Operational Research & Web Science

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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

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

- http://www.cormsis.soton.ac.uk/

- 32 full-time researchers; 2 industrial liaison officers; + administrative staff; + affiliated members

- $\approx$30 PhD students

- 5 MSc programmes: OR, OR & Finance, MS, MS & Finance, Knowledge and Information Systems Management (total $\approx$70 MSc students/year, mostly with external sponsors)

- Industrial Liaison Committee (BA, BAA, BP, DstI, HM Revenue & Customs, IBM, JP Morgan, Shell, etc.)

- regular seminar series, conferences, workshops, etc.

CORMSIS: Staff

Head, ILO, Admin Staff

Prof. Thomas
Ms Groom
Dr. Rowley

Credit Scoring

Dr. Baesens
Prof. Thomas
Dr. Mues

Discrete & Combinatorial Optim.

Dr. Bektas
Prof. Potts
Dr. Kaparis, Dr. Pearson, Dr Wu

Entrepeneurship

Dr. Warren

O.R. in Healthcare

Dr. Bolt
Dr. Smith
Prof. Brailsford

Knowledge Management

Prof. Connell
Dr. Makewita
Dr.Klein

HCI

Dr. Ashleigh

Nonlinear Optimisation

Prof. Flieg
Dr. Xu
Dr. Nguyen, Dr. Qi

Simulation

Dr. Avramidis
Dr. Currie
Prof. Cheng, Dr. Izady

Local Search

Dr. Bennell

Risk Management

Prof. Chapman
Prof. Williams
Prof. Johnson, Dr. Malik, Dr. Sung, Prof. Ward
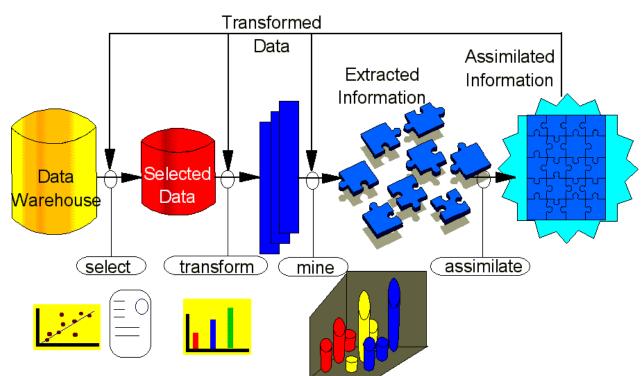
Industrial Collaborations

- AA
- Alcatel-Lucent
- BAE Systems
- bmi
- British Airways
- Dstl
- European Space Agency
- Ford
- IBM
- Tesco
- various NHS trusts
- ca. 60 further partners

OR and WS

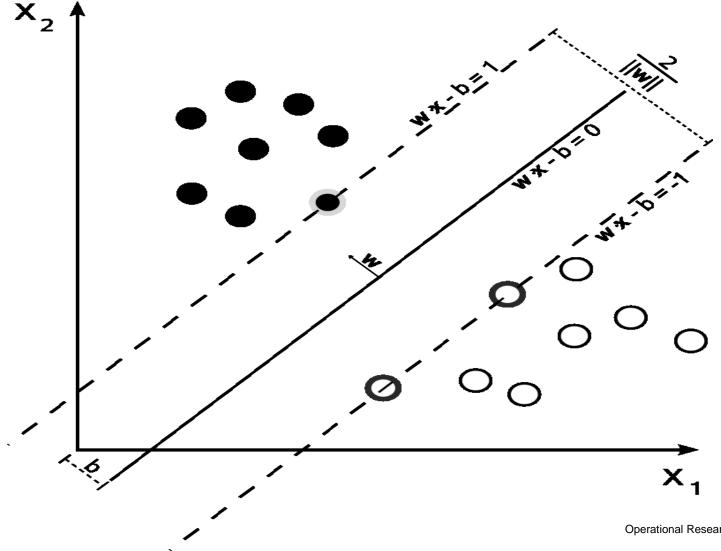# OR and Web Science: some applications

Machine Learning

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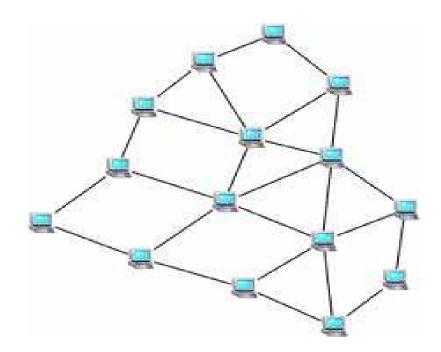- clustering
- forecasting

Machine Learning

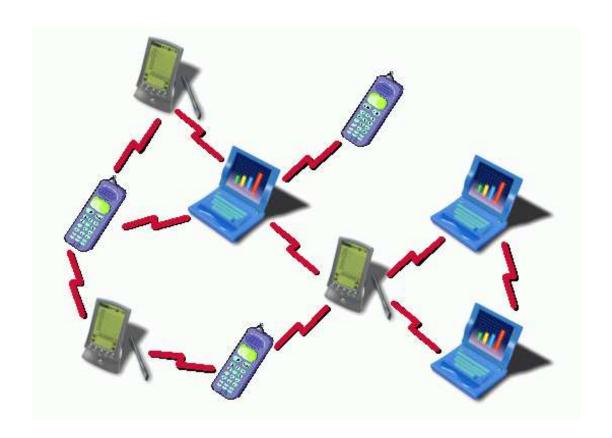Main analytic tool: Support Vector Machines (SVM)

Discrete & Combinatorial Optimization

- distribution logistics

- scheduling

- routing

- network design

- especially: the *robust* counterparts of the above
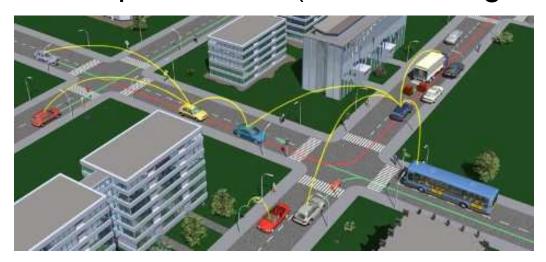
Nonlinear Optimization

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)
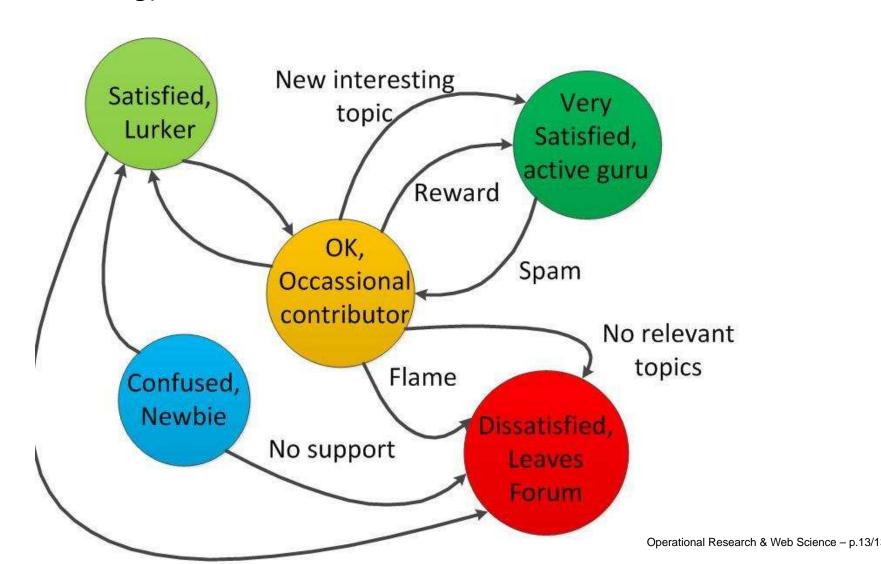

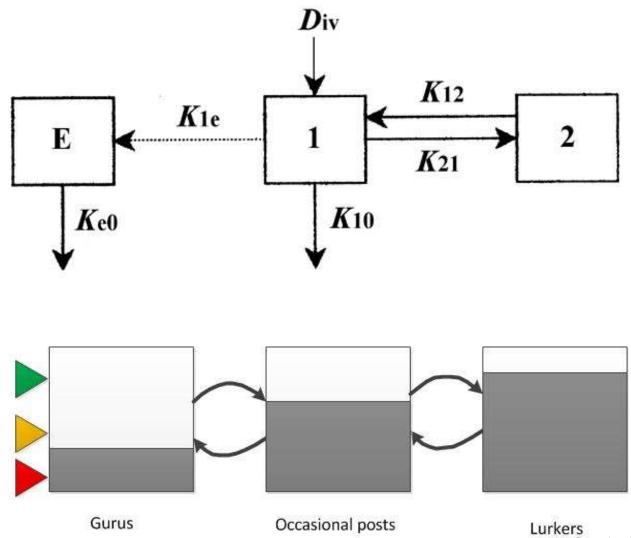- disaster recovery, wireless sensor networks, health care management etc.

Simulation & Risk Management

Risk Management in Online Communities (EU FP7 project, 11M€ funding)

Simulation & Risk Management

Tools used: compartment models, discrete time simulation