Creating a National Online Non-motorized Traffic Count Archive: 
Process and Progress

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and

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TREC
Transportation Insight for Vibrant Communities

Portland State University
Thank you to our partners!

- NITC
  NATIONAL INSTITUTE for TRANSPORTATION and COMMUNITIES
- Oregon Department of Transportation
- U.S. Department of Transportation
  Federal Highway Administration

- City of Austin
- City of Boulder
- Metro
- Eugene
  LANE COUNCIL OF GOVERNMENTS
- LCOG
  CENTRAL LANE MPO
- Cycle Oregon
- BEND
- IBM
- Saturdays Academy
Overview

- Motivation
- Functional Requirements
- Architecture
- Schema
- Conclusions/Next Steps
Motivation
Why aggregate bicycle and pedestrian count data?
Non-motorized Traffic Data

Local Agency

Local Agency

Local Agency

State DOT

State DOT

Regional Agency

National Archive

Source: Nordback
Non-motorized Traffic Data

Source: Nordback
Many Formats

<table>
<thead>
<tr>
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<th>15:00</th>
<th>20:00</th>
<th>Total</th>
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</table>
Compatibility

• Include TMG format critical fields
• Informed by
  – National Bicycle and Pedestrian Documentation Project
  – UCLA Bike Count Data Clearinghouse

http://www.bikecounts.luskin.ucla.edu/
Functional Requirements
Bike/Ped Portal

Upload

Storage

Download

Data Checking (QA/QC)

Data Visualization
Functional Requirements

• Input Tool
• QA/QC Tool
• **Data archive and metadata**
• Output Tool
• Data to include
  o Manual and **automated**
  o Road and path segments
  o Bicycle and pedestrian counts
Architecture
Bike-Ped Portal System Architecture

Count Data Sources

- Data Uploaded via Web interface
- Semi-automated ftp uploads

Data Upload Interface

- Data Upload Script
- Meta-data
- Raw data
- Validated data

Automated QA/QC Checks

Rejected Data

Email with approval link (automated uploads)
Use Case – Mobile counters

The same detector can be associated with multiple facilities and flows (at different times).
Use Case

Validation Counts – Manual counts checking automated counter

- Multiple counts of the same flow at the same time with different “detectors”
Schema Elements

• Segment Area
• Facility
• Flow
• Detector
• Count Descriptor
• Count Data
Segment Area

A segment area is a stretch of transportation right-of-way over which the volume of non-motorized traffic is not expected to substantially change.
Example Segment Area
Example Facility
Example Flow

Measured Flow: Westbound Bicyclists

Unmeasured Flow: East- and westbound Pedestrians
Example Detector
Schema

Segment Area

Facilities

Flows

Detectors

Count Descriptor

Count Data
  CD Id
  Start Time
  Measure Period
  Volume

Flow Count

Data

CD Id
Start Time
Measure Period
Volume
Conclusions
Conclusions

- Data sharing makes the most of the data we have
- Bicycle and pedestrian count data are complex
- Designed for compatibility
- Connecting a “Detector” with a “Flow” via a table adds **versatility** to the schema
  - Allows archive to handle mobile counters
  - Allows multiple counts of the same flow/time (as for validation counts)
- Minimizing data in count data table
  - Saves memory
  - Improves performance/efficiency
Next Steps in Phase I

- User data input interface
- Automated upload
- User data output interface
- Basic QA/QC
Phase II and beyond

• Future Phases (unfunded)
  – Enhanced QA/QC
  – Analysis tools
    • Summary Statistics
    • AADT from short duration counts
    • Integrating with weather data
Questions?

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EXTRA SLIDES
# Types of Data Warehouses

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<th></th>
<th>PUBLICLY AVAILABLE</th>
<th>ACCESS RESTRICTED</th>
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<tr>
<td>PUBLIC AGENCY/ NON-PROFIT</td>
<td>&gt; 10 agencies</td>
<td>2 or more agencies</td>
</tr>
<tr>
<td>PRIVATE FIRM</td>
<td>2 or more</td>
<td>2 or more companies</td>
</tr>
</tbody>
</table>

- **Publicly owned**
- **Publicly Available**
<table>
<thead>
<tr>
<th>Agency</th>
<th>Data Types</th>
<th>Map?</th>
<th>Graph?</th>
<th>Allows Data Download</th>
<th>Other</th>
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<tbody>
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<td>One week</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Weather</td>
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<tr>
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<td>✓</td>
<td>Weather</td>
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<tr>
<td>Portal</td>
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<tr>
<td>Lane Council of Governments</td>
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<td>✓</td>
<td>✓</td>
<td>Weather, photos</td>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>Allows data input</td>
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<tr>
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<td>Permanent</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Weather</td>
</tr>
</tbody>
</table>

Only one allows data input. None facilitate online data input for automated counts.
AMI and WWI

\[ AMI = \frac{\sum_{h=7}^{10} v_h}{\sum_{h=11}^{12} v_h} \]

where:
AMI = Average Morning/Midday Index

\( v_h \) = Average weekday hourly count for hour (h) where hours are given as starting time of the hour

\[ WWI = \frac{V_{we}}{V_{wd}} \]

where:
WWI = Weekend/Weekday Index

\( V_{we} \) = average weekend daily traffic
\( V_{wd} \) = average weekday daily traffic

AADT Computation

Two methods

• If full 365 days available, sum and divide by 365.
• If at least a week per month are available, use AASHTO method:

\[
AADT = \frac{1}{7} \sum_{i=1}^{7} \left[ \frac{1}{12} \sum_{j=1}^{12} \left( \frac{1}{n} \sum_{k=1}^{n} DT_{ijk} \right) \right]
\]

where

\( DT \) = daily traffic for day \( k \), of day of the week \( i \), and month \( j \)
\( i \) = day of the week
\( j \) = month of the year
\( k \) = index to identify the occurrence of a day of week \( i \) in month \( j \)
\( n \) = the number of occurrences of day \( i \) of the week during month \( j \)