



CIRRELT

Séminaire conjoint / Joint Seminar

Chaire de recherche du Canada en logistique et en transport et Chaire de recherche du Canada en distributique /
Canada Research Chair in Logistics and Transportation and Canada Research Chair in Distribution Management



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VEHICLE ROUTING AND DEMAND FORECASTING IN RECYCLABLE WASTE COLLECTION

Abstract: We present a recyclable waste collection problem, which extends the vehicle routing problem with intermediate facilities, integrating a heterogeneous fixed fleet and a flexible assignment of the end depot. Several additional side constraints reflecting the applied nature of the problem are also considered. We propose an MILP formulation and a multiple neighborhood search heuristic capable of solving instances of realistic size. The computational experiments show that the heuristic achieves optimality on small instances, exhibits competitive performance in comparison to solution methods for special cases of our problem, and leads to important savings in the state of practice. Moreover, it highlights and quantifies the savings from allowing a flexible depot assignment. The operational relevance of the routing algorithm depends on the forecast container levels at the time of collection. To this end, we develop a non-linear model which uses past level data available from ultrasound sensors fitted inside the containers to make short term forecasts. It is based on a discrete mixture of count data models representing populations depositing different quantities in the containers, thus reflecting a realistic underlying behavior. It exhibits better in- and out-of-sample performance compared to a simple count data model assuming only one deposit quantity. The real data in both problems comes from the Geneva area in Switzerland. After discussing the performance of the routing and forecasting model, we outline the methodological framework for their integration into a inventory routing problem incorporating the probabilistic information in the solution process.

Note: Ilya Markov is a doctoral student at the Transport and Mobility Laboratory of the School of Architecture, Civil and Environmental Engineering at EPFL. He is presently doing an internship at the Canada Research Chair in Distribution Management, under the supervision of Professor Jean-François Cordeau.

JEUDI / THURSDAY

26 novembre 2015 /
November 26th, 2015
10h30

Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal

Ouvert à tous / Open to all

Organisateur / Organizer
Jean-François Cordeau



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