

We present the Hierarchical Clique Analysis, a new algorithm for social networks analysis. The algorithm is exemplified with data about the recognition of proverbs collected in interviews in all Azorean islands and also in three Azorean emigration locations in the USA. Interpreting the set of this data as an incidence matrix of a graph, we obtain 8 oriented and isolated sub-graphs which distinguish the society in a kind of different families of proverbial users. The Hierarchical Clique Analysis finds distinct clusters with a high inner homogeneity.

■ WE-21

Wednesday, 15:40-17:00

6.2.47

Education and Sustainable Development

Stream: Education, and Social Policy

Invited session

Chair: *Hanife Akar*, Department of Educational Sciences, Middle East Technical University, Orta Dogu Teknik Universitesi, Egitim Fakultesi EF 316, 06531, Ankara, Turkey, hanif@metu.edu.tr

1 - Mind the gap: modelling learning in a professional curriculum

Jo Smedley, Newport Business School, University of Wales, Newport, Allt-yr-yn Avenue, NP20 5DA, Newport, United Kingdom, jo.smedley@newport.ac.uk

In an increasingly litigious society, a legal understanding is often required to support learning in non-related areas. Accessibility can be assured through a range of technological and non-technological learning approaches with information appropriately 'packaged' to engage with a widened range of learners. This presentation will reflect on lessons learned during project development and implementation and present a model for action learning involving a professional curriculum. Outcomes reflect the differences in user expectations between academic and professional subjects.

2 - Unemployment Similarities among Portuguese Regions — a Cluster Analysis Approach

Elisa Barros, Escola Superior de Tecnologia e Gestão, Instituto Politécnico de Bragança, Campus de Sta Apolónia, Apartado 1134, 5301-857, Bragança, Bragança, Portugal, ebarros@ipb.pt, *Alcina Nunes*

The regional distribution of the unemployed individual characteristics is of core importance for the development of public policies that can fight the unemployment phenomenon, especially in times of crises. The data mining cluster methodology allows finding groups of regional areas that share the same characteristics for the register unemployed and, therefore, helps in a better understanding of the problem and possible solutions. Preliminary results for the Portuguese regions show a clear division of the territory among four regions — north and south and urban and rural areas of the country — concerning individual characteristics such as the gender, age, education or unemployment duration. These results have policy consequences.

3 - Need for educational policy-making for the sustainable development of children living in poverty

Hanife Akar, Department of Educational Sciences, Middle East Technical University, Orta Dogu Teknik Universitesi, Egitim Fakultesi EF 316, 06531, Ankara, Turkey, hanif@metu.edu.tr, *Aysegul Ozsoy*

Improving educational opportunities for children of poverty may have a positive impact on their lives, especially, it may lead them to an upward social mobility to enhance a sustainable future. This talk is based on data drawn from a nationwide study whose participants are parents and children from squatter neighborhoods. Findings rate financial issues at the top of needs, and urge schools to provide children with poor households better school quality facilities to receive equality of opportunity in education. Also, social adaptation to urban live emerges as a need for social policy-making.

■ WE-22

Wednesday, 15:40-17:00

3.1.10

Maritime Logistics: Theory and Practice

Stream: Maritime Logistics

Invited session

Chair: *Heng-Soon Gan*, Mathematics and Statistics, University of Melbourne, Australia, Department of Mathematics and Statistics, University of Melbourne, 3010, Parkville, VIC, Australia, hsg@unimelb.edu.au

1 - Robust short-sea ship routing and scheduling

Cristina Requejo, DMat-CIDMA, University of Aveiro, 3810-193, Aveiro, Portugal, crequejo@ua.pt, *Agostinho Agra*, *Marielle Christiansen*, *Rosa Maria Figueiredo*, *Lars Magnus Hvattum*

A fleet of ships must service a given set of cargoes. Several ports are closed for service during nights and weekends, the loading or discharging may take several days, and it is important to avoid ships waiting in ports during the weekend before finishing the service. Maritime transportation is associated with a high degree of uncertainty, mainly due to bad weather and unpredictable service times. We discuss how to design robust ship routes and schedules and present mathematical models.

2 - Optimizing Schedules for Cooperative Engagements from a United States Navy Sea Base

Javier Salmeron, Operations Research, Naval Postgraduate School, 1411 Cunningham Rd, 93943, Monterey, CA, United States, jsalmeron@nps.edu, *Jeffrey Kline*, *Greta S. Densham*

This work presents Global Fleet Station Mission Planner (GFSMP), an optimization tool to aid in planning and scheduling of humanitarian-assistance and other theater-security cooperation missions for the U.S. Navy. GFSMP helps fleet staffs to examine how one naval ship deployed for six months with embarked teams can best meet its mission and logistical requirements. We illustrate the application of GFSMP in the U.S. Second Fleet's Trident Warrior 2009 exercise. Solutions significantly improve total mission value achieved and reduce costs compared to manual planning.

3 - Discrete time models for an Inventory Ship Routing Problem

Agostinho Agra, Matemática, Universidade de Aveiro, campus universitário de santiago, 3810-193, Aveiro, Portugal, aagra@ua.pt, *Marielle Christiansen*, *Henrik Andersson*

We consider an Inventory Ship Routing Problem that combines routing and inventory management at all ports of a single product. The product is produced and stored at production ports and transported by a heterogeneous fleet of ships to the consumption ports. Inventory capacities are considered on the production and consumption ports. We present a mathematical formulation of the problem where the time is discretized to easily take the varying production and consumption rates into account. Then we discuss different approaches to strengthen that formulation and report computational results.

4 - A Multi-Product Inventory Routing Problem with Varying Consumption Rates

Heng-Soon Gan, Mathematics and Statistics, University of Melbourne, Australia, Department of Mathematics and Statistics, University of Melbourne, 3010, Parkville, VIC, Australia, hsg@unimelb.edu.au, *Henrik Andersson*, *Marielle Christiansen*

We consider here a maritime inventory routing problem with varying consumption rates minimising total shipment, inventory and purchasing costs. There are draft limitations on ships entering production and consumption ports. More than one product can be loaded onto a ship. We will present an arc-based formulation for this problem and report on some preliminary results, including a decomposition attempt.