TECHSUMMARY June 2018

State Project No. DOTLT1000110 / LTRC Project No. 16-3SA

Evaluating Cell Phone Data for AADT Estimation

INTRODUCTION

Annual average daily traffic (AADT) represents the average traffic volume each day that a particular roadway segment accumulates over an entire year. Currently in the state of Louisiana, the Traffic Monitoring unit of the Louisiana Department of Transportation and Development (DOTD) estimates AADT for FHWA reporting, and generates the correction factors for AADT estimation from about 60 Permanent count stations scattered over the state, all in accordance with the FHWA Traffic Monitoring Guide. The unit collects 48-hour short duration "Routine" counts on approximately 1,400 sites across a third of the state each year, resulting in approximately 4,200 sites statewide over a 3-year period. The possession of limited data hinders roadway safety assessments and the development of cost-effective safety improvement projects in locations lacking traffic count data. With approximately 205,308 routes (unique roadways) within Louisiana, there is the need to find a practical, cost-effective, and progressive method of estimating AADTs across the entire state, as a way to supplement the current AADT estimation efforts. Streetlytics, a mapping tool developed using advanced transportation analytics, provides detailed traffic data across the United States, and has the potential to systemically estimate AADTs across all state and non-state roadways within Louisiana. The data Streetlytics provides is extracted from several sources including cell phones, mobile GPS, navigation systems, employment tax records, building permits, postal delivery volumes, and publicly available state-reported AADTs.

OBJECTIVE

- Conduct a review of Streetlytics to include a comprehensive detail of the capabilities of the tool, and how it can benefit the state of Louisiana
- Develop a list of roadways, both state and non-state, within the Baton Rouge Metropolitan Area (BRMA) for which there are available traditional traffic counts.
- Develop a suitable sample size based on statistical methods.
- Obtain Streetlytics count data and corresponding traditional count data for the selected sample.
- Undertake a comparative analysis of the Streetlytics and traditional count data, with the view to determine how comparable they are.
- Make a recommendation as to whether Streetlytics can provide AADTs for the state of Louisiana based on the results obtained for BRMA and whether it offers more value than traditional methods.

SCOPE

The literature review on Streetlytics was conducted based on information obtained from the manufacturers, AirSage, and Citilabs. The study area was limited to BRMA, for which the research team obtained a Streetlytics research license for the use of the tool. Even though there are many features to Streetlytics, this study focused only on the AADT feature. The research team relied on DOTD's Traffic monitoring unit to provide the Traditional count data for all roadways included in the sample. The Streetlytics license obtained was for the year 2015 so only sites for which there were publicly available traditional count data for 2015 were selected for this study.

LTRC Report 591

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METHODOLOGY

In this study, a bivariate correlation analysis and quantitative analysis (percentage difference) were used to evaluate the comparability of Streetlytics' volume counts with traditional DOTD counts. Simple linear regression was then used to develop predictive models that accounted for the differences between the two datasets. The data was analyzed on three levels (see Figure 1) to compare traditional count data to Streetlytics counts. Level 1 comprised all data, Level 2 comprised analysis of Routine count data and Permanent count data separately, and Level 3 comprised analysis of Observed and Unobserved locations within both Routine and Permanent count data. Observed locations refer to areas for which there were publicly available traditional counts that were used as part of the data sources to generate the Streetlytics count data; otherwise, these areas are referred to as Unobserved locations.

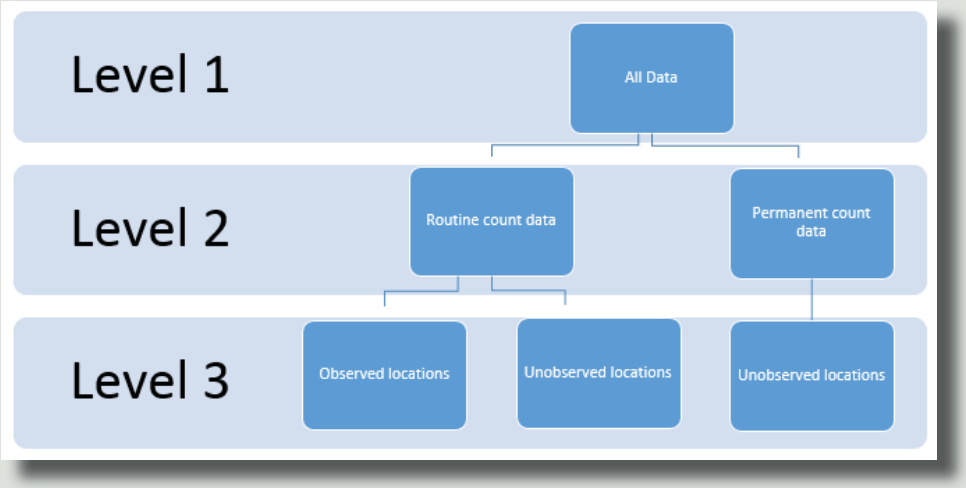

Figure 1
Heirarchy of sample groups

CONCLUSIONS

Overall, the results confirmed strong positive correlation between Streetlytics data and traditional count data. Analysis of all the data in Level 1 produced a percentage difference value of 44.50% with traditional count data reporting higher values than Streetlytics count data. Routine counts and permanent counts, analyzed at Level 2, showed percentage differences of 45.01% and 43.00% respectively. At Level 3, Unobserved locations from routine and permanent count data showed percentage differences of 53.90% and 43.00%, respectively, while a percentage difference of 23.60% was obtained for Observed locations (Routine count data). Furthermore, the percentage difference between the two datasets for Traditional count data under 300 vpd was 110.38%, and 37.08% for Traditional count data over 300 vpd. Approximately 10% of the data falls under 300 vpd and 3% falls below 50 vpd.

It can be concluded that even though differences exist between the means of Streetlytics and Traditional count data, the strong positive bivariate correlations obtained (0.85 to 0.96), and the high positive regression coefficients (0.73 to 0.92) associated with the data suggest that the Streetlytics count data are highly comparable to the Traditional count data. It can therefore supplement Traditional count programs and will be highly useful in locations lacking traffic count data.

RECOMMENDATIONS

The study recommends the completion of the following specific tasks prior to acquiring the annual subscription license:

- Identify business areas in need of the product with accompanying number of licenses needed
- Negotiate user terms with vendor, since currently it allows for only five simultaneous users.
- Negotiate with vendor to set minimum AADT value to 50 vpd (only 3% of data falls below 50 vpd) as opposed to the current 300 vpd (approximately 10% of data falls under 300 vpd). This will make the data more comparable for areas with low AADT, especially rural locations.
- Identify funding sources, and next steps in how to fully integrate Streetlytics into DOTD's existing data usage and reporting systems.