Operational Research & Web Science

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Southampton, December 2010
Overview

- CORMSIS, the Centre for Operational Research
- Operational Research and Web Science: some applications
  - Machine Learning
  - scheduling, routing, network design
  - distributed optimization
  - risk management in online communities
CORMSIS

CORMSIS: Centre for Operational Research, Management Science and Information Systems

- [http://www.cormsis.soton.ac.uk/](http://www.cormsis.soton.ac.uk/)
- 32 full-time researchers; 2 industrial liaison officers; + administrative staff; + affiliated members
- ≈30 PhD students
- 5 MSc programmes: OR, OR & Finance, MS, MS & Finance, Knowledge and Information Systems Management (total ≈70 MSc students/year, mostly with external sponsors)
- Industrial Liaison Committee (BA, BAA, BP, Dstl, HM Revenue & Customs, IBM, JP Morgan, Shell, etc.)
- regular seminar series, conferences, workshops, etc.
Industrial Collaborations

- AA
- Alcatel-Lucent
- BAE Systems
- bmi
- British Airways
- Dstl
- European Space Agency
- Ford
- IBM
- Tesco
- various NHS trusts
- ca. 60 further partners
OR and Web Science: some applications
Machine Learning

- extracting hidden patterns from data
- large-scale databases
- classification (e.g. credit scoring, etc.)
- clustering
- forecasting
Machine Learning

Main analytic tool: Support Vector Machines (SVM)
Discrete & Combinatorial Optimization

- distribution logistics
- scheduling
- routing
- network design
- especially: the robust counterparts of the above
Nonlinear Optimization

The next generation: self-organising *ad-hoc multi-hop networks* mostly without base stations, partly without backbone network.
Nonlinear Optimization

Further applications:

- car-to-car multihop networks (traffic management)

- disaster recovery, wireless sensor networks, health care management etc.
Risk Management in Online Communities (EU FP7 project, 11M€ funding)
Simulation & Risk Management

Tools used: compartment models, discrete time simulation