

Exploring Data Fusion Techniques to Derive Bicycle Volumes on a Network

Info Session

Thurs: September 06, 2018, 10-11am PDT



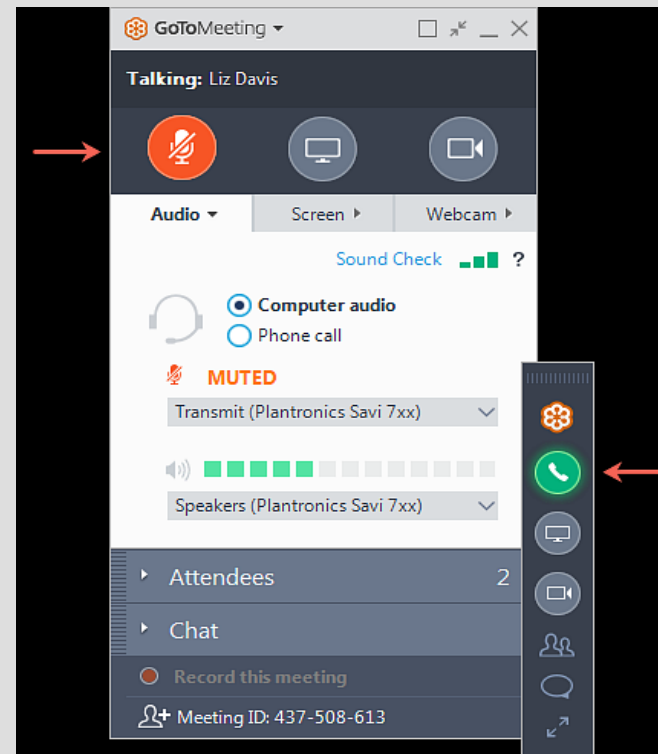
How to join the session

- NITC Pooled Project (Data Fusion) Information Meeting
- Thu, Sep 6, 2018 10:00 AM - 11:00 AM PDT
- Please join the meeting from your computer, tablet or smartphone.
<https://global.gotomeeting.com/join/976210597>
- You can also dial in using your phone. United States: +1 (646) 749-3112 Access Code: 976-210-597
- First GoToMeeting? Let's do a quick system check:
<https://link.gotomeeting.com/system-check>

OVERVIEW

- **Goal:** Clarify expectations of research project & provide platform to answer questions.
- 1. Brief Introduction (~5 min)
- 2. Presentation: Overview of project (20 min)
- 3. Q & A session (30-35 min)

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Project Parameters

General Scope

- RFP open to NITC consortium members
- Budget: \$200,000
- Study duration: 18 months
- Proposal due: **Mo. Oct. 1 @ 5pm** (*was Sept. 30*)
- Start: Dec. 15, 2018
- Duration: 18 months

Partners

- Oregon DOT
- Virginia DOT
- Colorado DOT
- Washington D.C. DOT
- Utah DOT
- Central Lane MPO
- City of Portland, OR
- City of Bend, OR

PRESENTER



Josh Roll

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Research Coordinator

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Exploring Data Fusion Techniques to Derive Bicycle Volumes on a Network

- Active transport modes, including bicycling have many benefits (e.g., lower congestion & emission levels, improvement in personal health).
- Many cities are interested in increasing bicycle activity. To evaluate their efforts, cities have to account for bicycle activity by combining bicycle data from different sources.
- Current work on data fusion techniques is limited; additional research is needed to understand how to integrate bicycle data from various sources.

This project will conduct research that explores how to combine data from different sources to establish bicycle volumes.

Project Objectives

1. Explore data fusion technique to determine bicycle volumes on a network using third party data sources and other commonly available data sources.
2. Determine which data sources and techniques produce the most usable results while also considering the level of difficulty to implement techniques.
3. Create and apply a framework to evaluate the accuracy, coverage, completeness, and representativeness of third-party data.
4. Develop tool for research implementation that makes findings from this work more easily realized.

Task 1: Literature Review

- Perform a literature review to examine commonly used methods for bicycle volume estimation, and methods for data fusion.
- Review should include:
 - Past research and documented descriptions of potential methods used in estimating travel activity for other modes like passenger and freight movements.
 - Cover past approaches to assess third party data quality.
- **Output:** Summary memo to TAC

Task 2: Identify & Catalogue Study Location

- Explore candidate sites where empirical counts data and third-party data (e.g. Strava, Ride Report, Map My Ride, Moves & bike share) are available for analysis.
- Datasets of interest: Count data and GPS data such as self-reported trips from smart phone apps.
- Possible tracks for acquiring third-party data:
 1. Work with public agencies that have purchased these data (pooled fund participants have data available & are willing to share).
 2. Purchase data using limited amount of the pooled funds.
- **Output:** Summary memo to TAC

Task 3: Data Gathering

- Gather all available data sources at the identified locations where third-party data and empirical counts data coincide.
 - Count data can include short and long term counts.
 - Third-party data sets should be collected and processed in a way to make them usable for comparison with counts data.
 - Other data sources most likely necessary for this project include bicycle network data as well as population and employment data.
- Considerations: Past research has found that network accessibility and measures of centrality are relevant predictors of non-motorized traffic volumes so network data is likely a key resource for this work and will need to be compiled.
- **Optional:** Develop tools for calculating bicycle accessibility and centrality using easily acquired data like Open Streets Map. These measures are likely important elements for inclusion in the data fusion models.
- **Output:** Summary memo to TAC

Task 4: Develop Data Fusion Models

- Develop models that include the analysis of longitudinal consistency of third party data to understand changes of their market share.
- Develop models using available data sources to predict observed bicycle traffic counts.
- Test model forms to determine the best predictive performance and understand the benefits of additional but less commonly available data sets.
- Considerations:
 - Common validation techniques should be used to verify model performance (e.g., Monte Carlo hold out or k-fold cross-validation).
 - Centrality measures important for model performance may not be available for many agencies.
 - Key deliverable for task: Demonstrate trade-offs on model accuracy for certain inputs e.g., availability of count data and more complicated measures derived from network data.
- **Output**: Summary memo to TAC.

Task 5: Model Application

- Apply models to appropriate study areas.
 - Compare the results across geographies to understand limitations and opportunities in applied models.
 - Consider the results in comparison to other available data sets such as travel model estimates, travel surveys, Census Journey to Work, crash data, etc., to better understand the overall performance of the models.
- **Optional:** Apply the models in high level crash rate calculations for select states and urban areas.
- **Output:** Summary memo to TAC.

Task 6: Prepare Final Report

- Synthesize summary memos into final report. The documentation of the final data fusion models should be detailed enough to allow others to easily understand the underlying processes.
- The report should include recommendations to support research objectives including:
 - Outline the appropriate data fusion techniques given specific data sources and their accuracy.
 - Identify data sources that are most suitable to use for techniques.
 - Provide clear guidance on how to set up future bicycle count programs given third-party data coverage and outline additional parameters that may need to be considered when setting up bicycle count programs.
- The report will be crafted throughout the process with summary memos following completion of each task. Each memo will be reviewed by the TAC with comments and questions submitted to the research team for consideration.

Task 7: Make Project Data Processing and Analysis Scripts Available

- Research needs to be transparent and open for anyone interested in understanding the details and underlying process.
- Make data processing, analysis, and visualization code with detailed documentation available on an open repository such as GitHub, where interested parties can easily access it.
- Data & scripts will be shared on NITC's open access repository, PDXScholar, for long-term storage (U.S. DOT requirement).

Additional Expectations

- Quarterly conference calls with TAC
- Deliverables for each task – provided 2 weeks prior to conference call or meeting.
- At least one in-person meeting with project panel
- Discuss in proposal how team will communicate with TAC

Q & A Session

MORE INFORMATION



RFP webpage

<https://nitc.trec.pdx.edu/funding/pooled-fund/exploring-data-fusion-techniques-derive-bicycle-volumes-network>

The **National Institute for Transportation and Communities (NITC)**, one of five U.S. Department of Transportation national university transportation centers, is a program of the Transportation Research and Education Center (TREC) at Portland State University.

The NITC program is a Portland State-led partnership with the University of Oregon, Oregon Institute of Technology, University of Utah and new partners University of Arizona and University of Texas at Arlington. We pursue our theme — improving mobility of people and goods to build strong communities — through research, education and technology transfer

QUESTIONS? asktrec@pdx.edu

