Alcohol Detection & Auto Speed Control in Smart Vehicles using IOT

Sudha Madhuri.B,Asst.Professor
Information Technology
Vignan's Institute of Engineering for Women
Visakhapatnam, Indiasudhamadhuri10863@gmail.com

Vijaya Lakshmi.K
Information Technology
Vignan's Institute of Engineering for Women
Visakhapatnam,Indiavijaykorlam1025@gmail.com

Haritha.P
Information Technology
Vignan's Institute of Engineeringf or Women
Visakhapatnam, Indiaharithapedakota947@gmail.com

Rishika.S
Information Technology
Vignan's Institute of Engineering for Women
Visakhapatnam, Indiarishikachowdary034@gmail.com

Jahnavi.K
Information Technology
Vignan's Institute of Engineering for Women
Visakhapatnam,Indiajahnavikannedi@gmail.com

***Abstract*—** Addressing drunk driving is vital to safeguardpublicroadsafetyandreducealcohol-relatedfatalities,evidentfrom India's 9.4% increase in road accident deaths in 2022. Thisresearch highlights the pressing need for safety measures intoday'sfast-paced world. Drunk or fatigued drivers are oftenresponsible foraccidents,leadingtonumerousinjuriesanddeathsannually.Akeyconsiderationindevelopingsolutionsisreal-timealcoholconcentrationmonitoringandalcoholdetection. Utilizing components like Arduino UNO, alcoholsensors,andamicrocontrollertheproposedsystemdetects andprevents drunk driving by regulating engine speed and issuingalerts through a voice module. This IoT-based approach aims toenhance driver andpassenger safety, minimize accidents, andreduce risks for transportation businesses, thereby decreasingliabilities.Byactivelydiscouragingdrunkdrivingandenforcingspeedlimits,thistechnologycansignificantlyreducetraffic-relatedinjuriesandfatalities.

Keywords—Alcoholdetection,ArduinoUNO,AlcoholSensor.

I. INTRODUCTION

It is common knowledge that India is one of the countries withthe greatest populations in the world. The bulk of this people isyoung, andthatiswhatstrengthensthecountry.Instancesofdrunkdriving andtrafficaccidentshavebecomefarmorecommon in the current day. Road safety has always been a hottopic of discussion in society. To try and lower the number ofcollisionsandfatalities,governmentsworldwidehaveimplemented a range of signs, lanes,and restrictions. But asignificantpercentageofpeoplecontinuetobreaktheseregulations, and as a result, regularly read about laneviolations,traffic accidents, and fatalities andinjuries causedbydrunkdriving. Young individuals make up the majority of the driversinvolved in these accidents. The root of these young people'saddictionisalcoholism.Consequently,thestrengthismakingtheissue the most difficult to solve. Examining the data from theprevious few years, find that a rise in DUI charges and trafficaccidents has resulted in a surge in the ratio of fatalities. This isstartingtogetextremelyserious.Choosingtodevelopatechnology called the "Alcohol Detection and Automatic EngineSpeedControl"aftercarefullyanalyzingthissituation.Thissystem is an embedded framework because it is built on bothsoftware and hardware , main hardware components were theArduino UNOand MQ3 sensor. The coding part was done usingtheArduinoIDE software.ThecodeisdoneintheembeddedClanguage. The devisedsystem prevents the inebriated driver fromoperating the car by blocking the engine. The Voice Module andLED notify the occupants of the vehicle of the driver's condition,avertingfurtheremergencies. Themain objectiveis toreducedrunkdrivingoccurrencesandtrafficaccidentsinordertocontributetotheimprovementofroad safety.

II. LITERATUREREVIEW

The study introduces an Internet of Things (IoT)-based accidentdetection system that uses vibration, accelerometer, and alcoholsensors to notify certain contacts when an accident is detected andprovidespositioncoordinates.[2].Inordertostopaccidentsbrought on by careless driving, the study describes an Internet of Things-drivenalcoholdetectionandemergencyalertsystem.Itincorporatesvital sign monitoring and alcohol level monitoring sensors such asMAX30100 and MQ3, together with an emergency button for real-time notifications. In order to improve road safety and preventoccurrences of drunk driving, future improvements might includedriving behavior monitoring.[3]. The study describes a multi-layercar security system with speed limit, emergency monitoring, andtheftalertsthatmakesuseofGPS,GSM,andRaspberryPimodules. Withreal-timetrackingandmonitoring,thisuser-friendlyandreasonably priced solution raises the bar for worldwide vehiclesecurityrequirements[4].

III. METHODOLOGY

The suggested system entails combining a number of sensors, dataprocessing, communication,and control components to create asmartcarsystemwithautomatedspeedcontrolandalcoholdetectionin the Internet of Things (IoT). By limiting the speed of the vehiclewhen it detects alcohol levels beyond the legal limit, the device lowerscollisionratesandpromotessafedrivinghabits.Byusinganalcoholsensor, this research may be able to determine the driver's bloodalcoholcontentandstoptheignitionfromeverstarting(MQ-3).Ifthedriver utilizes the alcohol sensor to detect alcohol, an alarm is set tosound at a predefined time interval, allowing the driver to verify hissafety.Alcoholisassessedwithinthedesignatedsensitivityrangeaswell.Thespeedwillbecontrolledassoonasalcoholisdetected.Ifalcoholis

detected,thevehicleshouldkeepgoingatthesamespeed,graduall yreduceitsspeed&stop.

ALGORITHMUSEDINTHEMETHODOLOGY:

Step1:ThedigitalpinsofmicrocontrollerA0,A5,andD8havebeen defined assensor,motor,voicemodule respectively.

Step2:The inputandoutputof thesepinsare indicated.

Step3:Startedtheserial monitor withaspecifieddelayandauser-definedfunction.

Step4:Tomakethemotorandvoicemodulepinwork,utilizedanif-else loop. Values of the Boolean type are being used as input.Thevoicemodulewillturnhighand themotorpinwillgolowif the digital value is equal to zero, or it will stay low and themotorwillstayhigh.

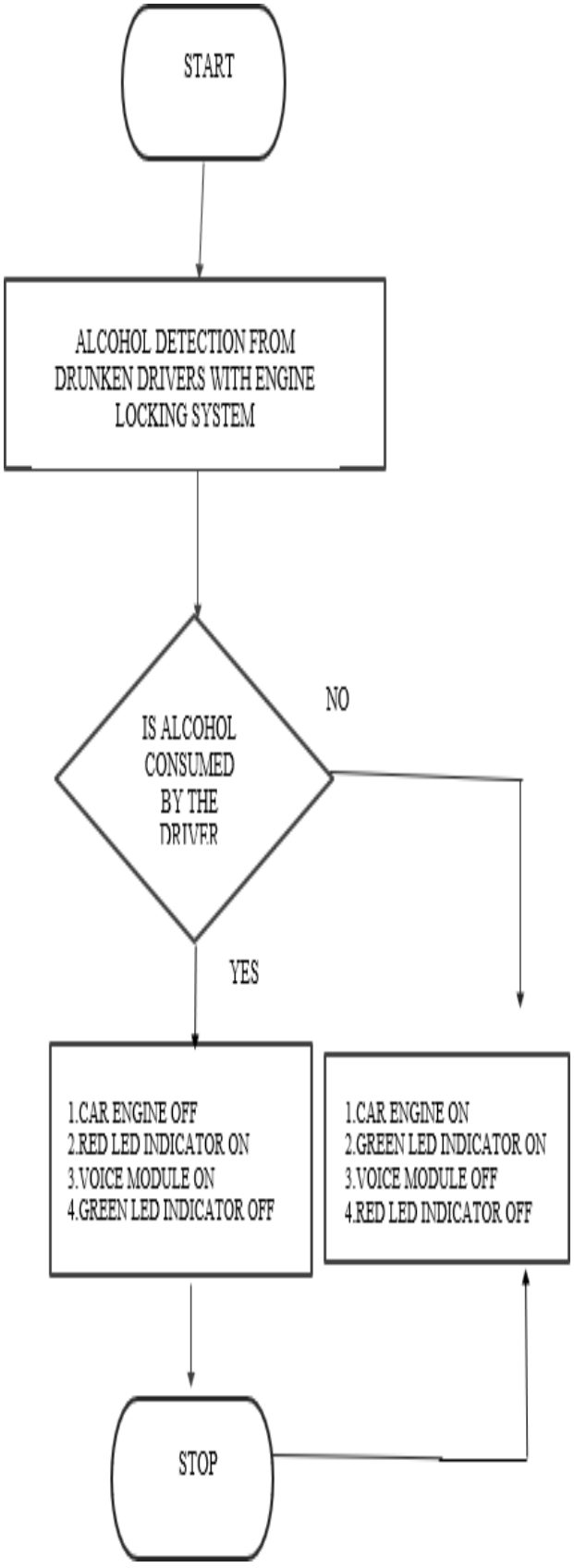

Fig1:FlowChart

HardwareComponents

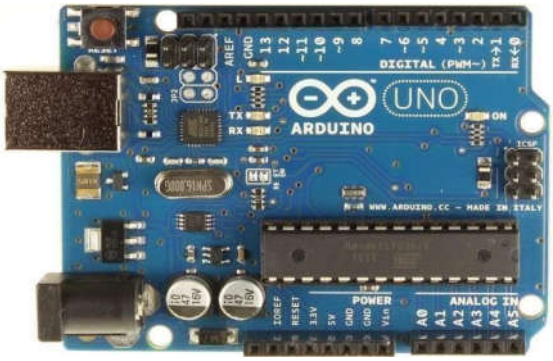

Fig2:Arduino UNOboard

Fig3:VoiceModule

Fig4:Relay

Fig5:LEDBulbs

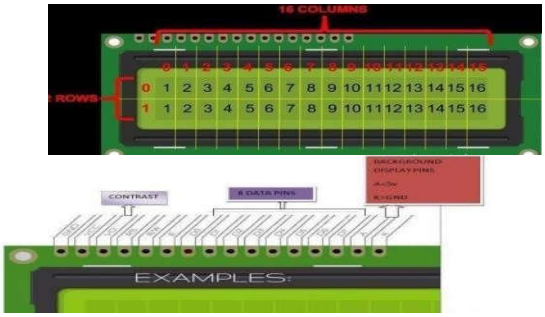

Fig6: PindescriptionofLC

IV. RESULTSANDDISCUSSIONS

The Arduino MEGA receives information from the alcoholsensor, which measures the subject's alcohol content. It nowcontrasts with the figure in the program, the vehicle doesn'tstartif thevalueismorethanthethreshold;else,itdoes.

Fig7:LCDDisplaysAlcoholnotdetectedwhenalcoholisn'tconsumed bythedriver

Fig8:LCDDisplaysAlcoholdetectedwhenalcoholisconsumedbythedriver

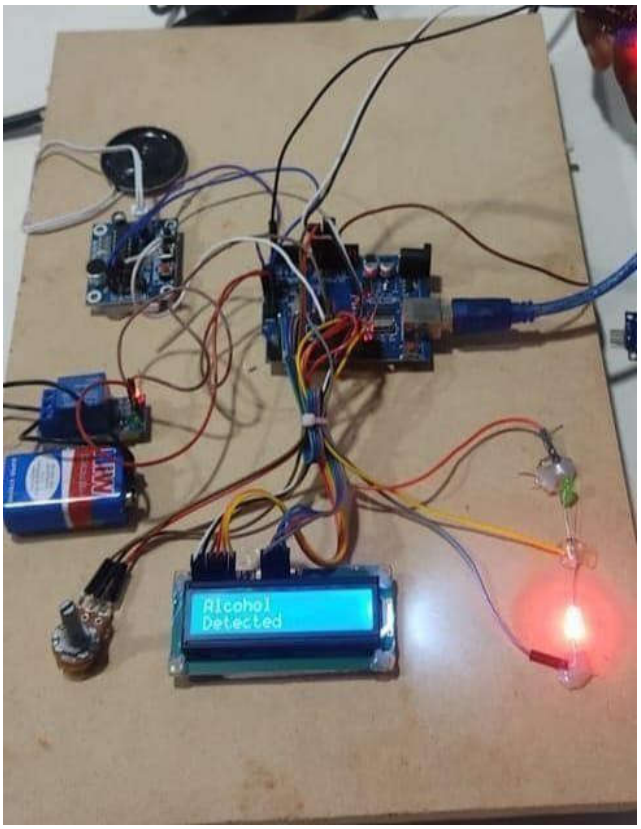

Fig9:RedLEDblink whenalcoholisdetected

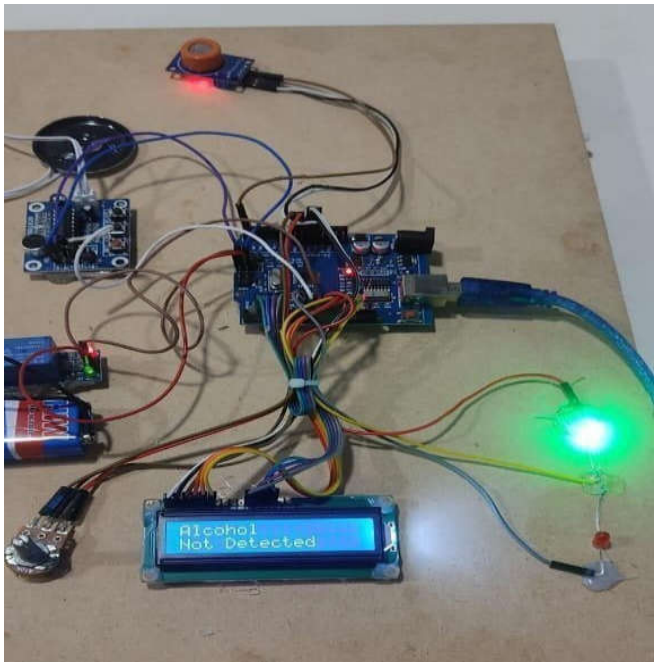

Fig 10: GreenLEDturnedonwhenalcoholisn'tdetected

V. CONCLUSION

ByharnessingthepowerofIoTandadvancedsensortechnology, It is imperative that continue to embrace and supportinitiatives that promote responsible driving behaviors, and smartvehicleswithalcoholdetectionandautomaticenginespeedcontrolrepresentacrucialstepinthatdirection.Alcoholdetectiontechnology, when integrated with automatic engine speed controlwithinsmart vehicles, represents a significant advancement inenhancing road safety and combating the pervasive issue of drunkdriving.Thisintegrationharnessesthepowerofemergingtechnologies, such as the Internet of Things (IoT) and advancedsensorsystems,tocreateaproactiveapproachtopreventingaccidents caused by impaired driving. Firstly, alcohol detectiontechnology operates as the frontline defense against the dangers ofdriving under the influence. Utilizing sophisticated sensors andbreathalyzerdevicesinstalledwithinthe vehicle'scabin, thesesystems can accurately monitor the alcohol levels of the driver inreal-time. This continuous monitoring ensures that any deviationsfrom safe alcohol thresholds are immediately detected, allowingforswiftintervention.Automaticenginespeedcontrolcomplementsalcoholdetectiontechnologybyprovidinganimmediate response mechanism. When elevated alcohol levels aredetected, the system intervenes by adjusting the vehicle's enginespeed or limiting its power output. This intervention is crucial inmitigatingtheriskofaccidents,asitdirectlyaddressestheimpaired driving behavior in real-time. Furthermore, automaticengine speed control is designed to ensure smooth and gradualdeceleration, thereby enhancing passenger comfort and safety.

Bygraduallyreducingthevehicle'sspeed,thesystemminimizesabrupt changes that could potentially lead to loss of control ordiscomfortforoccupants.Moreover,IoTconnectivityenablesremote monitoring and management of smart vehicle systems,enhancing fleet management efficiency and enabling proactivemaintenanceandsafetyinterventions.Fleetoperatorsandauthoritiescanremotelyaccessandcontrolvehiclefunctions,ensuring compliance with safety protocols and facilitating timelyinterventions when necessary. In conclusion, the integration ofalcohol detection technology and automatic engine speed controlwithin smart vehicles represents a holistic approach to enhancingroadsafetyandpromotingresponsibledrivingbehaviors.Byleveraging emerging technologies and proactive safety measurescan mitigate the risks associated with impaired driving and worktowardsafuturewhereroadaccidentsaresignificantlyreduced,

ultimately saving lives and preventing injuries. As a result,thelifeofthedriveraswellasthelossoftheothers'livescanbe prevented.

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