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ENHANCED COLUMN GENERATION ALGORITHM FOR ESTIMATING NON-PARAMETRIC DISCRETE-CHOICE MODELS

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Abstract: Discrete choice models (DCMs) provide probabilities for individuals choosing a certain alternative when faced with a set of limited options. DCMs can be parametric or non-parametric. Parametric models are easier to estimate but require assumptions about individuals' preferences, while non-parametric models rely solely on training data without any assumptions. Ranked-list methods are popular non-parametric models and capture individuals' behavior by associating them with preference lists of options sorted in decreasing order of preference. Individuals are assumed always to choose the option best placed in their preference list when confronted with an alternative. Despite the generality and simplicity of ranked-list methods, a major drawback is the exponential increase in the number of potential lists. Column generation (CG) can be employed to address this issue, with the CG subproblem modeled as a generalized linear ordering problem (GLOP). In this talk, we present a dynamic programming algorithm to solve GLOPs. The proposed method is generic and capable of handling different settings without requiring drastic changes to its implementation. The proposed algorithm outperforms a previously proposed Branch-and-Cut algorithm. Our algorithm efficiently generates preference lists when incorporated into maximum likelihood and minimum L1 estimators. The algorithm performs well when facing instances with numerous observations, which is crucial as non-parametric choice models heavily rely on data volume for accurate estimations. This is joint work with Claudio Contardo (Concordia University), Gerardo Berbeglia (Melbourne Business School, The University of Melbourne), and Jean-François Cordeau (HEC Montréal).

Short Biography : Luciano Costa is an Assistant Professor at the Universidade Federal da Paraíba (UFPB), Brazil. He holds a B.Sc. in Mechanical Production from UFPB (2013) and an M.Sc. in Production Engineering from the same institution. In 2020, he earned his Ph.D. in Applied Mathematics from Polytechnique Montréal, Canada. His research expertise includes Combinatorial Optimization, Exact Algorithms based on Cut and Column Generation techniques, Metaheuristics, Multiobjective Optimization, Discrete Choice Modeling, Vehicle Routing and its variants, Production Machine Scheduling, Lot Sizing Problems, Personnel Assignment, Humanitarian Logistics, Optimization in the Management of Academic Resources, and Resource Optimization in Health Care Services.

https://ulaval.zoom.us/j/67457884483?pwd=UD81mDG5Swi6UI41p69zWixXuHp16l.1
Meeting ID: 674 5788 4483 Passcode: 745425

MARDI

10 décembre 2024

10 h

En ligne:

ZOOM

Ouvert à tous

Responsable:

Leandro Coelho

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