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IBM NALAIYA THIRAN

LITERATURE SURVEY

TITLE : Signs with Smart Connectivity for Better Road Safety

DOMAIN NAME : Internet of things

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ABSTRACT

In this paper, we propose a game theoretical adversarial intervention detection mechanism for reliable smart road signs. A future trend in intelligent transportation systems is “smart road signs” that incorporate smart codes (e.g., visible at infrared) on their surface to provide more detailed information to smart vehicles. Such smart codes make road sign classification problem aligned with communication settings more than conventional classification. This enables us to integrate well-established results in communication theory, e.g., error-correction methods, into road sign classification problem. Recently, vision-based road sign classification algorithms have been shown to be vulnerable against (even) small scale adversarial interventions that are imperceptible for humans. On the other hand, smart codes constructed via error-correction methods can lead to robustness against small scale intelligent or random perturbations on them. In the recognition of smart road signs, however, humans are out of the loop since they cannot see or interpret them. Therefore, there is no equivalent concept of imperceptible perturbations in order to achieve a comparable performance with humans. Robustness against small scale perturbations would not be sufficient since the attacker can attack more aggressively without such a constraint. Under a game theoretical solution concept, we seek to ensure certain measure of guarantees against even the worst case (intelligent) attackers that can perturb the signal even at large scale. We provide a randomized detection strategy based on the distance between the decoder output and the received input, i.e., error rate. Finally, we examine the performance of the proposed scheme over various scenarios.

INTRODUCTION

Machine learning is one of the key enabling technologies for autonomous vehicles. An autonomous vehicle can learn how to recognize the surroundings and can base its strategic decisions on the information learnt. It is only a matter of time for autonomous driving to replace of human drivers completely. However, for the time being, there are still important, yet not completely addressed, challenges for autonomous driving. Road-sign classification is one of these challenges.Varying weather conditions, changing lighting throughout the day and occlusion are known to pose challenges to road-sign recognition/classification in real-time.

LITERATURE SURVEY

The author describes [1] Traffic incidents are one of the leading causes of death worldwide, and are responsible for about 40,000 fatalities each year in the United States. The goal of our project was to work with the New Mexico Department of Transportation (NMDOT) Intelligent Transportation Systems (ITS) Bureau to propose current and future ITS solutions to decrease fatalities in areas with high crash frequency, or hotspots, in NMDOT Districts 3 and 5. We accomplished this by utilizing ArcGIS maps to locate hotspots, interviewing professionals, and visiting these locations. We composed and analyzed a compilation of ITS solutions the NMDOT could potentially utilize in the future to improve traffic safety within the state, as well as recommended specific solutions that would best address the hotspots.

The author describes[2] Traffic signs have come a long way since the first automobile was invented. They have long served the purpose of warning and guiding drivers and also enforcing the traffic laws governing speed, parking, turns, and stopping. In this study, the authors discuss the issues and challenges facing current traffic signs, and how it will evolve into a next-generation traffic sign architecture using advanced wireless communications technologies. With technological advances in the areas of wireless communications and embedded electronics and software, we foresee that, in the future, digital traffic sign posts will be capable of transmitting the traffic sign information wirelessly to road users, and this will transform our roads into intelligent roads, where signs will appear promptly and automatically on in-vehicle displays to alert the driver. There is no longer the need to watch out for traffic signs since the detection will be automatic and performed wirelessly. This transformation will lessen burden on the drivers, so that they can then focus more on the traffic ahead while driving. Also, this evolution into wireless digital sign posts will fit well with the vision of future smart cities, where smart transportation technologies will be present to transform how we drive and commute, yielding greater safety, ease, and assistance to drivers.

The author describes [3] 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.

The author describes[4] In present Systems the road signs and the speed limits are Static. But the road signs can be changed in some cases. We can consider some cases when there are some road diversions due to heavy traffic or due to accidents then we can change the road signs accordingly if they are digitalized.This project proposes a system which has digital sign boards on which the signs can be changed dynamically.If there is rainfall then the roads will be slippery and the speed limit would be decreased.There is a web app through which you can enter the data of the road diversions, accident prone areas and the information sign boards can be entered through web app. This data is retrieved and displayed on the sign boards accordingly.

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