Visvesvaraya Technological University
Belagavi

A Project Phase -1 Report

on

“ACCIDENTSHIELD: AUTOMATED VEHICLE CRASH ALERT USING RASPBERRY PI”

Submitted by

C THARUN SAI YADAV, USN:1NH20EC035
VIMARSHA RUDRESH, USN:1NH20EC183
KONDURU SILPA , USN:1NH20EC066

In partial fulfilment for the award of the

degree of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

NEW HORIZON
COLLEGE OF ENGINEERING
New Horizon Knowledge Park, Ring Road, Marathalli
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with ‘A’ Grade, Accredited by NBA

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Bengaluru – 560 103

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

Certified that the Major project entitled "**ACCIDENTSHIELD: AUTOMATED VEHICLE CRASH ALERT USING RASPBERRY PI"** is carried out by **Mr. C Tharun Sai Yadav** bearing **USN: 1NH20EC035** and **Ms. Vimarsha Rudresh** bearing **USN: 1NH20EC183** and **Ms. Konduru Silpa** bearing **USN: 1NH20EC066,** bonafide students of NHCE, Bengaluru in partial fulfilment for the award of Bachelor of Engineering in Electronics and Communication of the Visvesvaraya Technological University, Belagavi during the year 2023-24. It is certified that all corrections and suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The mini project report has been approved as it satisfies the academic requirements in respect of the mini project work prescribed for the said degree.

Signature of the guide
Ms. Salna Joy
Assistant Professor
Department of ECE
NHCE, Bengaluru

Signature of the HoD
Dr. Aravinda K
Professor & HoD
Department of ECE
NHCE, Bengaluru

Name of the Examiner	Signature of the Examiner
1.	1.
2.	2.

ACKNOWLEDGEMENT

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ABSTRACT

The growing number of traffic accidents highlights the critical need for sophisticated safety measures. In order to improve road safety by promptly alerting emergency services to a collision, this study presents a novel automated vehicle accident alarm system. The central processing unit is the Raspberry Pi, which is easily connected to a variety of sensors and connectivity devices.

The principal constituents are an accelerometer, GPS module, GSM module, vibration sensor, alcohol sensor, LCD display, relay, buzzer, and infrared (IR) sensor. These parts enable constant observation of the dynamics and environment surrounding the vehicle. If the accelerometer detects a collision, the GPS module logs the exact location and the GSM module contacts the designated emergency contacts.

An alcohol sensor adds an extra degree of preventive capability to safety measures by keeping track of drivers' sobriety. By differentiating between different sorts of collisions, the vibration sensor enables the system to prioritize alarms according to the impact's severity. The IR sensor helps with object detection surrounding the car, and an LCD display provides real-time feedback on the system's status.

The system alerts passengers and pedestrians by activating the relay and buzzer upon impact detection. Concurrently, an automatic distress signal is sent to pre-identified emergency contacts that includes vital information including the location of the accident. By minimizing emergency response times, this quick and automated approach hopes to lessen accident severity and enhance victim outcomes.

This versatile system is made to seamlessly integrate into current vehicle systems, meeting the urgent need for preventative measures to enhance road safety. It has the ability to lessen the severity of accidents and save lives by giving emergency services accurate and timely information.

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CHAPTER 1
INTRODUCTION

Anytime might be an accident on the road, and they frequently result in dire circumstances that need for quick care. The "Accident Shield: Automated Vehicle Crash Alert" is our approach to this urgent problem. With the use of Raspberry Pi technology, this creative idea seeks to improve road safety by instantly notifying authorities of car accidents.

By automating the process of notifying authorities and emergency services in the case of a car crash, Accident Shield is a comprehensive emergency services notification system intended to improve road safety. Integrated hardware includes accelerometers, GPS modules, GSM modules, alcohol sensors, IR sensors, vibration sensors, an LCD display, relay, buzzer, and a power supply (battery) that are all part of the system that is based on its Raspberry Pi. Python is used to execute the programming code.

By automating the procedure of notifying emergency services in the case of a vehicle crash, Accident Shield acts as a preventative safety precaution. The system facilitates a prompt and efficient response to accidents by combining several sensors and communication modules, which may prevent fatalities and reduce injuries. Accident Shield is a strong and adaptable remedy for improving traffic safety since it combines hardware elements with Python programming.

The pursuit of enhancing traffic safety and cutting down on accident reaction times is crucial in this day of rapid technology development. An innovative solution that uses advanced technology and smart programming to provide a proactive safety net on the roads is Accident Shield, an Automated Vehicle Crash Alert System.

Unfortunately, traffic accidents frequently result in considerable loss of life and property damage. The speed at which emergency services may be called in and sent to the scene is crucial in reducing the aftermath of accidents. The human element included in traditional accident reporting procedures might cause delays, particularly in remote locations or in poor visibility. This is addressed by Accident Shield.

CHAPTER 2

LITERATURE REVIEW

Title of the paper	Author &Year of Publication	Outcome	Limitation
An IoT Based Car Accident Prevention and Detection System with Smart Brake Control	Murshed & Md Sanaullah Chowdhury 2023	This paper introduces an IoT-based smart system to mitigate accident-related fatalities, boasting continuous reliability and robust alerts. Future upgrades aim to ensure compatibility across all vehicle types, integrate GPS for enhanced email alerts, and implement roadside data mining for improved performance.	The system's effectiveness heavily relies on a stable and widespread IoT network. In areas with poor connectivity, the reliability of alerts and real-time monitoring.
Vehicle accident prevention using Raspberry pi and IOT.	Aravind Sampath & Vidhyapathi C. Oct-2023	The system activates a buzzer on simultaneous high vibrations from four sensors, updating GPS data to "thingspeak.com." The motor stops post-accident with LCD displaying "accident detected." Heartbeat exceeding 120 triggers motor off, displaying "abnormal."	High vibrations may not exclusively indicate accidents, leading to potential false positives. The system might struggle to distinguish between genuine accidents and other intense vibrations, such as rough terrains.
IoT Based Intelligent System For Vehicle Accident Prevention And Detection At Real Time,	Vivek Kinage, Piyush Patil Jan-2023	With rising vehicle accidents, our proposed system, utilizing Arduino, MQ-3 sensor, infrared sensor, accelerometer, and webcam, offers a real-time, cost-effective solution. It detects issues like drunken driving, drowsiness, and poor speed breakers, generating alerts and, if necessary, cutting fuel supply to prevent accidents.	The accuracy and reliability of the MQ-3 sensor, infrared sensor, and accelerometer are crucial..
ACCIDENT ALERT SYSTEM USING PRESSURE SENSING DEVICE	Tirth Patel, Saurabh Patel April 2023	The rise in vehicle popularity has heightened traffic risks and accidents, endangering lives due to limited crisis centers. An accident alarm system, utilizing GSM and GPS modules, enhances safety, communication, and efficiency. It offers potential for widespread impact in daily life	The effectiveness of the GSM-based alarm system is contingent on mobile network coverage. In areas with poor or no network signals, the system's ability to transmit alerts and communicate with crisis centers may be compraised
Accident Detection and Alert sytem using Gps &Gsm on Iot based Mar-2023	P. Josephinshermila a,* , S. Sharon priya b , K. Malarvizhi c , Ramakrishna hegde d , S. Gokul Pran e , B. Veerasamy Sep-2023	The Automotive Monitoring Black-Box system ensures driver authentication, real-time vehicle parameter monitoring, cloud storage, and website accessibility for organizations, improving accident analysis and prevention	The collection and storage of real-time vehicle parameters and driver authentication data raise concerns about privacy and data security.

CHAPTER 3

EXISTING SYSTEM

Traditional Vehicle Safety Systems:

- **Seatbelts and airbags**: These passive safety measures reduce injury risks in the event of an accident.
- **Brake anti-lock systems (ABS)**: Prevent wheel lockup t o keep control and increase stopping distance when braking.
- **Electronic stability control (ESC**): To detect and correct traction loss in order to prevent rollovers and skids.

Crash Detection and Alert Systems:

- **GPS-based emergency call systems**: They automatically alert emergency services to crashes by detecting abrupt changes in the speed or direction of the vehicle.
- **OBD (onboard diagnostics) systems**: track the operation of the vehicle and are able to identify possible crash triggers such as abrupt braking or airbag deployment.
- **Mobile phone apps**: Employ GPS and accelerometers to identify collisions and send alerts to emergency contacts or roadside assistance.

Advanced Accident Mitigation Systems:

- **Forward collision warning (FCW)**: This technology uses radars or cameras to identify possible collisions with oncoming traffic and then send out warnings.
- **Automated emergency braking (AEB)**: Capable of applying brakes on its own to prevent or lessen collisions.
- **Lane departure warning (LDW):** Drivers who inadvertently stray from their lane are alerted by the lane departure warning system (LDW).

CHAPTER 4

PROBLEM STATEMENT

To improve road safety, create a low-cost, real-time accident prevention system with an Arduino, MQ-3 sensor, infrared sensor, accelerometer, and webcam that targets problems like intoxication, fatigue, and unfavorable road conditions.

OBJECTIVES

Our project's goal is to integrate GPS modules and accelerometers to produce an automated vehicle crash alert. The system's objectives are to immediately alert emergency services, give exact position data, and identify incidents in real-time. Our objective is to reduce response times and save lives in order to improve traffic safety.

PROPOSED SYSTEM

The accelerometer tracks changes in the vehicle's motion over time and recognises sudden variations that point to a collision.

The GSM module instantly notifies emergency services of the precise position data that the GPS provides.

Emergency responders can better adapt their approach with the added context provided by driver condition monitoring.

Passengers are kept apprised of the issue through the user interface, and the automatic response system expedites the dispatch of emergency personnel. .

CHAPTER 5

HARDWARE AND SOFTWARE COMPONENTS

Raspberry _Pi


Fig.5.1

Designed to encourage science and programming education, Raspberry Pi is a credit card-sized computer. It is popular for do-it-yourself projects and prototyping, and it runs on a variety of operating systems.

Accelerometer (ADXL-335)

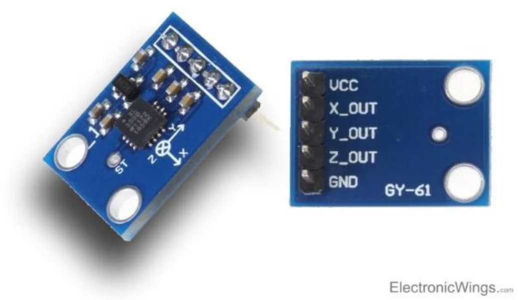


Fig .5.2

A compact, low-power accelerometer sensor with three axes of acceleration measurement is called the ADXL-335. It is frequently used to detect motion, tilt, and acceleration in electronic projects and devices.

GPS (Neo-6m)


Fig.5.3

The widely used NEO-6M GPS (Global Positioning System) module is renowned for its dependability and small size., It is frequently used in location-based projects and navigation systems.

GSM (SIM800l)

Fig.5.4

The SIM800L is a small GSM (Global System for Mobile Communications) module that is frequently utilized in electronic projects for wireless communication. Through the cellular network, it allows devices to make calls, send SMS, and access the internet.

Alcohol sensor

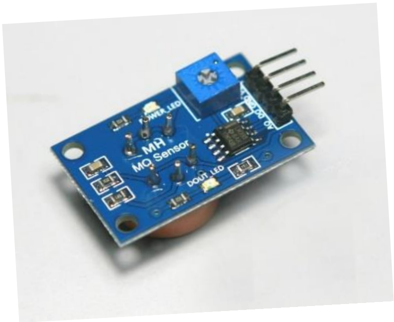


Fig 5.5

An electronic gadget used to identify vapors of alcohol in the atmosphere is called an alcohol sensor. It is frequently used in safety applications, like vehicle ignition interlock systems, and breathalyzer systems to measure alcohol content.

IR sensor

Fig 5.**6**

Infrared (IR) sensor, It is extensively employed in many different applications, such as robotics object detection, smartphones' proximity sensing, and security systems' motion detection.

Vibration Sensor

Fig 5.7

Vibration sensors are widely used for monitoring and detecting vibrations in industrial machinery and structural systems. They are devices that detect mechanical oscillations and convert them into electrical signals.

Lcd display

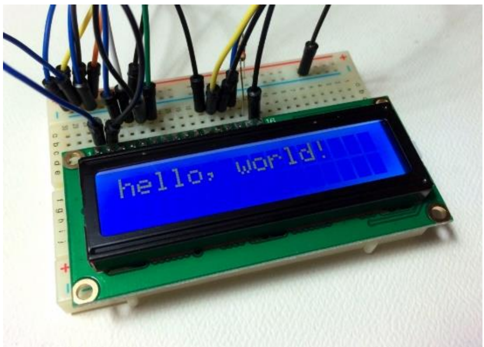


Fig 5.8

Text and graphics can be presented thinly, light-weight, and energy-efficiently with the help of LCD (Liquid Crystal Display), a flat-panel technology that is frequently used in electronic devices.

Relay

Fig 5.9

Relays are electrically operated switches that regulate current flow in electrical circuits. They are frequently used in industrial control systems and home automation applications, where they are typically used to control high-power devices with low-power signals.

Buzzer

This Photo by Unknown Author is

Fig 5.10

An electronic signaling device known as a buzzer emits a continuous or sporadic sound upon application of an electrical current. It is frequently utilized in electronic devices and systems for alerts, notifications, and other audible alerts.

Power Supply (Battery)

Fig 5.11

Transforming chemical energy into electrical energy, a battery is a portable energy storage device that powers electronic gadgets like laptops and smartphones among many other uses.

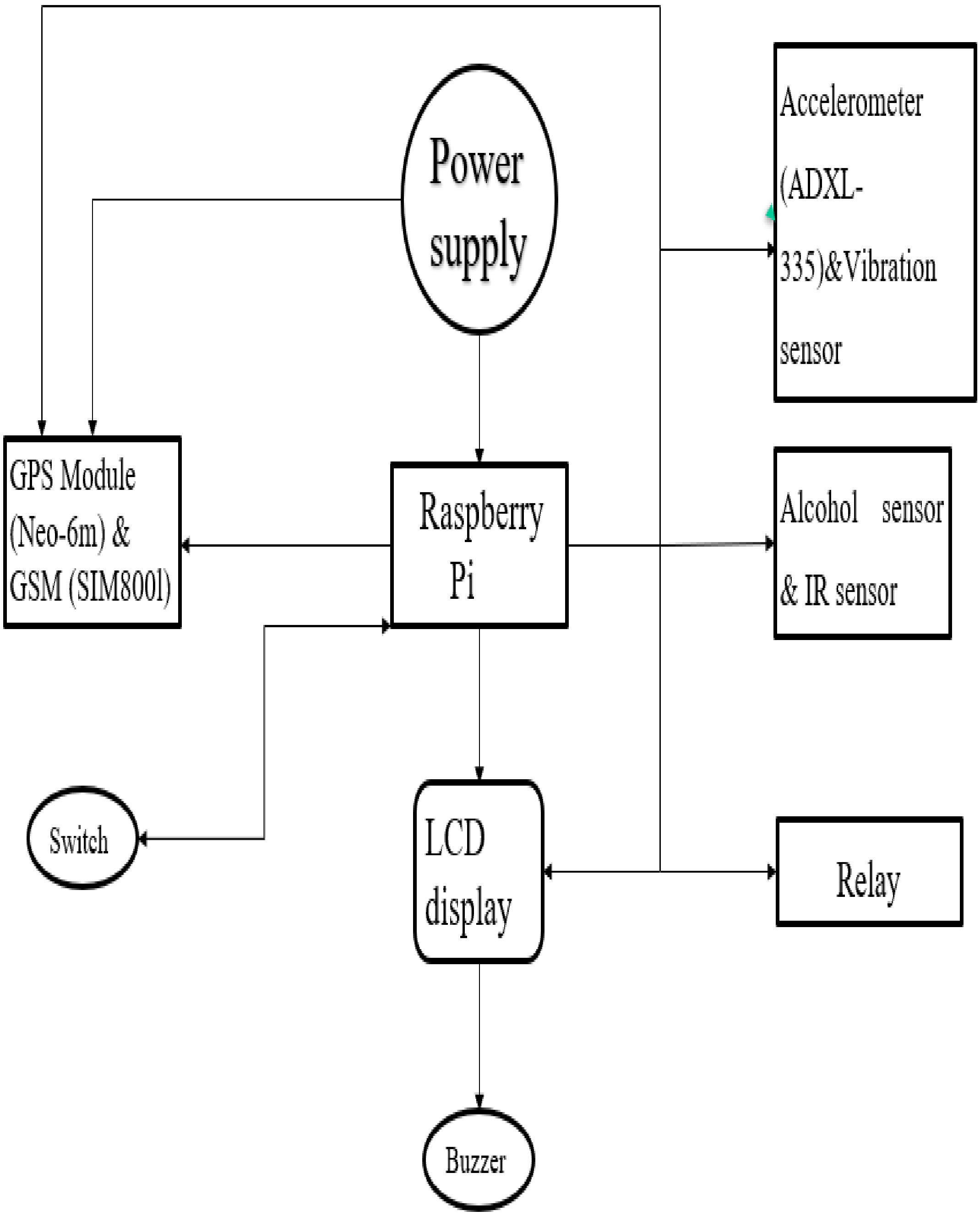
Software Components

- Thony Ide
- Programming Code (Python)
- Mobile

CHAPTER 6

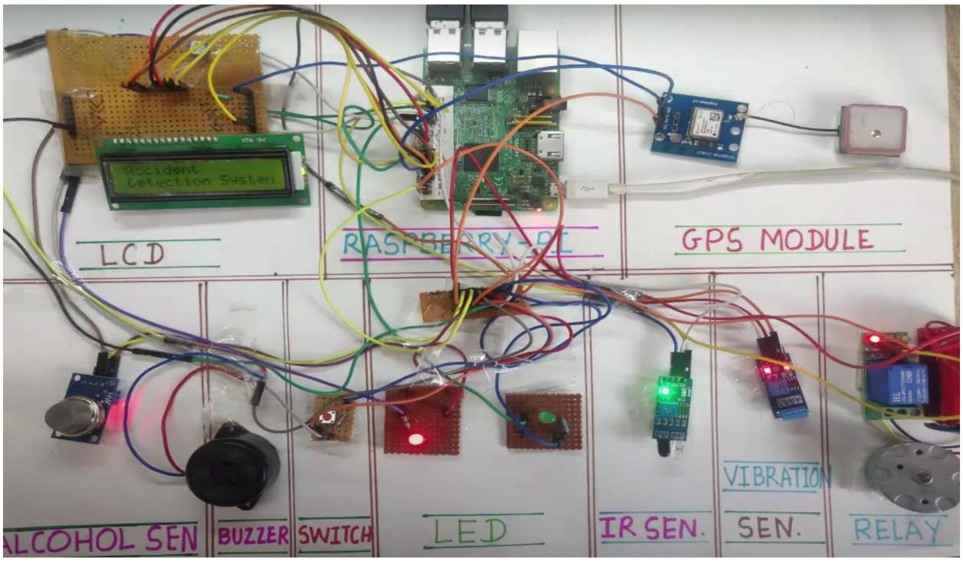
WORKING

a) Block diagram



6.1 fig Block Diagram

Circuit Connections & Working



6.2 fig Circuit diagram

In order for the project to function, sensor data from a variety of components—including the accelerometer, GPS module, vibration sensor, IR sensor, and optional alcohol sensor—must be continuously monitored. Based on preset parameters like abrupt acceleration, impact force, vibration patterns, and infrared signatures suggestive of a collision, the system uses this data to identify a vehicle crash.

The GSM module is triggered by the system to send an alert that includes information about the crash, including its location, date, and time. This alert is sent by SMS or phone call to predefined emergency contacts. In order to bring attention to the situation, the buzzer sounds an alert and the LCD display simultaneously displays visual feedback regarding the crash.

Relays are used in power management to effectively control power to particular components, saving energy when the system is not actively monitoring a crash. It is optional to log crash data for later analysis, which may include timestamps and sensor readings.

The system is rigorously tested before deployment to guarantee precise crash detection, dependable communication, and optimal operation of all components. Moreover, depending on how the project is designed, factors for user interaction or manual override options might be included. Protecting privacy, safety, and legal compliance must be the top priorities at all times. A smooth integration with emergency response systems can be ensured by working together with the appropriate authorities.

CHAPTER 7

ADVANTAGES AND APPLICATIONS

7.1) ADVANTAGES

Rapid Crash Detection

- **Advantage**: Accident Shield uses advanced sensors, including accelerometers, for rapid and accurate crash detection.
- **Benefit**: Swift identification of accidents ensures timely initiation of emergency response measures, minimizing the impact on individuals involved.

Immediate Emergency Services Notification:

- **Advantage**: The system autonomously communicates with emergency services through GSM technology as soon as a crash is detected.
- **Benefit**: Instant notification ensures that emergency services receive critical information promptly, enabling a quicker response to the scene.

Precise Location Reporting:

- **Advantage**: Utilizing GPS modules, Accident Shield provides precise location coordinates to emergency responders.
- **Benefit:** Accurate location data helps emergency services reach the accident site faster, particularly in areas with challenging navigation.

Driver Condition Monitoring:

- **Advantage**: Integrated alcohol and infrared sensors monitor the condition of the driver post-collision.
- **Benefit:** Emergency responders receive additional information about the driver's condition, allowing them to tailor their response accordingly.

Comprehensive Sensor Integration:

- **Advantage**: Accident Shield integrates various sensors, including accelerometers, GPS, alcohol sensors, and infrared sensors.
- **Benefit:** Comprehensive data collection enhances the system's ability to assess the severity of the accident and provides a more nuanced understanding of the overall situation.

User-Friendly Interface:

- **Advantage**: The system includes an LCD display, buzzer, and other feedback mechanisms to keep vehicle occupants informed.
- **Benefit:** Passengers receive real-time information, reducing panic, and increasing awareness about the ongoing emergency response.

Automated Response Mechanism:

- **Advantage**: Accident Shield features automated response mechanisms such as relays and buzzers for immediate attention.
- **Benefit**: Automated actions ensure a synchronized and rapid response to the detected accident, expediting overall emergency efforts.

Modularity and Adaptability:

- **Advantage**: The system is designed with modularity, allowing for easy integration of additional sensors or future upgrades.
- **Benefit**: Flexibility and adaptability ensure that Accident Shield can evolve with technological advancements and changing safety requirements.

Power Supply Reliability:

- **Advantage**: Operating on battery power, Accident Shield ensures continuous functionality even in the absence of external power sources.
- **Benefit**: Uninterrupted operation during power outages or disconnections enhances the system's reliability in emergency situations.

Proactive Safety Measures:

- **Advantage**: Accident Shield takes a proactive approach to safety by autonomously initiating actions upon crash detection.
- **Benefit:** Proactive measures contribute to reducing response times, minimizing injuries, and potentially saving lives.

Global Applicability:

- **Advantage:** Accident Shield’s design considers global road safety challenges, making it applicable in diverse geographical and infrastructural contexts.
- **Benefit:** The system provides a standardized and comprehensive solution that can be deployed worldwide to improve road safety.

7.2) APPLICATIONS

Traffic Management in Urban and Rural Areas:

- **Application**: To raise the general level of road network safety, Accident Shield can be incorporated into both urban and rural traffic control systems. It guarantees that accidents are responded to quickly in both crowded urban areas and isolated rural areas.

Systems for managing a fleet:

- **Application:** To improve their fleet management systems, companies and organisations with car fleets can use Accident Shield. When business vehicles are involved in an accident, it enables prompt response and coordination since it offers real-time crash detection and instant reporting.

Safety of Public Transportation:

- **Application**: Buses and taxis are examples of public transportation vehicles that can employ Accident Shield. This guarantees that emergency services are alerted as soon as there is an accident, which may lessen passenger injuries and fatalities.

CHAPTER 8

RESULTS AND DISCUSSION

The Autonomous Vehicle Crash Alert system that has been put into place, utilizing a Raspberry Pi and related parts, has demonstrated encouraging outcomes. The system for detecting crashes makes use of an accelerometer, vibration sensor, and infrared sensor to detect collisions. Precise reporting of crash sites is made possible by the GPS module's reliable and consistent location data. In order to guarantee a prompt response in a variety of network scenarios, the GSM module simultaneously and consistently sends alerts to pre-specified emergency contacts via SMS or calls.

The combination of audible alerts from the buzzer and visual feedback from the LCD display improves situational awareness for both the occupants of the vehicle and those in close proximity. The relay-equipped power management system exhibits effective energy conservation during periods of inactivity and maximizes continuous operation. An extra degree of security is added if an alcohol sensor is integrated since it can accurately identify the presence of alcohol.

Although more development and practical testing are necessary for thorough validation, the project's strong crash detection across a variety of scenarios highlights its potential. To improve usability, gathering user feedback is the next step. Working with emergency services to integrate the system and handle legal compliance is the next step to guarantee that the system complies with laws and protects user privacy.

Promising features include the Automated Vehicle Crash Alert system's strong crash detection and dependable communication capabilities. In order to improve the interface and address usability issues, user feedback is essential. Working together with emergency services guarantees a smooth transition into the current response mechanisms, which improves the overall efficacy of the system. Ensuring compliance with regulations and privacy standards is still a primary focus of legal compliance. It is imperative to conduct ongoing real-world testing to ensure thorough validation and identify any possible problems that might occur under different circumstances.

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CHAPTER 9

CONCLUSION AND FUTURE SCCOPE

9.1 CONCLUSION

The "Accident Shield: Automated Vehicle Crash Alert" project's conception and development represent a major advancement in emergency response systems and traffic safety. This cutting-edge technology blends sophisticated hardware elements with astute programming to produce a complete solution. It is intended to autonomously detect and report car accidents.

Although the project's actual execution and outcomes may differ, the theoretical conclusion can be To sum up, the Accident Shield initiative, which uses technology to enable quick and automated reactions to car accidents, is a big step in the right direction towards increasing road safety. Adoption and successful deployment of such technologies could result in fewer injuries, save lives, and advance the creation of more adaptable and safe transportation networks.

9.2 FUTURE SCOPE

The early success of the "Accident Shield: Automated Vehicle Crash Alert" project lays a strong basis for further development and enhancement. It is at the forefront of intelligent transportation systems thanks to its creative integration of multiple sensors and communication modules for quick crash detection. The project has an impact that goes beyond what was originally planned because it presents opportunities for ongoing innovation in traffic safety and emergency response.

Prospective research directions could involve enhancing crash detection algorithms, investigating sophisticated sensor technologies, and integrating artificial intelligence to facilitate more sophisticated decision-making. To fully realize the potential of the Accident Shield project, cooperation between research institutions, automakers, and emergency services will be essential.

The project's success also makes it possible to integrate it more broadly into smart city initiatives, which will improve safety infrastructure and traffic management in general. Sustained growth will depend on the ability to adjust with flexibility to changing regulatory frameworks and technological landscapes.

As the Accident Shield project develops, it might have an impact on more than just specific cars; it might also have an impact on rules and standards in the industry. This project demonstrates the revolutionary potential of technology to improve public safety and sets the stage for a time when intelligent systems will be crucial in reducing the effects of auto accidents.

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APPENDIX

```
#!/usr/bin/python
import time
import RPi.GPIO as GPIO
import serial
import string
import pynmea2
#import serial
GPIO.setmode(GPIO.BOARD)
GPIO.setwarnings(False)

ser=serial.Serial("/dev/ttyAM
A0", baudrate=9600,
timeout=1)

'''
define pin for lcd
'''
# Timing constants
E_PULSE = 0.0005
E_DELAY = 0.0005
delay = 1

# Define GPIO to LCD mapping
LCD_RS = 7
LCD_E  = 11
LCD_D4 = 12
LCD_D5 = 13
LCD_D6 = 15
LCD_D7 = 16
alcohol_Sensor = 18
Buzzer= 29
switch =22
red_led=31
green_led=32
seat_belt_Sensor = 33
vibration_sensor = 35
relay = 36
```

```
GPIO.setup(LCD_E, GPIO.OUT)
# E
GPIO.setup(LCD_RS, GPIO.OUT)
# RS
GPIO.setup(LCD_D4, GPIO.OUT)
# DB4
GPIO.setup(LCD_D5, GPIO.OUT)
# DB5
GPIO.setup(LCD_D6, GPIO.OUT)
# DB6
GPIO.setup(LCD_D7, GPIO.OUT)
GPIO.setup(alcohol_Sensor,
GPIO.IN)
GPIO.setup(Buzzer, GPIO.OUT)
GPIO.setup(switch, GPIO.IN)
GPIO.setup(red_led, GPIO.OUT)
GPIO.setup(green_led,
GPIO.OUT)
GPIO.setup(seat_belt_Sensor,
GPIO.IN)
GPIO.setup(vibration_sensor,
GPIO.IN)
GPIO.setup(relay , GPIO.OUT)

# Define some device
constants
LCD_WIDTH = 16    # Maximum
characters per line
LCD_CHR = True
LCD_CMD = False
LCD_LINE_1 = 0x80 # LCD RAM
address for the 1st line
LCD_LINE_2 = 0xC0 # LCD RAM
address for the 2nd line


'''
Function Name :lcd_init()
Function Description : this
function is used to
initialized lcd by sending
the different commands
'''
```

```
'''
def lcd_init():
  # Initialise display
  lcd_byte(0x33,LCD_CMD) #
110011 Initialise
  lcd_byte(0x32,LCD_CMD) #
110010 Initialise
  lcd_byte(0x06,LCD_CMD) #
000110 Cursor move direction
  lcd_byte(0x0C,LCD_CMD) #
001100 Display On,Cursor Off,
Blink Off
  lcd_byte(0x28,LCD_CMD) #
101000 Data length, number of
lines, font size
  lcd_byte(0x01,LCD_CMD) #
000001 Clear display
  time.sleep(E_DELAY)
'''
Function Name :lcd_byte(bits
,mode)
Fuction Name :the main
purpose of this function to
convert the byte data into
bit and send to lcd port
'''
def lcd_byte(bits, mode):
  # Send byte to data pins
  # bits = data
  # mode = True  for
character
  #        False for command

  GPIO.output(LCD_RS, mode) #
RS

  # High bits
  GPIO.output(LCD_D4, False)
  GPIO.output(LCD_D5, False)
  GPIO.output(LCD_D6, False)
  GPIO.output(LCD_D7, False)
  if bits&0x10==0x10:
    GPIO.output(LCD_D4, True)
  if bits&0x20==0x20:
```

```
  GPIO.output(LCD_D7, False)
  if bits&0x10==0x10:
    GPIO.output(LCD_D4, True)
  if bits&0x20==0x20:
    GPIO.output(LCD_D5, True)
  if bits&0x40==0x40:
    GPIO.output(LCD_D6, True)
  if bits&0x80==0x80:
    GPIO.output(LCD_D7, True)

  # Toggle 'Enable' pin
  lcd_toggle_enable()

  # Low bits
  GPIO.output(LCD_D4, False)
  GPIO.output(LCD_D5, False)
  GPIO.output(LCD_D6, False)
  GPIO.output(LCD_D7, False)
  if bits&0x01==0x01:
    GPIO.output(LCD_D4, True)
  if bits&0x02==0x02:
    GPIO.output(LCD_D5, True)
  if bits&0x04==0x04:
    GPIO.output(LCD_D6, True)
  if bits&0x08==0x08:
    GPIO.output(LCD_D7, True)

  # Toggle 'Enable' pin
  lcd_toggle_enable()
'''
Function Name :
lcd_toggle_enable()
Function
Description:basically this is
used to toggle Enable pin
'''
def lcd_toggle_enable():
  # Toggle enable
  time.sleep(E_DELAY)
  GPIO.output(LCD_E, True)
  time.sleep(E_PULSE)
  GPIO.output(LCD_E, False)
  time.sleep(E_DELAY)
'''
Function Name
:lcd_string(message,line)
Function  Description :print
```

```
.lcd_string(message,line)
Function  Description :print
the data on lcd
'''
def lcd_string(message,line):
  # Send string to display

  message =
message.ljust(LCD_WIDTH," ")

  lcd_byte(line, LCD_CMD)

  for i in range(LCD_WIDTH):

lcd_byte(ord(message[i]),LCD_
CHR)


lcd_init()
lcd_string("welcome
",LCD_LINE_1)
time.sleep(1)
lcd_byte(0x01,LCD_CMD) #
000001 Clear display
lcd_string("Accident",LCD_LIN
E_1)
lcd_string("Detection
System",LCD_LINE_2)
time.sleep(1)
car_start =0
GPIO.output(Buzzer, False)
GPIO.output(green_led, False)
GPIO.output(red_led, False)
GPIO.output(relay, False)
while 1:
    # Print out results
    car_start = 0
    alcohol_data =
GPIO.input(alcohol_Sensor)
    seat_belt_data =
GPIO.input(seat_belt_Sensor)
    if(seat_belt_data ==
False):

lcd_byte(0x01,LCD_CMD) #
000001 Clear display
        lcd_string("Seat Belt
",LCD_LINE_1)
```

```
000001 Clear display
        lcd_string("Seat Belt
",LCD_LINE_1)
        lcd_string(" Detected
",LCD_LINE_2)
        time.sleep(0.5)
        if(alcohol_data ==
True):

lcd_string("Alcohol not
",LCD_LINE_1)
            lcd_string("
Detected  ",LCD_LINE_2)

GPIO.output(Buzzer, False)

GPIO.output(green_led, True)

GPIO.output(red_led, False)
            time.sleep(0.5)
            while(1):

lcd_byte(0x01,LCD_CMD) #
000001 Clear display
                if(car_start
== 0):

lcd_string("press the
switch",LCD_LINE_1)

time.sleep(0.5)

switch_data =
GPIO.input(switch)


vibration_data =
GPIO.input(vibration_sensor)


if(vibration_data ==
GPIO.HIGH):

lcd_string("Accident
",LCD_LINE_1)

lcd_string(" Detected
",LCD_LINE_2)
```

```
,LCD_LINE_2)

GPIO.output(relay, False)

time.sleep(2)
                    dataout
=pynmea2.NMEAStreamReader()

newdata=ser.readline()
                    if
'$GPRMC' in str(newdata):

#print(newdata.decode('utf-
8'))

newmsg=pynmea2.parse(newdata.
decode('utf-8'))

lat=newmsg.latitude

lng=newmsg.longitude
                        #gps
= "Latitude=" + str(lat) +
"and Longitude=" +str(lng)

#print(gps)

time.sleep(2)

                    break

elif(switch_data == True):

lcd_byte(0x01,LCD_CMD) #
000001 Clear display

lcd_string("vehicle start
",LCD_LINE_1)

GPIO.output(relay, True)
                    car_start
= 1

time.sleep(0.5)
        else:

lcd_string("Alcohol
Detected",LCD_LINE_1)
```

```
lcd_string("Alcohol
Detected",LCD_LINE_1)

GPIO.output(Buzzer, True)

GPIO.output(red_led, True)

GPIO.output(green_led, False)
            time.sleep(0.5)
    else:

lcd_byte(0x01,LCD_CMD) #
000001 Clear display
        lcd_string("Please
Wear",LCD_LINE_1)
        lcd_string(" Seat
Belt  ",LCD_LINE_2)
        GPIO.output(Buzzer,
True)
        GPIO.output(red_led,
True)

GPIO.output(green_led, False)
        time.sleep(0.5)
```