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E-Mail :
editor.ijasem@gmail.com
editor@ijasem.org

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Examining The Use Of Artificial Intelligence Methods In Apps That May Identify Deadly Car Crashes

[1]AILADA SRIKANYA,[2]RACHABANTI UDAY KIRAN,[3]BOORA PREMCHAND, [4]GANTYALA JAYANTH, [5]K. Karthik

[1234]Student Department of ECE, Narsimha Reddy Engineering College, Maisammaguda (V), Kompally, Secunderabad, Telangana-500100.

[5]Assistant Professor,Department of ECE, Narsimha Reddy Engineering College, Maisammaguda (V), Kompally, Secunderabad, Telangana-500100.

ABSTRACT:

Health and social policy officials in countries throughout the globe are quite worried about the current state of vehicle accident rates. We have discussed the road incidents that have resulted in injuries and deaths in several Indian states in this article. Additionally, we have highlighted the several elements that play a role in traffic accidents. This study discusses a variety of approaches that several researchers have developed for detecting car accidents. A variety of collision avoidance methods were also discussed. The research goes on to examine the methods of analysis that were utilized to understand the many factors that trigger accidents. Fatigue, sleepiness, drunk driving, and distractions are some of the issues that traditional models often fail to detect.

Keywords— *Road Accidents, Traffic, IoT, Smart vehicle systems and Accident detection systems.*

INTRODUCTION

The current state of road accident rates is a major issue for healthcare and welfare policymakers worldwide. At the present time, one person dies and two more are injured in road accidents every 50 seconds [1]. Twenty to fifty million people get serious injuries in traffic accidents every year; the majority of these victims need expensive and long-term medical care. Despite this misery, vehicle accidents account for 1-3 percent of global GDP in the majority of countries [2-5]. There is a constant need for research into new strategies and programs aimed at enhancing traffic safety, since there are many viable options for reducing the impact of traffic accidents. If nothing is done, the World Health Organization (WHO) predicts that 1.9 million people would die each year in road accidents by 2020. There are drawbacks to the benefits that motorized cars have brought to many people's lives and society as a whole. Despite a declining trend in the percentage of people killed in road traffic accidents in high-income nations over the past decade, the social and economic costs of traffic congestion casualties are increasing dramatically for the majority of people around the world. Developing countries suffer disproportionately high rates of injury and mortality from road traffic accidents (RTAs), which account for about 85% of all deaths and 90% of the years lost to disability-adjusted life expectancy. India is one of several developing nations. Road traffic accidents (RTAs) in India happen daily, resulting in several fatalities and injured individuals. It is not uncommon for the whole family to perish. Many victims were in the prime of their careers when they tragically lost their lives. Because they are more likely to be on foot, on bicycles, or riding in public transportation (such as buses or minibuses), low-income persons have a disproportionately high risk of injury or death. An important continuing problem is the rapid and precise identification of individuals at risk of collisions caused by drowsy driving. There are certain individuals for whom consciousness scales are inappropriate or useless [7]. In any case, men are less able to detect fatigue or are less willing to confess it, therefore they are usually less accurate and reliable when applied to guys than to women. Accidents involving motor vehicles, which cause injuries and deaths, are an increasing problem in India's public health system. Nearly 2,650 people lose their lives and 9,000 are injured in road accidents each week. The most recent year for which data is available is 2013, and there were 137,423 deaths and 469,900 injuries in India due to automobile accidents [8-10]. At almost 140,000 per year, India's pedestrian fatality rate is now higher than China's, making it the worst traffic accident killer in the world. India is the only country in the world that has 53 injuries and almost 15 deaths every hour caused by road accidents [11]. In contrast to many emerging and developed countries, India's situation is deteriorating. China is a part of it [12–14]. Figure 1 shows the states in India

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where road unintentional fatalities occurred in 2021, according to information from the National Crime Records Bureau, Ministry of Home Affairs [8].

LITERATURE REVIEW

By combining GSM alert and GPS tracking capabilities, Kumbhar et al. (2015) created a smart fuel theft detection system that uses an ARM7 microprocessor. This system allows for real-time monitoring of the position and fuel levels of the vehicle.

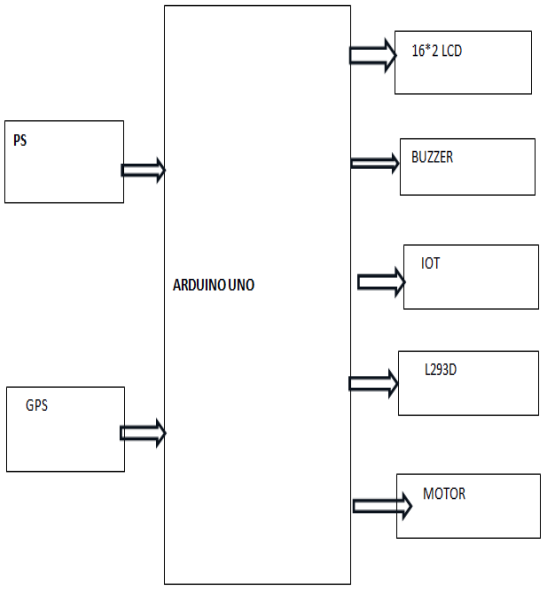
In 2016, Ghogardare et al. conducted research and developed an automated solution to combat gasoline theft. Using a PIC microcontroller, Shinde and Wahle (2016) developed a digital gasoline meter and a system to detect fuel theft that is based on GSM meters. Digital fuel meters and systems for detecting gas theft were the focus of More et al. (2016). When it came to heavier trucks, Geetha and Raja (2016) zeroed in on fuel theft detection. An Internet of Things (IoT)-enabled system for automatically detecting gasoline theft and monitoring fuel levels was created by Prabhu et al. (2022).

In order to provide a safe system, Charaan et al. (2022) suggested an improved method based on the Internet of Things. Intrusion Detection System (IDS) datasets were examined for classification difficulties by Lanfer et al. (2023) using explainable AI algorithms. Using smart surveillance technology, Kakadiya et al. (2019) developed an AI-based system to automatically identify robberies and thefts in banks. Using the YOLOv5 object detection paradigm, S and Bhuvanesh (2023) created a system that can identify theft in real-time.

METHODOLOGY

Working:

Its primary function is to detect tampering and track fuel levels. To get precise readings, it employs a submersible level sensor. An integrated gasoline cap sensor can identify the presence of an opened fuel cap. It processes data from many sensors using an Arduino microcontroller. With the included GSM module (SIM800L), the owner's mobile phone may get instant SMS notifications. It has a buzzer that may be used to make localized sounds. For the purpose of showing the fuel level in real-time, an optional LCD screen is available. When determining whether gasoline usage is normal or indicative of theft, the system analyzes the ignition condition. It's budget-friendly, user-friendly, and low-maintenance by design.



Block diagram

Arduino uno

A microcontroller board based on the Atmega328, the Arduino Uno is described in the datasheet. A 16 MHz crystal oscillator, 6 analogue inputs, 14 digital input/output pins (including 6 PWM outputs), 1 USB port, 1 power connector, 1 ICSP header, and 1 reset button are all part of it. All you need is a USB cable, an AC-to-DC converter, or a battery to get it going; it comes with everything you need to support the microcontroller.

Because it forgoes the FTDI USB-to-serial driver chip, the Uno stands apart from all previous boards. In its place, you'll find the Atmega8U2 configured to convert USB to serial. "Uno" signifies "One" in Italian and is chosen to commemorate the impending release of Arduino 1.0. Going forward, the Uno and version 1.0 will serve as the reference versions of Arduino. See the index of Arduino boards for a comparison with earlier generations; the Uno is the newest in a series of USB Arduino boards and the platform's standard model.

The USB port or an external power source are both viable options for powering the Arduino Uno. It chooses the power source mechanically. You may use a battery or an AC-to-DC converter (wall-wart) to power it from the outside (not via USB). It is possible to attach the adapter by inserting a 2.1mm center-positive connector into the power port on the board. The POWER connector's Gnd and Vin pin headers are suitable for inserting battery leads. The board is

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compatible with power sources ranging from 6 to 20 volts. But if the voltage is lower than 7V, the 5V pin could not give 5V and the board might become unstable. The voltage regulator might become too hot and ruin the board if you use more than 12V. A voltage range of 7 to 12 volts is suggested.

LIQUID CRYSTAL DISPLAY

In front of a light source or reflector, a thin, flat display device called a liquid crystal display (LCD) arrays a large number of color or monochrome pixels. Pile of liquid crystal molecules held aloft by two transparent electrodes and two polarizing filters, whose polarity axes orthogonal to one another, make up each pixel. If there weren't liquid crystals interposed, one would block the other from light. Light that enters one filter is able to pass through the other because the liquid crystal bends its polarity.

A program's ability to communicate with the outside world depends on its input and output devices, which in turn rely on human communication. An LCD display is a typical accessory for controllers. The 16x1, 16x2, and 20x2 LCDs are among the most popular types of displays that are attached to the controllers. This equates to sixteen characters on a single line. The first set has 16 characters on each line while the second set has 20 characters on each line.

BUZZER

Mechanical, electromechanical, or piezoelectric (piezo) buzzers or beepers are all examples of auditory signaling devices. Buzzers and beepers are often used in alarm systems, clocks, trains, and to validate human input (e.g., keystrokes or mouse clicks).

ESP8266 Wi-Fi Module

This project revolves on this. The module plays a crucial role in the project as it is centered on WIFI control of appliances. A low-cost Wi-Fi chip with full TCP/IP capability, the ESP8266 Arduino compatible module has an amazing built-in MCU (Micro Controller Unit) that allows you to control I/O digital pins using a simple programming language that is almost pseudo-code like. The Chinese company Es press if Systems is situated in Shanghai and makes this gadget. In August 2014, this chip made its debut in the ESP-01 version module manufactured by the third-party company AIThinker. The MCU can establish basic TCP/IP connections and connect to WiFi networks with the help of this little module. In his Many hackers and tech enthusiasts were interested in exploring and using it for a wide range of projects because to its tiny size and very inexpensive pricing (1.7$ to 3.5$). Since it has been so successful, Espressif has released other variants with varying proportions and technological specs. Among the following is the ESP32. Numerous projects and applications, such as home automation, may be found online.

RELAYS

Many household and commercial equipment, as well as industrial control systems, make use of electrically controlled switches called relays. By using a relay, two independent voltage sources may be isolated from one another; in other words, a little quantity of voltage or current on one side can manage a big amount of current or voltage on the other side, and vice versa.

Blue Tooth

Wireless headsets, gaming controllers, mice, keyboards, and a plethora of other consumer electronics make use of it. The range may be as little as less than 100 meters, depending on factors such as the transmitter and receiver, the weather, and terrain and metropolitan areas. One may construct a wireless Personal Area Network (PAN) using the IEEE 802.15.1 defined protocol. It transmits data wirelessly using frequency-hopping spread spectrum (FHSS) technology. To talk to other devices, it use serial communication. The USART is the means by which it exchanges data with the microcontroller.

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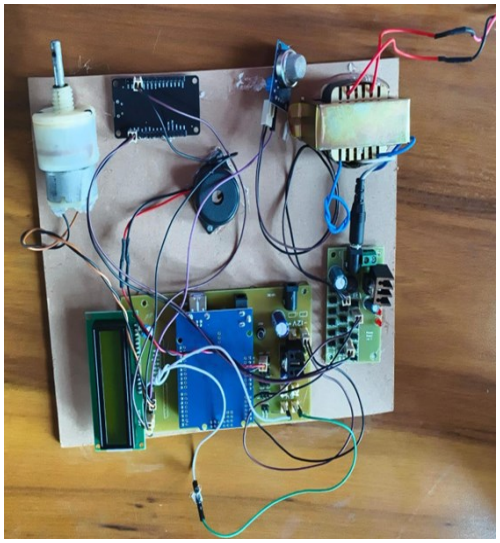
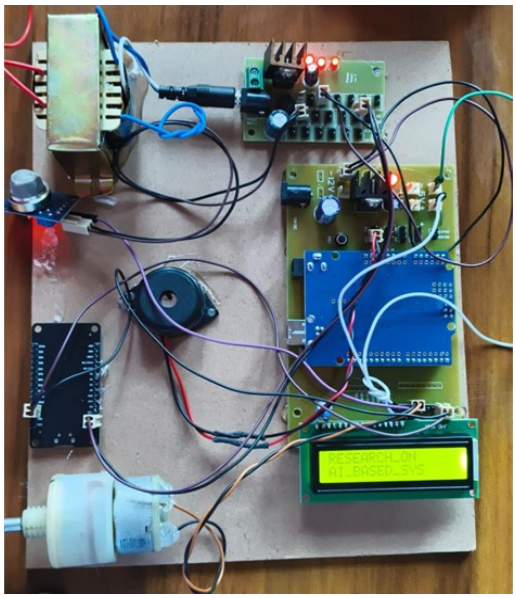
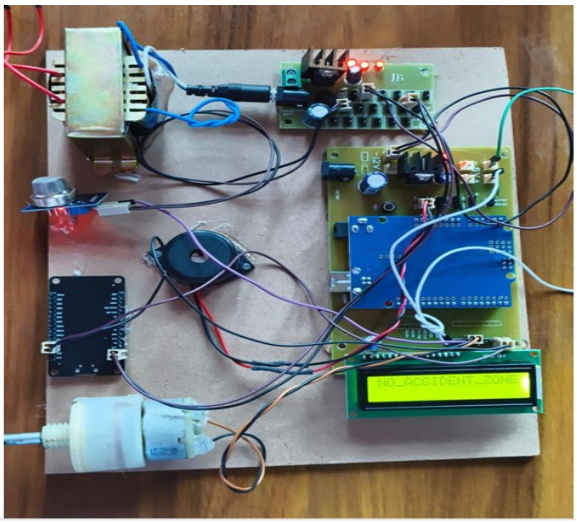
RESULTS



Output1



Output 2



Output3

CONCLUSION

Nowadays, people are very worried about how often car accidents occur. The proliferation of both automobiles and drivers who fail to exercise enough caution has led to an alarming rise in the frequency of road accidents. Our issues are exacerbated by those who do not follow traffic regulations and by the abundance of transportation options, especially in metropolitan areas. Worldwide, health and social policy are profoundly affected by the alarmingly rising frequency of road accidents. Road accident deaths and injuries in several Indian states have been the focus of this research. This paper presents new insights into the causes of these occurrences and offers new approaches to their detection and prevention. One possible solution is the development of collision-avoidance technologies, however there are still big issues with privacy and defect detection. In order to overcome these obstacles, we need exact algorithms or programs that can detect and evaluate accidents. According to the paper's findings, by harnessing the power of AI, we can significantly improve road safety and lessen the impact of traffic accidents.

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