BALANCED SAMPLING-BASED INTEGERISATION APPROACH FOR SPATIAL MICROSIMULATION

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Abstract

Spatial microsimulation models allow for the creation of spatial microdata with geographically-referenced individual-level components which are commonly not available in existing datasets. The underlying goal in any spatial microsimulation model is to produce weights that will translate to a spatial microdata reflective of the population. The Iterative Proportional Fitting (IPF) is an established reweighting method resulting in non-integer weights that are essentially converted into integers. The Truncate, Replicate, Sample (TRS) is the superior integerisation technique in existence; however, it fails to produce proportionately accurate integerised weights that correspond to the distribution of the population. This study proposes a modified TRS approach which uses a balanced sampling-based methodology in the integerisation stage. Results show that balanced sampling with inclusion probabilities is a more accurate alternative as it considerably improves the fit between the resulting spatial microdata and the population data in terms of the distribution of constraints used in the study. Balanced sampling with inclusion probabilities also results to improved fit, consistency, and stability in generating the spatial microdata based on the representativeness and internal validation measures presented.

Keywords: spatial microsimulation, balanced sampling, integerisation, TRS, iterative proportional fitting