**Data Sources**

Two datasets were used in this study. These include a set of six permanent counters from throughout the Pacific Northwest, which were used to develop and validate the method, and a set of short-duration counts from the Eugene-Springfield, OR region, which were used to demonstrate the method.

**PERMANENT COUNTER SITES**

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashland Dog Park (Ashland, OR)</td>
<td>2013</td>
<td>142</td>
<td>192</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>DeFazio Bridge South River (OR)</td>
<td>2014</td>
<td>749</td>
<td>741</td>
<td>748</td>
<td>742</td>
</tr>
<tr>
<td>DeFazio Bridge North River (OR)</td>
<td>2015</td>
<td>445</td>
<td>453</td>
<td>457</td>
<td>453</td>
</tr>
<tr>
<td>Frohnmayer South River (OR)</td>
<td>2016</td>
<td>398</td>
<td>415</td>
<td>4.3%</td>
<td>74</td>
</tr>
<tr>
<td>Heron Bridge South Fern Ridge (OR)</td>
<td>2017</td>
<td>484</td>
<td>457</td>
<td>5.6%</td>
<td>73</td>
</tr>
<tr>
<td>North Bank South Greenway Bridge (OR)</td>
<td>2018</td>
<td>464</td>
<td>471</td>
<td>1.6%</td>
<td>84</td>
</tr>
<tr>
<td>15th Ave. West Jefferson St. (OR)</td>
<td>2019</td>
<td>556</td>
<td>513</td>
<td>7.8%</td>
<td>34</td>
</tr>
<tr>
<td>Wilson Ave. North (WA)</td>
<td>2020</td>
<td>334</td>
<td>339</td>
<td>2.4%</td>
<td>7</td>
</tr>
<tr>
<td>Wilson Ave. South (WA)</td>
<td>2021</td>
<td>352</td>
<td>361</td>
<td>2.6%</td>
<td>5</td>
</tr>
</tbody>
</table>

**OPTIMAL DATA COLLECTION STRATEGY**

We conducted tests to determine how best to structure the data collection plan, based on predictive accuracy when the method is applied. This resulted in the following recommendations to achieve improved accuracy:

- Collect data across multiple years.
- Install counters at the same site at multiple times of year. The highest accuracy is achieved with data collection periods spread between seasons.
- Collect data for a minimum of two weeks per year at each location.

**VALIDATION**

To validate the SARM, we applied the technique to the permanent count dataset. We experimented with varying the quantity of data used and the sampling strategy using Monte Carlo cross-validation with 500 iterations. Evaluations were conducted using the Average Percentage Error: Calculated as:

\[
APE = \frac{\text{AADBT}_{\text{est}} - \text{AADBT}_{\text{obs}}}{\text{AADBT}_{\text{obs}}} \times 100
\]

Where:

- \(\text{AADBT}_{\text{est}}\) = Model predicted AADBT for the count location
- \(\text{AADBT}_{\text{obs}}\) = Observed AADBT for the count location

Based on this testing process, we discovered that sampling data from weeks spread throughout the year yields the best performance. The tests described in the following figure used this sampling technique.

**Seasonal Adjustment Regression Method**

This flowchart describes the model process. Negative-Binomial regression models are developed to predict daily bicycle volumes at each location where short-duration counts have been taken, based on weather information and other temporal details (e.g. day of week, minutes of daylight). All variables are included in each site’s model, unless the notes of the relevant conditions are available.

**COMPARISON OF TRADITIONAL EXPANSION FACTOR AND SARM ESTIMATES OF AADBT**

In addition to testing the method at the continuous count sites, we applied SARM to six short-duration count sites in Eugene-Springfield, OR. We developed extrapolation factors from the single continuous counter in Eugene, using the Traffic Monitoring Guide method. The above table shows a comparison between the predicted values using these two techniques, which reveals that the predictions overall are fairly similar between these two techniques. However, these sites were selected because they have similar hourly patterns to the continuous counter, which could be biasing the apparent performance of the TMG method.

**Limitations**

This method is best suited to communities who have not been able to install a permanent counter but have extensive sets of short-duration bicycle counts. As developed, this method does not allow for predictions to account for weather factors at locations where the observations don’t include the relevant weather conditions.

**Acknowledgements**

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