



Decision Support Methodologies (G54DSM)

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School of Computer Science

Module Introduction

Dr Rong Qu



THE UNIVERSITY OF Nottingham



An Overview of 1st Week's Content

- Module introduction
 - Aims of the module
 - Module content
 - Module schedule
 - Teaching methods
 - Textbooks + useful readings
 - Coursework assessment

- What are
 - decision making
 - decision support systems



Module Content

- This module introduces a wide range of advanced concepts, methods and techniques of Operational Research and Artificial Intelligence that can help in design of intelligent decision support systems
- The module will present a variety of examples of intelligent decision support systems from industrial and service sectors



Module Aims

- To provide a sound understanding of the advanced **Operational Research** and **Artificial Intelligence** methods
- Students will understand the methods and techniques that are available as aid in decision making
- Students will be acquainted with a number of applications from a variety of industrial and service sectors and will understand how software packages are designed to solve them



Module Learning Outcomes

- Knowledge and understanding
 - how to **model** a range of real-world problems suitable for analysis by OR and AI methods
 - a range of advanced OR and AI methods and their applicability to a variety of real-world decision making problems
- Intellectual Skills
 - The ability to understand complex ideas and relate them to specific situations
- Communicate results using appropriate styles, conventions and terminology



Module Learning Outcomes

- Professional Practical Skills
 - The ability to evaluate available OR and AI methods and select those appropriate to a given task

- Transferable Skills
 - On completion the students should understand the fundamental issues behind the development of intelligent decision support systems in different industrial and commercial sectors



Target Students & Module Requisite

- Postgraduate students registered for the following Masters degrees
 - Advanced Computing Science
 - Scientific Computation and Computational Finance
 - Available to JYA/Erasmus students

- Considerable knowledge and experience in computer programming
 - for the implementation of intelligent decision support systems - coursework
 - Excel VBA, C++, Java, Modelling using Excel



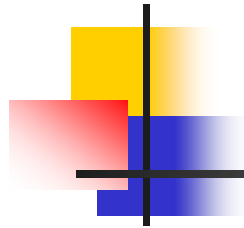
Course Context

- Related modules in CS
 - G54HSM Heuristic Search Methods
 - G53DSM Decision Support Methodologies
 - G53ORO Operations Research and Optimisation
 - G53KRR Knowledge Representation and Reasoning
 - G53DIA Designing Intelligent Agents
 - G52AIM Artificial Intelligence Methods



Module Resources

- G54DSM Web Page
 - <http://www.cs.nott.ac.uk/~rxq/g54dsm.htm>
 - All lecture slides and additional notes
 - Coursework (provisional: already available!)
 - Textbooks
 - Course schedule (might be adjusted)
- Feedback and Q&A to module list g54dsm@cs.nott.ac.uk



Teaching Methods

- Lectures: approx. 12 hours; Tuesdays 3-4pm
 - A range of DS methodologies
 - Invited lectures

- Seminars: approx. 10 hours; Mondays 1-3pm
 - Real world DSS applications
 - Presentations of prototype DSS from the class + feedback

- Private study: approx. 20 hours
 - Other possible OR/AI techniques
 - Literature of OR/AI techniques on DS problems



Module Assessment

- 100% on coursework
 - Interim report (25%) - 19th Mar 2009, 15:30pm
 - Decision support problem, techniques and literature
 - Final report (50%) - 30th April 2009, 15:30pm
 - Design and implementation of your prototype DSS
 - Presentation (25%) - As scheduled after Easter
 - 20 minutes + 10 minutes from the class



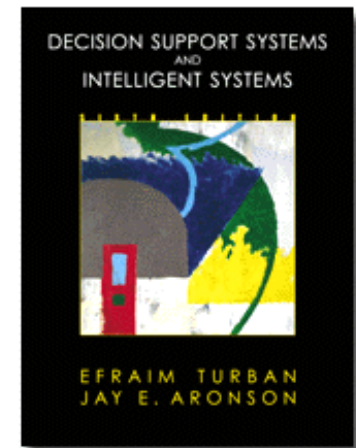
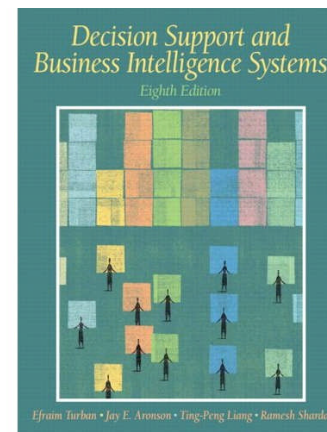
Textbooks

- **Decision support systems and business intelligent systems (Turban et al.), 2008**

The 5th edition available from the library

Comprehensive textbook in DSS

Part of the module material is from this book



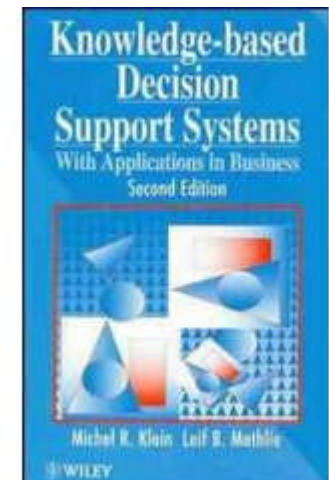


Reading Materials

- **Knowledge-based Decision Support Systems, With Applications in Business (Klein and Methlie), 1995**

integrates expert system technology with decision support technology

comprehensive, knowledge-based decision support systems for a business-oriented audience

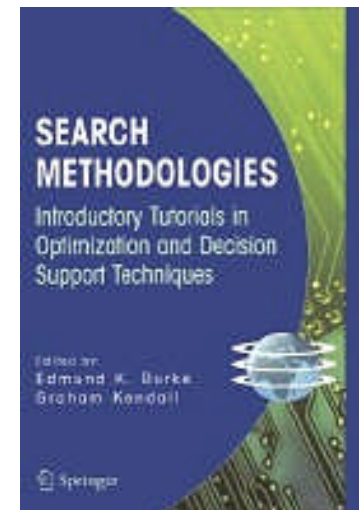




Reading Materials

- **Search Methodologies: Introductory Tutorials in Optimization and Decision Support Techniques (Burke & Kendall eds.), 2005**

State-of-the-art tutorial text of the main search and optimization methodologies across OR and AI

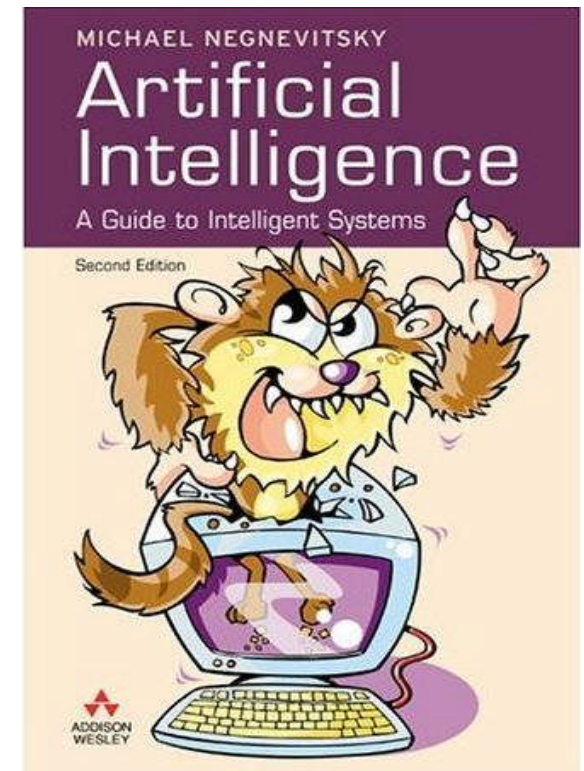


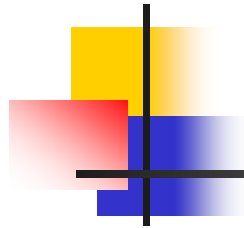


Reading Materials

- **Artificial intelligence: a guide to intelligent systems. (Negnevitsky), 2002**

Good AI textbook
Easy to read while in depth





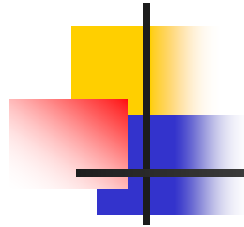
Lecture Schedule

- Part I: Decision Support Methodologies
(Dr Rong Qu)
 - Module Introduction & Decision Support Systems
 - Modeling and Analysis
 - Data Management
 - Expert Systems
 - Case Based Reasoning
 - Multi-objective Techniques
 - Examples of DSS Techniques



Lecture Schedule

- Part II: Real World Decision Support Systems (Prof. Edmund Burke)
 - Decision Support Systems at Heathrow Airport
 - Nurse Rostering Systems at Hospitals
 - Stock Cutting and Packing
 - EventMAP: Educational Timetabling System
 - Hyperheuristics in DSS



Lecture Schedule

- Part III: Demonstrations of DS Applications (Dr Rong Qu)
 - Presentations of DS problems
 - DSS presentations from the class
 - Seminar discussions of DS techniques
 - Feedback on interim reports and presentations