Vehicle Reidentification With Self-Adaptive Time Windows for Real-Time Travel Time Estimation

This paper proposes a vehicle reidentification (VRI) system with self-adaptive time windows to estimate the mean travel time for each time period on the freeway under traffic demand and supply uncertainty. To capture the traffic dynamics in real-time application, interperiod adjusting based on the exponential smoothing technique is introduced to define an appropriate time-window constraint for the VRI system. In addition, an intraperiod adjusting technique is also employed to handle the nonpredictable traffic congestion. To further reduce the negative effect caused by the mismatches, a postprocessing technique, including thresholding and stratified sampling, is performed on the travel time data derived from the VRI system. Several representative tests are carried out to evaluate the performance of the proposed VRI against potential changes in traffic conditions, e.g., recurrent traffic congestion, freeway bottlenecks, and traffic incidents. The results show that this method can perform well under traffic demand and supply uncertainty.