Title: Investigate Traffic Operation Efficiency and Safety Performance of Autonomous Vehicle-enabled Intersection Control Strategies

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Abstract:
In the U.S. two-thirds of urban vehicle-miles traveled are on signal-controlled roadways. A traffic signal can have a negative impact on intersection traffic operations by lengthening vehicle delay, increasing the rate of vehicle crashes, and introducing disruptions to traffic progression. Researchers at Oak Ridge National Laboratory estimated that poor signal control settings caused 296 million vehicle hours of delay annually. Recent advances in autonomous vehicle technologies open the door to highly efficient traffic control system operations in the future. There is great potential to improve intersection control and arterial management efficiency and safety performance. This study aims to investigate traffic operation efficiency and safety performance at intersections under different control strategies along arterials in autonomous vehicle-enabled traffic systems. It can be envisioned that there will be a fairly long transitional period before autonomous vehicles are fully deployed. Therefore, human-driven-vehicle-compatible autonomous intersection control and coordination are emphasized as well for efficient, safe, and intelligent traffic systems operations. Furthermore, this study will provide insights on the behavior and performance of autonomous vehicles in a dynamic, cooperative, human-compatible environment.