THE SCIENCE OF BETTER AT THE HEART OF ANALYTICS

INSIDE O.R.

JULY 2015 NO 535

WHO NEEDS MONEY

: : INSIDE THIS MONTH : : : : :

THE OR SOCIETY
www.theorsociety.com

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EDITORIAL

JOHN CROCKER

John Hopes, Vice President, gives us a very interesting account of where Analytics currently stands both in the world at large and in the more narrow limits of the OR Society. It is interesting also to note that the ratio of attendees to the Summit to the number of members is roughly the same as for the annual OR Society conference (i.e. about 1 in 10) although, of course, we do expect a somewhat larger number to be attending EURO2015 in a few days' time. John has mentioned that Clive Humby was one of the speakers at the Summit and you can read more about what he had to say in Nigel's article ('Father of the Loyalty Card').

This year is the anniversary of several major events in our history: the Magna Carter (800), Battle of Waterloo (200) and Einstein's theory of relativity (100), to name but a few. When the general theory of relativity was proposed, David Hilbert (amongst others) noted it contained a paradox. He discussed this with Emmy Noether, a mathematician who had an unpaid job of auditing examinations at Gottingen University (where Hilbert was professor) and her work led to the theory of symmetry, one of the foundations of modern physics (see 'Pioneers in Mathematics').

Sue Merchant continues to do an excellent job of keeping us informed on what is happening in the realms of Criminal Justice. Declan Wilson has also written an interesting appraisal of the 'Art of Data Visualisation' course run by the Society. You can also find out how O.R. and Analytics are coming to the aid of take-aways, charities and healthcare.

In one of the initiatives funded by the OR Society, Alistair Clark, UWE, looked at potential sources of funding for research. As a result, he is in the process of establishing an area within our website where you can go to find out more about these sources in terms of what types of project they may fund, how hard you will need to hit the stone to get some blood out of it and whether you would be advised to take on partners to help you (see News in Brief).

By this time next month, I expect to be recovering from a trip to Glasgow - my first experience of a 'EURO' conference. I feel sure there will be plenty of material to keep us busy writing articles for several months but, not so busy that we miss the Young OR Conference which this year will be held in September, the time when the Annual Conference would normally take place.

They say things come in threes and this month is no exception. We have had to sadly announce the deaths of John Crookes, Heiner M ller-Merbach and John Nash. Our sympathy goes to their friends and relatives.

<OR>

: : NEWS : : : : : : :

: : FEATURE : : : : : : :

: : LEADER : : : : : : :

: : ANALYTICS : : : : : : :

: : REGULARS : : : : : : :

BING IS ON THE ROAD AGAIN

NIGEL CUMMINGS

Bing, the search engine launched by Microsoft on June 1 2009, promised much, but inevitably suffered in comparison to the already well established Google Search Engine, especially in relation to Google's powerful mapping and routing functions, where Bing was always seen as a 'runner up'. It looks like this could be about to change.

A new study published in the Articles in Advance section of Transportation Science (An INFORMS publication) explains how Microsoft researchers have developed the new Bing routing engine that satisfies a large number of algorithmic requirements and overcomes previously encountered route search obstacles.

Surprisingly, the new algorithm has been generated from research on a classic algorithm published in 1959 by Edsger Dijkstra that was thought to perform too slowly to calculate online map routes. The new algorithm is said to provide an update to the already established Customisable Route Planning (CRP), and brings with it far greater speed and accuracy to planning routes with many stages. It also more accurately estimates the time needed for turns, U-turns, road closures, and traffic jams.

The research behind the algorithm also provides more accurate information for walking and cycling routes and identifies more reliable alternate routes. The study, Customizable Route Planning in Road Networks, has been provided by Daniel Delling, Andrew V. Goldberg, Thomas Pajor, and Renato F. Werneck, all employees of Microsoft.

According to Thomas Pajor. 'CRP incorporates traffic data and new personal preferences much faster - orders of magnitude faster. The resulting routing engine is a flexible and practical solution to many real-life variants of the problem, making it a perfect fit for Bing Maps.'

Modern real-world routing engines must satisfy several requirements. They must incorporate every last detail of a road network and be able to evaluate and compensate for time lost in making turns and observing traffic restrictions due, for example, to road repairs.

By combining new concepts - using separator-based methods rather than the traditional methods that exploit the hierarchical structure of roads - they significantly improved routing performance. The new algorithm utilises metrics that can now be calculated fast enough to match real-time traffic information.

Considering the original Dijkstra algorithm was thought to perform too slowly, Microsoft's re-engineering and production of the new and improved CRP algorithm is remarkable. More information at a cost can be found at:
http://pubsonline.informs.org/doi/abs/10.1287/trsc.2014.0579

<OR>

Maths Saves Lives!

A team under the leadership of Professor Paul Harper has won a Cardiff University Innovation and Impact Award. Modelling is helping the NHS match capacity to demand. The team's work is the first known case of embedded mathematical modelling in healthcare in the UK (or globally), creating an ongoing dialogue between modellers, clinicians and managers, encouraging them to engage, innovate, test alternatives, and take on leadership roles.

Professor Harper, Director of Health Modelling Centre Cymru, said, 'We are delighted to receive recognition for our innovative work to help NHS Wales design and deliver prudent healthcare services to ensure resources are used to maximum effect; this is a challenging yet vital task.'

Judith Paget, ABUHB Chief Executive noted, 'The project's success has led to better planning for the organisation and better analysis: much better decisions are made as a result of the input of the mathematical modellers.'

Dangerous mathematicians?

From November 2016 Australian academics could face a potential 10-year prison term for sending information overseas if their ideas fall within the Defence Strategic Goods List (DSGL). This could be in the form of online learning, academic papers or simply in emails to colleagues.

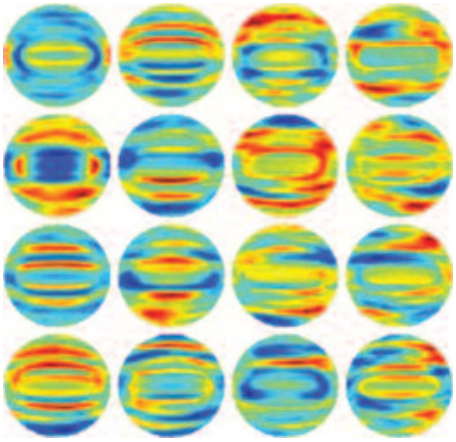
Until recently, Defence Export Control Office (DECO) only regulated physically exported weapons and so-called 'dual use' items such as encryption, computing hardware and biological matter. However in March 2015 the act was updated to include 'intangible supply', which is intended to prohibit the transfer of knowledge from Australia that could have military applications.

The penalty is up to ten years imprisonment.

For more information on this story, take a look at: http://bit.ly/1JTEMN2

Know Your Enemy

Pairing holographic microscopy with machine learning software could help hospitals and the food industry screen for bacterial infection in real time. A trial on bacterial identification software powered by machine learning algorithms has been completed in Korea's, Advanced Institute of Science and Technology.



The trial used L. monocytogenes, E. coli, L. casei and B. subtilis, which are all rod-shaped and virtually impossible to distinguish by eye. The first three are all pathogens; the fourth is a harmless bacterium used in laboratory research.

The process relies on Fourier transform light scattering (FTLS) measurements to create 2-D angle-resolved light scattering maps of the bacteria. The maps are then fed through machine learning software, similar to that used for facial recognition, which identifies individual strains almost immediately. More information on: http://bit.ly/1Biydkx

Who Pays the Piper?

Not surprisingly, there is no single source of funding for academic O.R. projects. In a survey carried out by Alistair Clark as part of an OR Society funded charitable project, he identified almost as many sources as people interviewed. As a result, he has decided to set up a website giving details of potential sources of funding including the type of project and the likelihood of being successful when applying. The intention is that all of you academics, out there, will add to this database whenever you attempt to gain funding whether or not you are successful so that it will build into a comprehensive source to help others improve their chances of finding likely sources and making successful applications.

The Education and Research Committee at the OR Society is working on ideas and activities to support research and search for funding for research on O.R. If you have any information or ideas, please contact Alistair Clark who coordinates this area with Bo Chen and Brian Dangerfield.

A full copy of Alistair's report can be found at: http://www.cems.uwe.ac.uk/~arclark

Behind every Silver Lining

According to Forbes magazine, 44% of enterprises rely on cloud computing to launch new business models today, 32% are using it to streamline their supply chains, 55% predict that it will enable new business models in three years and 69% expect to make moderate-to-heavy cloud investments over that time.

For more see: http://bit.ly/1GOde9h

4 Steps to Success

Retailers and their suppliers in 2015 are under more pressure than ever to deliver more goods to more destinations faster.

: : IN BRIEF: : : : : : :

Richard Becks, general manager of Industry Value Chains, E2open says that. 'To stay competitive, retailers need to know where things are at all times so they can redirect shipments, rebalance inventories and respond to new demands on the fly'.

The four steps are:

1. Use cloud-based software that can track and manage inventory in real time.
2. Use source tagging and RFID to keep track of inventory and stock levels.
3. Become a part of a B2B e-procurement network.
4. Make sure your marketing and supply chain teams are in sync.

More information can be found at: http://bit.ly/1KY39JF

Here today…

Velos was all about enabling companies to connect data sets, clean up data, and run predictive models. The company started up in 2010, then rose to some prominence in 2013 when it changed its focus from individual developers to business owners. Now, its resources have been absorbed into AOL and its parent company Verizon, following a buyout.

No doubt many more smaller businesses will suffer similar fates over the coming years.

More information on: http://bit.ly/1GOdpBw

The Big Truth

John Poppelaars wonders, 'Can Big Data really be Objective, Truthful and Credible?'

Big data is not objective nor truthful nor credible; it is a creation of human design and therefore biased. Numbers get their meaning because we draw inferences from them. Biases in the data collection, data analysis and modelling stages present considerable risks to decision quality, and are as important to the big-data equation as the numbers themselves. Decision makers must know about this uncertainty, know how it will impact decision making.

> 'Not everything that counts can be counted,
>
> and not everything that can be counted counts.'
>
> Albert Einstein

More at: http://bit.ly/1JXK9sW

John Crookes

It is with sadness that the Department of Management Science at Lancaster University report the death, on June 3, of John Crookes, a member of staff from 1967 to 1995. He moved to Lancaster after working with Richard Thomas & Baldwins Ltd. and British European Airways. He made a huge contribution to the Department and the O.R. profession. He was particularly noted for developments of computer simulation and for his infectious enthusiasm to see computer-based modelling in widespread use. A fuller obituary will appear next month.

Could analytics end slavery?

Slavery is illegal around our world, but the practice is, unfortunately, alive and well. We now live in an age though, where measures to detect and eradicate slavery exist for the betterment of mankind. One such measure involves supply chain analytics.

Like or loathe it, slaves work for you! Especially if you own electronics, jewellery or sporting goods. Or, if you enjoy coffee or tea; or eat exotic foods or wear fashionable clothes – all of which involve supply chains to get them to your table, wardrobe or living rooms.

The fact is. If we dig deep enough into the supply chain of many of the products we use and consume every day, we will find forced and child labour. Predictive analytics can help remove modern slavery from these supply chains.

An initiative labelled "Made in a Free World" is actively using analytics to pinpoint areas in supply chains where forced labour takes place. The predictive element of it can also be used to determine potential future slavery risks by triangulating a myriad of inputs too.

Analytics may not save the world we live in, but it continues to improve the lot of those of us who inhabit it.

More information can be found at: http://bit.ly/1So5saj

SUBMIT YOUR IN BRIEF STORIES TO InsideOR@theorsociety.com

Careers Open Day 2015

Exhibitor booking now open!

GORS Government Operational Research Service

CORDA Delivering Successful Futures

PROSPECT RECRUITMENT

[dstl]

NATS

Lancaster University Management School

The Open Day will be held at
Millennium Point, Birmingham
Wednesday 18 November 2015

Early Bird booking
Reserve a stand by 31 July for £290 +VAT
(£330 + VAT thereafter)

Price includes lunch and refreshments, monthly feature in Inside OR up to the event and a follow up article, and a profile on our website. Confirmed exhibitors will be promoted to students prior to the event.

To reserve a stand please email your full contact details to Louise Allison, louise.allison@theorsociety.com

Find out more online at
www.TheORSociety.com/CareersOpenDay

Join in the OR Society's social media initiative

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The OR Society

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Help in getting started is here if needed:
www.theorsociety.com/Pages/Networking/FollowUs/GettingStarted.aspx

Have you registered and booked your accommodation?

Glasgow will be a very busy place in July, so make sure you register soon and secure your accommodation!

Are you a Practitioner based in the UK or in Europe?

Many excellent initiatives are in place to help Practitioners become more effective and our dedicated articles and web pages will explain all! Go to www.euro2015.org/MAI and click through for full information.

Are you interested in Exhibiting or Sponsoring at the largest UK conference the Society has been involved with?

2,500 attendees are expected and many companies have already signed up! Check out the Industry Prospectus here - www.euro2015.org/sponsorship-and-exhibition - or contact Ollie Brook at euro2015@mci-group.com to have a chat!

For more information on all aspects of this amazing conference, and to register, go to www.euro2015.org

EURO 2015
12-15 JULY 2015
GLASGOW

27th European Conference on Operational Research

12-15 July 2015
University of Strathclyde

EURO
The Association of European Operational Research Societies

THE OR SOCIETY

PRACTITIONERS: WHAT ARE *YOU* DOING ON 13TH JULY AT 08.30

RUTH KAUFMAN

Will you be meeting up with Ashley Carreras and Alberto Franco for their hands-on workshop on group causal mapping, and see for yourself how it can help you get more out of groups?

Or turning up to the first set of Case Studies in O.R./Analytics (including an overview of the scope of O.R. practice, and impressive examples from three different emergency services)? Or heading off for a speed networking session, business cards in hand, elevator pitch at the ready, introversion qualms buried under your full Scottish breakfast? Or hear Professor Larry Phillips on his groundbreaking work on drugs risk-benefit, or talks on applications in retail, healthcare, behavioural O.R., or any other of the 50-odd activities on offer for the first working session of EURO2015, at Strathclyde University?

EURO2015 won't be easy for the practitioner. Each one of the 11 parallel 90-minute sessions over the three days of the conference offers similar richness of choice. True, the working sessions are interspersed with 2 hours of refreshment breaks, and finish at 5.30. But even in that 'down-time' the range of exhibitors and social events (not to mention any arrangements you have rashly made for catch-up over a coffee with acquaintances new and old, and the need to plan your choice of future sessions) will keep you on your toes.

Of course, if you are an O.R. practitioner, you will be used to advising other people on how to make robust decisions based on sparse, uncertain and complex data against a tight deadline. And Making an Impact and other practitioner events at EURO2015 will help you do it even better, through discovering new techniques, exploring practical issues, gaining inspiration from others, and building your professional network.

It's not too late to book for EURO2015, 12-15 July, Glasgow – just go to www.euro2015.org to book and to see the full (overwhelmingly full) programme, and to www.euro2015.org/MAI to find out more about practitioner activities. Do also pass this message on to colleagues.

One more thing: as the biggest gathering of O.R./analytics professionals in Europe, including several hundred PhD students, EURO2015 will have one session given over to an O.R. careers exposition. If you want to promote your company as an employer, and have the chance of informal conversations with potential employees, please email MAI-EURO@theorsociety.com using the subject line Careers Exposition.

If you want to keep in touch with what is planned for practitioners, and to let us know your preferences, please email MAI-EURO@theorsociety.com using the subject line Mailing List.

And perhaps I'll meet up with you at 8.30 on Monday 13th July – if I ever manage to decide which session to go to.

<OR>

CONFERENCE NEWS

EVENT:	EURO2015	DATE:	12 (welcome), 13 – 15 July 2015	VENUE:	University of Strathclyde, Glasgow
EVENT:	YoungOR 19	DATE:	22 – 24 September 2015	VENUE:	Conference Aston Marketing Suites, (CAMS), at Aston University
EVENT:	Blackett Lecture 2015	DATE:	26 November 2015	VENUE:	Grocers' Hall, London
EVENT:	8th Simulation Workshop SW16	DATE:	11-13 April 2016	VENUE:	Ettington Chase Hotel, Stratford

PIONEERS IN MATHEMATICS – DAVID HILBERT AND EMMY NOETHER

NIGEL CUMMINGS

In 1915, Göttingen University was regarded as the centre of mathematics for the Western World and at the centre of the University of Göttingen was David Hilbert (b.23 January 1862 – d. 14 February 1943).

David Hilbert

Hilbert devoted his career to logic and pure mathematics but is probably best known for the 23 'Hilbert Problems'. At the second International Congress of Mathematicians held in Paris on 8th August 1900, David Hilbert laid out an agenda for mathematics for the twentieth century. (Incidentally, on the 8th August 2000, the seven 'Millennium Problems' were announced. Twenty-two of the Hilbert problems had been resolved, the one exception and indeed one of the new seven being the Riemann Hypothesis.)

At the University of Göttingen, Hilbert was surrounded by a social circle of some of the most important male mathematicians of the 20th century. Men such as Emanuel Lasker, Ernst Zermelo, and Carl Gustav Hempel were students of his and the great John von Neumann was his assistant. At that time, women were not allowed to study or become students at universities and, of course, mathematics, in particular, was considered an inappropriate vocation for those of the female gender.

Hilbert was a leader in symbolic, axiomatic development as opposed to the more concrete style that emphasised the construction of solutions, he was a modernist and a free thinker. He had a rigorous approach to mathematics, it made him stand out from other scientists. He famously said on one occasion that 'physics was much too hard for physicists', even though he had been responsible for inviting Albert Einstein to Göttingen to lecture about his paradoxical theory of gravity.

Hilbert and his Göttingen colleagues were unable to understand the paradoxical consequences of Einstein's work. They could understand physical theories which included electromagnetism and the classical theory of gravity which all obeyed local energy conservation but Einstein's theory indicated that a failure of energy conservation occurred when an object could speed up as it lost energy by meeting gravity waves, where conventional theories indicated such an object should in fact, slowdown.

Hilbert was determined to resolve the paradoxes observed in Einstein's theory definitively and in doing so he set a chain of events in place which led to the induction of a female mathematician into the hallowed halls of Göttingen's mathematical faculty.

Her name was Amalie 'Emmy' Noether (b. 23 March 1882 – d, 14 April 1935). Although denied many of the privileges of male mathematicians, she, was at least, 'allowed' to 'sit in' on mathematics classes at the University of Erlangen (where her father was a professor of mathematics) and to audit courses with the permission of the professor in charge of those courses.

Amalie 'Emmy' Noethera

It was this auditing role that brought her into contact with Hilbert when she spent 1903 to 1904 auditing courses at Göttingen. Fortunately for her, rules surrounding enrolment relaxed and she later matriculated at Erlangen to earn her doctorate in mathematics (summa cum laude) in 1907. She could not however teach under the rules of her time so she became an unofficial assistant to her ailing father, also a mathematician and professor at Erlangen.

Her research and abstract approach to mathematics was often attacked by mathematicians who insisted on traditional methodologies. She persevered in her work and gained election to several academic societies which gave her the opportunity to speak around Europe and create a name for herself amongst the scientific community, although still unable to gained paid employment.

Hilbert developed an interest in Noether's work because he believed that her 'abstract' approach to mathematics could be useful in gaining an understanding of Einstein's theory of general relativity. Noether quickly grasped the perceived problems with Einstein's theory and spent three years trying to solve them. During her exploration of Einstein's theory, Noether uncovered the hidden relationship between symmetry and conservation, which came to unify all of physics. From this work we get the three conservation laws: energy, momentum and angular momentum. There is also a fourth symmetry: the charge symmetry and hence the conservation of charge which lies behind much of the work on subatomic physics.

A collection of Noether's papers was published in 1924, and Nathan Jacobson, a famous American mathematician regarded as one of the leading algebraists of his generation, described Noether's work thus. 'The development of abstract algebra, which is one of the most distinctive innovations of twentieth century mathematics, is largely due to her – in published papers, in lectures, and in personal influence on her contemporaries'

The circumstances of her life provide a powerful example of the humanising influence of science and mathematics. It was the exponents of these fields who were eager to welcome her into their fellowship without regard for her sex or ancestry; though men of philosophy, history, politics, and government sought to exclude her for these very reasons.

<OR>

Extended Abstract Submission Deadline

Three days of exciting opportunities for those in O.R. for ten years or less. Come and enjoy some great networking, plenary talks, workshops, careers panel and much more.

Extended Deadline to 30 JUNE 2015

Abstract, Keynote Paper and Extended Abstract Submissions

Workshops

sign up for

Analytics, Consultancy, O.R. in Schools and more!

Plenary Talks

come and listen to

Alex Phillips – 'Fan engagement in Sport'

Stewart Robinson – 'O.R. in the Age of Big Data' and

Graham Rand – 'Widening O.R.'s customer base: from Bawdsey Manor to Pro Bono'

For more information on all aspects of this superb conference, go to www.theorsociety.com/YOR19

THE OR SOCIETY

ADDRESSING LONELINESS IN RURAL NORTH YORKSHIRE

The project and my experience as a Pro Bono volunteer

BY SARAH CULKIN, UK DEPARTMENT OF HEALTH

The problem:

An organisation in the North of England took over a rural visiting service for the elderly and was very keen to ensure that as much benefit as possible could be provided for recipients of the service. It therefore requested a pro bono study from the OR Society to help a project team understand how a strategy for improving the service could be constructed.

The approach

I was assigned to the task by the OR Society and started work by collecting information and evidence through interviews with stakeholders, accompanying the project team on visits to clients, reviewing survey feedback and finance information. This information was used to produce an initial system diagram. I then facilitated a workshop with key stakeholders to present, discuss, amend and build on the system diagram (see figure 1).

Figure 1. Part of the System Diagram

The system diagram allowed a birds-eye view of the service, helping to see how people flow through the service and how it interacts with other neighbouring services and stakeholder groups.

Back at the office I reviewed the map and conducted thematic analysis on all of the interview notes and other textual information. This analysis allowed clarification and quantification of major themes and topics occurring in the information and led to a list of clear recommendations. For example, it showed that volunteers were not being used to good effect, instead visits were mostly performed by the three staff members, and links and communications with other organisations were also underdeveloped, leading to a confusion and sometimes duplication of work. By refocussing the work of the permanent members of staff to these areas, meant that the service could grow and also be more targeted and efficient.

These recommendations were assembled into a strategy map, showing how they link together and lead from inputs to desired outcomes. From this a balanced scorecard of measures can monitor progress and outcomes of the service to ensure maximum benefit (see figure 2).

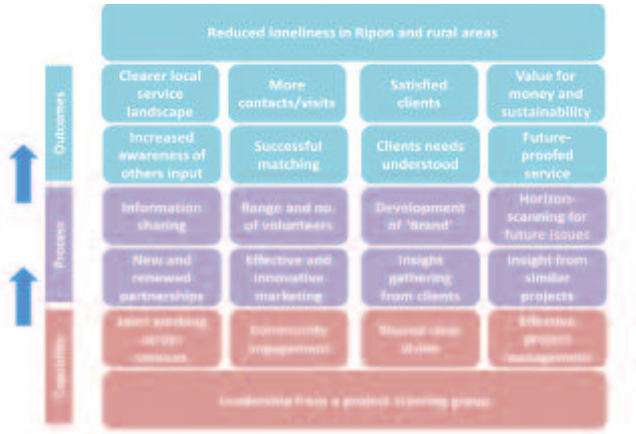

Figure 2. Strategy mapping of recommendations

My experience as a volunteer

I was made to feel very welcome by rural visiting team, right from the beginning. There could have been some suspicion about my role, as the review had been arranged through the chair of the umbrella organisation that the service sat under. The service had only recently been taken over by that organisation, and was based remotely, so it was seen as a good opportunity.

The service team in Ripon was small, but they were very dedicated to their elderly clients, this was easily seen as I accompanied them on home visits. In my role it was important that I ingratiated myself, made the team feel at ease, and explained clearly what I was and wasn't there to do. At the same time it was important to remain impartial and analytical, and be prepared to deliver recommendations that may rock the status quo. This balance was something I also felt quite keenly when writing up the final conclusions and recommendations in my report.

The experience was so rich, like nothing I have experienced in my day job at the Department of Health. For example, at the end of the stakeholder workshop where we reviewed and refined the system map, the service team leader hugged me because she was so pleased with the results - definitely not something that has happened in a civil service meeting before!

Because I was getting experience of a sector directly related to the work of the Department of Health, I was fortunate to be able to do this project as part of my CPD hours. As a result I have brought back so much that informs my day-to-day work, my understanding of the realities of care and the challenges the front-line face. In many ways it has been far more valuable than a training course, and without the cost. And the thought that I may have influenced decisions about this valuable service for the better is incredibly rewarding.

The benefits of the study

- As a result of the analysis the client, project team and analyst all gained a thorough understanding of the service and the wider system it is part of ;
- A Strategy map for reducing loneliness was identified and evidenced. This would be used in future, for example, to track numbers of volunteers used, how they contribute to the numbers of visits made, and how well the service works in partnership with neighbouring organisations;
- The client was 'taken on the journey', so now understands where strategies come from;
- The work produced a solid foundation from which to re-model the service and apply for associated funding.

At the end of the study the client said: 'I'm really pleased with the report and it will be very useful indeed for forward planning and to support our Big Lottery bid '

<OR>

TWO SIDES OF O.R.

SARAH FORES

May's meeting of the YHORG took place at the West Yorkshire Playhouse and looked at two diverse applications of O.R.

Paul Smith concentrated on experiences and trends relating to crew scheduling, particularly within the context of solution approaches that are embedded within commercial software. Sanja Petrovic presented a Case-based reasoning approach to radiotherapy treatment planning and how it utilises the knowledge of experts to learn and optimise.

Paul is a Senior Consultant at Omnibus and leads the technical support and development of the CrewPLAN system. Omnibus provide passenger transport software and CrewPLAN links with other units to produce crew schedules. In itself CrewPLAN needs a lot of information about the scheduling environment in order to be flexible to different requirements, and similarly needs to output sufficient detail to be useful in preparing the details of the work to be done by individual drivers. The software uses heuristics to reduce the problem size, and a generate-and-select approach to produce a set of shifts to cover the work, but optimality cannot be determined in isolation to the need for a fair weekly workload when the shifts are combined. Indeed optimality is a difficult concept because subjective costs can be used to discourage the inclusion of shifts with particular features. Increases in computer speed and storage have allowed for many improvements in crew scheduling but it remains important to retain an iterative process whereby users can investigate 'what-if' scenarios and use their expertise to work with the system to produce the best solutions. Efficient crew scheduling saves lots of money for a company and computer-based solvers can explore a much bigger solution space, but full automation is unlikely to be better than the joint efforts of computers and experienced schedulers.

Sanja is a Professor of Operational Research at the Nottingham University Business School. Sanja presented current investigations into the use of a Case-based Reasoning (CBR) approach to radiotherapy treatment planning for brain tumours. As instances of cancer are predicted to increase by 75% in the next 2 decades, treatment plans are vital in continuing to improve survival rates. Where radiotherapy is used the aims include attaining the uniform tumoricidal dose minimising the radiation dose received by organs at risk and surrounding healthy tissue. It may take a few hours but also several days to produce a treatment plan, which includes decisions regarding the radiation dose, the number of beams and the angle of beams. Case-based reasoning utilises the knowledge of experts and Sanja presented this approach using real-world brain cancer patient records from the Nottingham University Hospitals NHS Trust. For a new patient the attributes of the cancer are identified and compared to the Case Base for which treatment plans are recorded. The Case base has 64 cases in the training set and 22 cases in the test set and successful retrieval was defined as identifying the same beam number and a difference between beam angles of <20%. A two-phase retrieval was used to first select cases with the same beam number, and then use this to filter the beam angle results. Different similarity measures were tested and fuzzy similarity with local fuzzy sets and local attribute weights performed well. The approach was adapted using Neural Networks to learn how the difference in attribute values affects the output (i.e. the beam number). The success rate of the Adaption-guided retrieval for over 80 cases was 90% and shows the value of the approach, which contains the knowledge of the clinicians. Also it can learn after each new treatment so that, over time, can suggest different treatment plans. With extremely encouraging results the work will be further developed and include more cases

There were several questions and discussion from an audience interested in seeing two very practical applications of O.R.

<OR>

REGIONAL SOCIETIES

Contact details for all regional societies and meetings past and present are listed at:

http://www.theorsociety.com/Pages/Regional/RegionalList.aspx

MIND THE GAP: IDENTIFYING THE SKILLS, EDUCATION & TRAINING NEEDED FOR THE 21ST CENTURY JOBS MARKET

ONE DAY EVENT: Friday 18th September 2015, Loughborough University

EVENT WEB PAGE:
http://www.theorsociety.com/pages/SeminarsAndWorkshops/MindTheGap/MindTheGap.aspx

The growth of big data has meant demand for specialist talent in quantitative analysis, information management and business decision making has never been greater. But what skills and experience is required in the 21st Century jobs market? What are the challenges businesses are facing in building the teams capable of managing these new opportunities? How well are we preparing our graduates to meet these challenges?

To help answer these questions and explore these issues further, we are pleased to present a one-day event, brought to you by the OR Society, featuring the latest research in this area. With talks focusing on operational research, analytics, data science and information systems, this one-day event is designed to give employers, educators and specialists cutting edge insights into the skills needed for 21st Century business.

We are pleased to announce the following talks for the conference:

Is Operational Research in UK Universities 'Fit-for-Purpose' for the Growing Field of Analytics?
Loughborough University, Speaker: Michael Mortenson

Training to Practice or Training to Research? – An Assessment of Postgraduate O.R. Education
The University of Portsmouth, Speaker: TBC

Investigating Information Systems (IS) Graduate Skills in the UK
The University of South Wales, Speaker: Dr Angelos Stefanidis

Creating Business Value from Big Data Analytics
The University of Hull, Speaker: Professor Richard Vigden

Full details of the timetable will be released closer to the date. Details of the location and travel options are available here (http://www.lboro.ac.uk/departments/sbe/location/).

Registration is open now, but tickets are strictly limited and available on a first-come first-served basis. The cost of the event is £20 per person + VAT, to cover lunch, tea/coffee and refreshments. To book or for further information, please visit our webpage http://www.theorsociety.com/pages/SeminarsAndWorkshops/MindTheGap/MindTheGap.aspx

For any additional information or for special requests please email m.j.mortenson@lboro.ac.uk.

N.B. This event was originally intended to run in April but due to unforeseeable circumstance needed to be rescheduled.

<OR>

JOHN FORBES NASH JR

NIGEL CUMMINGS

13 June 1928 – 23 May 2015

John Forbes Nash, Jr, the mathematician, who suffered from paranoid schizophrenia and made fundamental contributions in game theory, differential geometry and partial differential equations died alongside his wife in a collision on the New Jersey Turnpike near Monroe Township, New Jersey, USA on May 23rd 2015. They were on their way home after visiting Norway to receive the 2015 Abel Prize for his work on nonlinear partial differential equations.

Nash was born in Bluefield, West Virginia. He gained his BSc and MSc from Carnegie Institute of Technology, initially majoring in chemical engineering, switching to chemistry before ending up in mathematics. Carnegie professor Richard Duffin's letter of recommendation to Princeton University simple said, 'He is a mathematical genius'. His 1950 PhD work at Princeton was on 'non-cooperative games' and contained, in its 28 pages, the definition and properties of what later became known as the Nash Equilibrium. It was essentially this which won him (along with John Harsanyi and Reinhard Selten) the 1994 Nobel Memorial Prize in Economic Sciences.

Nash developed work on the role of money in society. Within the framing theorem that people can be so controlled and motivated by money that they may not be able to reason rationally about it, he criticized interest groups that promote quasi-doctrines based on Keynesian economics.

Such doctrines permit manipulative short-term inflation and debt tactics that ultimately undermine currencies. He suggested a global 'industrial consumption price index' system that would support the development of more 'ideal money' that people could trust rather than more unstable 'bad money'.

In 1956, he suffered a severe disappointment when he discovered that Ennio de Giogi, an Italian mathematician, had published a proof of 'Hilbert's nineteenth problem' (a theorem involving elliptical partial differential equations) just months before Nash had achieved his own proof, via a different route.

Also in the 1950s, Nash had proposed an 'Enigma' type machine based on computational hardness which anticipated many of the concepts of modern cryptology but like similar work done at GCHQ in Cheltenham, this did not come to light until it was declassified in 2011 by the National Security Agency.

Nash's decades long struggle with schizophrenia was famously depicted in the 2001 Oscar-winning film 'A Beautiful Mind.' He was portrayed by the actor, Russell Crowe, Nash's wife Alicia was portrayed by Jennifer Connolly. Nash had apparently recovered from schizophrenia later in life, entirely without medication – the disease he said, 'Simply disappeared'.

Just before his death, he had explained to Fields Medallist, Cedric Villani that he had devised an equation to replace Einstein's theory of relativity.

<OR>

PROFESSOR DR. HEINER MÜLLER-MERBACH

BRIAN HALEY

28 June 1936– 30 May 2015

Heiner was born in Hamburg, lived through the Second World War there and spent all of his school days in that city. In 1955 he became a student in Industrial Engineering in the Mechanical Engineering Department of Darmstadt Technical University, graduating in 1960 and completing his PhD two years later. He first heard about O.R. during this period and joined the German OR Society for academics. As part of his education he was able to spend the 1963-4 session in Berkeley, California studying round-off errors in LP under George B. Dantzig. On his return to Germany he completed his 'habilitation' (a German requirement to be a Professor) leading to his appointment as Professor of Business Administration in Mainz in 1967. He was to return to Darmstadt for 11 years making a final move to Kaiiserslautern in 1983 where he became an emeritus Professor in 2004.

In the early 1960's OR Societies were being founded in many countries and there were two in Germany (AKOR and DGU) both of which he joined. When Germany applied to join IFORS it was necessary to resolve the problem that only one society could join IFORS representing each country. It was largely through Heiner's efforts that a merger was agreed. During this period he had attended meetings and written papers and was invited to convene a session on Network Flows and Graph Theory at the 5th IFORS Conference in Venice. His organising ability had been recognised since he was appointed as the Chairman of the Programme committee for the 6th conference in Dublin in 1972. It was during this meeting that he joined a group of other European delegates who expressed concern that the next two conferences to be held in Japan and Canada would be too difficult and expensive for them to attend. The group was to suggest an alliance which became EURO.

He became a member of the OR Society in 1973, served as an editorial advisor, published 5 papers in *JORS* and contributed to our newsletter. The Society was pleased to confer on him the Companionship in 1988.

He was elected as IFORS Vice President in 1974 in time for the Tokyo/Kyoto Conference and took special responsibilities for Publications, at that time mainly the conference proceedings. The Administrative asked him to extend his service by a further three years during which time he became President – elect. This heralded a further 6 years of duties culminating in a special role of Coordinator of Scientific Activities. He had an almost unbroken run of 20 years commitment to the International scene. Amongst the problems he had to resolve were those associated with the IRA in Dublin and the Falklands War resulting in him helping to transfer the conference from Buenos Aires to Washington. His skills in diplomacy will be remembered by all who came in contact with him

On a more personal level I found him to be a German with a British sense of humour. He was proud to be a German and shared his enthusiasm with my wife and I on several occasions including showing us the sights of Hamburg (by day!), taking us to the museum of the unification of Germany, viewing the largest barrel in the World in Heidelberg and, of course, tasting red German wine at a vineyard he knew. Having known him for most of the over 50 years he was in O.R. I am certain that his International contribution will be sorely missed but his legacy will long be remembered.

K.B.H.

<OR>

THE SCIENCE OF DATA VISUALISATION

DECLAN WILSON

'Good' data visualisation is a crucial part of presenting analysis.

The Science of Data Visualisation, delivered by Ian Taylor of Flying Binary, was labelled by the OR society as a course which would enhance our ability to present data effectively. Course objectives included learning how to 'transform your interaction with decision makers' through a mix of presentations, case studies and workshop exercises.

A course such as this was full of appeal for us since we model vast amounts of data on a daily basis to improve the banks assessment of risk. I and two other Royal Bank of Scotland colleagues made the journey from Edinburgh to Birmingham, with the aim of learning how to better present analysis. One challenge we face is presenting complex analysis and results to stakeholders to effectively influence and inform key decisions. We need to be accurate and give them the information they need, but in a simple and easy to understand way.

The course was delivered in the cosy venue of the OR Society Headquarters. During the course some key aspects of the theory and background knowledge of data visualisation were presented. This gave us a stable platform from which to evaluate data visualisation options. Although theory can be a dry topic, the application of this was relevant and clear to us.

The best part of the course was undoubtedly the way in which examples of existing data visualisations have been done in the past. These highlighted some important principles to adhere to for our own work. An example which Ian referred to was the London Underground Map:

The map opposite of the London Underground shows that

- Data visualisations don't have to be 'truthful' – the underground map does not present a geographically accurate map of London, but gives the user a clear and simple way to identify how to get from one station to another.
- Data visualisation should be a **representation** which is suitable for our **purpose**.

Ian facilitated constructive discussion around many examples, some of which were from his own company's previous work so he was able to offer crucial insight. Additionally the exercises which everyone on the course attempted were a great way to apply the principles and rules which were drawn out of the theory and case studies.

Taking what we learnt from the course back into work at RBS will be a valuable exercise. We are now in a better position to intentionally construct documentation and data visualisations that

will present analysis in a clear and simple way. I was made very aware of the value that presenting analysis and results well can add. We can all tend to focus on our analysis, models and numbers. Sometimes not enough thought is put towards making sure they are understood and acted on! RBS Risk Analytics and Models always has the need for talented individuals with O.R. skills, and training courses such as this one are a great way in which RBS invests in the people it employs.

<OR>

> 'Course objectives included learning how to 'transform your interaction with decision makers' through a mix of presentations, case studies and workshop exercises.'

MULTICRITERIA MAPPING

JOSIE COBURN

Multicriteria mapping (MCM) is an interactive method for exploring contrasting knowledges, framings and values on complex issues and their practical implications for alternative policy options.

Introduced for the first time as a web-based service in 2015, Multicriteria Mapping (MCM) is a globally-available, easily-accessible, multicriteria appraisal method for exploring contrasting perspectives on complex strategic and policy issues. The tool aims to help 'open up' technical assessment by systematically 'mapping' the practical implications of alternative options, knowledges, framings and values.

Report showing weighting chart and accompanying notes of a set of options.

MCM uniquely bridges qualitative and quantitative approaches, and enables more participatory analysis. It allows great flexibility, offering an appraisal method that is strongly grounded in theory but highly unconstrained in practice. This versatility has been reflected in its use internationally to explore contentious decisions in the fields of energy strategy, food production, environmental policy, radioactive waste management and public health.

The MCM web service is designed to ease project design and management, as well as flexible forms of engagement in group discussion or individual interview settings. A dedicated analysis package allows quick reproduction of general pictures as well as free exploration of an unlimited array of interpretive hypotheses. It also supports flexible arrangements for dissemination and involvement in analysis by different people. Each stage is backed up by easy-to-use drop-down menus, with an in-depth manual providing detailed support concerning wider practice, troubleshooting and underlying rationales. In these ways, MCM offers a potentially powerful tool for a range of uses, from postgraduate projects, through in-depth academic research, to demanding decision-making challenges in professional or policy settings.

Rob Bellamy used MCM as part of a broader Deliberative Mapping (DM) process to appraise proposed deliberate, large-scale interventions in the Earth's climate system for his doctoral thesis at the University of East Anglia. He used DM to 'open up' appraisal of the climate engineering proposals by situating them in context with alternative options for tackling climate change and engaging with diverse perspectives from academia, citizens, civil society, government, and industry. The process involved two parallel strands of engagement: one for specialists using computer-assisted MCM interviews, and one for members of the public using deliberative citizens' panels. Compared with other, more narrowly framed assessments of climate engineering, a radically different view of option performance emerged. Despite mapping vast uncertainties and divergent perspectives, climate engineering proposals were consistently outperformed by alternatives designed to reduce greenhouse gas emissions.

<OR>

'The MCM web service is designed to ease project design and management, as well as flexible forms of engagement in group discussion or individual interview settings'

ANALYTICS IS HERE TO STAY

JOHN HOPES

'There seems little doubt now that analytics is not going to go away, that our embracing of the topic is helping us to extend our reach (if not our membership), and that it provides us with a means to advance our objectives of increasing knowledge and awareness of O.R.'

I have been fairly quiet in these pages on the subject of analytics over the past year, but that doesn't mean the topic has gone away, far from it.

Indeed, the Society's Analytics Development Group (ADG) and Analytics Network have been busier than ever, and that has included holding our fourth annual analytics event (entitled: 'The Annual Analytics Summit 2015 - From Data to Decisions') at the end of April at the BMA in London.

As with previous years we had eight very varied and high profile speakers covering major companies in different sectors, consultants, software vendors and academia. Despite this diversity, a number of key themes emerged from the day. First was the widespread use of high quality data visualisation. In our event just three years ago this was seen as novel, but now it is the norm, and I think there is a message here for us in O.R.: it is not enough to produce the results of our models; how they are presented is just as important, and tools such as Spotfire as represented at our event by Ana Costa e Silva from Tibco are fast becoming the standard.

Another theme, and probably the headline theme of the day, was social media analytics, not only for market sentiment analysis, but even as presented by Prof Tom Jackson from Loughborough for mapping the mood of the nation. Similarly and very topically, given the timing of the event, Carl Miller from Demos showed how social media analytics could be used to monitor the progress of the election campaign in real time. I particularly liked the finding that Nick Clegg's empty chair was more highly rated than David Cameron's empty chair during the debate – which just shows how predictive social media analytics can be, rather like the pollsters!

An issue that came up several times and was a main focus for the panel discussion was that of privacy, data security and the complete lack of global governance and standards in a world of Big Data. This has come up in previous one day events and there seems to have been very little progress in addressing this vital issue. Perhaps, as has been suggested, this is an area where the OR Society could take a lead.

Some of the other themes from the day were more technical in nature. Several speakers touched on the move towards supporting decision making in real time with the results of Big Data solutions. In addition, applications such as predictive maintenance exploiting the internet of things came up several times. Finally, at the level of tools and techniques, there seems to be a growing preference for R and an increasing focus on machine learning / deep learning.

It was also interesting to hear from Clive Humby (one of the most recent Companions of the Society) how one of the more established areas of analytics related to customer behaviour is evolving to combine data from credit / debit, mobile phone and social media to obtain insight at the very fine geographic location level.

Overall, looking back over the four years we have been holding the event, it is clear that analytics is evolving fast. The consultants have moved on rapidly from analytics to Big Data and now to digital transformation, which has two challenges (or opportunities) for analytics: the increasing proliferation of devices collecting data, and the increasing demand for the results of analytics to be

delivered to smart phones or other mobile devices. One clear example of how 'digital' is changing things was given at our Summit by Sanjeevan Bala from Channel 4, who showed how digital TV enables broadcasters to identify their customers just as an online retailer can, even to the point of personally tailored advertising (your name on the Coke can in the ad) or programming.

Given the richness of the content of the Summit and the speed at which the subject area is moving it was a shame that attendance at the event dropped from 170 last year to 125 this time. Whether this was due to the title (is 'Summit' off-putting? Was it a mistake to drop 'advanced' from 'analytics'? Should we have moved on to 'data science'?), the date (it seems that being immediately before the election we had fewer Government attendees than previously), or just topic fatigue, we are not sure. Perhaps surprisingly for an analytics group we don't have enough data to determine quite which combination of factors has led to the drop in interest. We are, however, having a bit of a rethink for next year.

But beyond the event, what is next for analytics and for the Society's analytics initiative? The IT sector analysts, who have created a lot of the thought leadership in analytics, Big Data and data science, are predicting a number of trends. First, they foresee that analytics as a service, sitting in the cloud and delivered over the internet will become the normal way for users to access solutions. Second prediction is that both consultants and software vendors will be providing similar solutions. This seems to repeat a trend we have seen before in O.R. where O.R. technology becomes embedded in, for example, supply chain solutions in SAP. Finally, and echoing a number of speakers at our event, it is predicted that cognitive Artificial Intelligence (AI) technology will be integrated into business processes and replace business consulting resources. This is, of course, part of a wider trend to automate the provision of services from a wide variety of professionals, potentially including doctors, lawyers, consultants, tax advisers, accountants and even (who knows?) feature writers for Inside OR.

But what is happening with the Society's analytics initiatives? Well, we are hearing more and more support for the provision of some form of analytics accreditation or certification, and are continuing to pursue the option of offering the INFORMS CAP certification. In addition, we still believe there is an opportunity for the Society to add an analytics journal to its portfolio of publications (despite our repeated challenges in finding editors for it). I am determined to deliver these two initiatives before my term as Vice President comes to an end (this is probably a fatal commitment).

On top of this, our analytics network continues to grow (to about 1500 members at the moment), and is now running regional events to address the concern that it was too London centric. We also have two joint events planned with the RSS. The first to be held in the autumn is one for the analytics network, the subject being Big Data. The second one, in December, will be focused more on the challenges posed to professional statisticians and O.R. analysts by the emergence of analytics, data scientists and the automation of analysis mentioned above.

There seems little doubt now that analytics is not going to go away, that our embracing of the topic is helping us to extend our reach (if not our membership), and that it provides us with a means to advance our objectives of increasing knowledge and awareness of O.R. You will be hearing from me again on this issue.

<OR>

WHEN AI RULES THE WORLD

JOHN CROCKER

When I started working for a living, a cure for cancer, electricity generated by nuclear fusion and artificial intelligence (AI) were all just ten years away.

Over those 45 years, we have seen phenomenal changes; many cancers can now be cured or, at least, held at bay for many years – you are now more likely to survive cancer than die from it. Nuclear fusion, alas, is probably more like 20 to 50 years away than 10. But what of AI?

Regular readers of these pages will be familiar with the internet of things (IoT), cloud computing, pattern-spotting, object-recognition and voice-recognition. Magic Pony Technology has developed software that can improve the resolution of an image or reduce the number of bytes needed to store it to a fraction of the original by using images of similar objects to fill in the gaps. Celatron, another small British company, says that inSTREAM is 'the best knowledge worker you've ever hired'. It can apparently recognise the nature of a customer complaint, understand why it has happened and craft a personalised response (with minimum human input). VocalIQ, a Cambridge-based start-up has developed an alternative to Apple's Siri that engages the user in conversation. One of their aims is to develop a car that can talk to you.

Mike Lynch, CEO, Invoke Capital believes that AI is now at the level of a two-year-old but a two-year-old who can easily out-perform any adult when it comes to pattern-spotting, fact-checking or cross-referencing. Although it is stating the obvious, it is perhaps worth remembering that if there is a piece of software that can do a certain task then every computer can be loaded with that software and do the same task – they do not have to be taught or spend hours practicing and they will never forget how to do it.

There have also been some advances in learning – computers (or rather software) has managed to beat masters at chess and poker, win 'Jeopardy' and play Atari games like a veteran. Bots programmed with simple algorithms can also mimic the behaviour of ant, bee and slime mould colonies, at least when it comes to finding shortest routes or moving large objects.

Computers and robots have already made many workers redundant in many areas and, at the same time, improved productivity. This trend will continue unrelentingly as more activities become automated. David Waller, writing for the *Times*, suspects that accountants and auditors could be the next to go. Much of my job as editor could no doubt be replaced by software but it is so much more rewarding to be able to blame a human!

<OR>

Learning and Development Programme
OR Society Approved Training Courses

THE OR SOCIETY

HOW TO ENGAGE KEY STAKEHOLDERS IN YOUR

24-25 June, Birmingham
£1,200 + VAT for OR Society members

Course provider:
Brendan Hickling, Hickling & Associates

NEW FOR 2015

Learn how to conduct a rapid appraisal of a project to gain a clear idea of whom you need to engage with and how to do it in an effective and timely manner. If you're looking to bring people together and guide them through a process of effective discussion, you will benefit greatly from this course. You'll discover how to bring clarity to your project through the application of a simple appraisal tool, analyse the key issues and stakeholders, define your goals and plot your project.

Start work immediately on a project of your own; Get input from peers that you can apply directly to your situation as well as expert guidance; Get stimulated and empowered by new ideas and tools; Understand what you will need to do in the following weeks and months

PERFORMANCE MANAGEMENT WITH DATA ENVELOPMENT ANALYSIS (DEA)

6 July, Birmingham
£550 + VAT for OR Society members
Hands on course

Course provider:
Ali Emrouznejad, Emmanuel Thanassoulis

This course is ideal for anyone interested in assessing the relative performance of organisational units – for example different regional offices, bank branches, sales outlets, hospitals or schools. You'll get an introduction to the recent developments in DEA including weights restrictions, assessment under variables, returns to scale and target setting and undertake illustrative assessments using advanced features of the Performance Improvement Management Software (PIM-DEA).

Learn about new methods in efficiency and productivity; Understand principles behind the non-parametric performance measurement; Get hands-on experience of the PIM-DEA software from the developers; See how to apply DEA techniques to your own workplace

DATA MINING: TECHNIQUES AND APPLICATIONS

14 July, Birmingham
£665 + VAT for OR Society members
Hands on course

Course provider:
Bart Baesens and David Martens

Gain an overview of the data mining process and learn about predictive analyses such as regression and classification. Build your own decision models and see how to use data mining techniques in a range of applications such as marketing, finance and the public sector.

Developing predictive models using classification and regression, Decision trees, Logistic regression, Artificial Neural Networks; Evaluating predictive models; Applications in marketing, finance and risk management; Developing descriptive models using clustering and association rules; Apriori algorithm, k-means clustering; Lab exercises with Weka

DATA MINING: ADVANCED DATA MINING

15 July, Birmingham
£665 + VAT for OR Society members
Hands on course

Course provider:
Bart Baesens and David Martens

Developing skills learnt from the Techniques and Applications course (above)

State-of-the-art techniques in data mining: Support Vector Machines; Bayesian Networks; Rule Extraction; Text Mining Recommender Systems; Social Network Analysis (SNA): Principles of SNA; Mining Networked data; Applications in advertising, fraud detection and customer analytics; Big Data: Principles of Big Data; The mapReduce paradigm; Mining Big Data; Applications in government and marketing; The Black Swan

INTRODUCTION TO MEASURING AND DEMONSTRATING IMPACT IN COMPLEX SYSTEMS

16 July, Birmingham
£495 + VAT for OR Society members

Course provider:
John Newman and Sam Mackay

NEW FOR 2015

Public and third sector services are increasingly being asked to demonstrate the impact they have, and to make the case for why (and how) services should be commissioned, based on the outcomes they achieve. This course covers the core skills needed to successfully measure and demonstrate impact in a variety of settings and you will learn the skills needed to successfully navigate through the latest tools and techniques that are available, and to choose what will work best in your own organisation. You'll learn:

Techniques and methods for defining outcome and impact measures; Various ways to collect meaningful data and evidence; Qualitative and quantitative analysis techniques and their application (in the public / third sectors); Measuring impact in complex systems; Building a convincing business case

For details of all courses and to book online, visit www.theorsociety.com or call Jennie Phelps on 0121 234 7818

WHO NEEDS MONEY

NIGEL CUMMINGS

Bitcoin is a unique currency, it has no peers. It is digital money that solves many of the problems our current currencies suffer from. Yet many believe it also introduces many other uncertainties we never had to deal with before.

Above Satoshi Nakamoto

One of the largest worries that Bitcoin has engendered, concerns the fact that it is, to all intents and purposes untraceable. This feature of Bitcoin also attracts crime. It can for example, allow people to buy and sell drugs and other illegal items with significantly less risk of being traced by authorities than conventional currencies.

Bitcoin is also easy to lose and if you do, there is no way of getting it back. If your credit card is stolen or your bank account is criminally compromised there is a good chance you will not lose any money as banks will usually restore your balance. Even cash can be recovered if the police catch the thief or some kind person hands in your wallet but with Bitcoin, once it has gone it has gone forever.

Bitcoin, despite its name, has no physical manifestation – you cannot see, feel or smell one. The Bitcoin was invented by a virtually unknown scientist named Satoshi Nakamoto in 2008. The specification of his 'Bitcoin cyber currency' was published in 2009, followed in the same year when the release of his Bitcoin invention became public domain as Open Source code in 2009. In his paper, Nakamoto describes the process as, '…an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party. Transactions that are computationally impractical to reverse would protect sellers from fraud, and routine escrow mechanisms could easily be implemented to protect buyers…'

John Nash once spoke in a lecture about the concept of 'Ideal money' to an audience at Princeton in 2002. He described ideal money as having the function of a standard of measurement which made it comparable to units such as the watt, the hour or a degree unit of temperature.

Nash said that an ideal form of money should provide a viable solution to the Triffin dilemma - the conflict of economic interests that arises between short-term domestic and long-term international objectives for countries whose currencies serve as global reserve currencies – a solution that should serve both short-term domestic and international long-term objectives where central banking money has utterly failed.

Bitcoin could well fall into line with Nash's description of ideal money because, it too, focusses on the fluctuations and long-term perceived value of money, where the ideal inflation rate is as close to zero as possible, without being negative (deflation).

Nash's description of ideal money accurately describes the economic nature of Bitcoin, it is a disinflationary currency supply by design. Insomuch as it decreases in its inflationary nature by halving the block reward (and new currency issuance rate) at regular intervals.

Nash's concept of ideal money viewed it as something which could provide a global savings outlet for people who would otherwise be subject to 'bad money', or money expected to lose value over time under conditions of inflation. It eschewed any notion of there being 'trust' involved in transactions undertaken with it. Bitcoin can also be viewed similarly. It is not clear as to whether Nakamoto was influenced by Nash.

You can view Nakamoto's paper via: https://bitcoin.org/bitcoin.pdf

You can also view information about John Nash's ideal money in his 2002 paper by accessing this link:
http://www.jstor.org/stable/1061553?seq=1#page_scan_tab_contents

<OR>

SIMULATION WORKSHOP

THE OR SOCIETY'S 8TH SIMULATION WORKSHOP (SW16)

11-13 APRIL, 2016

ETTINGTON CHASE HOTEL, STRATFORD, WORCESTERSHIRE, UNITED KINGDOM

The biennial OR Society Simulation Workshop brings together practitioners and academics working in the field of discrete-event simulation and related fields. It provides an opportunity to exchange ideas on the current and future state-of-the-art in simulation and modelling. The programme consists of a Keynote presentation, panel discussion and parallel streams. Breaks between sessions and the conference dinner provide an excellent opportunity for networking. The exhibition area includes poster display and some of the latest developments in simulation software tools.

Location

Discover a charming and attractive hotel, set in 11 acres of grounds. Just seven miles away, explore over 800 years of history and the birthplace of William Shakespeare in the stunning Stratford upon Avon. Visit the Royal Shakespeare Company, take a trip on the river and soak up the historic and cultural atmosphere. Local attractions also include Warwick's Medieval Castle

ETTINGTON CHASE HOTEL

Ettington Chase is easily accessibly by air, rail or car. The nearest airport is Birmingham International a 30 minute drive away or by car from Junction 15 of the M40. London is only 1.5 hours away.

The Programme

The workshop will include plenary sessions, special focus streams, simulation practice sessions and posters. Contributions to the technical programme are sought in the following areas, although papers in any area of simulation modelling and analysis will be considered.

Simulation Modelling Methodology

- Component based simulation
- Collaboration methods
- Distributed simulation
- Web based simulation
- Simulation and artificial intelligence
- Simulation visualisation
- Simulation software
- Simulation standards
- Human performance modelling
- Agent-based simulation
- Service-oriented simulation
- Conceptual modelling
- Verification and Validation

Simulation Analysis Methodology

- Design and analysis of simulation experiments
- Simulation optimisation
- Risk Analysis
- Metamodelling

Simulation in Practice

- Simulation in manufacturing
- Simulation in services
- Simulation in defence
- Simulation in healthcare
- Simulation in semiconductor industry
- Simulation practice
- Simulation education
- Energy modelling
- Environmental simulation
- Supply chain and transportation modelling

All submissions will be peer reviewed. Accepted papers will be published in the Conference Proceedings and will be presented at the conference. Presentations will be given 30 minutes including time for questions and answers.

The **Simulation Practice Stream** provides an opportunity to submit a shorter paper (3 to 5 pages). These papers should either describe a novel application of simulation or provide some insight into how the use of simulation might be improved.

Posters of applied or research projects in simulation will be displayed during the conference. A poster session is provided where delegates have 1 minute to briefly introduce their work.

Conference Co-Chairs

Thomas Monks
NIHR CLAHRC Wessex Methodological Hub
Faculty of Health Sciences, University of Southampton
Southampton General Hospital
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Dr C S M Currie
School of Management
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SOCIAL MEDIA MONTHLY FAVOURITES

What's hot on Twitter from @TheORSociety community of 1,532 followers...

Ruth Kaufman @ruth_kaufman Jun 9
@euroconf2015 #ORMS Practitioners - Ian Seed's workshop shows how to get more actions from your brainstorms @ies63 @TheORSociety

Gabriele Bammer @GabrieleBammer Jun 11
European Journal of Operational Research: Special Issue on Community Operational Research applicn due 30 October

Brunella Longo @Brunella_Longo Jun 5
Enormous quantity of public processes and decision making are based on open data we assume assured & audited ...by someone else!

Julie Vile @JulieVile1 Jun 2
#ThisisOR Please vote for Cardiff Uni embedding modelling in the NHS by liking video/tweeting #CUII1 https://goo.gl/w4IvmX

Mark Montanana @MarkMontanana May 23
Very impressed by the IMPACT magazine from @TheORSociety

Michael Trick @miketrick
Symmetry in integer programming at #cpaior15 by @JeffLinderoth with a continuing muscular theme.

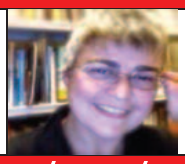
Frances Sneddon @FrancesSneddon May 26
A freshly brewed coffee and some great #ORMS stories, sounds a good start to the weekend to me! @YvesSagaert @TheORSociety @euroconf2015

Paul McLeod @WwDAdA Jun 12
Looks like a Wizardly course in #Optimization by Coursera (coming in August) #thisisOR #orms #analytics #moocs

Who the OR Society is following on twitter:

Yves Sagaert @YvesSagaert
Ghent (BE) & Lancaster (UK)

PhD Researcher in Sales Forecasting. Passionate about Big Data, Exogenous Information and their use in Supply Chain



Brunella Longo @Brunella_Longo
London, UK

Adviser at Open Data Assurance. Sort of a digital strategist, cyber security risks and information management expert all in one.

The OR Society on LinkedIn: join the 3,379 members who do so ...

Guidance requested
Sara Hasani, PhD, Decision Sciences

Sara has put out a request to compare two sets of allocation decisions from two different groups of decision maker:
Group 1 (member 1 allocates n units of resource m to partner 1, etc., member 2....); Group 2 (the same procedure). She asks: *What techniques can I use to investigate how different are the decisions between group 1 and 2?*

Leandro Domiciano Santos and Ibrahim Kucukkoc have suggested 'ANOVA'. Ibrahim adds, if you would not say "two different groups", then it could be paired-sample t-test. *Got any thoughts to support Sara?*

Twitter & Mobile data used for Crowd Modelling in the News
Gillian Groom, Technical Training Specialist at Minitab Ltd

Gillian tuned into Radio 4 Today programme on 27 May 2015 and heard a news soundbite about innovative use of Twitter and mobile phone data to quantify crowd sizes at large events. Gillian points out that this is as good example of O.R. in the news (May we encourage you to use this hashtag #thisisOR like Gillian does when you spot anything like this). She asks: *Would like to know more about how people are using this kind of data for data modelling?* http://rsos.royalsocietypublishing.org/content/2/5/150162

Gillian is looking forward to speaking at #EuroConf2015; discussing the differences between Finance and Manufacturing industries and their use of analytics. You may want to ask more in Gillian's Linkedin post about the session.

Why not join us on Twitter, LinkedIn or Facebook?
www.theorsociety.com/FollowUs
Get tweeting and posting: Your contribution might be featured next...

NEW CHAIR FOR THE CRIMINAL JUSTICE SPECIAL INTEREST GROUP!

BY SUE MERCHANT (CJ SIG SECRETARY)

At its AGM on June 5th, a new Chair of the CJ SIG was elected – Martin Rahman from West Yorkshire Police.

Martin is a Business Change Manager and has extensive experience of the practical application of a range of O.R. methods in major change projects, typically employing Lean process improvement supported by a range of tools such as discrete event simulation. He has been an active member of the OR Society and very much look forward to his influence on the group!

Martin's election is tinged with sadness as Ian Newsome has had to stand down due to illness. Ian has been a great Chairman ever since the group started around 10 years ago, not only working full time for West Yorkshire Police but also doing a PhD in O.R. in his spare time; we wish him a speedy recovery.

CJ SIG event June 5th

Following the elections and approval of the revised CJ SIG constitution 14 CJ SIG members, visitors and speakers were treated to three very different talks and also invited to comment on the type of talks they would like to see in future.

Our first speaker, Paul Hewson, who is Associate Professor in Statistics, Plymouth University talked to us about his work checking the validity of police and fire & rescue funding formulae for the Rural Services Partnership some years ago. He explained that funding is allocated centrally, though responsibility for delivery is devolved, and formulae are needed, for example, to allocate funding as fairly as possible between different areas, to give a degree of objectivity and to make technical assumptions apparent. A number of approaches were used to check the formulae; £152billion is allocated using three formulae based on 152 different indicators according to the NAO. He described several of the visual and analytical methods used and some of the problems they had found. He noted that more information is needed on the construction of formulae and assumptions made. Paul recommended that various software quality processes could be followed when developing spreadsheets and some O.R. habits may be relevant (e.g. ranging and simulation). (See his slides on the CJ SIG website for more detail.)

Brunella Longo, an independent information management consultant, then spoke to the group about her holistic approach to information security where she gives lectures and exercises to very small groups of company personnel. She mentioned the case of Starbucks where very clever hackers using sophisticated 'dashboards' had planned the timing of an attack to coincide with the company helpline not being open at that time. She emphasized that it was necessary with open data to understand the dynamics of open policy-making processes. She ended her talk with a mention of the link between cybercrime risks and defective premises and a warning for all to take care.

Our last two speakers, Janine Gill from ROC Technologies and Claire Gilmour, a systems change manager from the National Probation Service, spoke to us about ROC and its product Nimbus, which is a sophisticated business process methodology. Janine emphasised that ROC is keen that Nimbus works from the business end rather than being seen merely as a software product – it deals holistically with Process, Projects and People. She mentioned that they had recently done some research with Oxford University into why projects fail and how to avoid 'black swans'. Claire explained the power of Nimbus and indicated that the recent major business changes in the NPS could not have been handled successfully without it. The NPS needed a tool like Nimbus to ensure consistency across the country, reduce duplication and, save staff and management time in looking for information. All NPS staff will have process maps, documentation and related guidance on their desktops in future. Staff have been engaged to build and review the system using capture workshops. They can drill down into information and cost processes so in future the system can be used to identify savings/impact.

In a poll, top of the list for future events was facilitated discussion of CJ issues followed by O.R. techniques and methods with new relevant research and mix of types of event tying for third place.

<OR>

'Martin is a Business Change Manager and has extensive experience of the practical application of a range of O.R. methods in major change projects, typically employing Lean process improvement supported by a range of tools such as discrete event simulation'

SPECIAL INTEREST GROUPS

ANALYTICS NETWORK

CONTACT Sayara Beg
EMAIL: ANChair@theorsociety.com

Hull Analytics Forum

Date/Time: Wednesday, Wednesday, 01 July 2015 09.00 – 14.00
Venue: Hull University Business School, Cottingham Road, Hull, Yorkshire, HU6 7RX

The aim of the workshop is to investigate: How can organizations use big data analytics to create competitive advantage? What do managers need to pay attention to when building a data-driven organisation? How can industry, the public sector and academia collaborate to share data, expertise and knowledge?

Further details of the analytics forum and registration are here: http://hullanalyticsforum.org

You can also register directly here: https://eventbrite.co.uk/event/16478244874/

<OR>

TAX RELIEF ON PROFESSIONAL SUBSCRIPTIONS

The OR Society is one of the HMRC approved professional bodies under Section 344 of the Income Tax (Earnings & Pensions) Act 2003 - and is published by them as 'List 3' - therefore, if you are a UK tax payer and pay your own membership fees, you may be entitled to claim tax back on your subscription fee.

Who can claim?

If joining the OR Society is advantageous to you in carrying out your work or is relevant to your job, members employed in the UK may claim tax relief on their membership subscription fee.

Who can't claim?

Non UK tax payers, or members whose subscription fee is paid by someone else (e.g. employer).

How much can I claim?

Higher rate taxpayers can claim 40% of their membership fee, while lower rate taxpayers can claim 20% of their membership fee.

How to claim?

You must claim using a Self Assessment tax return if you already fill one in.

If you don't already fill in a Self Assessment tax return fill in form P87 and send it to the address on the form.

The OR Society is listed as 'Operational Research Society' in List 3. In order to claim tax relief, you will need your invoice for your membership payment.

More details can be found on the HMRC website, www.gov.uk/tax-relief-for-employees

<OR>

WHERE ARE THEY NOW?

The following members on the Society's mailing list have recently had their mail returned to the Membership section, presumably because they have changed their address.

Would any member who is currently in touch with them please ask them to email Carol.Smith@theorsociety.com advising us of their current whereabouts so that we can update our database and return to a speedy and efficient service.

Patrick Stribley	Hertfordshire	Jamie Pinfield	Hants

<OR>

REGIONAL SOCIETIES

MIDLAND (MORS)

CONTACT: Jen East (Secretary)
EMAIL: MidlandsORSociety@live.co.uk
Modelling Human Behaviour in Healthcare Systems
Date/Time: Monday, 29 June 2015 at 18:00 - 19:30
Venue: MB186, Main Building, Aston University, Aston Triangle, B4 7ET
Speakers: Andy Harrison, FICO

Non-members welcome, no charge is made. After the talk, you are welcome to join us and the speaker for a meal. For further information please contact MidlandsORSociety@live.co.uk

Refreshments will be available from 5:30pm.

Directions: Aston is a short, flat 15 minutes walk away from New Street Station, through the main shopping areas of the city along Corporation Street. Directions to Aston can be found at http://www1.aston.ac.uk/about/directions/ go to entrance marked E In the campus map

(http://www.aston.ac.uk/about/directions/) and follow the signs.

Abstract

Healthcare systems have been a popular application area for simulation modeling for more than sixty years. This talk focuses on discrete-event simulation (DES) models in which the simulated objects in such models are human beings (usually patients). We argue that this is an area where it is very important to capture behaviour. Two widely used psychological models of human health-related behaviour are presented, and their relevance and applicability to DES modeling is discussed. The talk describes two case studies which include patient behaviour: a DES model of screening for diabetic retinopathy, and a microsimulation model of screening for breast cancer. The key questions are: can we actually model patient behaviour, and does behaviour matter more in healthcare than other areas?

Speaker bio: Sally Brailsford is Professor of Management Science at the University of Southampton and has worked for over 25 years in the area of health O.R. She is Vice-President 1 of EURO and chair of the EURO Working Group on O.R. Applied to Health Services (ORAHS). She is one of the Editors-in-Chief of the UK OR Society's new journal Health Systems. She has twice won the UK OR Society's Goodeve Medal, in 2004 for modelling emergency healthcare services in Nottingham, and in 2006 for modelling chlamydia infection

Parking details: Visitors may use the pay-and-display car park in Car Park 12 (Number 27 In the campus map) from 16:30 to 24:00. The barriers will lift automatically as you come in through Colleshill Street. Alternatively, there are public pay and display car parks at Millennium Point and Love Lane. The Millennium Point/Think Tank Museum Multi Storey car park is approximately five minutes walk from the Aston University Main Building, and marked on our campus map. This car park is across the road (Jennens' Road) from Aston University. Access to this pay car park is via Jennens' Road (City Bound), B4 7AP. Further details can be found at: http://www.aston.ac.uk/about/directions/visitorparking/

SOUTHERN OR GROUP (SORG)

CONTACT: Patrick Beullens
TEL: 023 9284 6357
EMAIL: p.beullens@soton.ac.uk
SORG : The Impact of Pricing Decisions in a Business-to-Business environment
Date/Time: Friday, 17 July 2015 at 14.00-15.30
Venue: Playfair Library, Old College, South Bridge EH8 9YL Edinburgh
Speakers: Christopher S. Tang

Abstract: We examine the impact of pricing decisions in a B2B environment. Because the scope is broad and relevant literature is scant, we shall examine this issue in two specific setting. We first examine how discount pricing concessions can create the 'bullwhip effect' in the MRO (maintenance, repair, and operations) industry and discuss how to mitigate the bullwhip effect. Then, we discuss how uncertain spot price market in the ocean freight industry has triggered customers to demand carriers to offer 'price matching.' We examine the impact of price matching mechanism on the carrier.

Registration for this event is at http://www.business-school.ed.ac.uk/about/events/54c8d74726382ce0492f8d93/the-impact-of-pricing-decision

SORG : Tutorial on Vehicle Routing
Date/Time: Monday, 07 September 2015 at 08.30-17.30
Venue: Project Room 1.06, 50 George Square, Edinburgh EH8 9LH
Speakers: Gilbert Laporte

The operational management of fleets of vehicles in many application areas including the transportation of merchandise and the provision of public services such as waste collection is increasingly challenging with the rise of big data and smart online retailing systems amongst other things. Planners and schedulers of transportation routes for vehicles are often faced with many practical challenges including the combinatorial nature of routing and scheduling problems. Although significant progress has been made on the design of computationally efficient optimal methodologies and algorithms, it remains that the sizes of the problems to be solved in practice tend to favour the use of heuristics approaches and methods.

This World Class Workshop attempts to open the black box of exact and heuristic solution methods for both node and arc routing problems. The objective of this workshop is to enhance our understanding of why certain solution approaches and methods perform very well in some cases, but behave poorly in others. It should also initiate the discussion on future research directions by looking at a number of past and present-day problems. The workshop is primarily designed for researchers (e.g. PhD students, post-docs, and faculty members) in the fields of routing, scheduling and logistics.

This workshop is delivered by a renowned expert Professor Gilbert Laporte from the CIRRELT Research group, to present recent research on routing problems with applications in the area of transportation.

Website and registration:www.business-school.ed.ac.uk/routing
Contact e-mail address: routing@business-school.ed.ac.uk

FATHER OF THE LOYALTY CARD

NIGEL CUMMINGS

At our Analytics Summit, held earlier this year, was a man regarded in analytics and data management circles as the 'Father of the Loyalty Card'

Clive Humby together with his wife Edwina Dunn, started the data-analysis business, Dunnhumby in 1989. Their clients included Cable & Wireless and BMW and they pioneered of the loyalty-card concept by launching Clubcard on behalf of Tesco, which they sold to Tesco for a reported £30 million in 2001.

In 2011 the couple 'retired' to develop Starcount, specialists in 'Social DNA', and more closely investigate and explore the future of customer understanding and engagement in an even wider range of areas than their previous company.

When Clive Humby stepped up to the lectern at our most recent Analytics summit, we knew we were in for something special. In his new role as Chief Data Scientist at Starcount, he was uniquely placed to comment on understanding customers by analysing data.

At the onset of his talk he made it clear to all that he was NOT going to be talking about credit scoring or judging applications for loans, his experiences he said, were all about understanding customers and their value to business. 'Efficient use of data about customers allowed analysts to build stories about them, there were good stories and bad stories…'

It was the job of companies such as Starcount and Dunnhumby to not only extrapolate data to gain insight, but to build good stories. Data was, he said, 'Only interesting if you could tell stories with it that move people and businesses to change the way they engage and respond.'

Analysis of data could provide insight about motivations and behaviours too. 'If you don't understand motivations and behaviours you (and your brand) can't be relevant.' He also said that. 'Most customer insight teams today are just glorified management information teams… if you look at the data long and hard you can always find a good news story somewhere'.

He said that we often hear about the 'scariness' of data, and the understanding of it, 'well that goes right back to when I started in the 70's and direct marketing was just getting going'.

Direct marketing may have arrived in the seventies but… In case any of us were under the misunderstanding that gaining customer insight and using it to enhance marketing was a new phenomenon, Clive Humby then presented a slide which showed that customer insight research had been going on since at least the mid 1950's.

Of his own beginnings in this field he said when he began his work in understanding customer needs and providing marketing opportunities, market research was far from ideal. 'Everyone was complaining about 'junk mail', it had no relevancy… everything about engaging the customer today was about relevance, because if it's relevant it works. If it's not relevant and it's pushed down their throats, it doesn't work'.

Today though we were in a somewhat different position. He thought the explosion of data and developments in the technology that we use to analyse and process it, had gone slightly too far ahead. 'We can actually do very clever things with data… we are now able to do things that we couldn't before, but just because we can do them doesn't mean that we should. I think that it is a really big challenge for any organisation that is consumer focussed. The other thing I would say, is that, there is a lot of 'hype' about what is actually going on'.

FOOD, GLORIOUS FOOD

NIGEL CUMMINGS

How do you decide what people will want to eat and when they will want to eat it? This is a dilemma that has troubled UK food-to-go chain 'EAT.'.

Their solution has been to approach Blue Yonder whose Software-as-a-Service (SaaS) Forward Demand is now being used to predict demand for food and drink.

Blue Yonder's SaaS Forward Demand promised to reduce EAT.'s food wastage, as well help to manage staffing requirements more effectively and enhance customer satisfaction levels. Strahan Wilson, CFO, EAT. Says that it is now as simple as setting the right KPIs (Key Performance Indicators) in the software's dashboard communication interface.

EAT. is a familiar high-street food brand in the UK, particularly in central London where most of its 115 stores and 1,500 staff are based, like many other ready-to-eat food providers EAT. had found predicting demand for food and drink a difficult art to perfect, as it was affected by many external factors including public holidays and the weather.

Wilson explained that EAT. had installed 'an in-house forecasting tool', built by consultants for the company three years ago, but that became redundant about 18 months ago. It lacked sophistication and there was no one in the company with the right skills to modify it.

The company had three choices. It could go down the traditional but expensive on-premise route, or it could go for a cloud-based system that had a lower costs, but would still leave them with a model that needed maintenance. The third and preferred option was to outsource the system and the service to Blue Yonder.

The choice of utilising predictive analytics from Blue Yonder has helped the company in two main areas: reduction of food waste by 14% and improving staff scheduling. Cutting food waste by 14% represents a colossal saving, but there is a balance to be struck between waste and availability – zero waste may mean the company loses out on sales, because of lack of availability of products. The company is currently experimenting with adjusting the waste and availability ratio to find the optimal balance.

According to Wilson. '£1,000 of hot food takes more resources that £1,000 of cold food, so we have to schedule those requirements'. Armed with more accurate knowledge about anticipated buying habits, EAT. will be able to put extra staff in their stores when there is a high demand for hot food.

More information about Blue Yonder's analytics can be found at: http://www.blue-yonder.com/en/

<OR>

PROPORTIONAL REPRESENTATION VS. FIRST PAST THE POST

LOUISE MAYNARD-ATEM

In the May issue of Inside OR, given the fast approaching General Election, I wrote an article about election forecasts.

At the time of writing an overall majority government was predicted as almost impossible, with the most likely outcome being another five years of coalition. May 8 2015 proved a huge defeat not only for Labour but also for the opinion polls (well apart from the Exit Poll) and was followed by calls from a number of parties (particularly UKIP and The Liberal Democrats) to move away from the FPTP system and embrace proportional representation. In John's leader last month, he mentioned the fact that calls for a fairer voting system are by no means a new complaint, with Charles 'Lewis Caroll' Dodgson proposing a proportional representation system in 1876.

This month's article attempts to understand, compare and contrast both systems of voting as well as touching on the 2011 AV referendum.

Get in touch with me on the usual email address if you have any thoughts on this month's article or if there's anything else you'd like to bring to my attention (lmaynardatem@live.co.uk). Do you think we should abandon the FPTP sytem and take up proportional representation? I'm particularly interested to hear your views on this topic so don't hesitate to drop me a line.

The First Past The Post (FPTP) System

It makes sense to start with the FPTP system as it is currently in use in the UK today. This system allows voters within each constituency one vote per person for their preferred candidate (it's important to make the distinction that here in the UK you vote for the candidate rather than for the party, unlike the US system where you vote for the party); the candidate with the most number of votes is declared the winner and all other votes count for nothing. There are a number of advantages associated with this voting system; it's easy to understand, votes are quick to count and therefore a winner can be declared equally quickly. Conversely, the main disadvantages of this system are that MPs can be elected with a relatively small percentage of the vote, and it can encourage tactical voting where

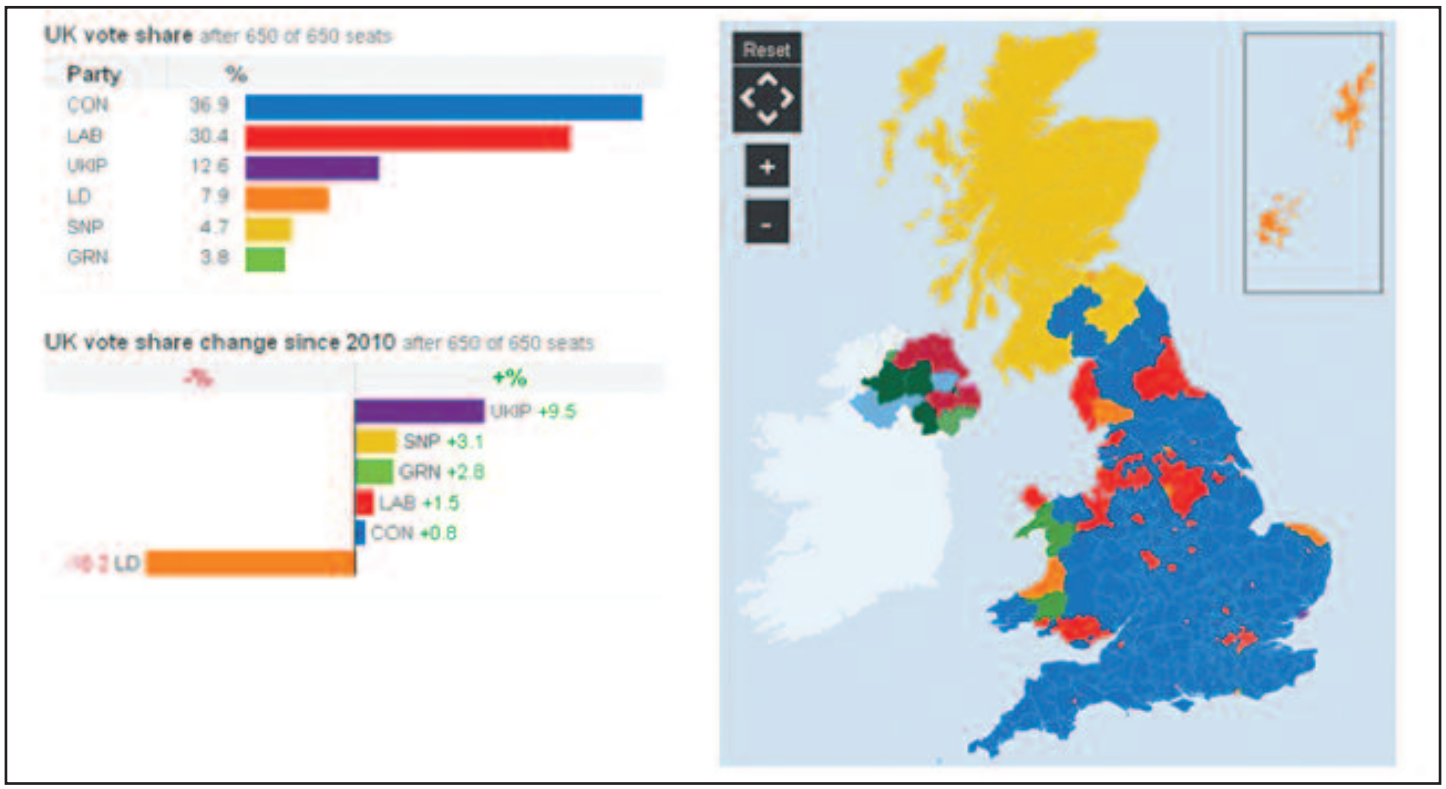


Figure 1: 2015 General Election Results – Conservatives: 331 seats; Labour: 232 seats; SNP: 56 seats; Liberal Democrats: 8 seats; Democratic Unionist Party: 8 seats; Sinn Fein: 4 seats; Plaid Cymru: 3 seats ; Social Democratic & Labour Party: 3 seats; Ulster Unionists Party: 2 seats; Green Party: 1 seat; UKIP: 1 seat; Other – 1 seat.

people vote against the candidates they most dislike. The results of the 2015 General Election are shown in Figure 1; with the FPTP system, we have a majority Conservative government.

The Alternative Vote & The AV Referrendum

The Alternative Vote (AV) is a system where the voter has the opportunity to rank the available candidates in order of preference until they no longer wish to express a further preference or run out of candidates.

Candidates are elected outright if they receive more than 50% of the first preference votes. If no candidate achieves this, the candidate who has lost (i.e. who has the least amount of first preference votes) is eliminated from the running and their votes are redistributed according to the second (or next available) preference marked on the ballot paper. This process then continues until one candidate has more than 50% of the vote.

In 2011, the UK held a referendum on the voting system used to elect MPs, as part of the Conservative – Liberal Democrat coalition. Of the 42.2% turnout, 68% voted No to AV whilst 32% voted Yes.

Proportional Representation

There are a number of different types of proportional representation systems, all of which are based on the underlying principle that parliament is decided by allocating seats on the basis of the number of votes each party receives. These voting systems ensure that all votes carry equal weight, with a popular example being the Single Transferable Vote (STV).

The STV uses preferential voting in multi-member constituencies; using this system candidates don't need a majority of votes to be elected, just a known 'quota' (or known share of the votes) determined by the size of the electorate and the number of seats to be filled. Each voter gets one vote, which can be transferred from their first preference candidate to their second. This system means that very few votes are wasted, and the majority contribute towards the overall result.

Verdict

In an analysis of 2015 GE results, the Electoral Reform Society (ERS) showed that Ukip had received 3.86m votes for the one MP it had elected to the Commons. This was compared with an average of 26,000 votes for every SNP MP, 34,000 for every Conservative, 40,000 for every Labour MP and 299,000 for every Liberal Democrat. The ERS said that 24.2% of seats in parliament were now held by MPs who would not be there if a proportional voting system were in place. The previous record highest figure was 23% in 1983, when the former SDP suffered as a result of the first-past-the-post system.

Although the system delivered a majority for the Conservatives (against all expectations) the ERS said the data demonstrated more clearly than ever that the system was skewed against certain parties and biased in favour of others.

The analysis also showed that, of almost 31 million people who voted, 19 million (63% of the total) did so for losing candidates. Out of 650 winning candidates, 322 (49%) won less than 50% of the vote.

Unsurprisingly, the analyst in me thinks that switching to a proportional representation voting system would be a much fairer way to elect our MPs and decide our government. But equally, I appreciate that moving away from the system that we currently have is likely to be not only politically (very) challenging, but may have an adverse effect on voting numbers. As John correctly pointed out to me when I sent him a draft of this article, the inner workings of parliament are both very strange and very complicated. Moving away from the current system to one of the alternatives listed above, whilst it would appear a lot fairer, may actually not be in our best interests.

<OR>

NEWS OF MEMBERS

The Society welcomes the following new members,

JENNIFER BADHAM, Bangor; MARTIN BALL, Fareham; LAURA BRUNDENELL, Hants; LOUISE DAVIES, London; NEIL MACKIN, Middlesex; SAMUEL MATTHEWSON, Manchester; ALBERTO MENDOZA, Canada; MICHAEL SPILLER, Sheffield; RYAN WATSON, Hants;

and Reinstated members,

JOHN HERINGTON, Hants; BLESSING MUTANGO, Edinburgh; SAMUEL SCOTT, Portsmouth;

and the following student members,

SOHAIB ASHRAF, University of Sheffield; BAHAR ATAY, Istanbul Technical University; RAUL BAIDYA, University Jadavpur India; ALAN BRETT, National University of Ireland; JOHN CONCANNON, University of Strathclyde; SOURAV DAS, Indian Institute of Technology Roorkee; RUAL GONZALEZ SANCHEZ, University of Hull; CONCHITA MLISWA, University of Greenwich; NAWFAL MOHAMMAD KHODABACCHAS, Warwick University; SIOBHAN MORAN, National University of Ireland; FURQAN MOHI U DIN, University of Nottingham; ABDUL MUTABBIR, University of Greenwich; PRITEE RAY, Indian Institute of Technology, India; DIVYANSH SHIVHARE, University of Warwick; AUTCHARAPORN SOMSING, Montpellier University France; DOUGLAS WATSON, University of Plymouth; ZHAOYU ZHONG, University Lancaster;

Total Membership

2741

NEW ACCREDITEES

The Society is pleased to announce that the Accreditation Panel has admitted the following members to the categories shown. These members are now entitled to use post-nominal letters as indicated: -

Admit to the category of FORS (FELLOW)

Peter BAILEY

<OR>

OR-30

Most of the papers in the July issue for 1985 were from the 'O.R. and Micro' conference held the previous November. There were twelve such papers plus an introduction written by Ken Gregory. All were quite short (1-4 pages) and all quite readable (by which I mean that I could understand most of what most of the authors were saying).

At that time, most micros used the ubiquitous 8088 chip with some using the 8086 and a few had the then new 80286 chip. Memory sizes were still measured in kilobytes and almost all micros had one or two 5.25' floppy disc drives with a capacity of up to 1.2 MB.

By the time of the conference, many O.R. type methods (e.g. LP, discrete event simulation, forecasting, network analysis and expert systems) were available in some form for use on micros. The main concerns, at the time, and probably still are were user-friendliness, capacity and speed. It was recognised that the micro had put computing into the hands of managers who, in some cases were developing their own systems, but mostly demanding ever more sophisticated packages from their 'tame' analysts.

Matthewson talked about DRAFT – a simulation program generator with graphical capabilities. Simon Peck discussed some of the implications of computer-literate managers. Ruth Davies described a kidney transplant simulation developed in Pascal. John Murdock looked at forecasting and inventory control incorporating interactive training. John Bowers considered network analysis. Michael Bell deliberated on why expert systems fail. Colin Lewis debated the concepts of user-friendliness in relation to forecasting models while Paul Salmon did much the same for micro-mainframe links. Dennis Sherwood argued that management accounts were of little help to managers. A.C. McKay and Frederick Wheeler concentrated their attentions on linear programming applications and packages whilst Ian Roderick dealt with integrated software.

As mainframes grew in size and speed so the need for 'clever' programming diminished. By that, I mean one could write programs that did not use the same bit of memory over and over again. It became increasingly less necessary to use word-packing, chaining and overlaying. However, when the micro came along, many of these 'fiddles' had to be re-invented although the floppy disc could often be used to good effect. The greatest benefits of the micro were the speed at which one could develop models, sometimes even with the sponsor sat next to you and the fact that the outputs could be viewed graphically (albeit with limited granularity). Interaction was also particularly useful for training purposes with many O.R. groups developing 'management games'.

The pdf files of the papers are jors1985100a.pdf through jors1985112a.pdf and can, of course, all be found in the archives via the website.

<OR>

OR-20

From the President

O.R. in the age of the internet

If a pull out supplement in the Financial Times is anything to go by the age of the internet has arrived. For academics electronic mail has proven its worth for several years – well it was bound to as it is essentially free- but now in industry has become aware of the availability of wide-area networks, and in particular the World Wide Webb. Whether it will create as quest a revolution in new products and new working practices as some predict, we will wait and see, but there is no doubt it will have an effect on Operational Research and the Society.

One effect is that it opens up whole new areas where Operational Research could be applied. The efficient ways of operating these networks to avoid blockages and minimise response times are important O.R. problems. The same problem for telecommunication networks was successfully addressed in the 1980s using stochastic and O.R. techniques, notably in the UK by Frank Kelly. Given that there is no such thing as a free good, the notion that networks can be surfed for free will not last forever and, that gives rise to some interesting O.R. problems on what are equitable and efficient ways of spreading the cost of networks between the users. Some work has been done in this area for physical network of utilities, but little for electronic networks. EDI – electronic data interchange – between companies will also move the boundaries of some of the classical O.R. problems in inventory control and production scheduling. Large manufacturing companies may find it not enough just to order from suppliers electronically but also to provide small suppliers with software that can dynamically update their production schedule in the light of such orders, Thus the boundaries between firms and between different O.R. problems will become blurred. The protection of electronic network traffic from interference could also be seen as an O.R. problem, even if the solution may involve some clever method of encrypting and validating messages.

: : LAST WORDS : : : : : : :

Will electronic networking affect the way Operational Research is done? Will O.R. Consultants be able to sit at home interacting with their clients, the clients' problems, and their information electronically? This was brought into sharp focus for me on reading an article by Gene Woolsey updating the way the PhD programme in Colorado School of Mines is run. All PhD students work together in one big room throwing ideas at one another, and when one is eventually given his project with a company he is expected to work for that company in all the jobs related to the problems. Such a programme implies O.R. needs interaction and physical involvement. These could not be replaced by a computer interface nor would I suspect the majority of Operational Researchers wish them to be.

Electronic networking may not remove all physical interaction but it does enormously affect two areas of importance to O.R. – communicating with and to others and access to information. Video-conferencing is well established, and there are several O.R. groups in the UK who have developed successful interactive decision support software packages which would allow groups of geographically dispersed decision makers to work towards some decisions or at least some agreed view of the main points of the problem. So no need to fly the manager of the Singapore branch back to the UK for an afternoon meeting? Not unless you are Barings. No need for head office? Well – people will always want to congregate where power is, and also there are the physical signs we pass to each other in the face to face meetings that are removed by electronic or video communication. My experience with collaborating on problems with people face to face and electronically make one convinced there is a difference in what happens. Sitting in a room with one discussing a problem is full of half-finished sentences, long pauses, but you learn how people really see the problem. Electronic communication by definition means the messages are larger and more thought out. You only communicate what you think might work, not your first reaction which you decided was wrong, but may spark something in your collaborator. The advantage is you do not have to spend time trying to coordinate diaries so you are all free at the same time. Both methods work but the side benefits are quite different.

Lastly there is the access to information and lots of it. So like a child allowed to choose anything he likes in a sweet shop, the problem is you cannot decide what you want. Also it being so easy to publish electronically, a lot of what is there will be relevant or trivial. Think of the analogy with publishing an academic journal. At present most of the costs are related to the physical production of the journal. If these were removed why should people still pay for a journal? At this point, it is what is left out of the journal that becomes as important as what is in it; readers will start paying for the quality of the articles and hence it is the refereeing process that is what one would pay for. Maybe this will be the way electronic journals develop.

So how does this effect the society? Well by the summer you will be able to communicate with Seymour House electronically – the final proof the age of the internet has arrived. Plans are afoot for a society page on World Wide Webb. The publications Committee is looking very carefully at the changes that electronic networking will have on the journals but so far, there seems to be no need to make major changes. As for the National Conference and the Training Events it still seems learning and networking face to face is not going to disappear overnight. It's too much fun! If you have any comments let me know face to face or by email at L.Thomas@ed.ac.eu

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<OR>

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For an informal discussion in total confidence on any of these positions or the market in general, please contact: Teresa Cheeseman, Kate Fuller or Mark Chapman. Alternatively visit our website to view our current vacancies.

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