Abstract:

Microscopic traffic simulation models are considered to be valuable and powerful tools for analyzing traffic operations in a wide range of planning and modeling tasks. However, modeling large-scale urban traffic networks is particularly challenging task even on a macroscopic level. The challenges are multifold when attempting to represent large urban networks in high-fidelity manner with operational details. While many previous studies proposed various simulation model calibration and validation methods, these processes are still considered to be more an art than science, especially if performed manually. This study describes such a manually-crafted simulation building, calibration and validation process that features a major urban grid network, encompassed with 6 busy arterials and 160 signalized intersections. A VISSIM model was calibrated and validated by using variety of traffic data, from two temporally, spatially, and characteristically different field data-collection campaigns. The accuracy and sensitivity of the model was repetitively fine-tuned and tested, until a chosen calibration criteria for several variables (volume, speed and travel times) was successfully met. Validation tests were performed with a completely fresh dataset at the end of the process. While the calibration efforts were a full success, the validation results were only half successful. Potential factors that could have impacted the mixed validation results are higher sensitivity of the validation data and seasonal shifts in
traffic demand and distribution. Future research will focus on collecting and testing new validation data sets, which will improve robustness and reliability of the simulation model.

Stichworte: microscopic simulation, Bluetooth travel time, throughputs, calibration, validation

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