Literature Survey

Signs with Smart Connectivity for Better Road Safety

Author name: W. H. D. Fernando and S. Sotheeswaran

Published in: 2021 International Research Conference on Smart Computing and Systems Engineering

Description:

The study presents an approach to detect traffic signs using You Only Look Once version 4 (YOLOv4) model. The traffic sign detection and recognition system (TSDR) play an essential role in the intelligent transportation system (ITS). TSDR can be utilized for driver assistance and, eventually, driverless cars to reduce accidents. When driving an automobile, the driver's attention is usually drawn to the road. On the other hand, most traffic signs are situated on the side of the road, which may have contributed to the collision. TSDR allows drivers to view traffic sign information without having to divert their attention. Due to the existence of a large background, clutter, fluctuating degrees of illumination, varying sizes of traffic signs, and changing weather conditions, TSDR is an important but difficult process in intelligent transport systems. Many efforts have been made to find answers to the major issues that they face. The objective of this study addresses road traffic sign detection and recognition using a technique that initially detects the bounding box of a traffic sign. Then the detected traffic sign will be recognized for usage in a speeded-up process. Since safe driving necessitates real-time traffic sign detection, the YOLOv4 network was employed in this research. YOLOv4 was evaluated on our dataset, which consisted of manual annotations to identify 43 distinctive traffic signs classes. It was able to achieve an average recognition accuracy of 84.7%. Overall, the work adds by presenting a basic yet effective model for real-time detection and recognition of traffic signs.

Author name: Usha Devi Gandhi, Arun Singh, Arnab Mukherjee and Atul Chandak

Published in: 2014 International Conference on Reliability Optimization and Information Technology

Description:

Connected vehicle technology aim to solve some of the biggest challenges in the transportation in the areas of safety, mobility and environment. The safety application for Intelligent Transport System(ITS) is one of the main objectives in this project. Safety application is research and industrial initiative which aim to contribute to the global advancement of automobile industry. In this project we focus on V2V communication, once cars are connected which is able to share data with other cars on the road and which help to reduce Highway accidents. Ultimately, vehicles are connect via multiple complementary technologies of vehicle to-vehicle (V2V) and vehicle-to-infrastructure (V2I) connectivity based on Wi-Fi, GPS, Dedicated Short Range Communication (DSRC). VANETS are also considered as one of the most important Simulator for safety of intelligent transportation systems. The use of the DSRC technologies support low latency vehicle-to-vehicle (V2V) communication.

Author name: Janusz Gozdecki, Krzysztof Łoziak, Andrzej Dziech, Wojciech Chmiel, Joanna Kwiecień, Jan Derkacz and Piotr Kadłuczka

Published in: 2019 6th International Conference on Models and Technologies for Intelligent Transportation Systems

Description:

The most important issue in the process of building the trust between the road signalling infrastructure and the end user is the information significance and its value. The ongoing NCBiR project - InZnak - aims to introduce a new type of the road signalling subsystem which relies on intelligent road signs equipped with variety of sensors and adaptive led displays. Sensors feed the autonomous algorithms with data necessary to take decisions on how to react to current road conditions. The proposed system typically consists of a few road signs communicating with each other and exchanging measured data: weather conditions, road surface condition, traffic volume, avg. vehicles speed, detected road events, etc. On the basis of the information exchanged between road signs, each of them runs the autonomous algorithm to process that data and computes the current status of road section driving conditions. The InZnak project focuses on the problem of the traffic control using intelligent autonomous road signs. The process of the speed limit determination is often complicated and in many cases it is defined by numerous legal

standards. In general, speed determination should take into account not only the technical aspect, but also social and legal aspects, which makes this process especially difficult. This paper presents the InZnak communication system architecture with the deployed prototype and its current status of integration.

Author name: Abubakar M. Miyim and Mansur A. Muhammed

Published in: 2019 15th International Conference on Electronics, Computer and Computation

Description:

Millions of vehicles pass via roads and cities every day. Various economic, social and cultural factors affect growth of traffic congestion. The effect of traffic congestion has major impacts on accidents, loss of time, cost, delay of emergency, etc. Due to traffic congestions there is a loss in productivity from workers, people lose time, trade opportunities are lost, delivery gets delayed leading to increasing cost. In providing solutions to these congestion problems, a new robust and smart solution that is based on Vehicle-to-Infrastructure (V2I) technology capable of addressing road accident and traffic management in Nigeria's mega cities is proposed. In this paper, the proposed system serves as an alternative to the existing traffic management system with an intersection control station that communicates with vehicles approaching the intersection through the V2I network. The vehicles are equipped with Dashboard Traffic Light (DBTL) sensors that communicate with the infrastructure. A Safe-to-Pass-First (SPF) algorithm was designed that considered real time speed, vehicle position and data to decide when to allow the vehicle to pass through the intersection. The algorithm checks the status of conflicting lanes to ensure that vehicle pass the intersection safely. This method has been found to be more efficient than the existing methods as the average waiting time at the intersection is reduced by 23% and improved throughput recorded, Python code and SUMO were used for the simulation.

Author name: Abd-Elhamid M. Taha

Published in: 19 November 2018 **,** ResearchGate Publications

Description:

The Safe System (SS) approach to road safety emphasizes safety-by-design through ensuring safe vehicles, road networks, and road users. With a strong motivation from the World Health Organization (WHO), this approach is increasingly adopted

worldwide. Considerations in SS, however, are made for the medium-to-long term. Our interest in this work is to complement the approach with a short-to-medium term dynamic assessment of road safety. Toward this end, we introduce a novel, cost-effective Internet of Things (IOT) architecture that facilitates the realization of a robust and dynamic computational core in assessing the safety of a road network and its elements. In doing so, we introduce a new, meaningful, and scalable metric for assessing road safety. We also showcase the use of machine learning in the design of the metric computation core through a novel application of Hidden Markov Models (HMMs). Finally, the impact of the proposed architecture is demonstrated through an application to safety-based route planning.

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