



# Research Problem Statement

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## I. TITLE

17-008 Bicycle and Pedestrian Traffic Monitoring Data Quality

## II. PROBLEM

Oregon Department of Transportation (ODOT) monitors motor vehicle traffic around the state, and has a small but growing body of bicycle and pedestrian count data. ODOT is investing in improving bicycle and pedestrian traffic monitoring; as data accumulates so does the complexity of the data and metadata regarding equipment utilized and multiple locations. Some types of equipment may tend to overcount and some may tend to undercount traffic depending on the location. In addition, volume patterns may vary widely across locations. How can the quality of this data be assessed? What can be learned from motor vehicle automated data quality checks that may apply to bicycle and pedestrian traffic data? Bicycle and pedestrian traffic volumes tend to be more variable than motor-vehicle traffic and thus require that data quality checks be adapted to identify erroneous spikes without flagging a high percentage of the dataset.

Without a systematic data quality checking process, equipment problems may go unnoticed and decisions might be made based on erroneous data. With a data quality checking process ODOT can improve the efficiency of data collection and target limited funding for maximum benefit. Existing data collection efforts would be improved and made more reliable, allowing ODOT and others to know they are getting what they are paying for. The goal of this research is to provide practical guidance to ODOT and partner agencies on how to best quality check bicycle and pedestrian traffic count data.

## III. PROPOSED RESEARCH, DEVELOPMENT, OR TECHNICAL TRANSFER ACTIVITY

In order to study this question, researchers will use bicycle and pedestrian count data from Oregon collected through the National Institute for Transportation and Communities (NITC) Bike-Ped Portal, a bicycle and pedestrian count archive funded by ODOT, NITC and other local and national partners (Nordback, Tufte, et al. 2015). Bicycle and pedestrian traffic count data from the archive would be used to analyze the quality of existing data. Quality checks would be created to identify known data problems, while avoiding flagging highs and lows due to typical bicycle and pedestrian traffic fluctuation. Techniques such as directional distribution, interquartile range checks, continuous AADT percent difference checks, continuous monthly average daily traffic (MADT) percent difference checks, and number of consecutive zeros have been identified by others and will be explored (Turner and Lasley, 2013; Ryus et al., 2015). As part of current ODOT supported Bike-Ped Portal project, a brief analysis was conducted to identify potentially erroneous data. In addition equipment testing as part of ODOT SRP#772 found the need for quality checking of counting equipment. This preliminary analysis identified the need to continue this work and identified the following types of quality checks that should be included:

1. Installation validation and calibration checks.
2. Maintenance checks for permanent and short duration counting equipment.
3. Automated quality checks for continuous count data.
  - Number of consecutive zero records.
  - Comparison to historic data (past counts).
  - Directional distribution.
  - Repetitive data.

Where practical, the recommended checks would be tailored to the specific equipment. The research would produce a recommended quality control program for bicycle and pedestrian traffic count data in the state of Oregon.

#### **IV. POTENTIAL BENEFITS**

Without this research, ODOT's growing set of bicycle and pedestrian count data will need extensive manual checking which is time consuming and often delayed due to lack of available staff time. The longer that erroneous data goes undiscovered the greater the chance that incorrect data will be used without being caught. Without accurate estimates of bicycling and walking, ODOT cannot make informed decisions regarding design and safety for those who walk and bicycle. With automated checks and a clear quality control process ODOT will save staff time and make the most of its investment in automated bicycle and pedestrian counting equipment.

#### **V. IMPLEMENTATION**

The results from this research are of immediate use as ODOT's bicycle and pedestrian traffic monitoring project is growing and no formal quality control process has yet been implemented. This work would result in a set of recommendations to ODOT presenting a program for quality control of bicycle and pedestrian traffic count data from equipment installation and maintenance to automating data checking. The automated checks would be detailed in the report and integrated into Bike-Ped Portal as an online tool for ODOT to flag potentially erroneous data. Quality checking will minimize the work needed validate new sites, catch problems before they result in months of wasted data, and insure that ODOT's efforts yield the highest quality data. This work would be coordinated with ODOT's Transportation Data Section's Transportation Systems Monitoring group.

#### **VI. LIST OF REFERENCES**

- Nordback, Krista, Kristin Tufte, Morgan Harvey, Nathan McNeil, Elizabeth Stolz, and Jolene Liu. "Creating a National Non-Motorized Traffic Count Archive: Process and Progress." *Transportation Research Record*, (Forthcoming).
- Turner, Shawn, and Philip Lasley. "Quality Counts for Pedestrians and Bicyclists: Quality Assurance Procedures for Non-Motorized Traffic Count Data." In *92nd Annual Meeting of the Transportation Research Board*. Washington, D.C.: Transportation Research Board of the National Academies, 2013.
- Ryus, Paul, Erin Ferguson, Kelly M. Lausten, Robert J. Schneider, Frank R. Proulx, Tony Hull, and Luis Miranda-Moreno. NCHRP 797 Guidebook on Pedestrian and Bicycle Volume Data Collection. Washington, DC: NCHRP, 2015.

#### **VII. CONTACT INFORMATION**

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