Dat.mobility

ADVANCING ANALYTICS

VACANCY: Calibration of a microscopic traffic demand model

INTRODUCTION

Dat.mobility has recently added the tour-based microscopic travel demand model Octavius to OmniTRANS transport planning software. This model can be used to forecast the number and type of tours (activity chains) along with their destinations and modes for each individual person and household within the study area. Contrary to traditional macroscopic models, Octavius describes individual behaviour and provides consistent travel and activity diaries for each of these individuals in the population, mostly using multinomial logit choice models. Traditional trip-based macroscopic models only describe the total amount of travel per mode (and often per purpose) between certain origins and destinations, usually presented as OD (origin-destination) matrices.

PROBLEM DESCRIPTION

The current choice models of Octavius aim to describe the travel behaviour of the population of the study area. However, the estimated parameters used in these choice models cannot be guaranteed to describe behaviour of all people in all regions accurately. This means that the model may deviate from traffic counts, which is an important measure of accuracy for a travel demand model. This is mainly due to the limitations of the data set used in the parameter estimation process and due to regional variations not captured by these parameters.

In macroscopic travel demand models, such as the gravity models used at Goudappel, these deviations occur as well. To improve accuracy of these models, the resulting “synthetic” OD-matrices are calibrated to better match traffic counts.

Although it is possible to apply the same methodology to the outcome of Octavius, the consistency between choices of individuals, which is key for the explanatory

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and predictive quality of Octavius, is lost. Moreover, complete trip- and activity chains cannot be reconstructed anymore after applying such a method. Because of the structure of Octavius, it should be possible to intervene in the model components which lead to the deviations instead of correcting the matrix as a post-processing step.

For certain other common measures, such as modal split, trip length distribution and attraction (number of arrivals in a zone), methods have already been developed to better match these measures. These methods determine parameters to add to the various choice models to adjust the probability distribution. A similar approach could work for traffic counts as well, although the link between the observed data and the individual choice models is more complex.

RESULT / OBJECTIVE

The goal of this assignment is to develop or adapt a method which can calibrate the choice models within Octavius to better match traffic counts while not deviating more than necessary from the original model. This method should maintain the consistency between choices within the model. Moreover, interaction with other calibration techniques, such as regionalization and attraction constraints, should be taken into account.

ASSIGNMENT

This assignment can be approached in different ways, but it would be expected that the following steps are part of the approach:

1. Exploring how traffic counts relate to the choice models in the current Octavius implementation
2. Researching which methods exist to calibrate (interrelated) choice models
3. Developing a new method or adapting an existing method for this application
4. Researching the interaction with existing calibration methods
5. Testing the method on a small-scale example model
6. (If time allows) a larger-scale application

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INFORMATION

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