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AN INTELLIGENT SYSTEM DESIGNED FOR EARLYACCIDENT DETECTION AND PREVENTION INCORPORATING EMBEDED TECHNOLOGY AND DEEP LEARNING

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ABSTRACT:

Car accidents are considered one of the most destructive phenomena. Though there are many different reasons behind car accidents, most accidents occur due to driver's unawareness and uncontrolled speed. Also, there seems to be a problem reaching the spot of accident in time for lack of awareness. As a solution, the advent of Internet of Things (IoT) technologies can reduce the number of accidents. In this paper, a smart system is described that alerts and controls the speed of a vehicle, also notifies the individuals accordingly when an accident occurs. This system always monitors the distance between vehicles and obstacles that are in front, using distance sensor. It will alert the driver to control the speed and reduce the speed by itself when a critical distance comes. Whenever an accident takes place for uncertain condition, an email alert will be sent to the accountable individual with car details.

KEYWORDS: CNN Algorithm, Arduino, IR sensor, vibration sensor, gas sensor, photos sign detection sensor, MQ3 sensor.

I.INTRODUCTION:

In recent years, the convergence of Internet of Things (IoT) and Deep Learning technologies has sparked a revolution in various domains, offering unprecedented opportunities to enhance safety and efficiency. One such critical application is in early accident detection and prevention systems. Accidents, whether on roads, in industrial settings, or within public spaces, often result in devastating consequences, ranging from loss of lives to significant economic damage. Traditional accident response mechanisms often fall short in providing timely intervention, leading to increased risks and severity of accidents. In response to these challenges, researchers and engineers are harnessing the power of IoT and Deep Learning to create innovative solutions that can detect potential accidents at their earliest stages and proactively prevent them. IoT devices, equipped with sensors and connected through networks, gather vast amounts of real-time data from the environment. Deep Learning algorithms, capable of processing complex patterns within this data, enable systems to identify subtle cues indicative of impending accidents. This introduction sets the stage for exploring the intersection of IoT and Deep Learning in early accident detection and prevention. It delves into the significance of such systems in mitigating risks, reducing casualties, and optimizing resource allocation. Additionally, it highlights the challenges involved in developing these systems, including data privacy concerns, computational complexity, and the need for robustness in real-world scenarios. Through this exploration, we aim to underscore the transformative potential of IoT and Deep Learning in creating safer environments and fostering proactive approaches to accident prevention. By leveraging these cutting-edge technologies, we pave the way towards a future where accidents become increasingly preventable, ultimately saving lives and minimizing societal impact.

II.PURPOSE:

An early accident detection and prevention project serves as a critical initiative aimed at leveraging technology to enhance safety across various domains, ranging from transportation systems to industrial workplaces and beyond. By integrating sensors, data analytics, and predictive algorithms, such projects aim to create proactive systems capable of identifying potential hazards and risky situations before accidents occur. Through real-time monitoring and analysis of environmental conditions, vehicle movements, human behavior, and other relevant parameters, these systems can detect patterns indicative of impending accidents or dangerous scenarios. By promptly alerting relevant stakeholders or autonomously triggering preventive measures, such as activating warning signals, adjusting traffic flow, or stopping machinery, these technologies have the potential to significantly reduce the occurrence of accidents and their associated consequences. Moreover, by collecting and analyzing data from past incidents, these projects can also contribute to the development of more robust safety protocols, infrastructure improvements, and educational initiatives aimed at fostering a culture of safety awareness and accident prevention. Ultimately, the overarching goal of early accident detection and prevention projects is to save lives, reduce injuries, and minimize economic losses by proactively addressing risks and vulnerabilities in various environments.

III.OBJECTIVE:

- Early Accident Detection
- Proactive Prevention Measure
- Integration With Embedded Technology
- Utilization Of Deep Learning
- Enhanced Road Safety

IV.EXISTING SYSTEM:

Our device is completely independent. It does not use the internal satellite navigation of the car. It has its own GPS module and antenna. We have built the device around the idea that it can be plug-and-play, low power consumption and will be compatible with the vast number of vehicles regardless of make and model at the same time be very reasonably priced so that it can be widely deployed. Physical Damage to the car is one of the trigger events. In the likelihood that a vehicle has damaged key areas of the car it will act as a trigger. It is simply a push button that gets pressed. It is placed with some protection between the chassis and the frame of the car. If an impact is strong enough to go up to the chassis bending panels and body, it is definitely a valid crash. This will also avoid triggering in the event of minor nonlife threatening collisions that happens more often. Since it is only a push button trigger it can be placed in many places of the vehicle so that angular, roof collapse and side-impacts are covered as shown in and shows possible impact switch (red) placements inside the car frame (green). Device contains two Maxim DS18B20 Digital Temperature sensors. A trigger occurs if cabin temperature exceeds 80°C and engine temperature trigger is at 120°C. We know that this is different for different vehicle and regions and therefore can be adjusted accordingly in the programming.

DISADVANTAGES:

- Human being is affected
- Time delay for takes for emergency rescue to arrive at the crash location
- Short range to communication
- Compatibility issues between different hardware components
- communication protocols, and IoT platforms may arise

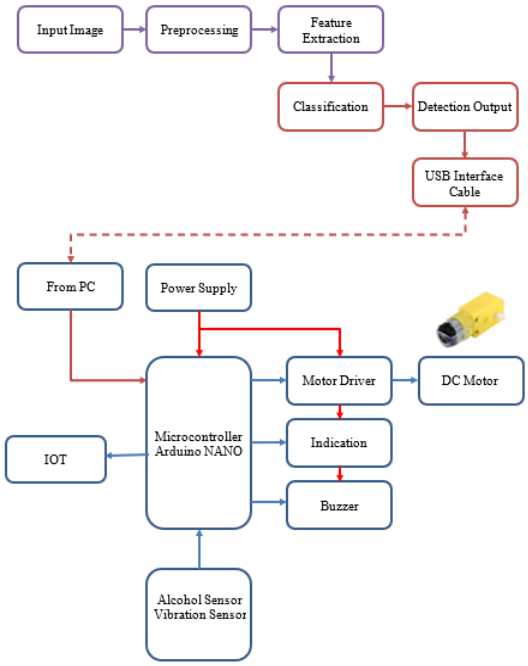
V.PROPOSED SYSTEM:

This paper proposes a new system that helps avoid vehicle clash if possible. As a consequence, the system alerts authoritative individual when an accident takes place. It monitors the vehicle to gather information regarding the distance between two vehicles. The ultrasonic sensors are used to measure the distance. This measurement gets updated each second. Furthermore, it's displayed to the driver via an interface. The system sends an alert to the driver depending on some criteria such safe, slow down, brake etc. When two vehicles come close, alarm in the car will get triggered. Overall, the proposed system offers a comprehensive approach to road safety, leveraging the capabilities of IoT and sensor technologies to monitor road conditions, detect potential hazards, and prevent accidents effectively. By providing real-time alerts and proactive interventions, the system aims to enhance driver awareness and reduce the incidence of road accidents, contributing to safer transportation environments. To implement road sign detection, gas detection, vibration sensing, and vehicle accident prevention using Arduino Uno and Node MCU, along with IoT message service, you can follow these general steps:

ADVANTAGES:

- Multiple communication can be achieved accurately.
- The vehicle safety authorities can enhance the crash reports post-crash analysis, record of the event and reduces the time to arrive at the crash location.

SYSTEM ARCHITECTURE



VI.FUTURE ENHANCEMENT:

The proposed system is developed to provide the information about the accident occur and the location of the accident. It helps to easily provide the assistant and help to the victim of the accident. This system uses GPS module to locate the vehicle. GSM is used to provide the information of accident. The results of the proposed systems are satisfactory. Additionally such system contribute to the evolution of autonomous driving, promising a safer future on the road.

VII.CONCLUSION

The driver helping system has been presented in this project. The basic idea is to recognize and classify the traffic signs from an input image. The image processing technique used in this system is based on the CNN algorithm. Finally, the recognition and classification of these potential road signs is done according to a database of road sign patterns and controls the speed according to it. The performance of this idea depends on the quality of the input image, in relation to its size, contrast and the way the signs appear in the image. This system is fully based on automation process which replaces the existing manual operation. Automation process, in turn decreases the human error, increases the accuracy, processing speed and reliability. In this report, a method to make a self-responding robot car is represented. Working of different hardware components is described.

In this paper, we have accomplished our proposition, an IoT based smart system which may help decrease the number of deaths by accident. Undeniably, our provided solution has many advantages over traditional systems. Reliability and maintainability of the system are robust.

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