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A

PROJECT REPORT ON

"SMART VEHICLE TRACKING AND MANAGEMENT SYSTEM"

SUBMITTED TO

SHIVAJI UNIVERSITY, KOLHAPUR
IN THE PARTIAL FULFILMENT FOR THE AWARD OF DEGREE OF

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

BY

Sneha Vijay Khot	**13EXTC32**
Shubhangi Sunil Koli	**13EXTC34**
Sneha Baban Madane	**12EXTC26**

UNDER THE GUIDANCE OF

Prof.(Dr.)S. A. Patil

UNDER THE CO-GUIDANCE OF

Prof. P. S. Terwadkar

DKTE SOCIETY'S TEXTILE AND ENGINEERING INSTITUTE,
ICHALKARANJI (AN AUTONOMOUS INSTITUTE, ACCREDITED WITH A+ GRADE BY NAAC) 2017-18

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CERTIFICATE

This is to certify that the project entitled

SMART VEHICLE TRACKING & MANAGEMENT SYSTEM

Being submitted to Shivaji University, Kolhapur by

Sneha Vijay Khot	**13EXTC32**
Shubhangi Sunil Koli	**13EXTC34**
Sneha Baban Madane	**12EXTC26**

In the partial fulfilment of the requirement for the award of degree of **Bachelor of Engineering** in Electronics and Telecommunication Engineering is a record of their work carried out under our supervision and guidance. As per our knowledge and belief the students have satisfactorily completed the project work.

Place: Ichalkaranji

Date:

Prof. (Dr) S. A. Patil
[Project Guide]

[External]

Prof. (Dr) S. A. Patil
[HOD]

Prof. (Dr.) P. V. Kadole
[Director]

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DECLARATION

We hereby declare that project work entitled **SMART VEHICLE TRACKING AND MANAGEMENT SYSTEM** completed and written by us has not previously formed the basis of award of any degree or diploma or other similar exam of this or any other university or examining body.
Further, we declare that we have not violated any of the provisions under copyright act amended from time to time.

Place: Ichalkaranji

Date:

	Name of the Students	Sign
1)	Khot Sneha Vijay	
2)	Koli Shubhangi Sunil	
3)	Madane Sneha Baban	

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Sincerely,

Khot Sneha Vijay

Koli Shubhangi Sunil

Madane Sneha Baban

ABSTRACT

The vehicle tracking system is an effective and efficient system. Using this system various applications could be developed. Few of them are, establishing communication between server and bus system, which is capable of providing real-time information regarding the current location of bus, supports in sending a group messages i.e. alert message to the passengers waiting at the next stop, change in current route, bus number, etc. Thus it saves the time of passengers and also works as an emergency handling system which will send alert messages simultaneously to server, police and ambulance in case of accidents. The designed & developed system has implemented and successfully tested in our college bus.

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CHAPTER 1

INTRODUCTION

INTRODUCTION

The main objective of Vehicle tracking systems is to provide security to vehicles. Accident alert systems has been to rescue people in accidents. This is an improved security system for vehicles. The latest technologies like GPS are highly useful nowadays, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of vehicle. This new technology, popularly called Vehicle Tracking Systems which has been created many wonders in the security of the vehicle. This hardware is fitted on the vehicle. The Proposed system is already in use with Cabs like Ola and Uber.

1.1 MOTIVATION

About 1.24 million people die each year as a result of road accidents. Human life is more valuable than anything else, timely help is more important than lending a helping hand. This project is one among those which is designed in a way to save human lives in a timely manner.

In modern day vehicles, vehicle anti-theft system is of prime importance and traffic accidents are one of the leading causes of fatal conditions. An important indicator of survival rates after an accident is the time between the accident and when emergency medical personnel are dispatched to the accident location. By eliminating the time between when an accident occurs and when the first responders are dispatched to the scene decreases mortality rates, we can save lives. There are two main parts discussed in the project. In this project the first part is vehicle tracking. And the second one is accident location intimation and alert system through SMS by using GSM module.

The concept of this project comes from the transport system of our college, which is very poorly managed and all records are on paper, which really does not look good as an engineering perspective. Transport manager manages all the records on the paper or files with that he do not have any system through which he can trace the location of all the vehicles and can coordinate them. Therefore it has been decided to develop such a concept which can give these all facilities to our college transport system and making it advanced in terms of technology.

1.2 OBJECTIVE

Main motto of the project is to incorporate different types of sensors so that they help in decreasing the chances of losing life in such accident which we can’t stop from occurring. Whenever accident is alerted the paramedics are reached to the particular location to increase

the chances of life. This device invention is much more useful for the accidents occurred in deserted places and at midnights. This vehicle tracking and accident alert feature will play much more important role in day to day life in future. And along with it the by generating e-pass we promote to Save Papers and Save Trees and move towards eco-friendly activities.

1.3 LITERATURE SURVEY

An intelligent, automated vehicle tracking system can resolve following problems such as, late arrivals to scheduled, improper use of company time and resources, unsafe driving habits, assigned routes, inefficient dispatching, and passenger's dissatisfaction. This can lead to better traffic flow modelling and a better understanding of driver behaviour. It includes various features like ingenuity, simplicity of design and easy implementation. It is completely integrated so that once it is implemented in all vehicles, then it is easy to track vehicle any time.

Prof. Savita.S.C. et al 2014 [1] has discussed safety of private and public vehicles which is a major concern nowadays so vehicle having GPS tracking system ensures their safety while travelling. Vehicle tracking systems are commonly used by fleet operators for fleet management functions such as routing, dispatch, on-board information and security. Other applications include monitoring driving behaviour, such as an employer of an employee, or a parent with a teen driver.

Prof. Kunal Maurya, et al [2] has elaborated system vehicle tracking system with an electronic device installed in a vehicle to enable the owner or a third party to track the vehicle location. It works using GPS and GSM technology designed to continuously monitor a moving Vehicle for doing so an AT89C51 micro-controller is interfaced serially to a GSM Modem and GPS receiver used to send the position (Latitude and Longitude) of the vehicle from a remote place.

Prof. Reynolds.J.C., 1990 [3] has designed and implemented first fully operational GPS/ Loran-based vessel monitoring system which monitors the workstation, communications solutions, and onboard navigation systems providing an integrated capability for the marine fleet operator. The system is a powerful tool for the fleet operator in such applications as shipping, scheduling, harbour operations, and route verification. Moreover, this concept can be applied to the larger problem of safe transport of hazardous cargo.

SeokJu Lee, 2014 [4] has discussed about the Vehicle tracking systems which is has been designed shipping industry because people wanted to know where each ship was at any given time. These days, however, with technology growing at a fast pace, automated vehicle tracking system is being used in a variety of ways to track and display vehicle locations in

real-time. This paper proposes a vehicle tracking system using GPS/GSM/GPRS technology and a Smartphone application to provide better service and cost-effective solution for users.

1.4 ORGANIZATION OF WORK

The organization of work for the proposed system can be divided into following points as follows:

1.4.1 VEHICLE TRACKING

When a request by user is sent to the contact number of GSM at the Arduino, the system automatically sends a return reply to that particular mobile indicating the position of the vehicle in terms of latitude and longitude. A Program has been developed which is used to locate the exact position of the vehicle and also to track the moving vehicle on Google Map. System implementation diagram is shown in Figure.1.1.

Figure.1.1: Implementation Diagram

1.4.2 ACCIDENT ALERT

This accident alert system detects the accident and the location of the accident occurred and sends GPS coordinates to the specified mobile, computer, etc. In any case if any mishap occurs then it's warning will be directly send to the intended receiver. In such cases when the accident occurs then accident is detected by combination of Vibration sensor & Accelerometer sensor. GPS module is used for tracking position of vehicle. When accident occurs, the

Accident alert message with location of accident occurrence will be sent to server-side(Institute/Company/Organization), Ambulance & Police by using GSM and GPS. Accident spot can be detected and save the human lives.

1.4.3 MECHANICAL FAILURE ALERT

Whenever the vehicle breakdowns i.e. Mechanical failure occurs then the driver just sends keyword for mechanical failure and then the mechanical alert message with the location of vehicle breakdown are send to server-side(Institute/Company/Organization) and mechanic.

1.4.4 E-PASS FOR PASSENGERS

We have used RFID tags as the e-pass/tickets to travel in the bus. This method helps to create a cosy data records of the students/passengers while travelling from bus. This also helps in Saving Papers and thus it is eco-friendly.

CHAPTER 2

SYSTEM DESIGN: HARDWARE IMPLEMENTATION

2.1 SYSTEM BLOCK DIAGRAM

The proposed system has the following blocks or hardwares which are as follows:

Figure.2.1: Block Diagram of system

In our project we have used ATMEGA 328 Arduino Uno R3 as the microprocessor for controlling and processing operations. GSM SIM 900 is interfaced with Arduino Uno to send and receive text message from the users. GPS is used to get the location of vehicle in form of co-ordinates like Latitude and Longitude. Sensors like Vibration sensor and Accelerometer sensors are used to detect accident and provide alert message at the server side. RFID Reader and RFID tags are used to maintain the records of passengers. Mobile used in the proposed system is a Smart phone used by the driver to provide location of the driver.

2.2 HARDWARE COMPONENT DETAILS

The hardwares used in this project are mentioned below with their specifications.

Table.2.1: Component List

Sr. No.	Component List	Specification	Quantity
1	**Ardunio UNO**	Operating voltage-5v, Digital I/O pins-14, Analog input pins-6, DC current per I/O pin 40mA, SRAM - 2KB, EEPROM-1KB, Clock speed-16MHz.	1
2	**GPS**	GY-NEO6MV2 Receiving bands: [1575.42MHz] Data rate: 9600bps	1

3	**GSM** **SIM 900A**	SIM900A Dual-band 900/1800 MHz Operating voltage 3.4 to 4.4V Power consumption 1.0 mA	1
4	**Vibration detection sensor**	Operating voltage: 5V	1
5	**Accelerometer**	GY-521 MPU6050+ 3 Accelerometer Accelerometer range: 2 4 8 16g Power supply: 3-5V	1
6	**RFID**	MFRC-522 Communication frequency: 13.56MHz	1

2.3 HARDWARE DESIGN DETAILS

The specific application of hardware for which it is implemented in this project is as follows:

2.3.1 ARDUINO UNO:

The Uno is a micro-controller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the micro-controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

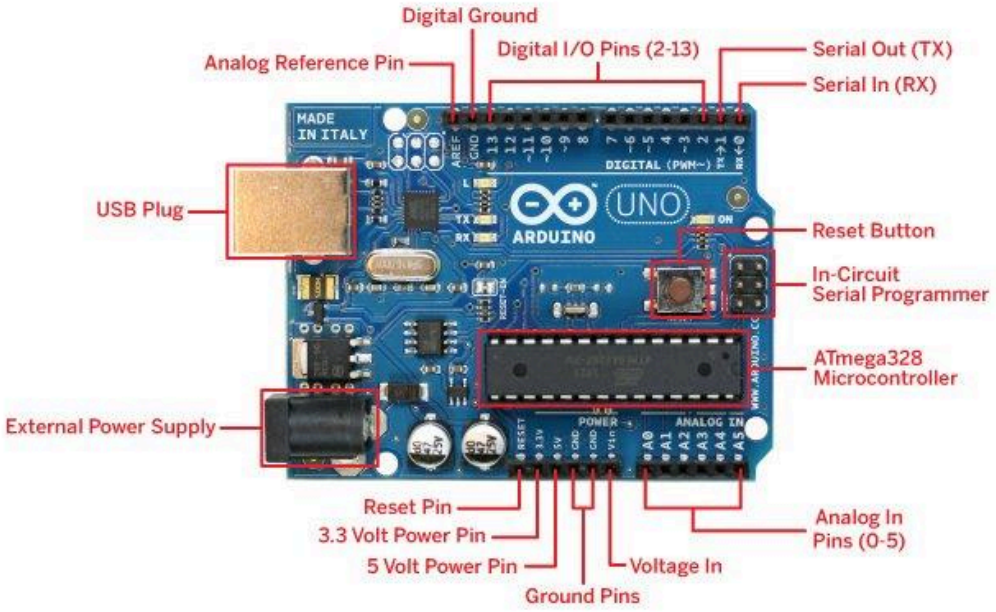


Figure.2.2: Arduino Uno

'Uno' means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

SPECIFICATIONS:

Table.2.2: Specification of Arduino

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pins	20mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32KB(ATmega328P)of which 0.5 KB used by boot loader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

2.3.2 GSM:

A GSM modem is a specialized type of modem which accepts a SIM card and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate

over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

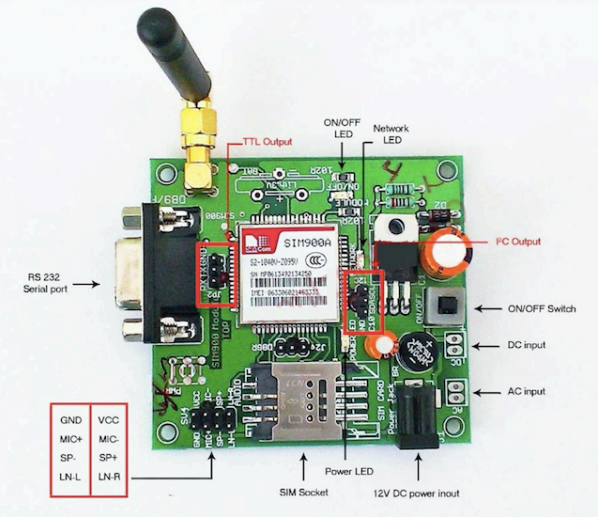


Figure.2.3: GSM Module

GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities.
For the purpose of this document, the term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.

FEATURES:

Table.2.3: Features of GSM

Quad-band	850/900/1800/1900MHz
GPRS multi-slot class12 connectivity	max. 85.6kbps(down-load/up-load) GPRS mobile station class B
Controlled by	AT Command
Supports	Real Time Clock
Supply voltage range	5V ~ 12V
Integrated	GPS/CNSS
supports	A-GPS

APPLICATIONS:

- SMS based Remote Control and Alerts
- Security Applications
- Sensor Monitoring
- GPRS Mode Remote Data logging

2.3.3 GPS SYSTEM

The Global Positioning System has revolutionized navigation and position location. The GPS system originally called NAVSTAR, was primary developed as a military navigation system for guiding missiles, ships and aircraft to their targets. The GPS system has been successful because it provides a direct readout of the present position of GPS receiver with a typical accuracy of 30m. An unlimited number of GPS receiver can operate simultaneously because all that a GPS receiver has to do to locate itself is to receive signals from four GPS satellites.

Figure.2.4 : GPS Module

The GPS space segment consists of 24 satellites in medium earth orbit (MEO) at a normal altitude of 20,200 km with an orbital inclination of 55 degree. The satellites are clustered in a group of four, called constellations, with each constellation separated by 60 degree in longitude. The orbital period is approximately one-half sidereal day (11 h 58 min) so the same satellites appear in the same position in the sky twice each day.

The satellites carry station-keeping fuel and are maintained in the required orbits by occasional station-keeping maneuvers, just like GEO satellites. The orbits of 24 GPS satellites ensure that at anytime, anywhere in the world, a GPS receiver can pick up signals from at least four satellites. Up to 10 satellites may be visible at some times and more than four

satellites are visible nearly all of the time. Replacement satellites are launched as needed, so there may be more than 24 operational GPS satellites at any given time.

GPS POSITION LOCATION PRINCIPLES

The basic requirement of a satellite navigation system like GPS is that there must be four satellites transmitting suitably coded signals from known positions. Three satellites are required to provide the three distance measurements and the fourth to remove receiver clock error. Below figure shows general arrangement of position location with GPS. The three satellites provide distance information when the GPS receiver makes three measurements of range, Ri, from the receiver to three known points. Each distance Ri can be thought of as the radius of sphere with a GPS satellite at its centre. The receiver lies at intersection of three such spheres, with a satellite at the centre of each sphere. Locally, at the receiver, the spheres will appear to be planes since the radii of the spheres are the very large. A basic principle of geometry is that the intersection of three planes completely defines a point. Thus three satellites, through measurement of their distances to the receiver, define the receiver location close to the earth's surface.

Figure.2.5 : Satellite

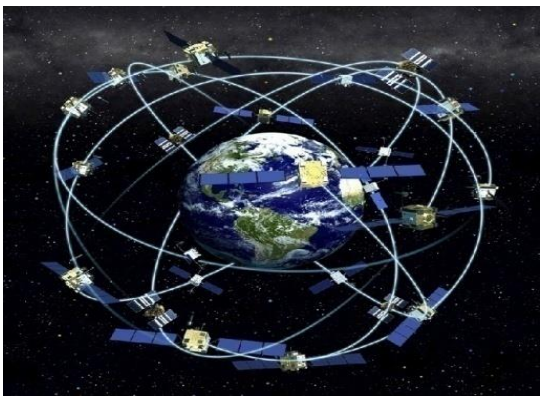


Figure.2.6 : Satellite orbits

Exact location on earth can be known GPS latitude, longitude information. Global Positioning System (GPS) is space based radio navigation System consisting of a constellation of Satellites and a network of stations used for monitoring and controlling. The GPS is operated and maintained by the Department of Defence (DOD). The GPS is a constellation of satellites in orbit around the Earth which transmit their positions in space as well as the precise period. It is receiver that collects data from the satellites and computes its location anywhere in the world based on information it gets from the satellites. Develop new microprocessor-based products and applications. The ARM is one of the major options available for embedded system developer.

2.3.4 RFID

MF RC522 is a highly integrated read and write card chip applied to the 13.56MHz contactless communication. Launched by the NXP Company, it is a low-voltage, low-cost, and small-sized non-contact card chip, a best choice for intelligent instrument and portable handheld devices.

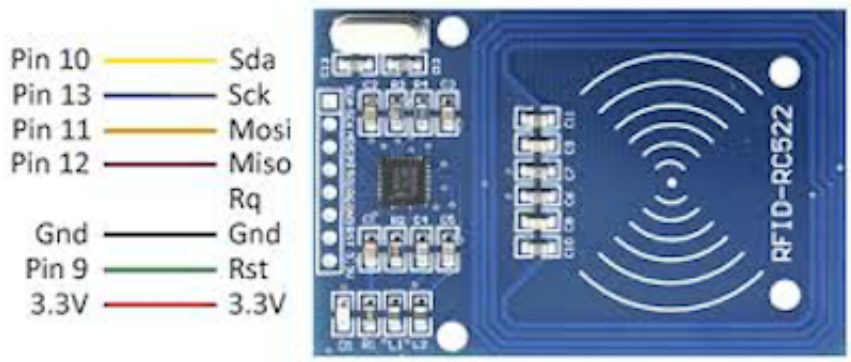


Figure.2.7: RFID Module

The MF RC522 uses advanced modulation and demodulation concept which fully presented in all types of 13.56MHz passive contactless communication methods and protocols. In addition, it supports rapid CRYPTO1 encryption algorithm to verify MIFARE products. MFRC522 also supports MIFARE series of high-speed non-contact communication, with a two-way data transmission rate of up to 424kbit/s. As a new member of the 13.56MHz highly integrated reader card series, MF RC522 is much similar to the existing MF RC500 and MF RC530 when there are also great differences. It communicates with the host machine via the serial manner which needs less wiring. You can choose between SPI, I2C and serial UART mode (similar to RS232), which helps reduce the connection, save PCB board space (smaller size), and reduce cost.

ELECTRICAL PARAMETERS:

Table.2.4: Parameters of RFID

Operating current	13—26mA/DC 3.3V
Idle current	10-13mA/ DC 3.3V
Sleep current	<80uA
Peak current	<30mA
Operating frequency	13.56MHz

Supported Cards	mifare1 S50, mifare1 S70, mifare UltraLight, mifare Pro, mifare Desfire
Physical features	size: 40mm×60mm
Ambient operating temperature	20-80 degrees centigrade
Ambient storage temperature	40-85 degrees centigrade
Ambient relative humidity	5%—95%

SPECIFICATIONS:

Table.2.5: Specifications of RFID Module

Module Name	MF522-ED
Working current	13—26mA/ DC 3.3V
Peak current	<30mA
Working frequency	13.56MHz
Card reading distance	0 ~ 60mm （mifare1 card）
Protocol	SPI
Data communication speed	Maximum 10Mbit/s
Dimension	40mm×60mm
Max SPI speed	10Mbit/s

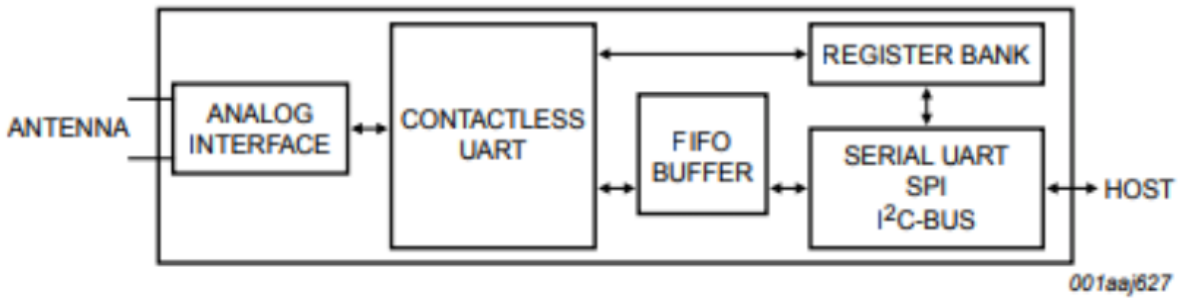


Figure.2.8: Internal structure of RFID

2.3.5 ACCELEROMETER

An accelerometer is a device that measures proper acceleration. Proper acceleration, being the acceleration (or rate of change of velocity) of a body in its own instantaneous rest

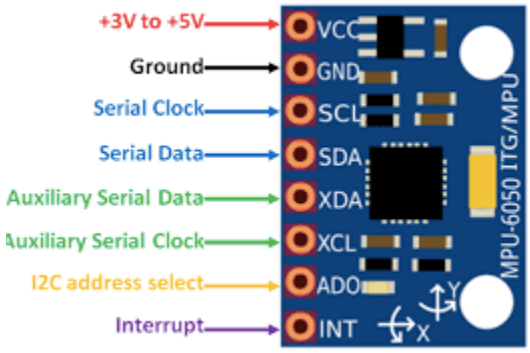


Figure.2.9: Accelerometer Module

frame, is not the same as coordinate acceleration, being the acceleration in a fixed coordinate system. For example, an accelerometer at rest on the surface of the Earth will measure an acceleration due to Earth's gravity, straight upwards (by definition) of $g \approx 9.81\ m/s^2$. By contrast, accelerometers in free fall (falling toward the centre of the Earth at a rate of about $9.81\ m/s^2$) will measure zero.

How Does an Accelerometer Work?

An accelerometer works on the principle of the piezoelectric effect. Imagine a cuboidal box with a small ball inside it, like in the picture above. The walls of this box are made with piezoelectric crystals. Whenever you tilt the box, the ball is forced to move in the direction of

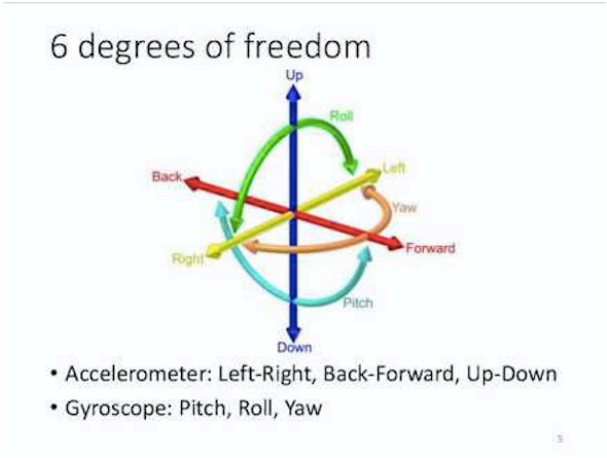


Figure.2.10: Accelerometer axes

the inclination due to gravity. The wall that the ball collides with creates tiny piezoelectric currents. There are three pairs of opposite walls in a cuboid. Each pair corresponds to an axis

in 3D space: X, Y, and Z axes. Depending on the current produced from the piezoelectric walls, we can determine the direction of inclination and its magnitude.

The MPU-6050 is a six-axis motion tracking device developed by InvenSense. The main features of the MPU6050 device are mentioned below.

- Three – axis Accelerometer
- Three – axis Gyroscope
- Digital Output Temperature Sensor
- Six 16-bit ADC (three for Accelerometer and three for Gyro)
- Integrated Digital Motion Processor (DMP)
- 1024B FIFO Buffer

The six-axis MPU-6050 is some time called as a 6 DoF (six Degrees of Freedom) device, as it provides six output values (three from Accelerometer and three from Gyro). The MPU-6050 can communicate using I2C Protocol. Digital Motion Processor or the DMP is an embedded processor that can reduce the computational load from the host processor, like an Arduino, by acquiring and processing data from Accelerometer, Gyroscope and an external Magnetometer.

2.3.6 VIBRATION SENSOR

This module features an adjustable potentiometer, a vibration sensor, and a LM393 comparator chip to give an adjustable digital output based on the amount of vibration. The

Figure.2.11: Vibration sensor module

potentiometer can be adjusted to both increase and decrease the sensitivity to the desired amount. The module outputs a logic level high (VCC) when it is triggered and a low (GND) when it isn't. Additionally there is an onboard LED that turns on when the module is triggered.

FEATURES:

The default state of the switch is close

- Digital output Supply voltage:3.3V-5V
- On-board indicator LED to show the results
- On-board LM393 chip
- SW-420 based sensor, normally closed type vibration sensor
- Dimension of the board: 3.2cm x 1.4cm

Vibration sensors are sensors for measuring, displaying, and analyzing linear velocity, displacement and proximity, or acceleration.

Vibration — however subtle and unnoticed by human senses — is a telltale sign of machine condition. Abnormal vibration indicative of problems with an industrial machine can be detected early and repaired before the event of machine failure; because such a failure is potentially costly in terms of time, cost, and productivity, vibration measurement allows industrial plants to increase efficiency and save money. Therefore, vibration analysis is used as a tool to determine equipment condition as well as the specific location and type of problems.

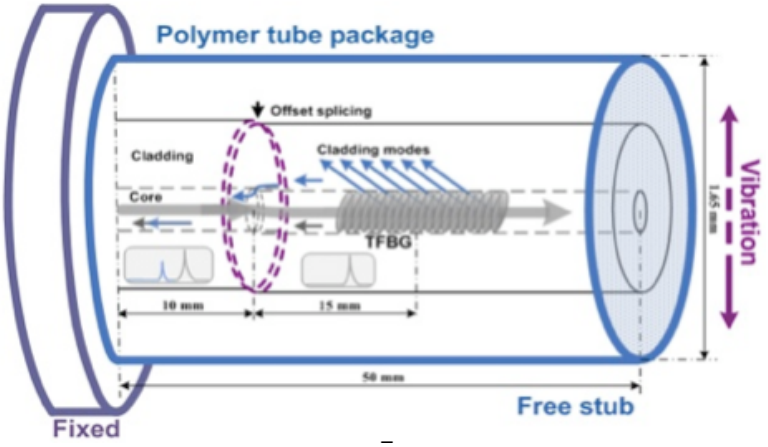


Figure.2.12: Internal Structure of vibration sensor

It works on electromechanical principle The Vibration Sensor Detector is designed for the security practice When Vibration Sensor Alarm recognizes movement or vibration, it sends a signal to either control panel Developed a new type of omni-directional high sensitivity Security Vibration Detector with omni-directional detection

SPECIFICATIONS:

Table.2.6: Specifications of Vibration Sensor

Sensitivity	Height adjustable
Consistency and Interchangeability	Good
Reliability and Interference	Accurate triggering strong anti-interference
Automatic Reset	Automatic reset is strong
Signal Post-processing	Simple
Output Signal	Switch signal
No External Vibration Analysis of Plates	Product design vibration analysis of the internal amplifier circuit
Detection Direction	Omni-directional
Signal Output	Switch signals
Output Pulse Width	The vibration signal amplitude is proportional
Operating Voltage	12VDC (red V + shield V-)
Sensitivity	Greater than or equal 0.2g
Frequency Range	0.5HZ ~ 20HZ
Operating Temperature Range	-10 /~ 50

2.4 WORKING AND SIMULATION

2.4.1 VEHICLE TRACKING

In this part the obstacle comes in the path of vehicle is detected by using ultrasonic sensor. It is an ultrasonic range finder sensor. Ultrasonic sensor continuously produce high frequency sound wave. This wave return back after hitting on obstacle and at that time echo is generated.By using the total time period required for sending and receiving the signal, the distance between obstacle and vehicle is calculated. In that part L298N motor drive circuit is used to avoid obstacle and avoid accident. L298N is a dc motor driver which is used to drive motor in clockwise & anticlockwise direction. It can provide bi-directional current for two motors simultaneously. This two motors are used to avoid obstacle. At the start both motors will run normally and vehicle moves forward. This two motors are used to give direction to the vehicle as per the position of obstacle.

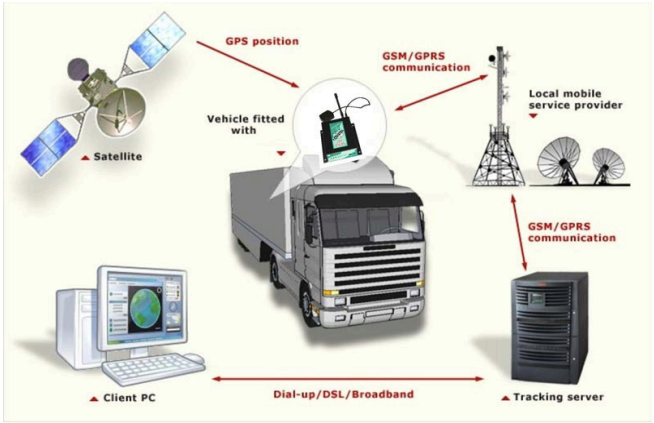


Figure.2.13: Vehicle Tracking System

2.3.2 VEHICLE MANAGEMENT

In some cases, we can't avoid accident using obstacle avoiding part hence in this case immediate help is require to reduce saver condition. In accident detection part we used piezoelectric sensor to detect accident.

In vehicle management there are multiple of tasks to manage in a system which varies from type of server-client requirement and their application. Few of the tasks that can be managed are shown below:

- Maintaining the students records like name, contact details and fees record etc.
- Location tracking of various system can be done at a time if implemented in bulk.

- Accident alert message system.
- e-Pass using RFID tags.

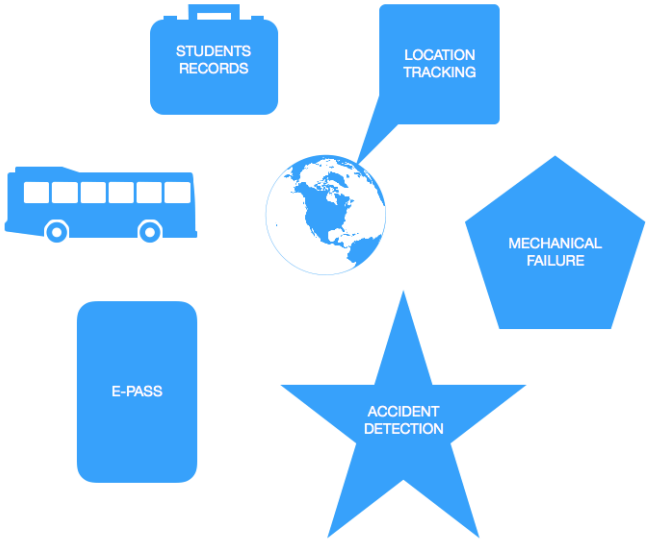


Figure.2.14: Vehicle Management

This sensor detects vibrations during accident and sent signal to Arduino. Here we used GPS for tracking position of vehicle &GSM is used to send message. In this case when accident occur it is detected by piezoelectric sensor and immediately sent message with time, date and accident spot to the Ambulance, Police or family by using GSM to get help.

CHAPTER 3

SYSTEM DESIGN: SOFTWARE IMPLEMENTATION

3.1 SOFTWARE REQUIREMENTS

3.1.1 Arduino Compiler

The Arduino IDE is a cross-platform application written in Java, and is derived from the IDE for the Processing programming language and the Wiring project. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and is also capable of compiling and uploading programs to the board with a single click. There is typically no need to edit make files or run programs on a command-line interface. Although building on command-line is possible if required with some third-party tools such a Uno.

The Arduino IDE comes with a C/C++ library called "Wiring" (from the project of the same name), which makes many common input/output operations much easier. Arduino programs are written in C/C++.

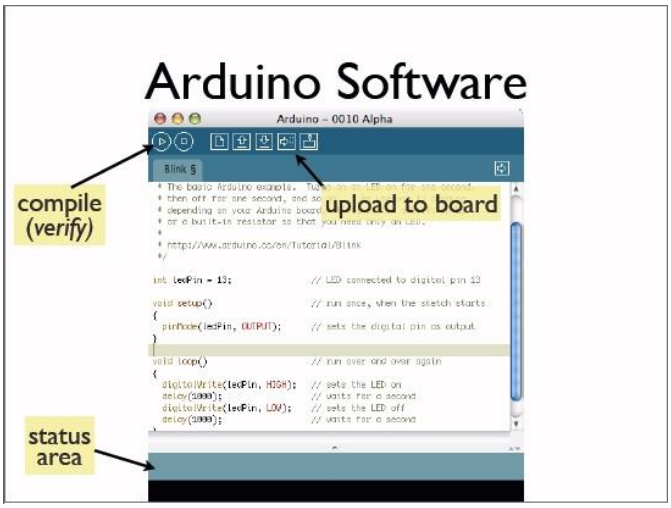


Figure.3.1: Arduino Compiler

3.1.2 Google Maps

Google Maps is a desktop and mobile web mapping service application and technology provided by Google, offering satellite imagery, street maps, and Street View perspectives, as well as functions such as a route planner for traveling by foot, car, bicycle (beta test), or with public transportation. Also supported are maps embedded on third-party websites via the Google Maps API,[1] and a locator for urban businesses and other organizations in numerous countries around the world. Google Maps satellite images are not updated in real time; however, Google adds data to their Primary Database on a regular basis. Google Earth support states that most of the images are no more than 3 years old.

Figure.3.2: Google Maps App

3.1.3 Tasker

WHAT IS TASKER?

Tasker is an application for Android which performs tasks (sets of actions) based on contexts (application, time, date, location, event, gesture) in user-defined profiles or in clickable or timer home screen widgets.

We are Android users, and we are a pampered bunch. Android is such a flexible mobile OS that our Android devices often act as our personal genies granting our daily mobile wishes, making some of our mobile dreams come true. And, as powerful as OEM-provided genies already are, a task control and task automation app such as Tasker only multiplies their power severalfold.

Figure.3.3: Tasker Application

Most people describe Tasker as a task control and task automation app. But, I see more than that. It's an Android programming app for complete noobs like me and for advanced users with experience in Android programming. But instead of scaring you with lines of code, Tasker lets you use a friendly interface, which, on a fundamental level, lets you create mini Android apps that do your bidding.

Tasker terms

First, let's come to terms with… the terms in Tasker. Many of the concepts may be new to you, and they can be a bit overwhelming, especially to neophytes. But, once you get the logic of Tasker, you'll find that it's a truly powerful app even for programming noobs

- Action — The basic element of Tasker. It refers to phone or tablet functions and features that perform something or bring the phone to a certain state. Tasker supports more than 200 actions grouped into 21 categories.
- Task — A group of actions. Usually linked to a trigger or "context," but can also be a free-floating, standalone task executed manually. A task can be run within another task. You can clone, export, import, and lock tasks.
- Context — Situations or conditions which, when true, trigger the execution of the task(s) associated with it.
- Profile — Some sort of "container" or "package" for context(s) and linked task(s). You can define several contexts for a single profile, and all those conditions must be true for the linked tasks to run.
- Variable — A name for an unknown value that can change over time, like the battery level or the date.
- Scene — A custom-made user interface. You can create your own layout of buttons, menus, popups, and other UI elements.
- Project — A group of profiles, tasks, scenes, and variables. Each project has its own tab (at the bottom of the main screen) with a user-defined project name. You can also export or import projects. You can even export a custom project as a standalone Android app (APK): just tap on the project name/icon, select Export, and choose "As App."

3.2 ALGORITHM DETAILS

1) Initialize Hardware, LCD & SMS.
2) Wait for input as a location request SMS to GSM by the passenger.
3) GSM commands Arduino to produce location request as the task.
4) Arduino takes location in form of co-ordinates(Latitude, Longitude) from the GPS interfaced with Arduino.
5) Arduino processes the data from GPS and gives it as output to the passenger's number available in the contact list of Arduino's program through the GSM.
6) When the passenger receives the SMS it is provided with a link through which the vehicles location is traced.

3.3 FLOWCHART

The working flowchart of the proposed system are shown in following graphical representation wherein the flowchart for overall system is shown in figure 1 and the flowchart for software based operation of the system is shown in figure 2 as follows,

The overall tracking part is shown in this flowchart where the process begins with client requesting location of the vehicle.

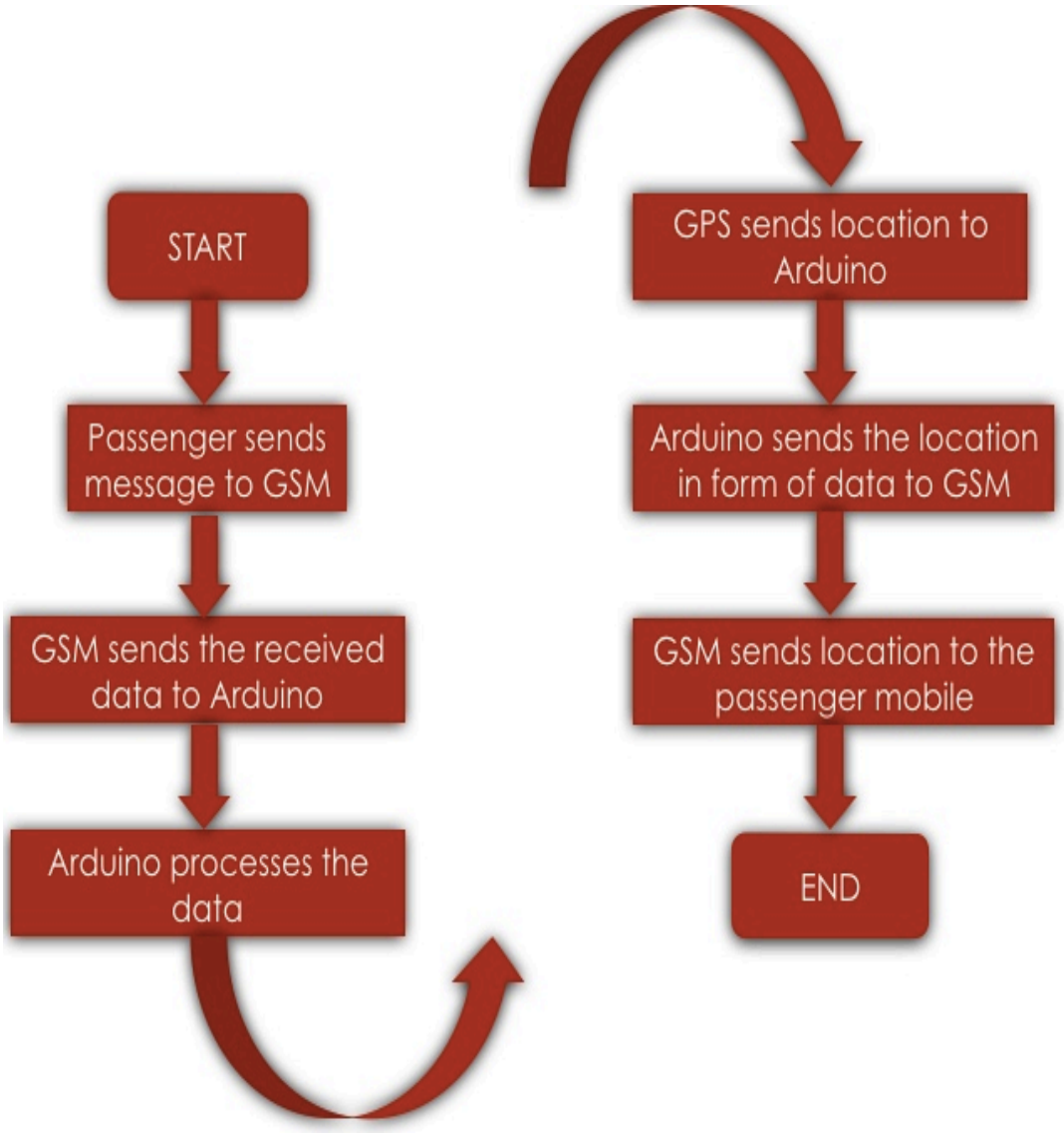


Figure.3.4: Overall Flowchart of system

The software operation of the proposed system at server side are shown in this flowchart. The Yellow blocks represents flow of Tracking operation and the Blue blocks represents the flow of Management operations.

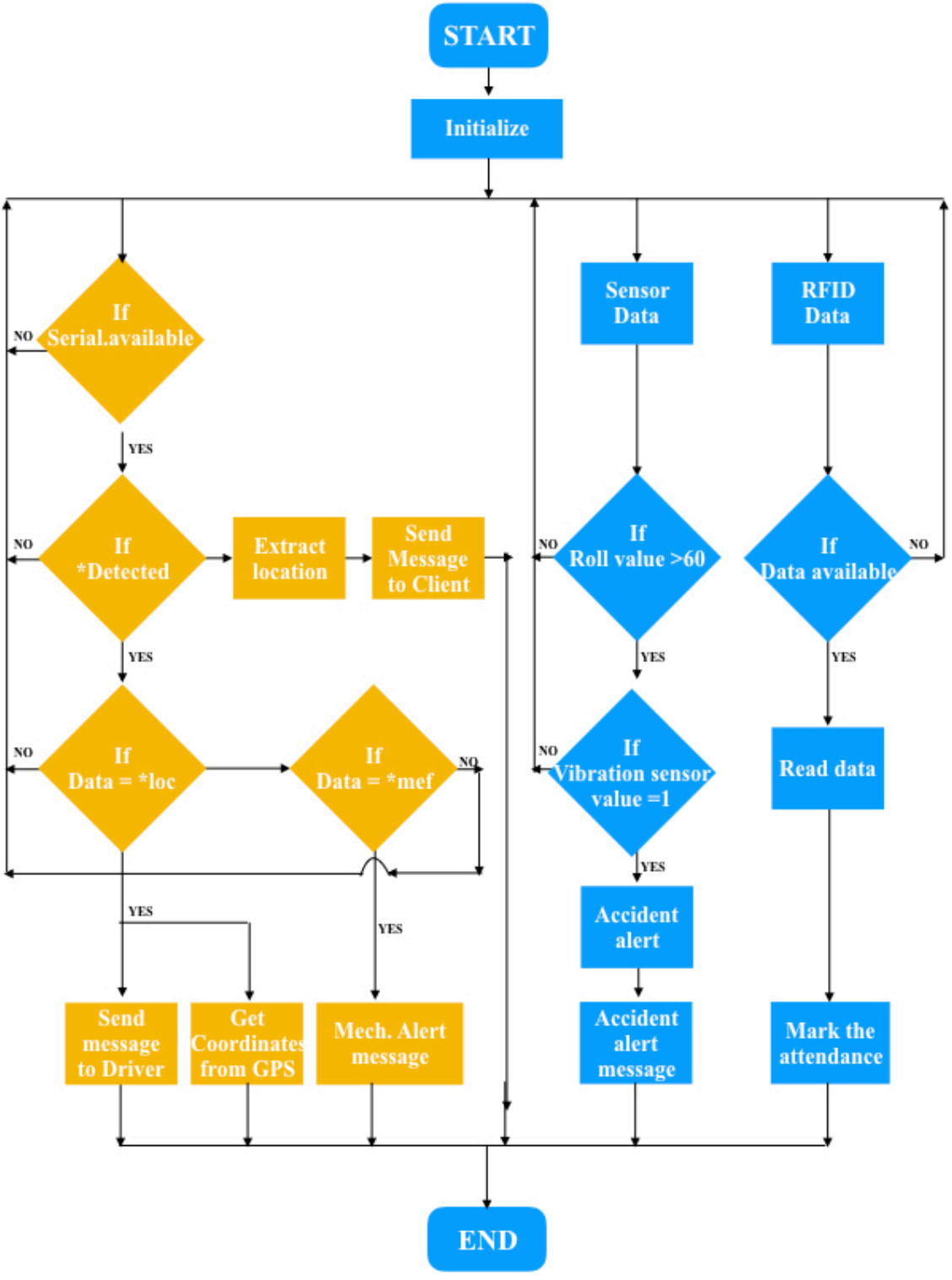
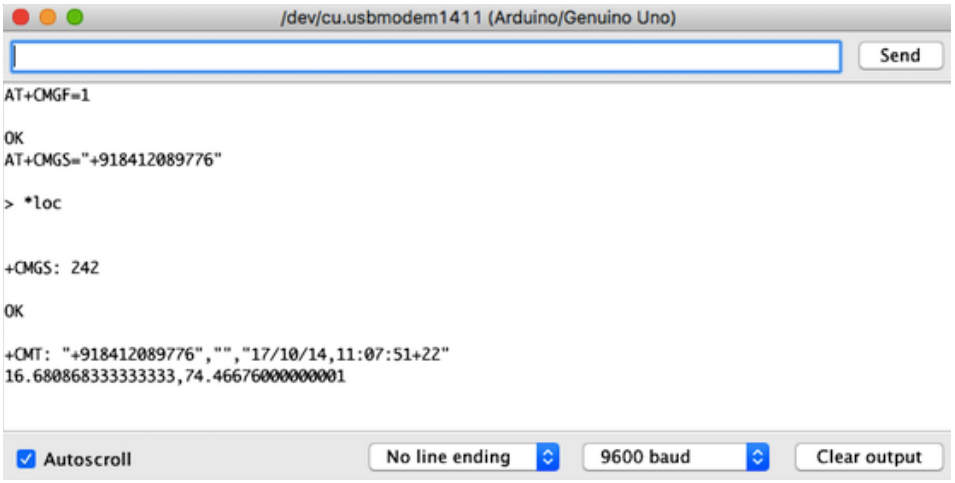


Figure.3.5: Software based Flowchart of system

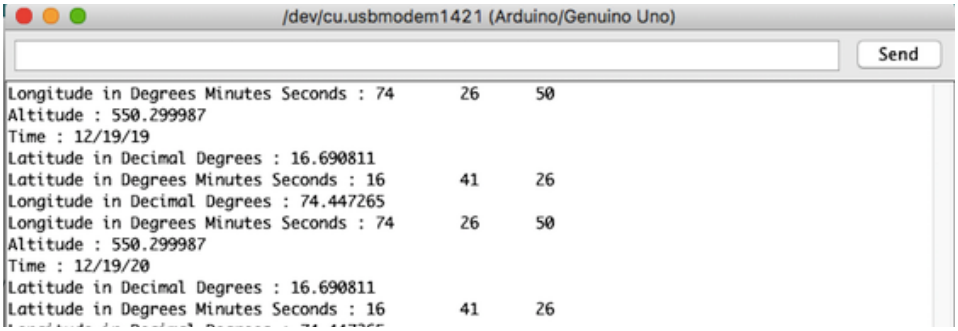
3.4 SIMULATION AND RESULTS

The simulation of project is done using Arduino compiler's serial monitor window wherein the different components were interfaced and the results obtained were displayed as follows:

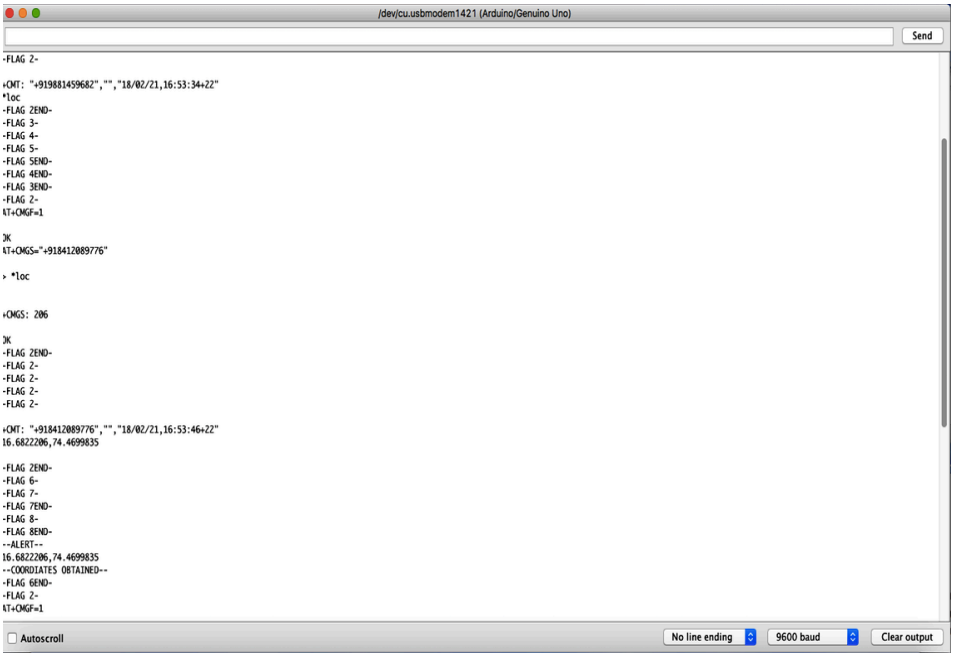
1. Sending *loc keyword and Location response:(Arduino + GSM)



2. Testing of GPS:(Arduino + GPS)



3. Overall Working of Vehicle Tracking:(Arduino + GSM + GPS)



CHAPTER 4

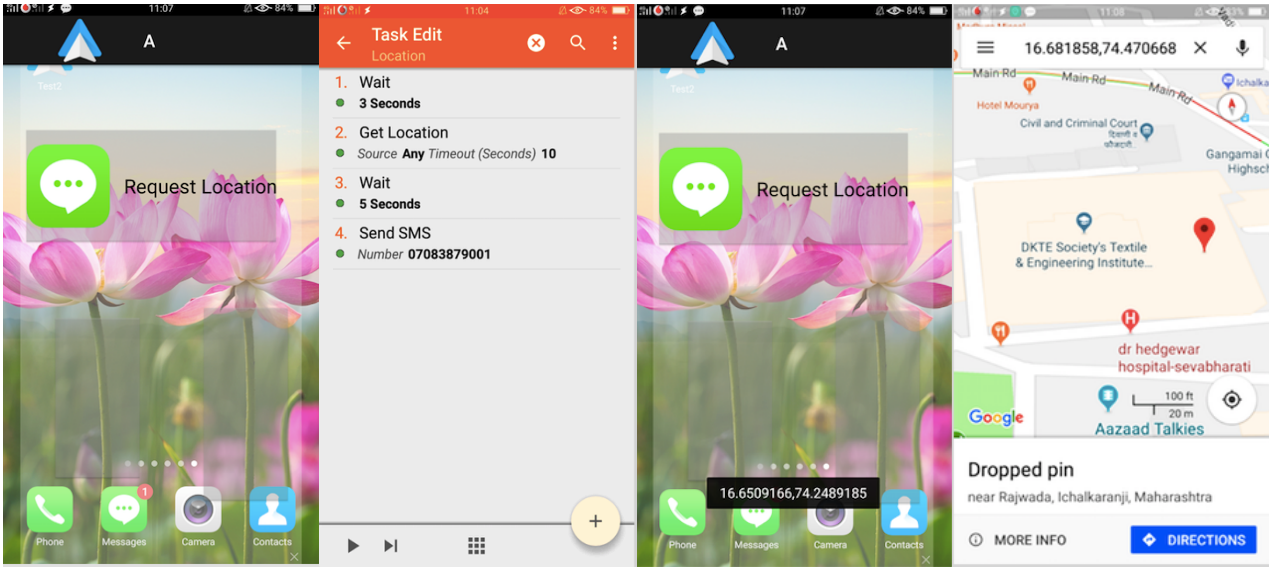
RESULTS AND DISCUSSION

4.1 RESULTS AND DISCUSSION

4.1.1 RESULTS:

This is an intelligent and sophisticated mobile vehicle tracking system that could keep-up with fast infrastructural growth and road infrastructure development. This system proved to be much more efficient and produced good results.

TRACKING PART RESULTS:



STEP 1 STEP 2 STEP 3 STEP 4

Figure.4.1: Screenshots of VTS Application

The results obtained for the Tracking of vehicle are as follows:

STEP-1: The VTS app is opened in the clients smartphone. The first step is to send a location request to the driver/Bus. After clicking on “Request Location” button it automatically sends message to the driver.

STEP-2: After getting location request on drivers mobile phone the Tasker application executes the specified task for it which is as shown in figure. It sends co-ordinates to the Arduino.

STEP-3: The Arduino sends the location to the client and then it appears in the flash of VTS mobile app.

STEP-4: After receiving the message the Tasker opens the other application in the mobile phone i.e. Google maps to locate the co-ordinates.

MANAGEMENT PART RESULTS:

Whenever the vehicle breakdowns or the accident occurs at a certain location then the appropriate message is to be given to the Institute, mechanic, police and hospital along with the Location. The message which we get is as follows.

PROJECT MODEL PHOTOGRAPH:

The Hardware model of our proposed system is as shown in Figure.4.6. Here the circuitry is made compact so that it can be connected in all vehicles in a very optimum space.

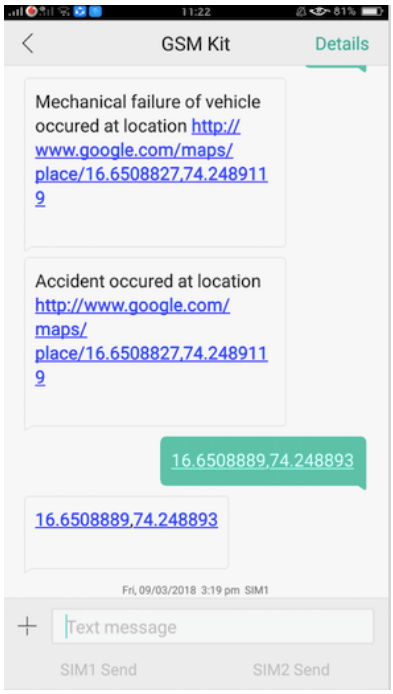


Figure.4.2: Response of GSM

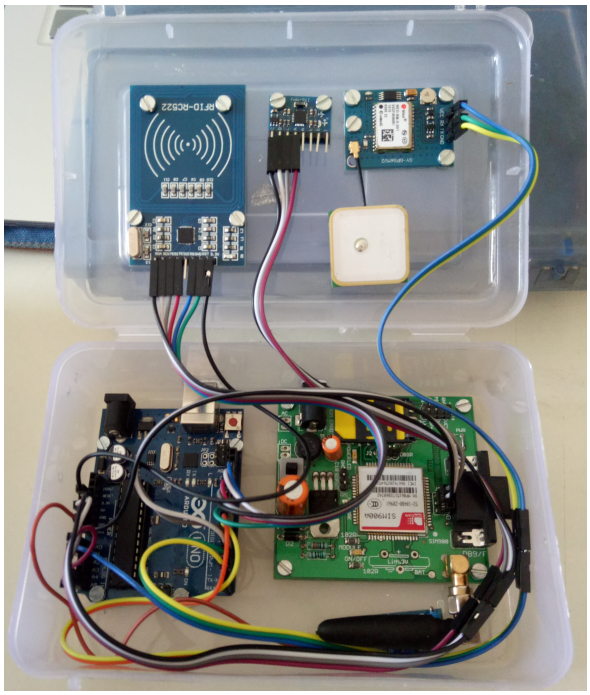


Figure.4.3: Project Model Photograph

4.1.2 DISCUSSION:

The proposed system has been implemented in the cabs/taxi's in the metro cities. They are present in Ola and Uber where in the driver/vehicle shares the live location with the passenger to get the route monitoring and fleet management etc.

4.2 MERITS AND DEMERITS OF PROJECT

4.2.1 MERITS:

- Tracking system can keep an eye on children driving habits. Parents can therefore clamp down on people who consistently speed or drive dangerously.
- GPS vehicle tracking system can also monitor the fuel consumption of company's fuel so that managers can work towards a more economical and environmentally friendly fleet of vehicles.
- Tracking system can also help people to map out the shortest routes a driver can take which can help to save time, money and fuel.

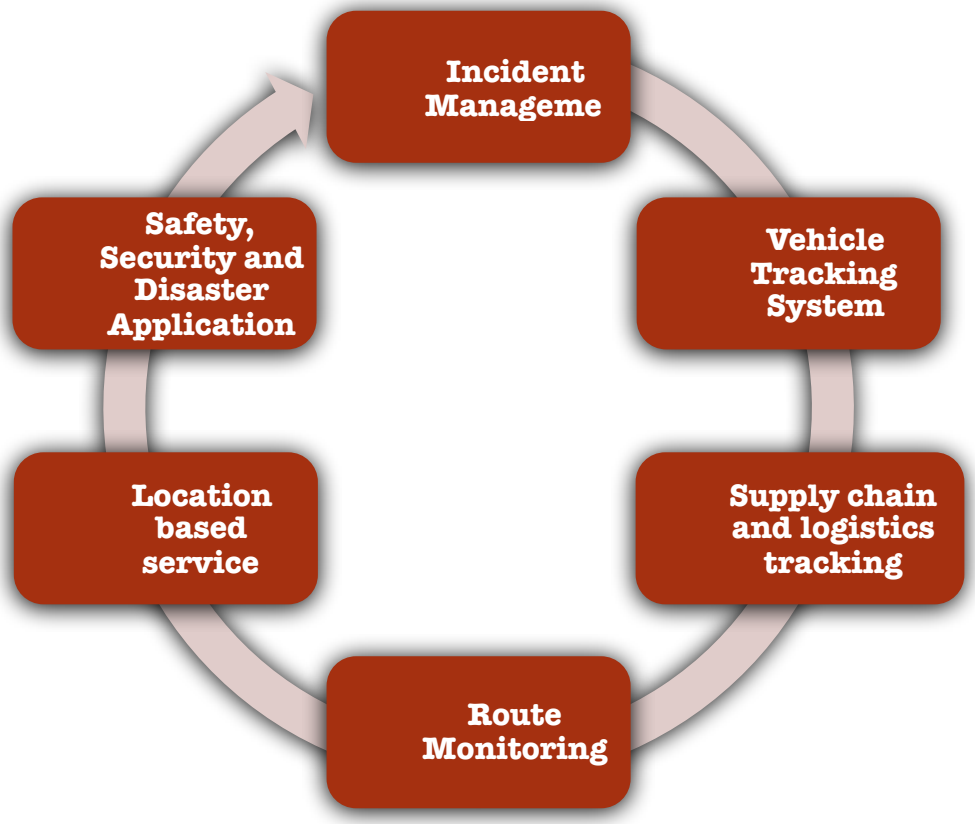


Figure.4.4: Applications of VTS

4.2.2 DEMERITS:

- There are another piece of technology to go wrong and cause stress to the staff that come to rely on the tracking devices.
- Sometimes the signal strength would not be available to devices for efficient data access.

4.3 FUTURE SCOPE

- We can use the EEPROM to store the previous navigation position upto 256 locations and we can navigate upto N number of locations by increasing its memory.

- With the help of high sensitivity vibration sensors we can detect the accidents. Whenever vehicle unexpectedly had an accident on the road, with the help of vibration sensors we can detect the accident and we can send the location to the owner, hospital and police.
- We can use our kit to assist the traffic. It can be done by keeping the kits in the entire vehicles and by knowing the locations of all the vehicles.
- If anybody steals our car we can easily find our car around the globe. It is obtained by keeping vehicle positioning vehicle on the vehicle.

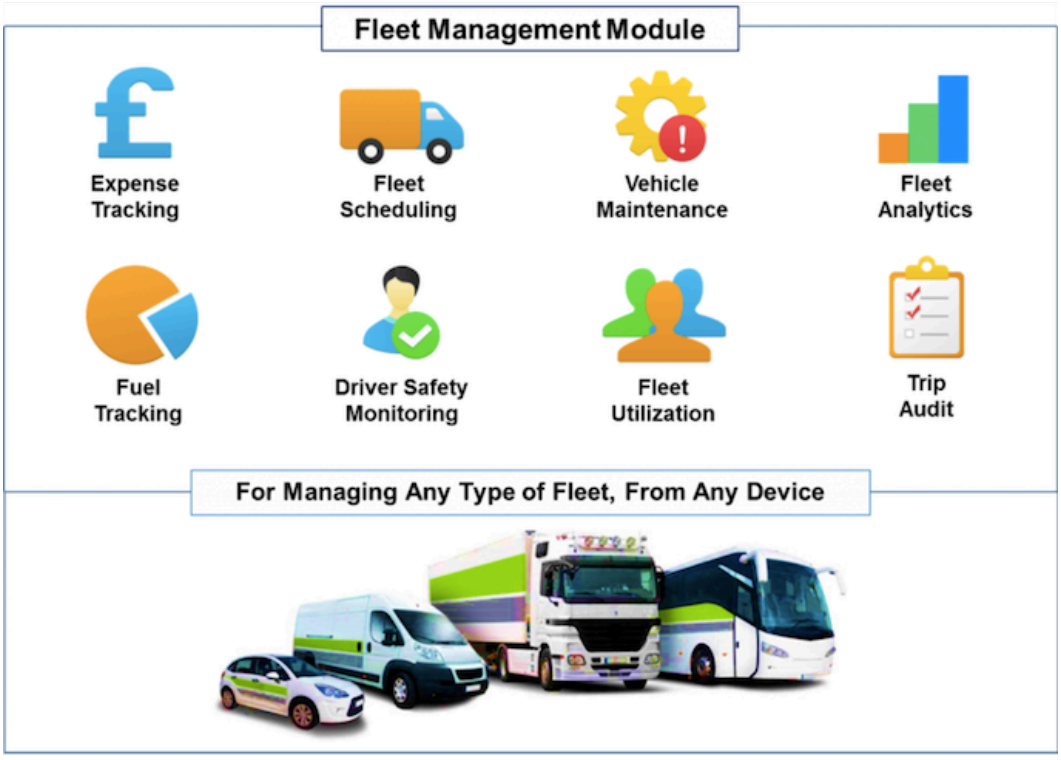


Figure.4.5: Extension of Project

APPENDIX

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BILL OF MATERIALS (BOM)

Sr. No.	Component	Amount
1	Arduino Uno	₹ 500.00
2	GSM (Sim 900)	₹ 1200.00
3	GPS (NEO 6M)	₹ 920.00
4	Accelerometer (GY-521 Mpu6050)	₹ 293.00
5	Vibration Sensor	₹ 150.00
6	Jumpers	₹ 150.00
7	Tasker Software	₹ 249.00
8	RFID Reader	₹ 300.00
	Total	**₹ 3762.00**

PARTICIPATION CERTIFICATES


BHARATI VIDYAPEETH'S
COLLEGE OF ENGINEERING, KOLHAPUR
Accredited by NAAC with 'A' Grade
TECHNO BHARATI 2K18
CERTIFICATE
This is to Certify that, Mr./Ms./Mrs. sneha khot
has participated / won First Prize / Second Prize / Third Prize / Runner Up in Event Project Expo
Orgnized at Bharati Vidyapeeth's College of Engineering, Kolhapur Dated 9th March 2018.
Prof. R.P.Mirajkar
Event Coordinator
Dr. V.R.Ghorpade
Principal


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