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POLLUTION & SAFETY OF VEHICLE USING IOT

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Abstract: In this modern era transportation is becomingas one of the important needs of human. Though it hasnumerous needs, we face lot of problem in it which costhumanlife.Itensuresthedriverisnotgetdrunkenthroughthealcoholsensorisdeployedtoavoidthecollision and sends alert message to the official personwhichgiveGPSlocation.Thiscontentisbasedonproblemsthatsocietyisfacingintoday'sworld.Pollutioncontinuous to be a significant issue for our environmentandmanyaresuffering duetoroadaccidents.Itisnecessary to monitor air quality for a better future andhealthylivingforall.Weproposeanairqualitypollutionmonitoring system that allows us to monitor and checkair quality pollution through IoT. This design suggests apreciousrouteforseeingmachineemigrations,particularlyCOand NH3 gas emigrations andsafetymonitoringsystem.

Andalsoplaysimportantroleinpreventingdrunkanddriveaccidents.Thesmokeratioemittedfromthe vehicle is monitored by sensors, and the data can bedisplayedonthephone.

KEYWORDS:MQ5Module,MQ135Module,MQ3Module, DHT Module, Node MCU, Motor, Relay,Arduino(UNO),GSM,GPS,Thinkspeaksoftware,NVIDIA.

I. INTRODUCTION

Vehicletracking systemsarepopularamongpeopleas a retrieval device and theft prevention. The main benefitofvehicletrackingsystemsisthesecuritypurposesbymonitoring the vehicle's location which can be used as aprotectionapproachforvehiclesthatarestolenbysendingitspositio n coordinates to the police center as an alert for thestolen. When a police center receives an alert for stolenvehicles,theycanmakeanactiontopreventthistheft.Nowadays, it is used either as a replacement or addition forcar alarms to protect it from theft or it can be used as amonitoring system to keep track the vehicle at the real time.So, many applications can be used for this purpose to blockcar's engine or doors as an action to protect the vehicle. Dueto the advancement in technology vehicle tracking systemsthatcanevenidentifyanddetectvehicle'sillegalmovements and then attentive the owner about these movements. Thisgives an advantage over the rest applications and other pieces oftechnology that can serve for the same purpose. Nowadays,vehicle tracking is one of the most important applications.For example, the maps given to vehicle drivers may play alarge role in vehicle tracking and monitoring. The majordifficultyisthatvehicleownersmaynotbeabletodistinguish the vehicle in a place as a result of overlappingmaps, which adversely affects the process of tracking andmonitoring. It requires some kind of system to detect whatdistance travelled during a trip to a vehicle. This may be anadditional point andhelp the police in preventing thefts andlocatingthevehiclebyrelyingonreportsfromtheseapprovedsystemsand

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studyingandanalyzingthemtodetectstolenvehicleslocations. This system is a important device for tracking ofvehicles in real time the owner can get to observe or monitorit and today it is really important feature among people havingcostly cars, used as theft avoidance, recovery of the stolen carand due to some health issues of driver. The collected datacanbeobservedonadigitalmapbyusinginternetandsoftwa re There is tremendous demand for object trackingapplication for the business process. The real-time trackinginformation could solve many problems in the world such asvaluable things and assets. GPS is the Global PositioningSystem which provides the location, with this we can getatmosphericconditions.ThereareseveraltypesofGPStrack ing system available in the market. Driver fatigue hasbeen the main issue for many problems due to tiredness,tediousroadcondition, andunfavorableclimatesituations.

Every year, the National Highway Traffic SafetyAdministration (NHTSA) and World Health Organization(WHO)havereportedthatapproximately1.35mil lionpeopledie due to vehicle crashes across the world. Generally, roadaccidents mostly occur due to way of driving. These situationsoccursduetothedriveraddictiontoalcoholorindrowsi ness.The maximum types of lethal accidents are recognized as aseverefactoroftirednessofthedriver.Whendriversfallasleep,the n the vehicle will be out of control. There is a needto designsmartorintelligentvehiclesystemthroughadvancedtech nology. This paper implements a mechanism toalert thedriver on the condition of drowsiness or day dreaming andpollution present in air. An message is being transmitted to adestinationusingIoTmodule,whichreliesonwirelesstransmi ssion.

Incurrentyears,drowsydriverdetection isthemostrequiredprocesstoprevent anyroadaccidents,probablyworldwide. The aim of this paper is to construct a smart alerttechniqueforbuildingintelligentvehiclesthatcanautomat icallyinformsdrowsydriverimpairment.Butdrowsiness is a natural phenomenon in the human body thatis produced due to different factors. Hence, it is required todesign a robust alert system to avoid the cause of the vehicleaccidents and monitoring pollutions emitted by the vehicles,inthisproposedpaper.Whenthedriver'sunconscious nessisdetected, the IoT module issues a warning message along withthe reasons, if any subsystem faults occurred in engine andlocationinformation,therebyalertingwiththehelpofamess agethroughIoTtechnologyfromthemonitoringsystem.

II. LITERATUREREVIEW

The cautious drivers are the majority and they arewilling to learn and improve their driving control over vehicleinordertomaketheirlifesafer.Fromasafetyperspectivet hedriver is helped with a system that monitors driver alertness.Thiswillreducetheirchanceofrespectivedriver's life gettingintoanaccidentwith57percent.

Nowadays, pollution is became one of the majorproblemsintheworld.Oneofthemajorcauseforthepolluti on is from vehicle emissions. Harmful Gases for theenvironment that are releaseddirectlyfrom the cars andtrucksaretheprimarysourceofvehicularpollution.Automo biles also pollutetheair during the processes ofmanufacturing, refueling, and from the emissions associatedwithoilrefining.GovernmentofIndiatoregulatethee missionofairpollutantsfromcombustionengineequipment, motor vehicle. To control the pollution emittedby vehicles, the amount of air pollution is needed to becalculated, and vehicle causing pollution must be identified.InternetofThingsmaybecomehelpfulincitiesformo nitoring air pollution from vehicles and the amount ofpollutioncanbegatheredandanalyzed.Thisprojectisdesigned to operate the system using a sensor network andgather information about pollutant levels discharged by thevehicles.TocontrolthepollutantfromthevehicletheGovern menthasintroducedaPUCcertification.PUCCertificationisim portantforallvehiclesinIndianroads.Thevalidity of the certificate is 6months. After that, we must takeanewcertificatewhichisvalidfornext6months.

To overcome this real time problem, our proposedsystemhasansubsystem insidethevehiclethatmonitorsthecontinuous emission of pollutant. Gas sensors are used todetect and monitors the air pollution level in air. When theconcentration level of gas increases, the output voltage fromthegassensoralsoincreases.Varioustechnologyusesvario us type of sensors A solid-state sensor consists of oneor more metal oxides from the transition metals, such as tinoxide,aluminumoxide,etc.Thesemetaloxidesareprepareda ndprocessedintoapaste,whichisusedtoformabead-typesensor.Therearevarioussolid-statesensors:solid-electrolyte type,capacitor andsemiconductorsensor.

This proposed system has been developed to workefficientlyinrealtime.Inreferenceasystemhasbeendevelo ped in which tags are used. It detects the pollutantlevel of each vehicle and then the database is used to storethe coming information. For further analysis the observationissenttotheinternetserver.For theairpollutionmonitoring,wirelesssensornetworksarebesttou seforrealtimecondition.InAirQualityIndexandalgorithmareus edin fordata Aggregation. In this system, sensors and Arduino hasbeenusedtomonitorairpollution.Thissystemprovidesrealti meinformationofthecontaminationofdifferentgaspollutantspr esentsinair.Hadmadeasystemforairpollutionmonitoring.Thiss ystemisusedeffectivelytoperformanalysis in Vishakhapatnam. To detect the percentage ofpollution an array of sensors is used and conversions ofobservedconcentrationtocorrespondingelectricalsignalareu sed for furtherprocessing.

To transmit the observed data by the sensors UsingWi-Fi technology has been used. The usage of Wi-Fi hasbeen increased but at the same time the node life time hasbeenaffectedwithincreaseinpowerconsumption.Samecan be employed in any industry. has been used for creation ofweb portal in which the inputs are provided by the user forcontrolling the appliances. In Internet of things (IOT) hasbeen used in which large numbers of distinct devices areconnected throughout differentsystems.

III. EXISTINGSYSTEM

Global air pollution is one of the major concerns ofour era. One of the major factors of air pollution is harmfulpollutant emitted by vehicles. Each and every vehicle emitspollutant of certain standards, but the main problem ariseswhen they exceed the standard norms. The actual cause fortheviolationofemissionlevelsistheincomplete combustionoffuelinsidetheenginewhichismainlyduetotheim propermaintenanceofvehicles.
Thisemissionfromvehiclescannotbecompletely avoided,butitcan bedefinitely controlled.

To overcome the problems of existing systems, asystem is proposed to monitor emission level of individualvehicles. An IoT kit is prepared using gas sensors,
Arduinointegrateddevelopmentenvironment(IDE),andaWi-Fimodule.

This kit can be physically placed in exhaust systemofeveryvehicle.Thegassensorsgatherdatafromexhaus tofvehicle and forward the data to the Arduino. The Arduinotransmits the data to the cloud via the Wi-Fi module
nodeMCU.Aserverisalsodesignedwhichkeepstheinformatio nabout the emission level of every vehicle so that RTO canaccessrelevantdatafromtheserver.Thecontrollercontinuo usly monitors the emission of the vehicles and if itsemission exceeds standard norms a notification is generatedand is interpreted by RTO. Hence using this pollution
controlcircuitemissionofindividualvehiclescanbemonitored which helpsin reducingthepollutionlevel.

IV. PROPOSEDSYSTEM

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A alert technique for generating intelligent vehiclesthat can automatically avoid drowsy driver impairment. Butdrowsiness is a natural phenomenon in the human body thatcausesduetodifferentfactors.Hence,itisrequiredtodesign a robust alert system to avoid accidents. When the driver'sunconsciousness is detected, the IoT module issues a warningmessage and location information, thereby alerting with thehelp ofmessagethroughthemonitoringsystem.

V. REQUIREMENTSSPECIFICATION

1. NVIDIA:

Designed for use in power-limited environments,theJetsonNanosqueezesindustry-leadingcomputecapabilities,64-bitoperatingcapability,andintegratedadvanced multi-function audio, video and image processingpipelinesintoa 260-pinSODIMM.

TheMaxwellGPUarchitectureimplementedsevera larchitecturalenhancementsdesignedtoextractmaximumper formanceperwattconsumed.

EachMPIOcanbeconfiguredtoactasaGPIOorit can be assigned for use by a particular I/O controller.Though each MPIO has up to five functions (GPIO functionanduptofourSFIOfunctions), agiven MPIOcanonlyactas a single function at a given point in time. The functionsforeachpinontheJetsonmodulearefixedtoasingleS FIOfunction or as a GPIO. The different MPIO pins share asimilarstructure,buttherearesseveralvarietiesofsuchpins.Th e varieties are designed to minimize the number of on-boardcomponents(suchaslevelshiftersorpull-upresisto

Figure1:NVIDIA

2. DHT11

ThedigitaltemperatureandhumiditysensorDHT11 is a composite sensor that contains a calibrated digitalsignal output of temperature and humidity. The technologyofadedicateddigitalmodulescollectionandthetem peratureand humidity sensing technology are applied toensure that the product has high reliability and excellentlong-termstability.

Thesensorincludesaresistivesenseofwetcomponent and an NTC temperature measurement device,andisconnectedwithahigh-performance8-bitmicrocontroller.Onlythreepinsareavailableforuse:VCC,G ND, and DATA. The communication process begins withtheDATAlinesendingstartsignalstoDHT11,andDHT11r eceives the signals and returns an answer signal. Then thehost receives the answer signal and begins to receive 40-bithumituredata(8-bithumidityinteger+8-bithumiditydecimal+8-bit temperatureinteger+8-bittemperaturedecimal+8-bitchecksum).Itstemperaturemeasuringrangeisfrom-40to+125degreeCelsiuswith+0.5degreesaccuracy.

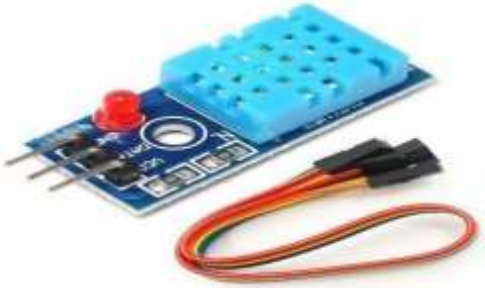


Figure2:DHTModule

Humidity measurement range: 20 - 90%RH. Outputdigital signals indicating temperature and humidity. Workingvoltage:DC5V;PCBsize:2.0x2.0cm.Humiditymeasu rement accuracy: ±5%RH. Temperature measurementaccuracy:±2℃.

2. MQ-3GasSensor:

Sensitive material of MQ-3 gas sensor is SnO2,which withlower conductivityinclean air.When thetargetalcoholgasexists,Thesensor'sconductivityismorehi gheralong with the gas concentration rising. Please use simpleelectrocircuit,convertchangeofconductivitytocorresp ondoutputsignalofgasconcentration.

MQ-3gassensorhashighsensititytoAlcohol,andhasgoodresistance todisturbofgasoline,smokeandvapor.The sensor could be used to detect alcohol with differentconcentration, it is with low cost and suitable for differentapplication.MetaloxidesensorsarealsoknownasChe miresistors, the working of the sensing is based on thechange of resistance of the sensing material when exposedtoalcohol. So, by keeping it in a simple voltage dividernetwork,alc

Figure3 :MQ-5GasSensor

3. NodeMCU

NodeMCUisanopensourceIoTplatform.Itincludes firmware which runs on the ESP8266 Wi-Fi SoCfrom if Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to thefirmware rather than the development kits. The firmwareuses the Lua scripting language. It is based on the project,and built on the if Non-OS SDK for ESP8266. It uses manyopen-sourceprojects, suchaslua-cjson and SPIFFS.

The NodeMCU (Node Microcontroller Unit) is anopen-sourcesoftwareandhardwaredevelopmentenvironment built around an inexpensive System-on-a-Chip(SoC)calledtheESP8266.TheESP8266,designedandma nufacturedbyifSystems,containsthecrucialelementsofa computer: CPU, RAM, networking (Wi-Fi), and even amodernoperatingsystemandSDK.Thatmakesitanexcellent choice for Internet of Things (IoT) projects of allkinds. However, as a chip, the ESP8266 is also hard to accessand use. You must solder wires, with the appropriate analogvoltage, to its pins for the simplest tasks such as powering itonorsending akeystroke tothe "computer"on thechip.

Theprogramitinlow-levelmachineinstructionsthatcanbeinterpretedbythechiphard ware.ThislevelofintegrationisnotaproblemusingtheESP8266

asanembedded controller chip in mass- produced electronics.
Itisahugeburdenforhobbyists,hackers,orstudentswhowantto experimentwithitintheirownIoTprojects.

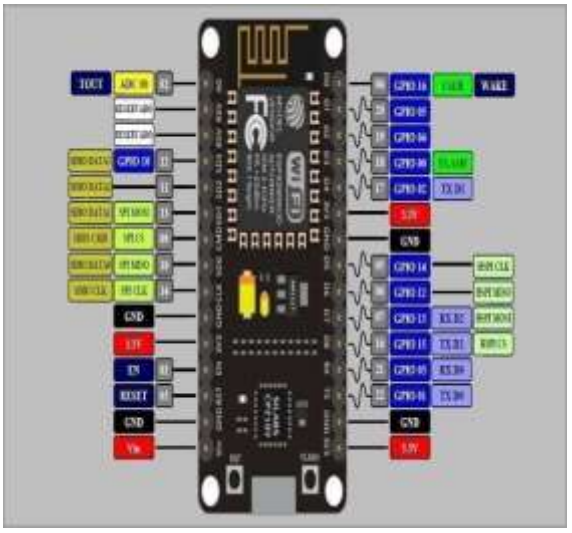
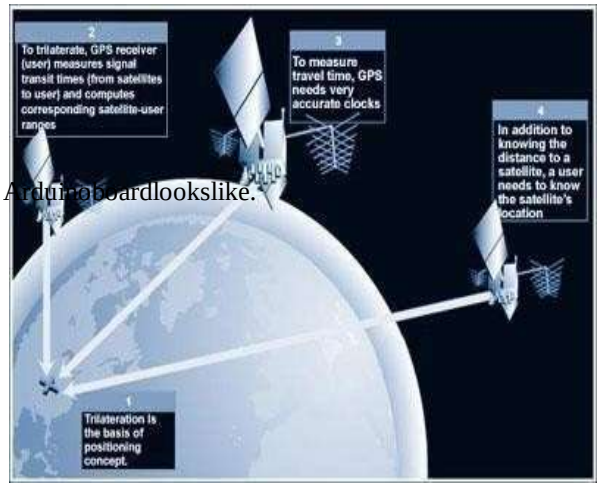


Figure4 : NodeMCU

Working:

Satellite navigation is based on a global network ofsatellites that transmit radio signals in medium earth orbit.Users of satellite navigation are most familiar with the 31global positioningsystem(GPS)satellites*.TheUnitedStates, who developed and operates GPS, and Russia, whodeveloped a similar system known as gleans, have offeredfreeuseoftheirrespectivesystemstotheinternationalcommunity.The internationalcivilaviationorganization(ICAO), as well as other international user groups, haveaccepted GPS and gleans as the core for an international civilsatellitenavigationcapabilityknownastheglobalnavigationsatellite system(GNSS).



Arduinoboardlookslike.

Figure6:SatelliteNavigation

4. ArduinoUNO

TheArduinomicrocontrolleropen-sourcesingleboardcomputer that has gained considerable traction in the hobbyand professional market. The Arduino isopen-source,

Figure5:ArduinoUNOC

arrier Synchronization:

Thecarriertrackingfunctionissimilartotheprocessingthatoccursinconventionalradiocommunicationsreceivers. It enables a receiver to track andprocess carrierphase information, which is instrumental in demodulatingthedata message.

In navigation receivers, this carrier information is alsousefulforseveralothernavigation-related functions thatcanincrease precision or timeliness of the navigation solution,andalsotoenhanceoverallreceivertrackingperformance.

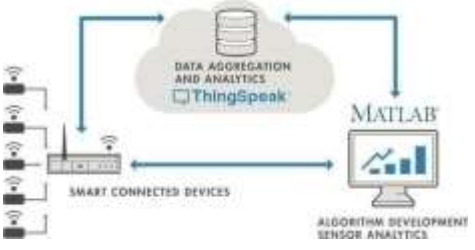
I. SOFTWAREIMPLEMENTATION:

ThingSpeak is an open-source software written in Rubywhich allows users to communicate with internet enableddevices. It facilitates data access, retrieval and logging ofdata by providing an API to both the devices and socialnetwork websites. ThingSpeak was originally launched byBridgein2010 as aserviceinsupportofIoTapplications.

ThingSpeak has integrated support from the numericalcomputingsoftwareMATLABfromMathWorks,[4] allowingThingSpeakuserstoanalyzeandvisualizeuploaddeddatausing MATLABwithoutrequiringthepurchase ofaMATLABlicensefromMathWorks.

ThingSpeak is an IoT analytics platform service thatallows you to aggregate, visualize, and analyze live datastreamsin the cloud. You can send data to ThingSpeak fromyourdevices,createinstantvisualizationoflivedata,andsendalerts.

ThingSpeakenablessensors,instruments,andwebsitesto send data to the cloud where it is stored in either a privateorapublicchannel.ThingSpeakstoresdatainprivatechannelsbydefault,butpublicchannelscanbeusedtosharedata with others. Once data is in a ThingSpeak channel, youcan analyze and visualize it, calculate new data, or interactwithsocialmedia,webservices,andotherdevices.ThingSpeak provides access to MATLAB to help you makesenseofdata.Youcan:



whichmeanshardwareisreasonablypricedanddevelopmentsoftware is free. This guide is for students in me 2011, orstudents anywhere who are confronting the Arduino for thefirsttime.ForadvancedArduinousers, prowltheweb;therearelotsof resources.Thisiswhatthe

7: Thinkspeak

- Convert,combine,andcalculatenewdata.
- Schedulecalculationstorunatcertaintimes.
- Visuallyunderstandrelationshipsindatausingbuilt-inplotting functions.
- Combinedatafrommultiplechannelstobuildamoresophisticatedanalysis.
- ThislibraryenablesanArduinoorothercompatible hardware to write or read data toor from ThingSpeak, an open data platformfortheInternetofThingswithMATLABanalyticsandvisualization.
- Hardware specific examples are found here.Buttogiveyouanideaofusageexamplesforwritingandreadingwithan ESP8266areshownbelow.Completedocumentationinalso shownbelow.
- ThingSpeakoffersfreedatastorageandanalysisoftime-stampednumericoralphanumericdata.UserscanaccessThingSpeak byandcreating aThingSpeakuser account.
- ThingSpeakstoresdatainchannels.Channelssupport an unlimited number of timestampedobservations(thinkoftheseasrows inaspreadsheet). Each channel has up to 8 fields(think of these as columns in a speadsheet).Checkoutthisforanoverview.

Channels may be public, where anyone can see thedata, or private, where only the owner and select users canread the data. Each channel has an associated Write APIKey that is used to control who can write to a channel. Inaddition,privatechannelshaveoneormoreReadAPIKeysto controlwhocanreadfromprivatechannel

VII.SIMULATIONRESULT

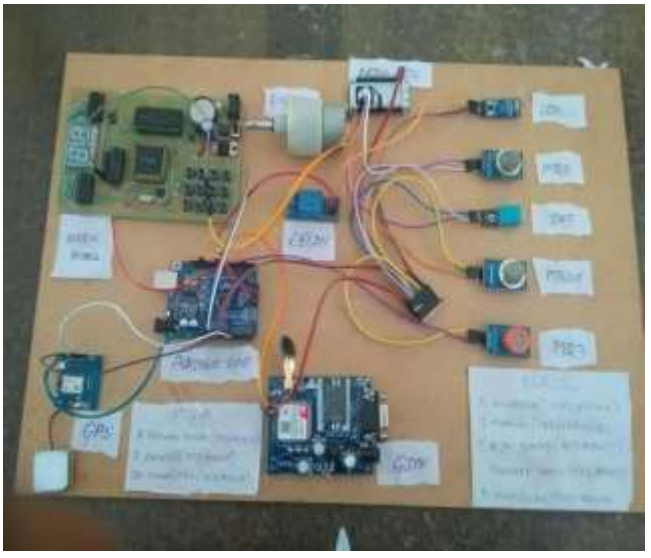


Figure8 :Result

The designed smart intelligent environmental systemmonitors the adulterants produced by the vehicles and alsoadvise the vehicle possessors to control the pollution. Thesystem also sends the pollutant position data to the garçonforunbornanalysis.Theairpollutionagenciescansuitabletodissectthedataandalsodescrythevehicleenrollmentfigurest hat causes further pollution in the atmosphere. Theadvanced system is alowcost,simpletooperate andisfluently fitted inany locales. The advanced system providesbetter delicacywithlowcostthanthebeingsystem.

VIII. CONCLUSION

Thesystemtomonitorvariousparametersofenvironmentusing NVDIAmicrocontroller,GSMTechnology is proposed to improve quality of air. With theuseoftechnologieslikeGSMenhancestheprocessofmonitoringvariousaspectsofenvironmentsuchasairqualitymonitoringissueproposedinthispaper.Thedetection and monitoring of dangerous gases istaken intoaccount in a serious manner and related precautionshavebeen considered here in the form of an alert message andabuzzer so that the necessary action maybe taken. It isestimated that this systemwill have a greatacceptance in themarketasitisacentralizedsystemforacompletemonitoringfunction.Thesmartwaytomonitortheenvironment and an efficient, low cost embeddedsystem ispresentedwithdifferentmodels inthispaper.

In the proposed architecture function of differentmodules werediscussed.Thenoiseandairpollutionmonitoringsystem withInternetofThingsconceptexperimentally tested for monitoring two parameters. Thisdata will be helpful for futureanalysis and it can be easilysharedtootherendusers.Thismodelcanbefurtherexpanded to monitor the developing cities and industrialzonesforpollutionmonitoring.Toprotectthepublic healthfrom pollution, This model provides anefficient and lowcostsolutionforcontinuousmonitoringof environment.

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