Internet of Things-Based Car Wiper and Accident Location Notification

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Abstract: To reduce the number of car crashes that result in deaths or severe property damage was the primary goal of accident prevention programmes. Recognising Danger and Taking Precautions This strategy reduces the amount of time it takes for emergency services to reach a dangerous situation, saving lives. This apparatus can detect fog and clear it from the screen, allowing for safer navigation. If the car detects that you have been drinking, it will not start for you. A buzzer will ring if a blink sensor detects the driver is closing their eyes while driving. If the motorist ignores the warning, the car’s ignition will be turned off. The windshield wipers will activate automatically if the rain sensor detects rain. When an accident happens, a limit switch is triggered, which shuts off the system and notifies the parents by the Twilio account they provided before the accident.

Key words: Rain sensor, Alcohol, Limit Switch, Accident, Wiper.

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1. INTRODUCTION

An alarming number of people are killed or injured in accidents every year in the vast majority of nations throughout the world. Stupidity is the underlying flaw that causes most accidents. The researchers concluded that 57% of the incidents could be attributed directly to the actions, dynamism, responsiveness, and sharpness of the drivers. Some studies [1], suggest that if drivers are informed in advance, accidents are less likely to occur. They can choose for an alternative approach, or at the absolute least, increase their level of caution, to forestall any potential difficulties or mishaps [2]. The planned outcome of the mobile ad hoc network was to be a simulation of the very unconventional network design. Two of the company’s vehicles have the inter-vehicle communication and data-sharing hardware and software installed. VANET allows for two types of communication to take place: first, between vehicles; and second, between vehicles and infrastructure. A single round journey is all that’s needed for information to be sent from one vehicle to another [3]. The process is analogous to a dialogue between cars. It’s like sending a letter that mysteriously disappears in the mail. The phrase "vehicle-to-vehicle communication" is used to describe a system that allows cars to alert other drivers to potential collisions and share safety information with one another. The primary function of this system is to alert drivers when they go too close to the car in front of them. With LiFI, automobiles are able to more easily exchange information with one another. Ultrasonic sensors may be able to determine how far apart vehicles really are. The microprocessor, which monitors and controls the whole circuit, may be set to alert the driver with an alarm when the destination is near [4]. Numerous roadblocks reduce visibility and increase the risk of an accident. Vehicles, including cars and trucks, are more likely to break down at night, posing a bigger difficulty in areas with little lighting, such as parkways. The vehicle behind the stationary item might make an incorrect assumption about its location, causing an accident, or it could make very little contact with the object’s rear, causing severe damage. The system’s design took into account a wide range of factors. ITS, or intelligent transportation systems, are state-of-the-art programmes that use state-of-the-art technology to help in traffic management and keep streets safe in a variety of novel ways. One example is the ability of cars to talk to each other. The Vehicle-to-Vehicle (V2V) correspondence design takes use of the maturing remote system to provide early warning signs, hence decreasing road congestion and accident rates. Customers’ safety might be improved by driving more courteously. It also aids efficiency by facilitating communication between cars about accidents. Perhaps we can all do our part to protect the environment by driving more cautiously. It leads the motorist in the right direction and helps them make good decisions so they may avoid accidents. The goal of this system is to implement the Li-Fi protocol for inter-vehicle communication. We suggest employing LED light bulbs in combination with the Li-Fi technology that uses optical range data transmission as an optical remote channel for signal creation in this study. Using an optically remote channel, Li-Fi technology transmits data across a long distance. Actually, if you switch to LED lighting, you won’t have to waste time and energy going to boring, pointless meetings. Using light constancy, a localised vehicle-to-vehicle networking system might be set up [5].
2. PURPOSE OF RESEARCH
The complete absence of unintended events is intended to be the primary outcome of the proposed system. This paper, which we are now able to produce with the assistance of a Raspberry Pi, comes in particularly helpful in severe weather situations such as thick fog and heavy rain. When there is a significant amount of fog, we may make use of open cv and image processing techniques to examine the fog as well as the automobile approaching from the other way with the assistance of the camera. If the blink sensor determines that the driver has become sleepy while operating the vehicle, an alert will be sent to the driver. If an alcohol sensor determines that the driver’s blood alcohol concentration (BAC) is higher than the permitted level, the ignition will not turn over. In the event of an accident, the limit switch is activated, which in turn causes the system to become inoperable and sends an alert to the parents through the Twilio account they previously established.

3. LITERATURE REVIEW
The market for vehicle-to-vehicle (V2V) technology is rapidly rising as an increasing number of individuals look for answers to the challenges they have with their mobility. This growth is helping to enhance both productivity and creativity. There are now more automobiles on the road than at any other point in time [6]. The majority of this may be attributed to urbanisation as well as a rise in foreign travel. The growing popularity of ever-larger automobiles has immediate repercussions, including the rise in pollution levels as well as the number of people who are maimed or killed as a result of being involved in car accidents. Accidents on the road may happen to pedestrians as well as drivers [7]. Motorists are not the only ones who put themselves in danger when they drive on the road. After years of research and efforts to standardise the technology, recent developments in linked cars are on the cusp of being commercially available, achieving economic viability, and being employed by the general public in a wide range of circumstances. In recent years [8] there has been an acceleration in the pace of advancement that may be made in this sector via the use of mechanical approaches. Major metropolitan regions now need to set constraints on technology innovation in order to stimulate the development of safer, quicker, and more effective gateways in order to address the rising problem of traffic congestion. This is necessary in order to tackle the growing issue of traffic congestion [9]. The dramatic increase in the number of cars on the road is the biggest contributor to the growing problem of traffic congestion. On the other hand, this problem may often be overcome by the use of innovative traffic control systems and the strategic placement of highway interchanges [10]. This new method of sharing real-time street and traffic data among moving vehicles [11] paves the way for the adaptation and integration of a wide variety of applications for driver assistance, security, traffic efficiency, metro detection, as well as information and entertainment into the designs of modern vehicles. Its principal objective is to facilitate the timely and effective transmission of warning signals between moving vehicles in order to enhance overall road safety and make the process of avoiding collisions an easier task [12]. Figure 1 illustrates the need of connected automobile developments in order to satisfy the expanding information requirements of consumers who are on the go. Communication between vehicles and other objects,
known as V2X, is used throughout these exchanges. Communications between vehicles ("V2V") and between vehicles and infrastructure ("V2I") are enabled, as is interaction between cars and nearby pedestrians, cyclists, and charging stations [13].

4. PAPER OVERVIEW
A. FEATURES AND CAPABILITIES OF THE HARDWARE

![Block diagram of the auto-collision-detection and -prevention system](image)

**Figure 1.** Raspberry Pi-based auto-collision-detection and prevention system block diagram

The linkages between the various components, such as the Raspberry-Pi 3b, camera, rain sensor, buzzer, GPS-GSM, phone, limit switch, blink sensor, alcohol sensor, and LCD, are shown in this block diagram. The primary purpose of this method is to eliminate future instances of traffic accidents. The circuit has been set up to sound an alert in the event that the driver loses consciousness, as well as in the event that there is precipitation or fog present. If it determines that the driver is impaired in any way, the MQ3 gas sensor will immediately cut power to the car’s engine and the vehicle will come to a stop. In the event that the driver starts to feel sleepy while driving, they may use the buzzer to wake themselves up and get their attention back on the road. The engine will turn off if the driver does not respond when the warning noises are activated in the car. Theipers are automatically powered on by the DC motor the moment the rain begins to fall. It is possible that the Open CV image processing technology will be able to assist drivers in finding and identifying goods that have been buried in the elements during the winter, when snow and ice obstruct their vision. In the event that there is an issue with your Twilio account, a notification in the form of a text message will be sent to the mobile number that is linked with the account. It will not only provide the geographic coordinates (longitude and latitude), but it will also monitor the location and report any shifts that occur.
Algorithm:
Step 1: Set up the system.
Step 2: The ignition will automatically shut off if alcohol is detected in the driver’s system.
Step 3: When the driver begins to show signs of fatigue, the eye blink sensor will turn the car off.
Step 4: Image processing techniques for identifying and eliminating fog.
Step 5: Motor-driven wipers will be activated during rain.
Step 6: A message alert will be issued and the engine will shut down if an accident happens.
Step 7: the system’s conclusion.

C. Flowchart:

![Flowchart Diagram]

Figure 2. Diagram showing steps to identify and avoid car accidents

The flowchart shows the logical progression of the system through its many processes using components like as decision boxes, conditional boxes, and others. The user must provide all necessary information during the application’s setup procedure before it can begin functioning. After that, the system has to be wired into the existing electrical grid and supplied with power. The car won’t start if the alcohol detector and the eyeblink detector both go off at the same time. When the system is first activated, each sensor undergoes a battery of tests to ensure it is functioning at peak efficiency. Next, it snaps a picture and runs it via image processing software to determine how much progress has been made since the fog cleared. The motor that operates the windscreen wipers will begin turning on as
soon as the rain sensor detects impending precipitation. In the event of an accident, the GPS will notify the parents and any other contacts that have been entered. Longitude and latitude coordinates will be sent in the message. If any of the prerequisites aren’t satisfied, the system will take the necessary action and log the results; otherwise, it will double-check the sensors and log the results as before.

5. RESULTS AND DISCUSSION

![Raspberry Pi-based vehicle accident detection and avoidance hardware configuration](image)

**Figure 3.** Raspberry Pi-based vehicle accident detection and avoidance hardware configuration

The graphic supplied for you here shows some of the parts that go into the hardware implementation of the article. Some examples of these parts include IR proximity sensors, DC motors, rain detectors, LCD displays, GSM/GPRS modems, limit switches, alcohol detectors, buzzers, and eye blink sensors.

The schematic depicts every component of the circuit in great detail. If the MQ3 gas sensor determines that the driver is under the influence of alcohol or drugs, system functionality is terminated. Fog detection is a method for determining whether or not fog is present and, if so, how dense it is. In order to evaluate characteristics linked to fog, such as visibility, humidity, temperature, and the presence of suspended water droplets, it is common practice to monitor fog detection by evaluating data from many sensors and devices shown in above figure.
6. CONCLUSION
The paper includes suggestions for dealing with the most fundamental problems that have arisen as a result of the fog on the highways. Using sensors for things such as rainfall, speed, blood alcohol concentration, and even eye blinks among other things. It is possible to report urgent situations in real time.

References


