

Reliability Analysis of DSRC Vehicle Networks for Vehicle Safety Applications

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ABSTRACT

In recent years, as the applications of the vehicle safety increase, the special-purpose short distance communication network (DSRC) has become an important research area. However, the vehicle safety applications need high system reliability to improve the safety of vehicles. The reliability of DSRC becomes an important issue that is connected to the success of applying the DSRC in vehicle safety area. In this thesis, we propose an analysis model to analyze and simulate the reliability of DSRC in vehicle safety applications including SVA, FCW and LCA. The simulation scenarios include the urban region, the freeway, and the openfield region that represent the possible applications of different vehicle speeds. The simulation results show that when the vehicles with the same velocity and distance between two vehicles, the car accident will not happen if the distance between two vehicles is longer than 25, 75 and 50 meters in the urban region, the freeway, and the openfield region, respectively. The results also show the reliability of DSRC protocol decreases when the maximum number of received packet is equal to 1 and the distance between two vehicles is longer than 150, 100 and 125 meters in the urban region, the freeway, and the openfield region, respectively. At last, when the velocity and distance between two vehicles are different, the reliability of DSRC will vary as the vehicle velocity varies, especially in the freeway area.

Keywords : DSRC, Reliability, Performance, EstiNet, VSC, Telematics.

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