哈爾濱工業大學 深圳研究生院
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信息与通信工程学院

Fine-Grained Reliability for V2X Communications

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Abstract: Intersections are critical areas of the transportation infrastructure associated with 47% of all road accidents. Vehicle-to-vehicle (V2V) communication has the potential of preventing up to 35% of such serious road collisions. In fact, under the 5G/LTE Rel.15+ standardization, V2V is a critical use-case not only for the purpose of enhancing road safety, but also for enabling traffic efficiency in modern smart cities. Under this anticipated 5G definition, high reliability of 0.99999 is expected for semi-autonomous vehicles (i.e., driver-in-the-loop). As a consequence, there is a need to assess the reliability, especially for accident-prone areas, such as intersections. We unpack traditional average V2V reliability in order to quantify its related fine-grained V2V reliability. Contrary to existing work on infinitely large roads, when we consider finite road segments of significance to practical real-world deployment, fine-grained reliability exhibits bimodal behavior. Performance for a certain vehicular traffic scenario is either very reliable or extremely unreliable, but nowhere in relative proximity to the average performance.

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