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## Choice Set Generation for Multi-modal Travel Analysis

Stella Fiorenzo-Catalano, Rob van Nes and Piet H.L Bovy  
 Transport and Planning Section  
 Faculty of Civil Engineering and Geosciences  
 Delft University of Technology  
 Delft  
 The Netherlands  
 E-mail: [S.Catalano@ct.tudelft.nl](mailto:S.Catalano@ct.tudelft.nl)

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### Abstract

Multi-modal trips are a common travel phenomenon, which are expected to become more important in the future because of their expected contribution to sustainable urban transportation. However, multiple different types of travel choices, such as transport service types, travel modes, and transfer locations, are involved in a multi-modal trip, making it difficult to model multi-modal traveling. We present a method that generates choice sets of multi-modal routes using a supernetwork, which might be used for prediction purposes. This method considers stochasticity in the perception of the network attributes as well as in the preferences for the different trip components. The primary objective of the paper is to analyze the comparison of generated route sets and observed route sets. Three options for generating route sets have been studied, i.e.: variation in the network attributes only, variation in traveler preferences only, and the combination of both. The latter case proved to yield the best match with observed route sets. Furthermore, the analysis shows that variation in travelers' preferences is more important than variation in network attributes. Recommendations for further improvement of the choice set generation method are included. The analysis revealed insights into the possibilities of generating realistic multi-modal route sets and it is proved that the randomization approach is feasible providing good coverage of the observed routes. By far the best results are obtained by randomizing both network attributes and variation in traveler preferences.

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