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Assessing Complete Street Strategies Using Microscopic Traffic Simulation Models

Project 1712
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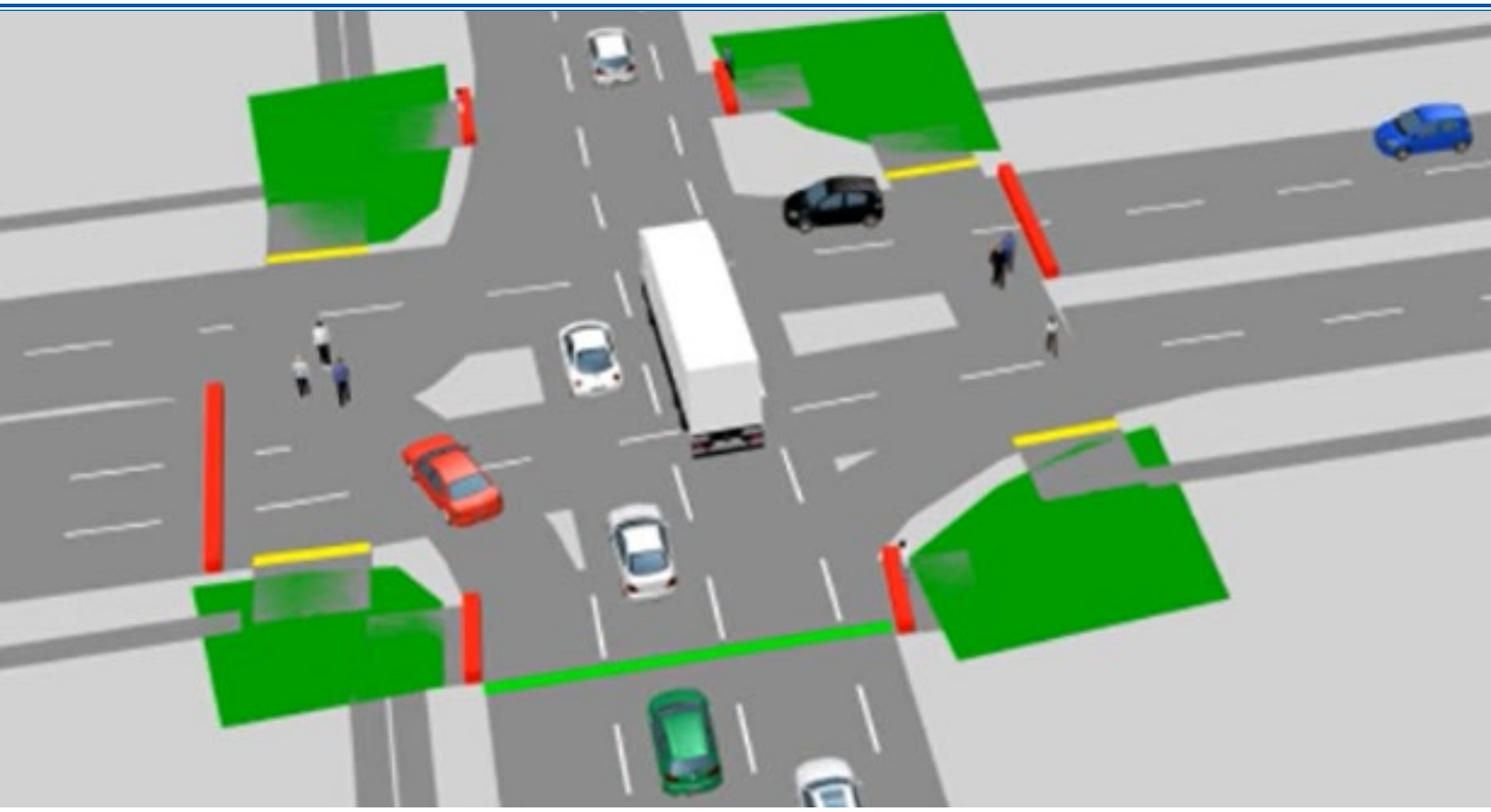

Demonstration of multimodal traffic flow through a downtown San Jose intersection (animation created using VISSIM).

Through an evaluation of "complete-street" strategies via the powerful tool of a microscopic traffic simulation environment, this project aims to improve multimodal mobility and public life in the bustling hub of downtown San Jose. Most of the existing work on the evaluation of complete street strategies occurs after the implementation of the project and examines the key metrics only on the streets being evaluated. This work, however, provides a network-wide impact evaluation framework at the planning stage before the street redesign is put in place, allowing a risk-free examination of various scenarios and measures not easily tested in real-world environments.

Study Methods

A multimodal base model for downtown San Jose was created in a VISSIM microsimulation environment using traffic and network information from 2015. This base model included vehicle, pedestrian, and bicycle traffic and provided a benchmark to compare quantitative network performance measures (e.g., travel times and delays) for the scenarios being evaluated. The scenarios included the conversion of Almaden Blvd. from an existing one-way to a two-way operation at varying levels of automobile travel demand. The base model serves other purposes as well, as it may be modified by the city staff in the future to

evaluate other street redesign scenarios, including temporary closures of streets to automobile traffic for events, such as farmers' markets.

Traffic simulation is used to quantitatively evaluate and demonstrate the operation of traffic under street redesign and travel demand increase scenarios. The method used here can provide an estimate of network-wide performance measures for complete street projects at the planning stages.

Findings

The city network may be able to accommodate a modest (in the range of 5% to 10%) increase in single-occupancy automobile travel demand but not the demand projected by the 2040 travel demand model. Projected levels of single-occupancy automobiles will result in significantly higher delays than those experienced currently by the users.

Policy Recommendations

The city should modify the base model (for 2015 traffic conditions) in order to test other street traffic redesign scenarios as they are envisioned in the future. Also, the city should explore Travel Demand Management (TDM) measures so that the city network is able to adequately function for all transportation modes including pedestrians, bicyclists and transit riders. 3-dimensional animations created via VISSIM should be used to engage the public prior to the implementation of street redesign projects and provide them a better understanding of the traffic flow through the redesigned network.

About the Authors

Bernice Liu received her BS and MS degree from California Polytechnic State University San Luis Obispo in Fall 2019.

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To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/1712

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