

Advanced  
Research

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Project Title:  
Improving the Accuracy of  
Intersection Counts for Measuring  
Urban Street Network Density and  
Resilience

Task Number: 3459

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## Improving the Accuracy of Intersection Counts for Measuring Urban Street Network Density and Resilience

This project plans to improve the accuracy of methods used for calculating street intersection counts and densities data.

### WHAT IS THE NEED?

Intersection density (counts normalized by area) is a common measure used in the compact and sustainable street network design, that supports active transportation. But often the transportation practitioners count intersections incorrectly because most data sources do not provide a simple 1:1 representation for street intersections. The rough-approximation methods of traditional intersection counts introduce bias and prevent a true accounting of the transportation system's ability to support sustainable and environmentally responsible travel behavior. To improve the measurement of urban street network compactness and sustainability, there is a need to improve the accuracy of methods used for calculating street intersection counts and densities data (which is used as foundational input data for correctly measuring the compactness & sustainability of urban street networks).

### WHAT ARE WE DOING?

This project plans to develop algorithms for automatically calculating intersection counts & densities and develop a reusable toolkit for accurate assessment of street network compactness. This project will conduct empirical assessment of traditional intersection counting methods to quantify their limitations (bias in data due to rough approximation methods) and will assess the impact of this bias on resilience simulations, to measure the extent to which the overcounts and redundancies (inherent in traditional intersection modeling methods) impact resilience analysis.



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## WHAT IS OUR GOAL?

The goal of this project is to improve the measurement of urban street network compactness and support sustainable transportation practice by providing accurate methods of intersection counts.

## WHAT IS THE BENEFIT?

This project plans to develop methods (for automatically calculating intersection counts) that will yield topologically corrected network models with a closer 1:1 relationship between model nodes and real-world intersections, allowing for improved tractability of important network algorithms for planning sustainable street networks and simulating network resilience.

## WHAT IS THE PROGRESS TO DATE?

On January 4, 2022 this research task was executed under contract 65A0674.

The contractor has worked on brief literature review, algorithm development and packaging, empirical analysis and documentation, resilience simulations, and has prepared a technical report to be submitted to an appropriate conference this spring.

This project ended on December 31, 2022.