

Operational Research and Management Sciences Group (ORMS)

Seminar Series – Autumn Term 2013

- Speaker:** Dr Jonathan Fieldsend
- Title:** Visualising data with Pareto relationships
- Date:** Wednesday 9th October 2013
- Venue:** Room E2:02, Warwick Business School, Social Sciences Building
- Time:** 14:00 hrs.
- Abstract:** Multi-objective optimisation yields an estimated Pareto front of mutually non-dominating solutions, but with more than three objectives understanding and visualising the relationships between solutions is challenging. Also, in many situations we have access to a general set of solutions, with multiple quality criteria, which do not form a non-dominating set, but where we would also like to visualise the Pareto relationships in the data intuitively. In this talk, two aspects of visualising data with underlying Pareto relationships are discussed. For general sets, we examine the use of graphs and scatter plot projections which aim to limit the loss of both dominance and Pareto shell relationships between solutions to multi-objective problems. For sets comprising only mutually non-dominating solutions, we look how we might extract landmark solutions, which we can highlight when mapping solutions to lower dimensions (using e.g. MDS). Natural solutions to use as landmarks are those lying near to the edges of the mutually non-dominating set. We look at different ways an 'edge' might be defined in this context, and show how their visualisation can reveal information about the structure of the estimated Pareto front.
- Biography:** *Dr Jonathan Fieldsend is a lecturer at the University of Exeter. My route into machine learning has been a rather meandering one. I read Economics at Durham University from 1995-1998. I then undertook the MSc programme in Computational Intelligence at the University of Plymouth, with EPSRC support, before finally migrating into Computer Science with a PhD in the subject between 1999-2003 at the University of Exeter. My doctoral research focused on multi-objective optimisation and its application to neural network learning. From 2002 I worked successively as a Research Associate then Research Fellow and finally Business Fellow at Exeter, during which time my exposure to advanced machine learning concepts and applications greatly increased, as did my interaction with industry and industrial problems. I was appointed as a lecturer in Computer Science in 2006, and continue my broad interest in nature inspired computation, multi-objective optimisation, machine learning and the interface between them.*

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