

Using Archived AVL/APC Bus Data to Identify Spatial-Temporal Causes of Bus Bunching

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Abstract

Although deviations from schedules are unavoidable in a stochastic environment, better understanding the main causes of bus bunching can greatly aid transit agencies in the development of efficient strategies that aim to improve overall service quality. The availability of tremendous amounts of archived data provides an opportunity to better understand the complex causes of bus bunching. This research utilizes half year's data from automatic vehicle location (AVL) and automatic passenger count (APC) technologies in a low performance route of TriMet, the public transit provider in the Portland region. The goals of this research are to: (1) exploit the availability of detailed archived Bus Dispatching Systems (BDS) data, (2) identify specific time periods and segments where the conditions that lead to bus bunching are created; (3) develop a method to identify the factors that lead to bus bunching. This paper proposes a method to identify and visualize bus bunching problems in a time-space diagram. This study also develops a method to summarize causes of identified bus bunching incidents. The method is successfully applied to a route data and bus bunching factors for pairs of low performing buses are discussed.

Keywords: transit, performance, schedule adherence, archived data, bunching