

Fostering V2X communications in the Autonomous Driving environment

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Summary

Automated Driving is the most disruptive change in the transport industry for the last decades. The drivers will be moved to a monitoring role to finally become a mere passenger and let the car be in charge of all driving functions. The other prominent emerging technology is Cooperative ITS, which allows vehicles to become connected to each other, to the infrastructure and even other modes of transport.

Most initiatives focus on autonomous driving vehicles with on-board sensors, therefore only capable of sensing the area close to vehicle and build a map of the vehicle's surroundings. A clear drawback of this approach is the limited range of on-board sensors that not provide much time to anticipate possible hazards and the lack of coordination among autonomous vehicles since there is no information of the intended manoeuvre. This abstract proposes the usage of V2X communications to increase the sensing range by the exchange of vehicle's information, automated some manoeuvres in response to C-ITS applications that have proved the benefits and therefore enable efficient autonomous manoeuvres that will lead to a positive effect on road safety and traffic efficiency.

The present study is well differentiated. On the one hand, base on the information so far exchanged on CA messages, it will be evaluated the improvement of extended its content with information provided from local sensors, therefore vehicles will increase the knowledge of their surroundings. New data fusion solutions will be proposed and the impact of those solutions will be assed on simulations. It will also be studied the possibility of exchange information for easing automated manoeuvres e.g. lane changes, pass through intersections, overtaking...

On the other hand, C-ITS applications will be automated. Actuators will be installed on reference platforms, they include engine, steering and braking control. On the case of safety applications, they vehicle will not require the drivers input and thus they vehicle will automatically react according to the information exchanged and info provided by local sensors. With non-safety manoeuvres, the vehicle will act based only on the exchanged info. The benefits of C-ITS applications will be assed focusing on the safety and traffic efficiency improvement.

The proposed solution of integrating cooperative services with autonomous driving vehicles will greatly improve the road safety and traffic efficiency. The solution will prove the benefits of addressing together C-ITS and autonomous driving with a prototype implementation and from there, new concepts for the exchange of local sensor data will be investigated.