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GSM-Based Auto-Identification and Engine Management

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Abstract:
An efficient automotive securitysystem is implemented for anti-theft usinganembeddedsystemintegratedwithGlobalPositioningSystem(GPS)andGlobal System for Mobile Communication(GSM. System presented has Two types oftracking, one is online tracking with GPSsystemcanonlyreceivethevehiclelocationinformationfromsatellitesandother is offline tracking. GSM system isinstalledinthevehicleforsendingtheinformation to the owner of the vehicle.Thepreventivemeasureslikeengineignition cutoff is installed in the vehiclewhich is controlled using user or ownerGSMmobile.Theownercanlockorunlockhis/hervehiclewiththehelpofSMS.Thesystemisimplemente dongeneralpurposeprintedcircuitboard(PCB)UsingARDUINO.

IndexTerms:GSM, GPS,AURDINO,SIM800L

I.INTRODUCTION

Vehicletrackingsystemswerefirstimplementedfortheshippingindustrybecause people wanted to know where eachvehicle was at any given time. These days,however,withtechnologygrowingatafastpace, automated vehicle tracking system isbeing used for car theft detection whichtracks and displays vehicle's locations inreal-time.GPSisareal timesatellitenavigationsystemforthreedimensionalpositiondetermination.The GlobalSystemforMobileCommunications(GSM)isthesecond-generationdigital cellular mobile network. Due to its wideavailability, it is chosen as the medium fortransferoflocationinformation.ThesimpleandinexpensiveShortMessageService(SMS)allowsuserstose ndupto 160characters.Systempresentedhereincorporatesthedevelopmentofin-vehicletrackingdevicetolocatethecoordinates of the vehicle stolen, whicharethenplottedontheGoogle mapapplication to get the exact and accuratelocation. Also the developed system canswitch-off the ignition of engine with thehelpofSMS.

LITERATUREREVIEW

SomepeopleusestheGPSsystemonlytothevehicletotracethevehiclelocationlikethelatitude,longitudeandspeedof thevehiclebutnotusefulforcontrollingthevehicle.Somepeopleusesonly GSM for controlling the vehicle but notuseful to trace the vehicle, some researchersusesGSM,GPSsystemtocontrolthevehicle as well as to trace its location. Theliterature review of the work is as follows.Kaushiketaldevelopedananti-burglaryvehicle security system, which uses thumbimpressiontostartthevehicle.Theauthorizedpersonsthumbimpressionsarestoredinthedatabaseofthesyste m.Thevehicle is started if the finger print of thedatabase is matched. If anyone accessed thevehicle by chance then the fuel tank will beemptied through the relay bolt fitted to thetank at the same time it gives alarm that thevehicleistheftsothattheunauthorizedpersoncannotrefilltheemptiedfueltank.S

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SPethakarusesGSM,GPS&RFIDsecurity systemfortaxilikevehicles.Forstarting the vehicle the worker must use theRFIDcardinwhichtheidentificationnumberisprovidedsuchthattheidentification numbers already preloaded into the database of the system, If the numberis matched, GPS and GSM comes in to playandsendsSMStothevehicleownerthelocation like latitude and longitude
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thevehicle.Iftheownerdetectedtheftbychance then he sends the SMS to the
GSMsuchthatitwilllockthedoorsofthevehicle.NagarajausedGSMsystem,Microcontroller,andrelayswitchforthe ignitionsystem.ItttheftisdetectedtheMicrocontrolleractivatestheGSMsystemtosendSMStotheowner,Iftheowner gives reply to the SMS then the relay switchisactivatedanditdeactivatetheignitionsystem.AlkhederusesGPS-GSMsystemthatusesGoogleearthapplication.Thesystem contains GPS module provided in thevehicle,thisGPSmoduleexchangesinformation with the GSM system to sendSMS to the owner. After getting SMS to theowner, he can trace the latitude, longitudeand speed of the vehicle using Google earthapplication.

EXISTINGSYSTEM

The GPS/ GSM Based System is
oneofthemostimportantsystems,whichintegratebothGSMandGPStechnologies.Itisnecessaryduetothemanyofa pplications of both GSM and GPS systemsand the wide usage of them by millions ofpeople throughout the world. This system isdesigned for users in land construction andtransportbusiness,providesreal-timeinformationsuchaslocation,speedandexpectedarrivaltimeoftheuserinmoving
vehicles.Thissystemmay
alsousefulforcommunicationprocessamongthetwopoints.CurrentlyGPSvehicletrackingensurestheirsafetyastra velling.Thisvehicletrackingsystemfoundinclientsvehiclesasatheftpreventionandrescuedevice. Vehicle owner or police follow thesignalemittedbythetrackingsystemtolocate a robbed vehicle in parallel the stolenvehicle engine speed going to decreased andpushedto off.
Afterswitchoftheengine,motorcannotrestartwithoutpermissionofpassword. This system installed for the fourwheelers. Vehicle tracking is usually used
innavyoperatorsfornavymanagementfunctions,routing,sendoff,onboardinformationandsecurity.Theapplicatio nsinclude monitoring driving performance of aparent with a teen driver. Vehicle trackingsystems accepted in consumer vehicles as atheft prevention and retrieval device. If thetheft is identified, the system sends the SMStothevehicleowner.Afterthatvehicleowner sends the SMS to the controller, issuethenecessarysignals to stop the motor
A few of the leading manufacturingcountriesofcarsecuritysystemincludesChina, USA, Italy and India. Some of thehighlydemandedcarsecuritysystemsarelisted.
The power supply block powers thewhole system. Three voltage levels for thesystem which comprises the microcontroller,GPSmodule,GSMmodem,immobilizerandthecamerawouldbedesigned.Themicrocontroller
and camera are separate anduse 5.0V each. The GSM and GPS modulesare combined on one board (called MG2639shield)hencetheyusethesamevoltagelevel which is 3.8V. The immobilizer (whichconsists basically a relay) operates at 12V,hence the three voltage levels are 3.8V, 5.0Vand12V.

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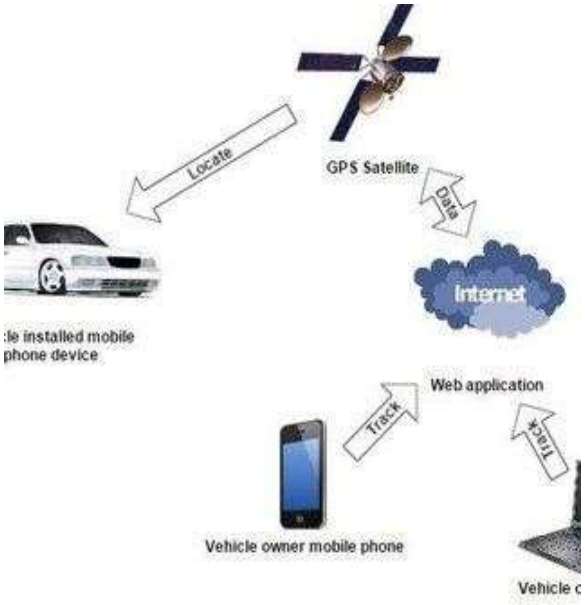

Fig1:ExistingSystem

PROPOSEDSYSTEM

ProposedMethodInthisproposedwork,anovelmethodofvehicletrackingand locking system used to track the theftvehicle by using GPS and GSM technology.This system puts into sleeping mode whilethevehiclehandledbytheownerorauthorized person otherwise goes to activemode, the mode of operation changed by inpersonorremotely.Ifanyinterruptionoccurredinanysideofthedoor,microcontrollerisinterruptedandSMSissentt othemicrocontroller.Thecontrollerissues the messageabout the place of thevehicletothecarownerorauthorizedperson. When send SMS to the controller,issuesthecontrolsignalstotheenginemotor. Engine motor speedsaregraduallydecreases and come to the off place . Afterthatallthe doors locked. To open the doororrestarttheengine,authorizedpersonneeds to enter the passwords. In this method,trackingofvehicleplaceeasyanddoorslockedautomatically,therebythiefcannotgetawayfrom the car.

TheGlobalPositioningSystem(GPS) is a satellitebased navigation systemconsists of a network of 24 satellites locatedintoorbit.Thesystemprovidesessentialinformationtomilitary,civilandcommercialusersaroundtheworlda ndwhich is freely accessible to anyone with aGPSreceiver.GPSworksinanyweather

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circumstancesatanywhereintheworld.Normallynosubscriptionfeesorsystemchargesto utilizeGPS.

Fig2:BlockDiagram

SOFTWAREDEVELOPMENT

Thesoftwareoftheprojectisbasedontheflowchartinfigure3.4.Ifvehicleisforcefullyignitedthenautomatically turnonantitheftdetectionsystem.Ontheotherhand,If vehicle is started in authorized wayfeedbacksystemautomaticallydisables the anti-theft detection system.Whenvehiclestartedforcefullyawarningmessageisdeliveredtoregisteredmobilenumberas"CarStart ed". Owner has access to stop thevehiclebysendingthe message"Stop" in relay and GPS enable theArduino to send location coordinate.GPS attachedtothearduinoenableGSM to send the live coordinates ofthelocationinevery 10second.Thesecoordinatewhenusedin Googlemaphelptolocatetheexactpositionofthevehicle.

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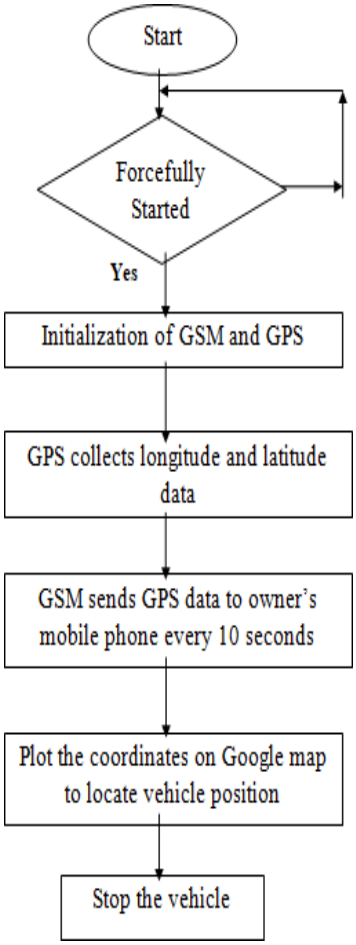

Fig3:FlowChar

RESULT

Thisproposedprojectmodelistestedbyforcefully starting thevehicleasincasethevehicleisstolen.Theresultsobtainedareasperexpectationsoftheprojectdesigned.Assoonast hecarisforcefullystartedbytheunauthorizedperson, theft detection system kicks in andtheowner gets theSMSwithin15to20seconds. There may be slight delay, if anyduetomobilenetwork.Centralarduinosends signal to control section inreal time.Inthispaper,wehaveproposedanovelmethodofvehicletrackingandlockingsystems used to track the theft vehicle byusingGPSandGSMtechnology.Thissystem puts into the sleeping mode vehiclehandled by the owner or authorized persons;otherwise goes to active mode. The mode ofoperations changed by persons or remotely.Whenthetheftidentified,theresponsiblepeoplesendSMStothemicrocontroller,thenissuethecontrolsign alstostoptheenginemotor.Afterthatallthedoorslocked. To open the doors or to restart theengine authorized person needs to enter thepasswords. In this method, easily track thevehicleplaceand doors lock.

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Fig3:Messagealerton mobile

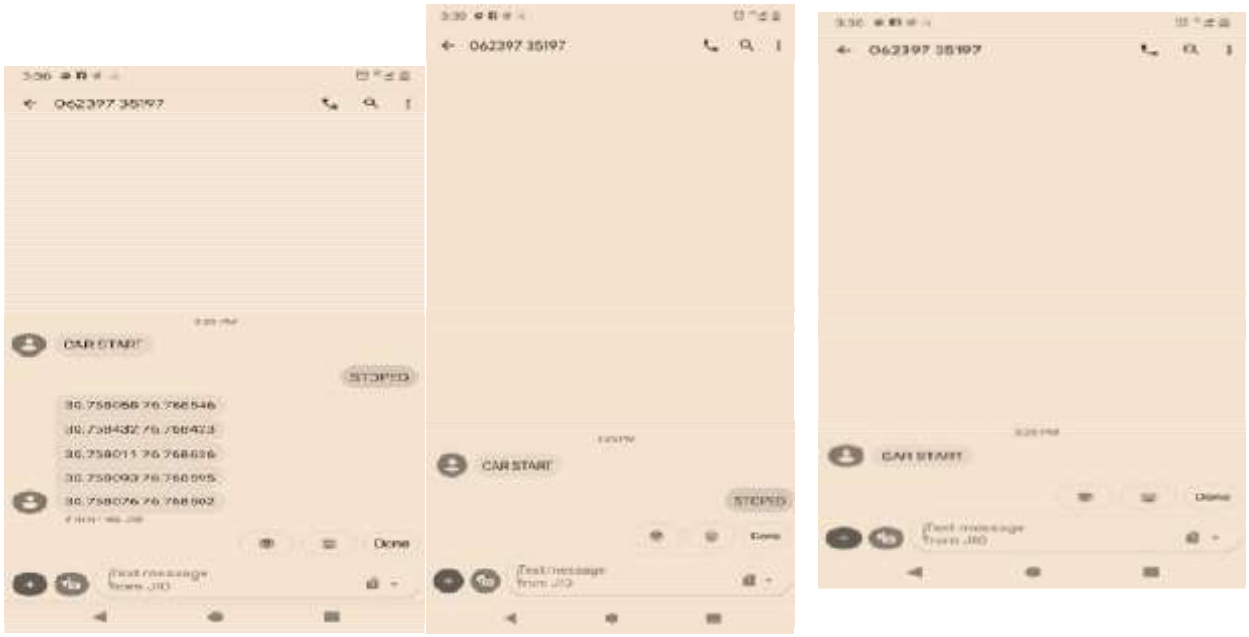

Fig4:Ownerrespondingtomessage

Afterreceivingthealert messagefromthetheftdetectiondevice,theuser responds via 'STOPED' messageand after receiving the response fromthe owner mobile, the GPS and GSMmodules keeps tracking and sendingtheupdatedlocation coordinatesevery 10 seconds to the owner mobilenumber.

Figure4.4:Messageshowingcoordinatestracked bydetectiondevice.

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