

## ABSTRACT

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Public transportation is vital for many people who do not have the means to use other forms of transportation. In small communities, transit service is often limited, due to funding constraints of the transit agency. In order to maximize the use of available funding resources, agencies strive to provide effective and efficient service that meets the needs of as many people as possible. To do this, effective service planning is critical.

Unlike traditional road-based transportation projects, transit service modifications can be implemented over the span of just a few weeks. In planning for these short-term changes, the traditional four-step transportation planning process is often inadequate. Yet, the characteristics of small communities and the resources available to them limit the applicability of existing transit demand models, which are generally intended for larger cities.

This research proposes a methodology for using population and demographic data from the Census Bureau, combined with stop-level ridership data from the transit agency, to develop models for forecasting transit ridership generated by a given geographic area with known population and socioeconomic characteristics. The product of this research is a methodology that can be applied to develop ridership models for transit agencies in small cities. To demonstrate the methodology, the thesis built ridership models using data from Lafayette, Indiana.

A total of five (5) ridership models are developed, giving a transit agency the choice to select a model, based on available data and desired predictive power. More complex models are expected to provide greater predictive power, but also require more time and data to implement. Simpler models may be adequate where data availability is a challenge. Finally, examples are

provided to aid in applying the models to various situations. Aggregation levels of the American Community Survey (ACS) data provided some challenge in developing accurate models, however, the developed models are still expected to provide useful information, particularly in situations where local knowledge is limited, or where additional information is unavailable.

