Existing Challenges for Use of Passive GPS Devices for Routine Travel Data Collection

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ABSTRACT

Traveler route choice behavior is the cornerstone of numerous advanced traffic management technologies. However, few datasets of actual segment-by-segment travel routes have been collected and analyzed. This is understandable, given the difficulties faced by traditional survey methods, such as phone and mail surveys, when collecting route data.

With the improved accuracy of GPS devices, it is now feasible to collect route data using GPS devices, especially passive GPS devices, which are relatively low-cost, do not require additional computerized equipment, and are more suitable for collecting data for research purposes, given their small size and lack of a screen to distract users. However, despite the widespread availability of GPS technology, there are still very few comprehensive GPS-collected travel route datasets. Collecting data with passive GPS devices is not as straightforward as widely assumed. This is especially true if the data is to be used directly in identifying route choice behavior. When the GPS device is used to collect multiple-day travel data, the post-processing of the data is challenging. Automatic spatial models to identify trip ends and convert point data to link-by-link data is necessary but also extremely time and resource intensive.

This paper will summarize the results of several research projects conducted by the authors to study the methodological possibility of using GPS to collect travel route data. Spatial models were constructed in a GIS environment to accomplish the data processing and conversion. One unique feature of the study is that model calibration was conducted using real known route data so that the accuracy of the models was measured. This work will contribute to better utilization of GPS devices in travel data collection.

Note: This research was still in progress at the time of publication; contact the lead author above for more information.

Key words: automatic spatial models—GPS data sets—traveler route choice behavior