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Automatic Vehicle Speed Control in Restricted Zones with Weather API Integration

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ABSTRACT: As far as motorcars are concerned, safety is veritably important in speed confined areas to reduce the circumstance of accidents. It minimizes the loss of property and life. As per the recent checks, in the last many times, there has been a tremendous increase in accidents in academy area, sanitarium area and near sharp turns, due to their haste to reach the target position snappily. thus controlling the speed of the vehicle has been an important issue to consider. This paper is intended to be integrated with the Weather API to enhance its functionality. The Weather API provides information about rainfall conditions, similar as temperature, moisture, and rush, in a defined area. The ECU uses this information to acclimate the vehicle speed consequently, icing that the vehicle isn't only driving at a safe speed, but also in a manner applicable to the rainfall conditions.

KEYWORDS: Weather API, Temperature detector, microcontroller (AT89S52), Zigbee receiver, Arduino UNO

I. INTRODUCTION

Automatic Vehicle Speed Control in confined Areas with Weather API Integration is a system designed to help motorists control their vehicle speed in certain areas where speed limits apply. The system uses a combination of GPS, detectors and rainfall data from APIs to cover the vehicle's position and current rainfall conditions.

This system is particularly useful in areas where rainfall conditions can affect driving conditions and make it delicate for motorists to maintain a safe speed. For illustration, in areas where heavy rain or snow may reduce visibility, the system can automatically acclimate the vehicle's speed to insure that the motorist maintains a safe distance from other vehicles and objects on the road..

The Weather API integration provides real- time rainfall data to the system, which is used to determine the applicable speed limit for current driving conditions. For illustration, if the rainfall API reports that it's raining heavily in a particular area, the system can automatically reduce the speed limit for that area to insure that motorists aren't driving too presto for the conditions. aren't running.

Automatic vehicle speed control systems in confined areas with Weather API integration have the eventuality to significantly reduce the number of speeding accidents in adverse rainfall conditions. This is an important step towards perfecting road safety and making driving safer for all. In recent times, there has been an increase in the use of automatic vehicle speed control(AVSC) systems in confined areas similar as seminaries, hospitals, and other defended areas. AVSC systems are generally used to limit the speed of a vehicle to a certain limit so that it doesn't beget disturbances or collisions. With the growing fashionability of AVSC systems, there's a need for ways to integrate these systems with rainfall APIs in order to optimize their performance.

International Journal of Innovative Research in Science, Engineering and Technology*An ISO 3297: 2007 Certified Organization**Volume 12, Special Issue 1, April 2023***10th National Conference on Frontiers in Communication and Signal Processing Systems (NCFCSPPS '23)****5th -6th April 2023****Organized by****Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India****II. RELATED WORK**

Automatic vehicle speed control in restricted areas with weather API integration is a promising area of research and development involving the use of the technology to improve road safety and traffic flow. The main objective of this system is to prevent accidents by automatically controlling the speed of vehicles in restricted areas. The system could also help reduce traffic congestion and emissions.

The system integrates Weather API data to adjust the speed of the vehicles according to the weather conditions. For example, in case of heavy rain or fog, the system can automatically reduce the speed limit in a restricted area to ensure safe driving. This integration can also help avoid accidents caused by sudden weather changes.

The system relies on various sensors, cameras, and GPS to detect the position and speed of the vehicle. It also uses image recognition algorithms to recognize road signs and markings. Vehicle speed automatically adjusts based on the speed limit in the restricted area, and weather API data is used to adjust the speed limit if necessary.

One of the major advantages of this system is that it can reduce human error, which is a major cause of accidents. It can also help in reducing the workload of traffic officers who have to manually monitor and control the speed of vehicles in restricted areas.

However, there are some challenges associated with implementing such a system. For example, the accuracy of the sensor and image recognition algorithms must be high to ensure reliable operation. The system must also be designed to work in all weather conditions and road conditions.

Finally, automatic vehicle speed control in restricted areas with weather API integration has the potential to improve road safety and traffic flow. However, it requires careful design and testing to ensure that the system is reliable and effective.

III. EXISTING SYSTEM

Automatic Vehicle Speed Control in Restricted Areas with Weather API Integration is a system designed to control the speed of vehicles in specific areas based on weather conditions in those areas. The existing method for this system usually includes the following steps:

Weather API Integration: The system integrates with Weather API to retrieve real-time weather data for restricted areas. Weather data includes parameters such as temperature, precipitation, wind speed and visibility.

Speed limit calculation: Based on the weather data received from the API, the system calculates the appropriate speed limit for the restricted area. For example, if visibility is low due to fog or rain, the system can calculate a lower speed limit to ensure safe driving.

Vehicle Speed Monitoring: The system continuously monitors the speed of vehicles in a restricted area using sensors such as radar or lidar.

Speed Adjustment: If a vehicle is detected to exceed the speed limit set by the system, the system automatically adjusts the speed of the vehicle to match the calculated speed limit. This can be achieved through various means, such as reducing engine power or braking.

Alerts and Notifications: The system can also send alerts and notifications to drivers, fleet managers or traffic officers if a vehicle exceeds the speed limit or weather conditions change in a restricted area.

Overall, the Automatic Vehicle Speed Control System with Weather API integration is designed to promote safe driving in restricted areas by automatically adjusting vehicle speed based on real-time weather conditions.

IV. PROPOSED SYSTEM

The proposed system is an automatic vehicle speed control system that uses weather API integration to operate in restricted areas. The system will be implemented in vehicles to ensure that they operate at a safe speed in designated areas, especially during adverse weather conditions.

The system will use the Weather API to obtain real-time weather data such as wind speed, precipitation, visibility and temperature. This data will be used to determine whether or not to activate the automatic speed control system. If weather conditions exceed a predetermined limit, the system will activate and automatically reduce the vehicle speed to a safe level.

The system will use GPS technology to identify restricted areas, such as school zones, construction sites and areas with heavy pedestrian traffic. Once the vehicle enters these areas, the system will automatically reduce the vehicle speed to the posted speed limit or a lower speed if weather conditions require it

The system will also incorporate machine learning algorithms to continuously learn and adapt to the changing weather conditions and adjust the vehicle speed accordingly. The machine learning model will use historical weather data and driving patterns to optimize the performance of the speed control system and ensure maximum safety.

Benefits of the proposed system include reducing the likelihood of accidents in restricted areas during adverse weather conditions, reducing traffic congestion and improving traffic flow, and reducing the need for manual speed control by drivers. Overall, the system will improve road safety and enhance the driving experience for motorists.

V. BLOCK DIAGRAM

The system will consists: Automatic Vehicle Speed Control System: It will be responsible for controlling the speed of the vehicle based on the data received from other components of the system. GPS receiver: This will be used to determine the location of the vehicle. Weather API Integration: This component will be responsible for fetching the current weather conditions at the location of the vehicle. Restricted Area Database: This will have a list of restricted areas where vehicle speed will need to be controlled. Control Unit: This will be responsible for coordinating the actions of all other components of the system. User Interface: This will be used to display the current speed of the vehicle and any warnings or alerts that need to be displayed to the driver.

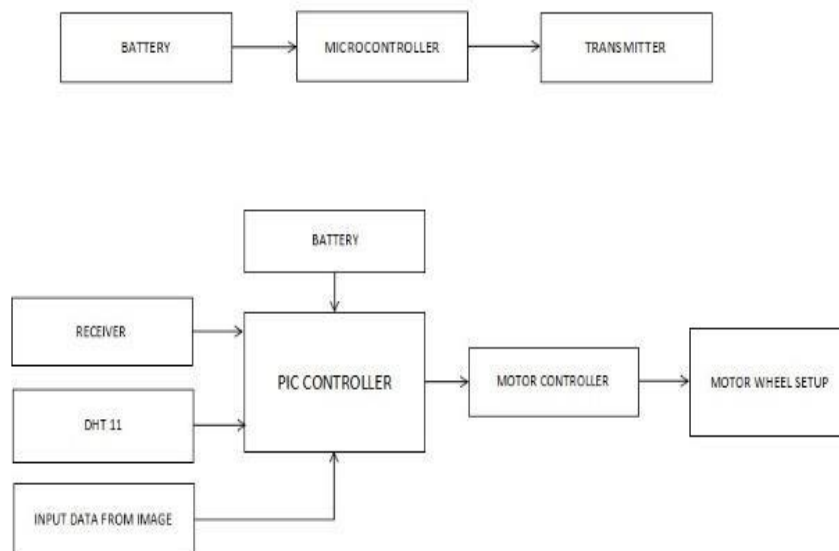


Fig.1Block Diagram

The system will works:

The GPS receiver will continuously determine the location of the vehicle. The control unit will compare the location of the vehicle with the restricted area database to determine whether the vehicle is in a restricted area. If the vehicle is in a restricted area, the Weather API integration component will be used to obtain the current weather conditions at the vehicle's location. Based on the current weather conditions, the automatic vehicle speed control system will adjust the vehicle speed to ensure that it remains within the restricted speed limit. Zone. The user interface will display the current speed of the vehicle and any warnings or alerts that need to be displayed to the driver.

VI. EXPERIMENTAL RESULTS

Automatic vehicle speed control is a technology that uses sensors and other systems to automatically adjust vehicle speed based on certain parameters. This technology can be especially useful in restricted areas, such as school zones or construction zones, where it is important for drivers to slow down and pay close attention to their surroundings.

Weather API integration refers to the process of integrating weather data from an API (Application Programming Interface) into a system or application. By integrating weather data, it is possible to make more informed decisions about driving conditions and adjust vehicle speed accordingly. For example, if the weather API indicates that it is raining heavily in the area, the speed control system can automatically reduce the speed of the vehicle to help prevent accidents.

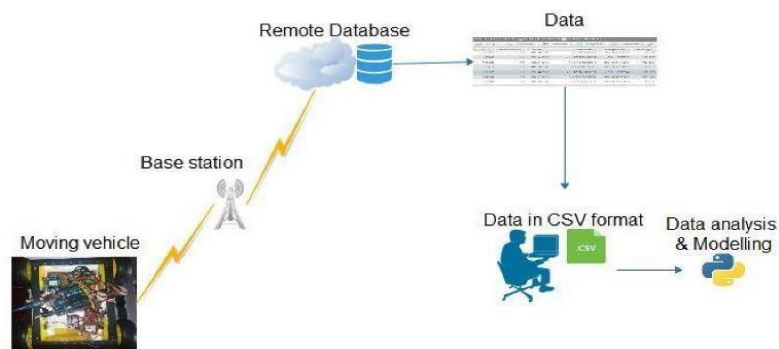


Fig.2.Experimental Results

While these technologies have shown promise in reducing accidents and improving safety, it is important to note that they are still relatively new and may require further testing and refinement before they can be widely implemented. Additionally, the weather API may not always provide accurate or up-to-date information, which may limit the effectiveness of motion control systems.

VII. FUTURE SCOPE

Parallel implementation would allow for real-time operation processing every frame during turn detection which could further improve the overall global sign detection ratio. Additional work examining temporal clustering of Getting closer to signal recognition will also help improve performance. While the system has been developed to meet UK road regulations, developing a specific junction detector could extend its application to other countries in which it is used. Example cancels the current speed restriction.

VIII. CONCLUSION

The system discussed can be designed to control vehicle speed in specific areas to avoid accidents in low speed areas. Vehicle will be detected in low-speed zone with the help of IR transmitter and IR receiver. As soon as the IR receiver in the vehicle detects a low-speed zone, the throttle valve in the speed limiting mechanism will be closed and the flow of petrol will gradually reduce. So, the speed of the vehicle is reduced automatically and hence this system has the effect of reducing the lives of people from accidents.

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