Literature Survey On Signs With Smart Connectivity For Better Road Safety

Team Members:
Hemanth kumar R
Kishore K S
Saravanan S
Dayanidhi S

ABSTRACT

Project for Smart Connected Signs for Road Safety. The speed limits and road signage in use today are static. However, under specific circumstances, the signs may be modified. If the road signs are digitalized, we may take into account situations when there are detours due to traffic congestion or accidents and adjust the signs accordingly. Intelligent transportation systems (ITS) present a number of life-saving options.The relationship between interconnected mobility and road safety has been the focus of a Road Safety International task force, which is made up of top international specialists in both road safety and connected mobility.The development of intelligent vehicles depends on the detection and recognition of traffic signs. To address issues such how readily the environment can affect traditional traffic sign detection and the poor real-time performance of deep learning-based traffic sign recognition techniques, a better traffic sign detection and recognition algorithm for intelligent vehicles is proposed. First, spatial threshold segmentation is performed using the HSV colour space, and traffic signs are successfully identified using shape features.

INTRODUCTION

Automobiles have evolved into a need for daily human movement as a result of the modern society's rapid economic and technological growth. The widespread use of automobiles has brought about a great deal of convenience for people, but it has also led to several traffic safety issues that cannot be ignored, such as heavy traffic and frequent accidents on the roads. Traffic safety problems are primarily brought on by the driver's subjective actions, such as distraction, poor driving technique, and disregard for the law. Smart cars have emerged as an efficient tool for removing these human variables.In order to liberate the human body and significantly lower the likelihood of accidents, self-driving technology can help, or perhaps independently complete, the driving operation. The development of intelligent vehicles, which directly impacts the adoption of driving behaviours, depends on the detection and identification of traffic signs. The efficiency and safety of automatic driving can be significantly increased by smart cars, which use a vehicle-mounted camera to gather accurate and reliable road traffic information. Smart cars can also identify and understand traffic signs in real time in the actual road sceneries. Consequently, doing a thorough investigation on it is required.

The connection between driving and roadside advertising signs

Driving is a challenging activity that involes extensive interactions between drivers, vehicles, and other transport system elements like the environment of the road and other road users. Additionally, each part of the transportation system contains a variety of components that may affect a driver's performance (Rothengatter, 1997). For instance, a driver with ten years of experience who is travelling at the posted speed limit on a clear roadway is likely to show a different degree of performance than a driver with less experience who is travelling at the

same speed on the same highway with many obtrusive passengers. The installation of systemic measures is necessary due to the individual differences among drivers and the variety of components in the environment of the road traffic.

PROBLEM WITH ROADSIDE PARKING

Finding a parking spot for cars to park is a big issue in crowded cities. The car owners select the nearby parking spots that are free. Lack of parking spaces causes congestion, such as bike scrambling and temporary parking in prohibited areas. These actions not only violate traffic laws but also produce air pollution and increase fuel consumption. In addition to contributing to traffic accidents and public safety issues, unlawful parking of the car. The creation and application of an automated parking system from the viewpoint of its algorithms. To manage all the risk, designing with minimal cost and functional safety is a demanding and challenging task.In order to solve the issue of parking on the side of the road, a system is proposed in which image processing methods are used to determine whether parking spaces are available. The image is captured by the implanted event recorders in the cars. When the system receives a request for a parking spot, it searches for and directs the motorist to the closest parking place with the aid of the application. It is more successful at lessening traffic.

Smart transportation and traffic signs with computer versions

In order to improve the vehicle's capabilities for safe driving and path planning, the study proposes a real-time traffic sign sensing (detection and recognition) framework. The suggested solution makes use of the capsules neural network, which performs better than the convolutional neural network by avoiding the need for manual labour. In comparison to the convolutional network, the capsules network offers a stronger resilience to spatial variance and high reliability in the sense of the traffic sign. Comparing the accuracy of the capsule network with that of the CNN and the RNN using the Indian traffic data set reveals a 15%

improvement.The Houben, et al. [1] research analyses the best method for classifying traffic signs by taking into account popular approaches like the linear classifier that depends on the HOG descriptor, the viola-jones detector on the Haar features, and the Hough transform. Remain committed to your original goal of seeing and understanding the traffic sign.

Methods for traffic sign detection and classification

Various traffic sign recognition systems have been proposed during the past few years. The current study provides an overview of a few effective, contemporary techniques for identifying and categorising traffic signs. In fact, localising regions of interest including traffic signs is the primary objective of detection methods, and we classify detection techniques into three broad categories: color-based (classified according to the colour space), shape-based, and learning-based methods (including deep learning). Additionally, we categorise classification techniques into two groups: deep learning techniques and learning techniques based on manually created features (HOG, LBP, SIFT, SURF, BRISK). The various detection and classification techniques are listed in tables along with the various datasets for quick reference.

ISSUE IN EMERGENCY VEHICLES

An emergency can happen at any time, anywhere, and can pose a threat in a number of ways, so it's critical to have a quick and effective route to get to the medical facilities. Traffic congestion has gotten much worse at an alarming rate as a result of the growing population. The proper steps must be taken to address this situation. Even if every vehicle has a need of its own, the emergency vehicle must be given the greatest priority in order to decrease the wait time for the emergency vehicle and the likelihood of a risk. Transporting the patient in an emergency is challenging during rush hour. An effective emergency response system should be

in place to take action right away in the event of a disaster.The limitations of the current technology are reviewed, and a solution is suggested to overcome them. However, as the number of vehicles has dramatically expanded, so have the demands placed on the transportation system. A parking support system, a real-time information system based on the availability of roadways, and adaptive control at crossings are the major tools in the current system. All of these systems call for data on the current traffic circumstances. They suggest a system that uses magnetometers and microphones to gather information about the present traffic situation. The magnetometers are capable of measuring all the necessary characteristics, including count, speed, presence, etc.

CONCLUSION

Smart road signs with embedded smart codes are a potential future development in intelligent transportation systems. Smart codes created using error-correction techniques can offer robustness against small scale perturbations in addition to incorporating comparatively more information. In order to protect trustworthy smart road signs against dangers that could intelligently disrupt the smart codes at small or big scales, we have developed an adversarial intervention detection method based on game theory. We took into account a number of performance metrics when designing the detection mechanism, including the cost of not being able to detect an attack and thus losing the chance to prevent subsequent attacks, the cost of adversary-induced decoding error or failure, the cost of false alarms, and the simplicity of a deceptive perturbation.Knowing the designed defence, i.e., under the solution notion of Stackelberg equilibrium where the defender is the leader, has allowed us to build the detection rule against the worst-case attacker who maximises the cost metrics. In order to reduce any computational challenges that can occur when computing the equilibrium when there are a lot of different road signs, we have offered a relaxation on the attacker's approach space. As a result, we were able to convert the issue into an LP with a significantly low computational complexity. Finally, we have numerically evaluated the performance under various conditions.

REFERENCE

Abukhait J, Abdel-Qader I, Oh J-S, Abudayyeh O (2012) Road sign detection and shape recognition invariant to sign defects. In: EIT. USA, pp 1 - epsilon

De la Escalera, Arturo, J. Ma Armingol, and Mario Mata. "Traffic sign recognition and analysis for intelligent vehicles." Image and vision computing 21, no. 3 (2003): 247-258.

Prashant Jadhav, Pratiksha Kelkar, Kunal Patil-“ Smart Traffic Control System Using Image Processing”- International Research Journal of Engineering and Technology (IRJET), 2016.

NinadLanke, SheetalKoul-“Smart Traffic Management System”- International Journal of Computer Applications Vol 75, Page no 0975 – 8887 No.7, 2013.

Ondrej Karpi - “System for Vehicles Classification and Emergency Vehicles Detection” Vehicular communication, 2017

P. Fine, K. Eames, and D. L. Heymann, ““herd immunity”: A rough guide,” Clinical Infectious Diseases, vol. 52, no. 7, pp. 911–916, 2011.

K. K. Katircioglu and Y. Li, “Machine vision technology for shelf inventory management,” U.S. Patent US 2015/0 262 116 A1, Sep., 2015.

J. Guerin, S. Thiery, E. Nyiri, and O. Gibaru, “Unsupervised robotic sorting: Towards autonomous decision making robots,” International Journal of Artificial Intelligence and Applications, vol. 9, no. 2, 2018.