

Plénières de COSI - 2014

- L'échec du vote majoritaire et comment le surmonter

Michel Balinski. CNRS et Ecole Polytechnique, Paris, France.

- New Perspectives in Social Data Management

Siham Amer-Yahia. CNRS, Laboratoire d'Informatique de Grenoble, France.

- An Adaptive Multiphase Approach for Very Large Unconditional and Conditional p-Median Problems

Saïd Salhi. Centre for Logistics & Heuristic Optimization (CLHO), Kent Business School, University of Kent, UK.

- Recent advances in exact algorithms for the Capacitated Vehicle Routing Problem

Eduardo Uchoa. Universidade Federal Fluminense, Niterói, Brazil.

L'échec du vote majoritaire et comment le surmonter



Michel Balinski

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Lauréat du Prix de théorie John von Neumann 2013 (en anglais John von Neumann Theory Prize), décerné par l'Institute for Operations Research and the Management Sciences (INFORMS).

Abstract: Dès l'enfance tout le monde vote entre deux alternatifs en choisissant un plutôt que l'autre, la majorité des voix déterminant le choix collectif. Cette pratique courante s'est transformée en une conviction que ce choix est réellement jugé le meilleur alternatif par un électorat ou un jury.

L'objectif de cette présentation est (1) de démontrer que le vote majoritaire peut bien faire un choix contraire à celui considéré le meilleur par un électorat ou un jury – même quand il s'agit de seulement deux candidats ou alternatifs – et (2) d'expliquer comment un électorat ou un

jury peut – en utilisant le jugement majoritaire – designer le choix réellement évalué le meilleur par une majorité.

Références.

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New Perspectives in Social Data Management



Sihem Amer-Yahia

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Abstract: The web has evolved from a technology platform to a social milieu where factual, opinion and behavior data interleave. A number of social applications are being built to analyze and extract value from this data, encouraging us to adopt a data-driven approach to research.

I will describe a perspective on why and how social data management is fundamentally different from data management as it is taught in school today. More specifically, I'll talk about data preparation, data exploration and application validation.

This talk is based on published and ongoing work with colleagues at LIG, UT Austin, U. of Trento, U. of Tacoma, and Google Research.

Short biography. Sihem Amer-Yahia is DR1 CNRS at LIG in Grenoble. Her interests are at the intersection of large-scale data management and social Web analytics. Until July 2012, she was Principal Scientist at the Qatar Computing Research Institute where she led a group in SocialComputing. While there, she worked with local Universities on student mentoring and with Al Jazeera on news analytics. From 2006 to 2011, she was Senior Scientist at Yahoo! Research and worked on revisiting relevance models and top-k processing algorithms

on Delicious, Yahoo! Travel, Yahoo! Personals and Flickr. Before that, she spent 7 years at at&t Labs in NJ, working on XML query optimization and XML full-text search. Sihem has served on the SIGMOD Executive Board, is a member of the VLDB and the EDBT Endowments and serves on the editorial boards of ACM TODS, the VLDB Journal and the Information Systems Journal. She was track chair of SIGIR 2013 and of PVLDB 2013. She is PC chair of EDBT 2014 and will be PC chair of BDA 2015 and SIGMOD Industrial 2015. Sihem received her Ph.D. in Computer Science from Paris-Orsay and INRIA in 1999, and her Diplôme d'Ingénieur from INI, Algeria.

An Adaptive Multiphase Approach for Very Large Unconditional and Conditional p-Median Problems



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Abstract: In this talk an overview of logistic system is first given followed by the importance of location analysis as one of the activity in the chain. The aim of the talk is to explore ways to tackle very large data sets when solving a class of location problems namely the p-median problem. Here the goal is find the optimal (or best) location of p facilities that serve all the customers. As the problem is very large aggregation techniques are briefly reviewed. A multiphase approach that incorporates demand points aggregation, Variable Neighbourhood Search (VNS) and an exact method is proposed for solving very large-scale unconditional and conditional p-median problems. The method consists of four phases. In the first phase several aggregated problems are solved with a “Mini VNS” to generate promising facility sites which are then used to solve a reduced problem in Phase 2 using VNS or an exact method based on an efficient 0-1 formulation. The new solution is then fed into an iterative learning process which tackles the aggregated problem (Phase 3). Phase 4 is a post optimisation phase applied to the original (disaggregated) problem. For the p-median problem, the method is tested on three types of datasets which consist of up to 89,600 demand points. The first two datasets are the BIRCH and the TSP datasets whereas the third is our newly geometrically constructed dataset that has guaranteed optimal solutions. The computational experiments show that the proposed approach produces very competitive results. The proposed approach is also adapted to cater for the conditional p-median problem with interesting results. Here there already exist q facilities in the system and the aim is to find the new location of p extra facilities.



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Abstract : The Capacitated Vehicle Routing Problem (CVRP) was defined by Dantzig and Ramser (1959) as follows. A fleet of vehicles with identical capacities must depart from a depot in order to deliver demands at a set of customers. The solutions are sets of routes starting and ending at the depot such that: (i) each customer is visited by a route, (ii) the sum of the demands of the customers in a route does not exceed the vehicle capacities. The goal is to minimize the total travel distance. Although dozens of other VRP variants (including features like time windows, multiple depots, heterogeneous fleet, split delivery, pickup and delivery, precedences, loading constraints, etc) are studied, CVRP occupies a central position in the vast VRP literature. Since it is the most classical and simpler variant, it is natural that many important new ideas were first tested in it.

In the early 2000's, the best performing algorithms for the CVRP were branch-and-cut algorithms that separated quite complex families of cuts identified by polyhedral investigation. At that time, some instances with only 50 customers could not be solved to optimality. Fukasawa et al. (2006) could solve all the instances from the literature with up to 134 customers, combining cut separation with column generation, in a so-called branch-cut-and-price algorithm. Since then, all the best CVRP algorithms are based in that combination. This talk reviews those algorithms, highlighting the contributions in Baldacci, Christofides and Mingozzi (2008), Baldacci, Mingozzi and Roberti (2011), Contardo (2012), and Ropke (2012). It also presents the very recent developments in Pecin (2014) that allowed breaking the 200 customer barrier.

Short bio : Eduardo Uchoa is Associate Professor of Production Engineering at Universidade Federal Fluminense, Niterói, Brazil. Professor Uchoa holds an undergraduate degree in Computer Science from Universidade Estadual de Campinas, Brazil and a Ph.D. on Operations Research from Pontifícia Universidade Católica do Rio de Janeiro, Brazil. He is currently ranked as Researcher Level 1 by the Brazilian funding agency CNPq and received two special grants as young scientist by the State of Rio de Janeiro. His research areas include the theory and application of integer programming approaches solving for large NP-hard combinatorial optimization problems. In particular, he had made significant contributions for

the joint use of column and cut generation techniques, in the so called branch-cut-and-price algorithms. Professor Uchoa is author and co-author of several papers that have appeared in leading journals such as *Mathematical Programming*, *Mathematical Programming Computation*, *Computers and Operations Research*, *Annals of Operations Research*, *Networks*, *European Journal of Operational Research* and *Interfaces* and in conferences like *IPCO*.