of time you have for stop and gosignals is dependent on the density of vehicles at the time.Infrared sensors play a vital role in finding the density. Themicrocontroller's suggestion determines the length of timethe go signal glows, which is based on the density measuredon the lane. The sensors which are fixed on all the lane willdetectthevehicle'scompanionandsendsanacknowledgment to the microcontroller. The microcontrollerconcludes the glowing time of the go signal and stops thesignal based on the details. It implies that the traffic lights'temporal order is set in accordance with the vehicle density.This has the potential tobe extremely useful among thesnarl-up reductions, and it also has the potential for futuredevelopment.

Keywords-Inthispaperincludedensity-basedtrafficcontrol,infraredsensors,RFtransmitter&receiver,andmicrocontroller-based algorithm.

I. INTRODUCTION

The human being is God's most intelligent creation. Humanbeings are constantly inventing new inventions in order tomakelifesimpler.Peoplearebeginningtogrowtheirstandardoflivingfrom theirhomes,withnewwingsofhope. This may be one of the reasons why traffic congestionon the roads is getting heavier by the day. Two big concernshave resulted as a result of this. A square measure is createdand if there is no traffic, you will be forced to wait. Massivetraffic congestion and other problems arise as a result ofinadequatetrafficmanagement.Mountedmanagement'sdescription On traffic, we have a tendency to not dominatetraffic in accordance with density, but we do so in terms ofprogramming that is already in place among the systems. Tocounter the drawbacks of a difficult and fast traffic lightsystem, we prefer to implement a bearing system that reliesondensitytomaintaintrafficcontrol.'Intelligenttrafficcongestionmanagementsystembasedonde nsityisthename of the scheme. A device that can modulate itself tokeep up with the number of cars, or density, is referred to asan intelligent traffic congestion management system basedon density. We're creating a conventional control system, anassociatedegreeintelligenttrafficcongestioncontrolsystem, with the aid of IR sensors .A infrared transmitterandareceivermakeuptheIRsensingportion.Theseinfraredtransmittersandreceiverswillbe mountedatafixeddistanceoneithersideofthelane.Infrareddetection featurecandetectthevehicleasitmovesthroughtheroadand sends the data to the microcontroller. Themicrocontrollercankeeptrackofhowmanythereare,adjust the LED's glowing time to the amount ofvehiclescorrespondingtothedensityofsuchcars.LEDswillglowforlongerthannormalifthedensityishi gherortheotherwayaroundifthedensityislower.Thekeybenefitofthisapproachisthatitcutsdownonvehicl ewaittimes.Sinceweallrealizethattimeisthemostimportantassetthesedays,mostdriversbreaktrafficlaws simplytogettotheirdestinationontime.Thereasonforviolatingtrafficlawsistoattendforanextendedperio doftimeregardlessofwhetherornottrafficisavailable.Asaresult,theproposedschemeisinanexcellentposi tiontoreducepeople'sproblemswhilealsoreducingthenumberofincidentsthatoccurona regularbasis.

II. EXISTINGSYSTEM

Currently,trafficiscleansedbytrafficcopsusingasystem oftrafficsigns,handsignals

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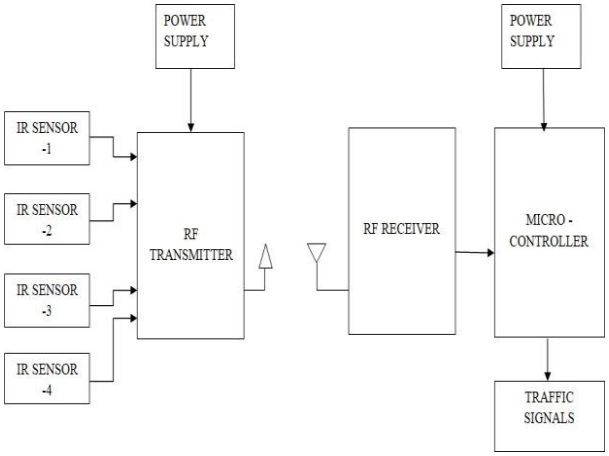
andmarkings.Stopsigns, for example, have a red institution and are polygonworkedasafiddle;everyvehiclecontrolmanagementwidgetisobligedbydegreesofstructureandu se;Stopsigns,for example, have a red institution and are shaped like afiddle. Arrange templates to communicate with the driver toeasily and systematically comprehend the sign on the road'sfield of view. The standard use of tints and forms assists inthis particular statement and the selection of the best methodof operation In the present case, traffic signals are beingattacked in other ways, such as with a fixed time delay,which maintains a particular timeframe when dynamicallymoving from one sign to another, creating unwanted andunnecessary chaos on one route while leaving other routesvacant. The solutions wesuggestmonitor the amount oftraffic on particular roads and provide real-time data as aresult,controlthecompositionofthesign'sdetection.

III. PROPOSEDSYSTEM

Inoursystem,infraredsensorsplayacriticalroleindetecting traffic density in all lanes. One IR detectormustbe installed for each lane; these sensors will always detecttraffic on that specific route. These sensors are wired to anRFTransmitter,andthedatatransmittedbytheRFTransmitter is received by a microcontroller-connected RFreceiver. The microcontroller senses and clears traffic basedon the results of these sensors. To address traffic congestion,we usually propose a device that employs simple electroniccomponentssuchasalight-emittingdiodeasasignalindicator, The density was aided by IR sensors to determinevehicle density and a microcontroller to outline the amountoftimespentwaiting for atraffic signal.

IV. SYSTEMPROTOTYPE



V. HARDWAREDESCRIPTION

A. PowerSupply

Asupplyof+5V withrespecttoGNDhasbeendeveloped tomeetthepowerrequirementsofthehardwareoftheintelligent traffic signal system. The TTL logic level used inthese circuits ranged from 0V to 5V. It contains a 0V to 9Velectrical unit that converts 220V AC to 9V AC. The 9V isconverted to 9V2 DC by the bridge rectifier. It's then filteredthrough a 1000uF capacitance before being controlled with a7805toachieve+5V.Additionalfilteringof220uFcapacitance is used to separate the +5V output voltage fromnoise.

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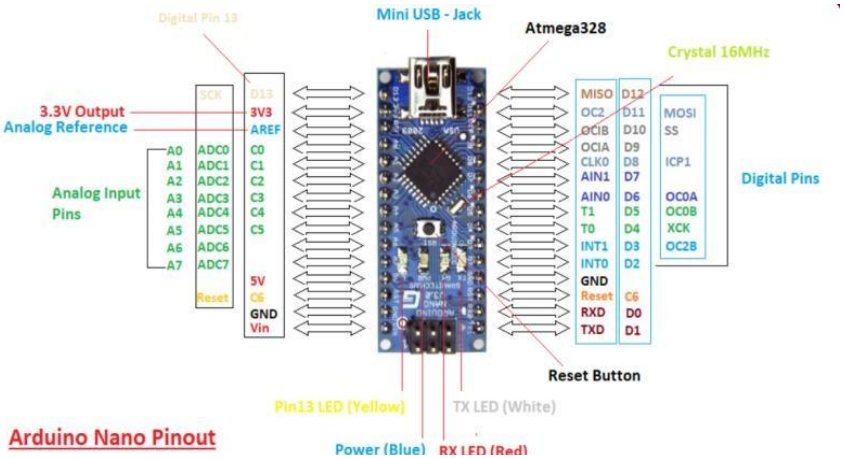
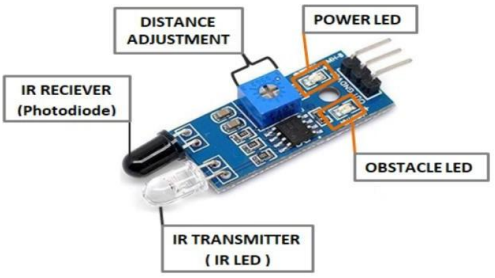
B. Arduinonano

Itisasmall,consistent,andtensileopen-sourcemicrocontroller with the ability to be quickly programmed,reprogrammed,anderasedatanytime.TheArduinoplatform, which debuted in 2005, was developed to offerhobbyists,students,andprofessionalsalow-costandconvenientway to create computersthatmove in responsetotheirsurroundingsbyusingsensorsandactuators.Centered on a free and open-source computing platform fordesigning and programming electronic devices. It can alsoact as a mini-computer, similar to other microcontrollers, byaccepting inputs and manipulating outputs for a variety ofnaturalphilosophydevices.Italsosendsandreceiveswireless data with the aid of several Arduino shields, whicharediscussedinthisarticle.



C. Infra-redSensors

Inoursystem,infraredsensorsplayacriticalroleindetecting traffic density in all lanes. They're arranged onbothsidesoftheroadandcommunicatewiththemicrocontroller via an RF receiver and transmitter module.The microcontroller senses traffic and controls it with thehelpofthesensors'output.Themicrocontrollerisattachedto IR sensors. If there is traffic on the lane, the output of thatparticular detector becomes logic one; otherwise, it becomeslogic zero. Based on the results of the IR sensors logics, themicrocontroller adjusts the glow time of the go signal of thecorresponding junction to a much higher value. As a result,the go signal glows for a longer time as the type of densityincreases.



D. RadioFrequencyTransmitterandReceiver

To incorporate wireless communication for this project, aradiofrequencytransmitterandreceivermodulewillbeused inside the circuit. With the aid of this module, the IRsensor'soutputissenttothemicrocontroller.

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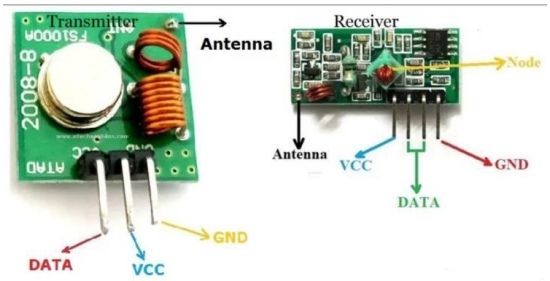
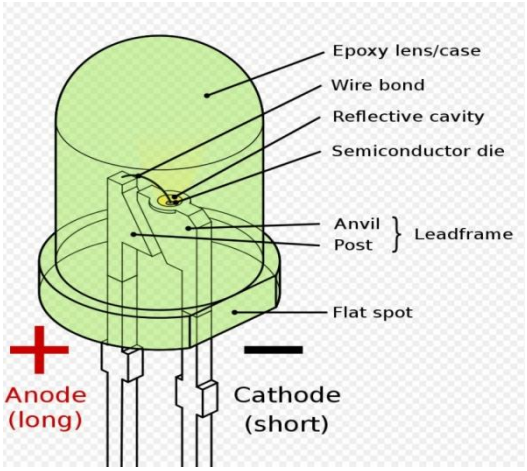
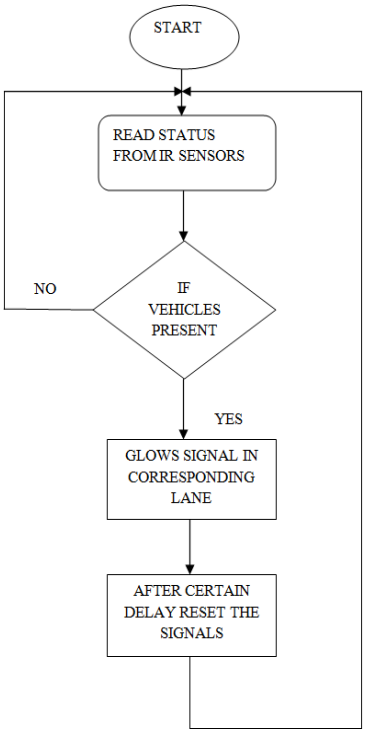


LightEmittingDiode

Asalightindicator,twoLEDs,i.e.stopandgosignals,areused.



VI. FLOWCHART



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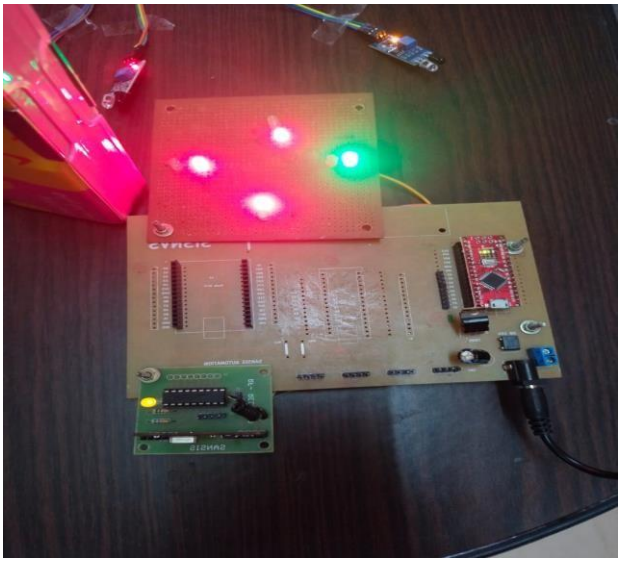
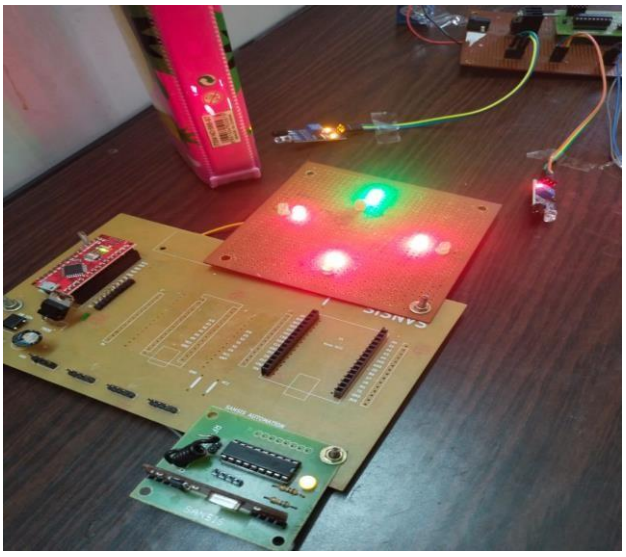
VII. RESULT

Theintelligentdensity-basedtrafficcontrolsystemwassuccessfullyintroducedasaresultofthestudy.WeuseanIRtransmitterandIRreceiverfortrafficdensitymeasurementinthisprototype,whichismountedonoppositesidesofroads.The infraredsensordetectsthevehicle and relays the information to the microcontroller viaRF transmitter and receiver. The microcontroller then makesadecisionand assignsthesignalbased onthatdecision.

LANE1:



LANE2:



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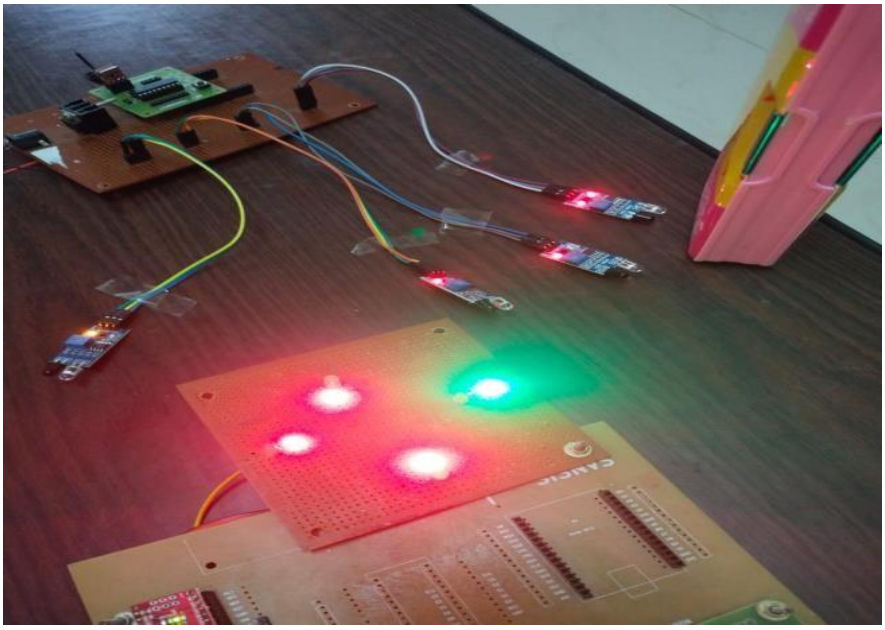
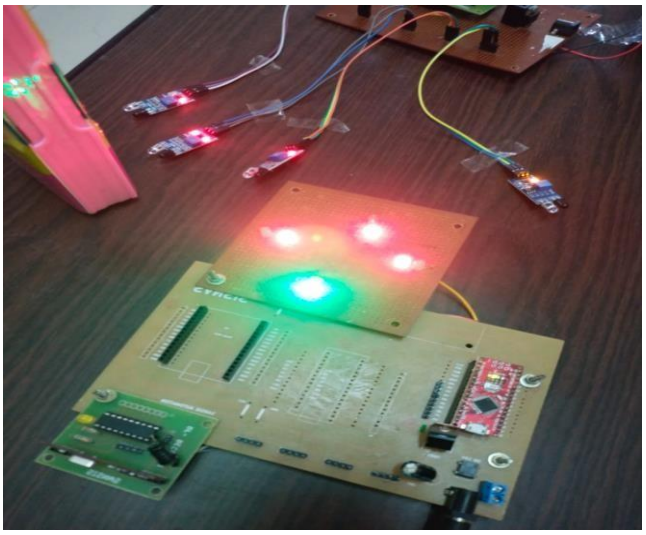
LANE3:



LANE4:



CONCLUSION

In this report, we concentrated on the issue of traffic congestion in areas of high traffic density. This device can be used to address traffic-related issues such as traffic congestion, which creates an excessive latency period for cars to halt, emergency vehicles, or forcefully passing, and so on. We hope to reduce the likelihood of unreasonably congested traffic generated by traffic signals by using this device design. The density, or the number of vehicles going through the lane, is determined, and the microcontroller determines if the lane should have a blinking traffic light.

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