# Research Report Summary

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## V2I Infrastructure

# Placement and Safety Implications of CAVs in an Interconnected Network

The goal of this study is to gain a better understanding of the impact of information sharing strategies on the network collision risk. Researchers have investigated how advancements of CAVs and information sharing technologies can help promote safety at node/link level [1][2][3]. However, a transportation

system is an interconnected network. Research related to the safety implication of CAVs considering an interconnected transportation network is limited. We propose a novel transportation network model to consider the adaptive decision making of CAVs responding to mobility





Information Sharing Locations





For CAVs traveling from Orlando Airport to Disney World, information sharing at Node 17 (trip origin) leads to lowest network collision risk.



For CAVs traveling from Disney World to Orlando Airport, information sharing at Node 13 leads to lowest network collision risk.



Information sharing at Node 6 leads to lowest network safety risk if all traffic is considered.

information updates along their Microscopic travel paths. simulation is conducted to estimate key parameters for network equilibrium model. Different V2I information sharing strategies are evaluated and compared to understand the impact of information sharing locations transportation on network safety with CAVs. The main contribution of this study is two-fold. First, we propose a

"More information may not always be better for the network safety. Information sharing locations are critical for the equilibrium traffic patterns and the resulting network collision risk."

novel and mathematical tractable transportation network modeling framework to consider the adaptive decision making of CAVs with information updates. Second, we integrate microsimulation techniques with network modeling to evaluate the impacts of information sharing locations on transportation network safety.

### Outcomes

This study proposes a novel network modeling framework that can capture the adaptive decision making of CAVs with information updates. The proposed methodology could guide the network planning of V2I devices to maximize the effectiveness of information sharing and minimize the network collision risks. The potential outcomes include:

- potential adoption by transportation planners to determine the optimal information sharing locations to optimize network safety
- promoting an integration of network modeling and microsimulation for network safety analyses by practitioners

### Impacts

The proposed methodology could influence the current practice of transportation safety analysis from a node/link centric perspective to network perspective. This shift of safety analysis has the following potential impacts:

- reductions in the exposure of traffic in riskprone situations that will minimize the potential collision risks over network
- *improvement of network mobility through minimizing network collision risks*

#### References

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