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Stefan Voß (Eds.)

Computational Logistics

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Preface

The increasing complexity of present-day logistics operations as well as the increasing availability of information, makes it imperative to jointly use optimization and artificial intelligence for devising computational data-driven intelligent decision support. Recently, important efforts and initiatives from all sides of optimization and artificial intelligence have been undertaken to improve logistics operations with sophisticated algorithms and information systems. This resulted in advances in both theoretical and practical aspects as well as technical innovations in several logistics sectors, such as maritime shipping, freight transportation, urban distribution, multi-modal transportation, warehousing, and inventory management. This way, the trend towards computational logistics, as the glue between decision making and operations, has become a key component for economic and industrial growth. On the other hand, in the middle of the COVID-19 world crisis, advances in this area are more necessary than ever to support speedy operations, to flexibly adapt supply chains to distribution disruptions, and to avoid potential shortages.

Computational Logistics covers the management of logistics' activities and tasks through the joint use of computational technologies and advanced decision support and optimization techniques. It is applied in several areas, e.g., the flow and storage of goods and services as well as the flow of related information. In this context, modeling and algorithmic approaches are developed, verified, and applied for planning and executing complex logistics tasks, e.g., for finding the most efficient routing plan and schedule to transport passengers or distribute goods. The models and algorithms are integrated with computing technologies, not only for getting satisfactory results in reasonable times, but also exploiting interactivity with the decision maker through visual interfaces, and for extracting knowledge from data to improve future decision making. This promotes the joint effort of practitioners and scholars for better understanding and solving the logistics problems at hand.

The International Conference on Computational Logistics (ICCL) is a forum where recent advances in the computational logistics research area are presented and discussed. This volume offers a selection of 49 peer-reviewed papers out of 93 contributions submitted to the 11th ICCL edition, virtually held at the University of Twente, The Netherlands, during September 28–30, 2020. The papers show various directions of importance in computational logistics, classified into five topic areas reflecting the interest of researchers and practitioners in this field. The papers in this volume are grouped according to the following parts:

1. Maritime and Port Logistics

Maritime logistics is the backbone of global supply chains and international trade. The performance and functioning of its related activities are remarkably influenced by the quality of its planning and management. In ICCL 2020, the contributions that fall into this area relate to, among others, port development, waterway transport, stowage planning, container management, and various real-world applications.

2. **Vehicle Routing and Scheduling**

This well-known family of optimization problems constitutes an important part of real-world transport and logistics activities. Due to the many specific real-world features, there is a strong necessity of modeling and developing efficient solution approaches as well as formalizing cases that permit advancements in this area. The papers in this category address, among others, dynamic vehicle routing, collaborative logistics, inventory routing, cross-docking, green and electric vehicle routing, pickup and delivery, customer prioritization, and drivers' considerations.

3. **Freight Distribution and City Logistics**

The progress in transportation and economic trade as well as the development of cities and regions require the adaptation and update of current systems to cope with changes that also involve sustainability and environmental impact. The works in this part relate to a diverse range of topics, such as vehicle repositioning, carsharing, travel time predictions, smart cities, waste collection, and truck platooning.

4. **Network Design and Scheduling**

Designing and scheduling logistics networks is among the most important tactical and strategic decisions in supply chain management. This area pursues the efficient organization, modeling, and management of the diverse resources and operations involved in such a way that the flow of products, services, or persons is as good as possible. Contributions considering supply chain networks, logistic flow problems, shortest path algorithms, and matching problems fall into this category.

5. **Selected Topics in Logistics**

The papers that appear in this area relate to a range of topics concerning various computational logistics topics such as cash distribution, logistics-related serious games, e-commerce, game theory applications, pricing, order picking and loading problems, and quality investments.

The ICCL 2020 was the 11th edition of this conference series, following the earlier ones held in Shanghai, China (2010, 2012), Hamburg, Germany (2011), Copenhagen, Denmark (2013), Valparaiso, Chile (2014), Delft, The Netherlands (2015), Lisbon, Portugal (2016), Southampton, UK (2017), Salerno, Italy (2018), and Barranquilla, Colombia (2019). The editors thank all the authors for their contributions as well as the program committee and reviewers for their invaluable support and feedback. Finally, we would like to express our gratitude to Julia Bachale for her helpful support and assistance during the preparation of the conference. We trust that the present volume supports the continued advances within computational logistics and inspires all participants and readers to its fullest extent.

September 2020

Eduardo Lalla-Ruiz
Martijn Mes
Stefan Voß

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Contents

Maritime and Port Logistics

Evaluating Port Development Strategies for a Modal Shift: A Norwegian Case Study	3
<i>Andreas Breivik Ormevik, Stein Ove Erikstad, and Kjetil Fagerholt</i>	
Pickup and Delivery Problem with Transshipment for Inland Waterway Transport	18
<i>Yimeng Zhang, Bilge Atasoy, Dimitris Souravlias, and Rudy R. Negenborn</i>	
Ferry Service Network Design for Kiel fjord	36
<i>Ingvild Eide Aslaksen, Elisabeth Svanberg, Kjetil Fagerholt, Lennart Christian Johnsen, and Frank Meisel</i>	
Smart Containers with Bidding Capacity: A Policy Gradient Algorithm for Semi-cooperative Learning	52
<i>Wouter van Heeswijk</i>	
Analyzing the Impact of the Northern Sea Route on Tramp Ship Routing with Uncertain Cargo Availability	68
<i>Mingyu Li, Kjetil Fagerholt, and Peter Schütz</i>	
Stowage Planning with Optimal Ballast Water	84
<i>Beizhen Jia, Kjetil Fagerholt, Line Blander Reinhardt, and Niels Gorm Malý Rytter</i>	
Waterborne Hinterland Transports for Floating Port Terminals	101
<i>Gerrit Assbrock, Jens Ley, Ioannis Dafnomilis, Mark B. Duinkerken, and Dingena L. Schott</i>	
An Optimization Model for Defining Storage Strategies for Export Yards in Container Terminals: A Case Study	119
<i>Daniela Ambrosino and Haoqi Xie</i>	

Vehicle Routing and Scheduling

Dynamic Assignment Vehicle Routing Problem with Time Windows	135
<i>Kim J. Los, Frank Phillipson, Elisah A. van Kempen, Hans J. Quak, and Ulke Stelwagen</i>	

Time-Dependent Travel-Time Constrained Inventory Routing Problem	151
<i>Faycal A. Touzout, Anne-Laure Ladier, and Khaled Hadj-Hamou</i>	
Vehicle Routing Problem with Reverse Cross-Docking: An Adaptive Large Neighborhood Search Algorithm	167
<i>Aldy Gunawan, Audrey Tedja Widjaja, Pieter Vansteenwegen, and Vincent F. Yu</i>	
Solving a Bi-Objective Rich Vehicle Routing Problem with Customer Prioritization	183
<i>Tim van Benthem, Mark Bergman, and Martijn Mes</i>	
A Genetic Algorithm to Minimise the Number of Vehicles in the Electric Vehicle Routing Problem	200
<i>Bertran Queck and Hoong Chuin Lau</i>	
Decentralized Combinatorial Auctions for Dynamic and Large-Scale Collaborative Vehicle Routing	215
<i>Johan Los, Frederik Schulte, Margaretha Gansterer, Richard F. Hartl, Matthijs T. J. Spaan, and Rudy R. Negenborn</i>	
Metaheuristic Approaches for the Fleet Size and Mix Vehicle Routing Problem with Time Windows and Step Cost Functions	231
<i>João L. V. Manguino and Débora P. Ronconi</i>	
Cyclical Inventory Routing with Unsplittable Pick-Up and Deliveries	246
<i>Jakob Schulte, Michael Römer, and Kevin Tierney</i>	
The Multistage Stochastic Vehicle Routing Problem with Dynamic Occasional Drivers	261
<i>Jørgen Skålnes, Lars Dahle, Henrik Andersson, Marielle Christiansen, and Lars Magnus Hvattum</i>	
Cumulative VRP with Time Windows: A Trade-Off Analysis	277
<i>Alejandro Fernández Gil, Mariam Gómez Sánchez, Eduardo Lalla-Ruiz, and Carlos Castro</i>	
Freight Distribution and City Logistics	
Formulations of a Carsharing Pricing and Relocation Problem	295
<i>Giovanni Pantuso</i>	
Evolutionary Approach for the Multi-objective Bike Routing Problem	311
<i>Pedro Nunes, Ana Moura, and José Santos</i>	
Quantifying the Effect of Flexibility and Information Sharing in Transportation Planning	326
<i>Ebba Celius, Madeleine Reehorst, Heidi Dreyer, and Peter Schütz</i>	

A Bin Packing Problem with Mixing Constraints for Containerizing Items for Logistics Service Providers 342
Sajini Anand and Stefan Guericke

Distance Approximation for Dynamic Waste Collection Planning 356
Fabian Akkerman, Martijn Mes, and Wouter Heijnen

Daily Distribution of Duties for Crew Scheduling with Attendance Rates: A Case Study 371
Martin Scheffler and Janis Sebastian Neufeld

A Heuristic Algorithm for Finding Attractive Fixed-Length Circuits in Street Maps 384
Rhyd Lewis

Minimizing Movements in Location Problems with Mobile Recycling Units 396
Eduardo Alarcon-Gerbier and Udo Buscher

Travel Time Prediction Using Tree-Based Ensembles 412
He Huang, Martin Poulos, Anne Meyer, and Markus Pauly

Platooning of Automated Ground Vehicles to Connect Port and Hinterland: A Multi-objective Optimization Approach 428
Nadia Pourmohammad-Zia, Frederik Schulte, Dimitris Souravlias, and Rudy R. Negenborn

Dynamic Pricing for User-Based Rebalancing in Free-Floating Vehicle Sharing: A Real-World Case 443
Nout Neijmeijer, Frederik Schulte, Kevin Tierney, Henk Polinder, and Rudy R. Negenborn

Automated and Autonomous Driving in Freight Transport - Opportunities and Limitations. 457
Joachim R. Daduna

Learning-Based Co-planning for Improved Container, Barge and Truck Routing 476
Rie B. Larsen, Bilge Atasoy, and Rudy R. Negenborn

Overcoming Mobility Poverty with Shared Autonomous Vehicles: A Learning-Based Optimization Approach for Rotterdam Zuid 492
Breno Beirigo, Frederik Schulte, and Rudy R. Negenborn

Idle Vehicle Repositioning for Dynamic Ride-Sharing 507
Martin Poulos, Anne Meyer, and Nitin Ahuja

Smart City: A Perspective of Emergency and Resilience at a Community Level in Shanghai 522
Xiaoning Shi, Wenchen Sun, Stefan Voß, and Jiangang Jin

Network Design and Scheduling

A Shortest Path Algorithm for Graphs Featuring Transfer Costs at Their Vertices 539
Rhyd Lewis

A Global Intermodal Shipment Matching Problem Under Travel Time Uncertainty 553
Wenjing Guo, Bilge Atasoy, Wouter Beelaerts van Blokland, and Rudy R. Negenborn

Cutting Planes for Solving Logistic Flow Problems 569
Kishan Kalicharan, Frank Phillipson, and Alex Sangers

Deep Reinforcement Learning and Optimization Approach for Multi-echelon Supply Chain with Uncertain Demands 584
Júlio César Alves and Geraldo Robson Mateus

The Multi-period Petrol Station Replenishment Problem: Formulation and Solution Methods 600
Luke Boers, Bilge Atasoy, Gonçalo Correia, and Rudy R. Negenborn

Simulation Approach for Container Assignment Under Uncertainty 616
Wouter J. de Koning, Frank Phillipson, and Irina Chiscop

A Mathematical Model to Route Technicians for Inland Waterway Shipping 631
Melissa Buballa, Daniel Wetzels, Kay Lenkenhoff, and Kevin Tierney

Selected Topics in Logistics

Reactive GRASP-Based Algorithm for Pallet Building Problem with Visibility and Contiguity Constraints 651
Manuel Iori, Marco Locatelli, Mayron C. O. Moreira, and Tiago Silveira

Game Theoretic Analysis of State Interventions to Reduce Customer Returns in E-Commerce 666
Maria Beranek

Fair User Equilibrium in a Transportation Space-Time Network 682
Lianne A. M. Bruijns, Frank Phillipson, and Alex Sangers

Comparison of Manual and Automated Decision-Making with a Logistics
 Serious Game 698
Martijn Mes and Wouter van Heeswijk

Pricing and Quality Investments in a Mixed Brown-Green Product Market. . . 715
Arka Mukherjee and Margarida Carvalho

Increasing the Practical Applicability of Order Picking Operations
 by Integrating Classification, Labelling and Packaging Regulations 733
Sarah Vanheusden, Teun van Gils, Katrien Ramaekers, and An Caris

A Solution Approach to The Problem of Nesting Rectangles with Arbitrary
 Rotations into Containers of Irregular Convex and Non-Convex Shapes. 747
Alexandre Romanelli and André R. S. Amaral

Cash Distribution Model with Safety Constraints 763
*William J. Guerrero, Angélica Sarmiento-Lepesqueur,
 and Cristian Martínez-Agaton*

Correction to: Stowage Planning with Optimal Ballast Water C1
*Beizhen Jia, Kjetil Fagerholt, Line Blander Reinhardt,
 and Niels Gorm Malý Rytter*

Author Index 779