



THE
OPERATIONAL
RESEARCH
SOCIETY

INSIDE:

I speak data

Care coordination

Do you know your DiM
from your AiM?

Analytics Quarterly

AUTUMN 2016

Join the OR Society and the Analytics Network



Operational Research is the science of better decision-making and we are the professional home of the Operational Research (O.R.) and analytics community in the UK.

We support our members as they develop their skills and careers as operational researchers, analysts, academics and decision-makers.

We offer:

-  TRAINING
-  NETWORKING
-  ACCREDITATION
-  AWARDS AND MEDALS
-  JOURNALS
-  VOLUNTEERING
-  O.R. ADVOCACY AND EDUCATION

Our Analytics Network provides a forum for analysts to share knowledge, experience and contacts. It is also preparing to offer a new Analytics Journal, as well as running leading edge events such as the Annual Analytics Summit.

Join the OR Society here:
www.theORSociety.com

Read more about the Analytics Network here: www.theORSociety.com/analyticsnetwork

Editorial

Welcome to the Operational Research Society's newest publication, the re-launched Analytics Quarterly.



This issue of AQ looks at developments in existing Analytics systems and provides some insight into more advanced technologies likely to appear on your consoles in the near future. There is no doubt that not only is Analytics here to stay, it is continuously in development and seemingly forever capable of generating new platforms, new views and analyses of data and competitive value streams in business.

In the world of 'Medicare', analytics connected to the Internet of Things (IoT) is providing rapid insight from data captured and transmitted by wearable and remote sensing devices. This flavour of analytics is assisting both patients and healthcare professionals in providing the data needed for decision support in preventive and interventional healthcare.



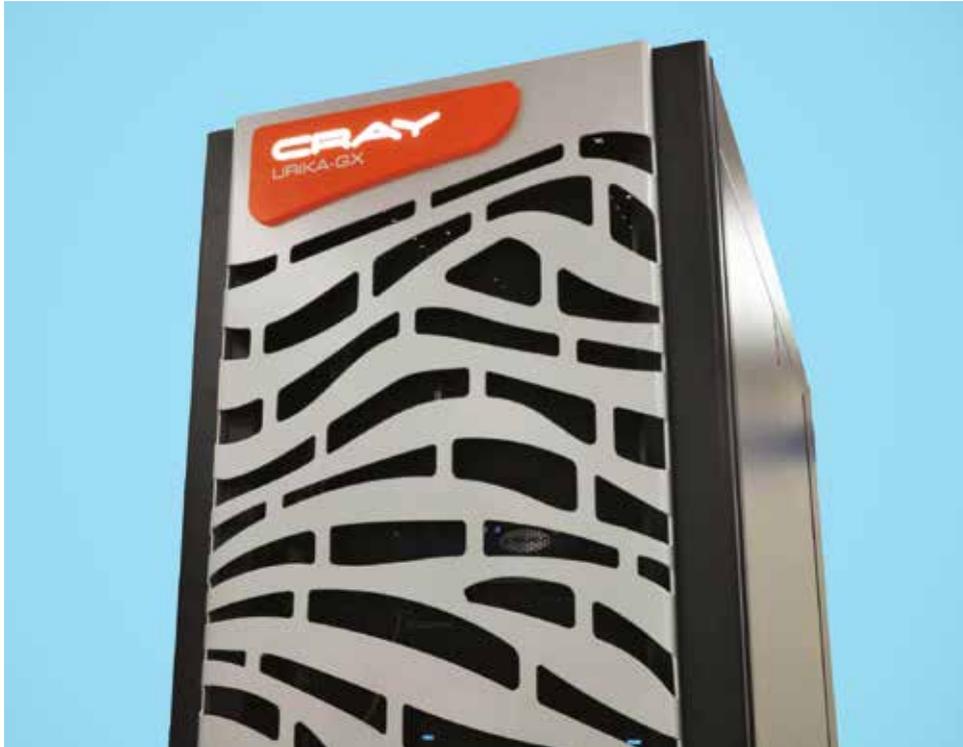
Join us in celebrating a future that is driven, for our benefit, by Analytics!

Nigel Cummings

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News in Brief



SUPERCOMPUTING AND ANALYTICS

Initially amazed by the power of analytics, disappointment surely follows when we discover the processing involved with the more esoteric versions of analytics requires copious amounts of computer processing power.

Waiting for a batch processed analytics job to complete its run soon becomes more than a matter of nipping off away from the workstation for a quick cup of coffee as some analytics processes take hours. In an effort to reduce the times users have to wait to complete their analytical tasks, CRAY, the “super computer” people, have launched the

Urika-GX – the first “agile” analytics platform to fuse supercomputing with an open, enterprise framework.

The Urika-GX will provide data scientists with very high levels of performance and the ability to derive insight from datasets quickly. Urika-GX is a standard 19-inch rack featuring industry-standard Intel Xeon processors, up to 22 TB of DRAM and as many as 1,728 cores per system. There’s 35 TB of SSD storage and 192 TB of hard-drive storage per rack. It also taps into the renowned Cray Aries high-speed interconnect. Want one? They’re not cheap. 

More details on: www.cray.com/products/analytics/urika-gx

APACHE SPARK™ – THE WAY AHEAD, FOR A WHILE...

Apache Spark, a fast and general engine for large-scale data processing, could be the next best thing in Analytics because of its ability to speed up the processes involved. As many of you will know, Apache Spark started out as a component of the Hadoop ecosystem, but recently it has developed, branching out to the big data platform of choice for a number of enterprises.

Spark provides dramatically increased data processing speed compared to Hadoop (up to 100x speed increase for some processes) and is now the largest big data open source project, according to Spark originator and Databricks co-founder, Matei Zaharia. It is likely that 2017 will see large scale adoption of Spark as the analytics accelerator of choice.

However, Spark’s software solution may be heading toward its peak in 2017, as analytics acceleration via hardware is expected to become



the dominant analytics development during 2018. In the meantime though, we should perhaps embrace Spark, and use it to increase the speed and efficiencies of our analytics operations. 

More information on Apache Spark and an associated download, can be found at: spark.apache.org



YELP KNOWLEDGE

Yelp are making their database of over 100 million reviews (collected over the past twelve years) available to an expanding partnership of companies including Medallia, Reputology, Revinat and Sprinklr in what they are calling Yelp Knowledge.

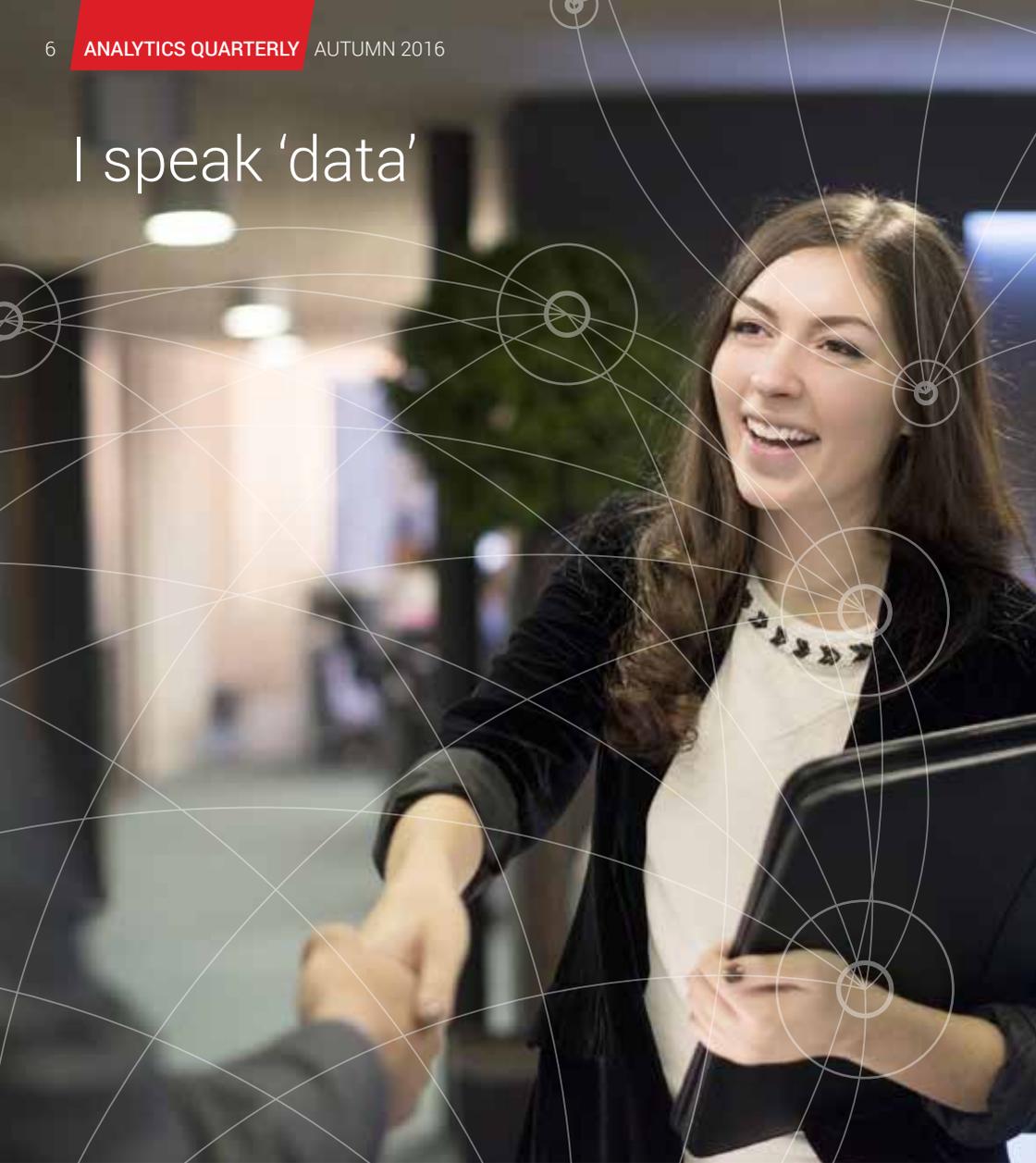
Apparently this will, for example, allow users to see not just how good the reviews are “but gain a more holistic sense of how their locations are performing and how customer sentiment is trending”.

Yelp Knowledge is aimed at analytics and marketing firms, but also available for businesses where, Yelp says, it will offer custom analytics as needed. 

More at: <http://bit.ly/2aY2hsm>



I speak 'data'



Embracing data and analytics technologies is, according to a report released during August 2016, capable of putting employees on a “fast track” to higher salaries.

A survey from Alteryx (a self-service analytics platform specialist) recently asked UK business leaders to detail the most important competencies in the workforce today. Responses to the survey revealed that knowing a second language isn't considered important any more, but knowing Analytics is.

According to a report generated from the responses received from the survey, Data and Analytics abilities have apparently surpassed multilingual skills that were once seen essential for business. The report also states that... “those in the ‘know’ are commanding salaries which are 30% higher than data celibates”.

Alteryx's research also found that the shift in the importance placed on data and analytics has also been reflected in the way businesses manage and interact with data.

The Alteryx “Business Grammar” report affirms that data is no longer ‘confined to the IT department or technical specialists’. It also says that only 15% of UK businesses are still “doing data” the old fashioned way while almost a third (31%) are empowering their employees with self-service analytics tools.

From its survey of UK business leaders Alteryx also found that over a quarter (26%) considered data and analytics skills to be the most important skill or capability for a potential new employee. In total, 60% of those surveyed, considered that data and analytics skills were one of the top two skills or capabilities needed today, with industry experience coming just above at 69%.

Only 22% of respondents felt that multilingualism was one of the top qualities for potential hires, despite the fact that a report from as recent as 2014 suggested two thirds of British businesses identified a demand for second languages. The Alteryx report also states that 79% of business leaders are confident data analytics should be a part of MBA programmes.

40% of those surveyed reported that decisions about how data is accessed, integrated and analysed still lie with the IT team, but 29% attributed this responsibility to the executive leadership. Furthermore, over two thirds (68%) felt it had become easier to get the data needed

for decision making over the last year.

The Alteryx research highlighted a number of challenges that still though, these include “getting the data needed for decisions”, and the perils of incomplete data, which apparently is a problem for 43% of business leaders. Cleanliness of data was an issue too, with 46% of respondents revealing that data received from other department or business divisions needed to be cleaned, repaired, or re-organised before it was ready for analysis. Only 31% of those surveyed reported that their teams had all the data they needed in one place, with 41% reporting that they used data from more than five separate sources for decision making.

Stuart Wilson, VP EMEA, Alteryx, Inc recently said his companies' research had revealed that attitudes to processing data and its relevance in business today has changed remarkably in just a few years. He also said that “the change in attitude that's taking place in boardrooms today shows the value of being data-savvy and how important it is that effective analytics are made available to business users. It makes sense to equip every business analyst with self-service tools that allow them to ask questions of their data.”

Stuart Wilson and the Alteryx report also add weight to the belief that while most organisations depend on their IT department or business intelligence team for analytics-based decision-making, it now appears things are changing. Business leaders are demanding more agile and flexible insight, and, increasingly, organisations are boosting the speed and quality of their analytics by adopting a “DIY approach” and providing self-service analytics tools. 

More information on the services provided by Alteryx can be found at: www.alteryx.com/

Care Coordination

Predictive analytics in healthcare

A recent report on applying predictive analytics to healthcare, published by Elsevier, stated there were “Seven ways predictive analytics can improve healthcare”, which are likely to make up just the tip of the iceberg.

Everyone is a patient at some time in their lives, for some reason or another, all of us want good medical care, and we assume that every doctor is a medical expert with good research experience to back up their health care decisions.

Unfortunately, this is not always true: diagnosis of illness is highly subjective – one of the reasons perhaps, when faced with impending medical interventions, some of us opt for second and even third opinions. Physicians are, as we know, experienced, well trained individuals who do their best to stay up to date with the latest research, but they cannot possibly commit to memory all the knowledge they need for every medical situation that arises.

This is one reason why increasing numbers of medical professionals – as well as insurance companies – are using predictive analytics (PA) enabled technologies to search through massive amounts of existing patient records to help them predict outcomes for their individual patients.

The medical information analysed is by no means restricted to patient records either, it can include data from various past treatment outcomes as well as the latest medical research published in peer-reviewed journals and databases.

PA not only helps with patient outcome predictions, it can also reveal associations in data that our human brains would never determine. PA-enabled medicine can draw on responses to medications to hospital readmission rates. Examples are predicting infections from methods of suturing, determining the likelihood of disease, helping physicians with diagnoses, and even predicting future wellness.

According to Dan Hogan, founder of Medalogix, there is a real need for improved care coordination to boost health outcomes and PA can play an important role in doing just that. He also said, “When we can predict patient risk with advanced statistical modelling, we can proactively coordinate care at a lower, less restrictive and more cost effective acuity level, like home health, before a high acuity care stay is necessary.”

To be useful for predictive analysis, medical data should be made available to all who need it and it should be “connectable” too. Unfortunately this is not yet common: a survey conducted by Nielsen Strategic Health Perspectives and the Council of Accountable Physician Practices (CAPP), recently found that 51% of 30,000+ respondents, drawn from a database of patients, reported their doctors were not able to share information about their health, nor were their doctors aware of pre-existing patient medical history prior to their appointments.

PA can help with End-of-Life-Care (EoLC) too, 80% of patients want to die at home apparently, yet only 20% do so. This circumstance alone diminishes care quality, and costs healthcare billions in avoidable hospital readmissions and ineffective intervention-based care. Medalogix mentioned at the beginning of this article have already developed a ‘care coordination’ PA enabled application called Medalogix Bridge, which is capable of identifying which patients are likely to pass away within 180 days, or those who could benefit from hospice care.

No doubt other software companies will develop EoLC analytics applications, and clinicians equipped with such analytically precise EoLC information, will be more able as a result of applying it, to ensure the right patients get access to the right care, at the right time. Used appropriately PA can connect and share data to enable care providers to coordinate care

proactively rather than reactively. Traditionally, care is coordinated from the top of the patient care ladder, the hospital or emergency room, down.

Predicting patient risk with advanced statistical modelling, will allow healthcare professionals to proactively coordinate care at a lower, less restrictive and more cost effective maintenance

level, like home health, before a high maintenance care becomes the only option. 

More information on the use of PA in healthcare, can be found at: www.ibm.com/smarterplanet/global/files/the_value_of_analytics_in_healthcare.pdf



Do you know your DiM from your AiM?



Where to store all this data? The future looks DiM

Data is pouring into organisations from every conceivable direction – from operational and transactional systems; from scanners, sensors and smart meters; from inbound and outbound customer contact points; from mobile media and the Web.

Such streams of data contain a wealth of potentially valuable insights, but its primary value lasts only as long as it can be captured and analysed. Unfortunately so much data presents storage problems, where do you keep it all? The answer! Well... Why keep it at all? Just retain the valuable and actionable components of it, take immediate action and discard the remainder.

This is the principle behind Data in Motion (DiM), a platform that enables organisations to take advantage of “event stream processing”. DiM handles many device protocols and brings all of the data flows into Hadoop directly from the Internet of Things (IoT), enabling “Analyse on the fly” – finding what’s meaningful, grabbing only what is needed, gaining instant insights and making the best “instant” decisions on the data flowing in.

Proponents of DiM see this not just as a clever way forward, but the only way forward, due to traditional approaches (‘store then analyse’) soon being overwhelmed by the volume of data streaming in, which will make them stay behind the curve with ‘stored data’ already being historical in nature. 

To find out more about this topic, take a look at: <http://bit.ly/1OWUdmx> & <http://bit.ly/2cXvyUO>

Always AiM high!

Another term you may not have heard much about in the ever developing world of analytics is Analytics in Motion (AiM).

The industrial use case that motivated the development of AiM was a Telco billing system designed by Huawei Technologies. They needed a system capable of processing up to 100,000 events per second and to answer up to 100 real-time analytical queries per second in less than 100 milliseconds for analytical data between 30GB to 300GB. Conventional analytics systems could not cope with such volumes of data and such high speed requirements.

Huawei’s analytical needs led to the development a system that can benefit any area of analytics that requires ultimate speed of processing – a system for handling enormous workloads under strict latency and scalability regulations.

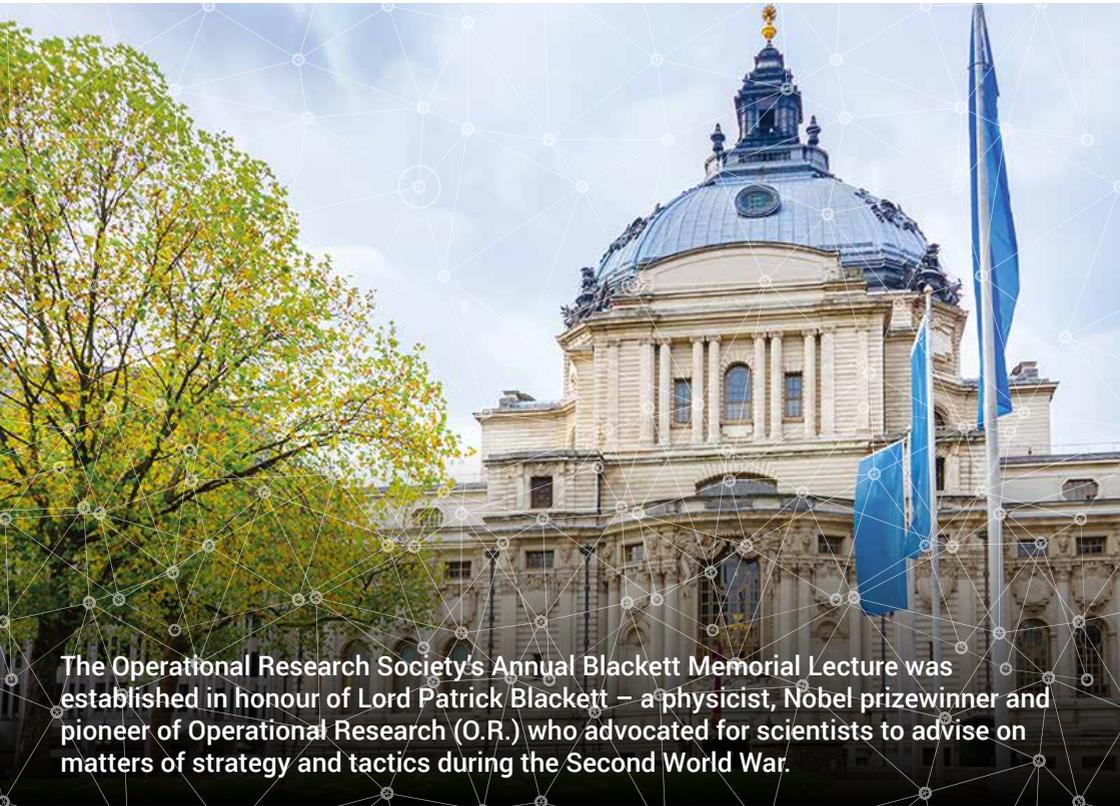
AiM is one of the stages in analytics’ evolution that will one day lead to an ‘All Data’ approach. Data is in the process of transforming everything. We’ve moved beyond big data; it’s now ‘all data’ that we need to embrace. But this isn’t just a technological step – it’s a business growth requirement.

It’s no longer acceptable to simply take data, analyse historical information contained within it, and understand what happened. You’ve got to take decisive action while things are happening all around you. In many ways AiM is a sibling to DiM, (Data in Motion), its creation was prompted by a need to process information quickly, gain insight, discard redundant, bad or useless data, and generate rapid, actionable insight for decision making. 

Find out more at:

www.systems.ethz.ch/node/516
www.analyticsinmotion.net/
<http://bit.ly/2dmznU9>





The Operational Research Society's Annual Blackett Memorial Lecture was established in honour of Lord Patrick Blackett – a physicist, Nobel prizewinner and pioneer of Operational Research (O.R.) who advocated for scientists to advise on matters of strategy and tactics during the Second World War.



**Machines that learn:
big data or explanatory
models?**

**Professor Andrew Blake,
Alan Turing Institute**

In machine vision systems, how can two competing deep learning paradigms be integrated, and what has already been achieved? Professor Blake holds Fellowships and Medals from many distinguished societies and was a pioneer in developing the theory and algorithms that make it possible for computers to behave as seeing machines.

Thursday 17 November 2016

Central Hall, Westminster, London

www.c-h-w.com

Timings:

16:00 Tea and biscuits

16:30 President's Welcome and Society awards followed by the lecture from Andrew Blake (Alan Turing Institute)

18:00 Drinks reception

19:00 Evening meal for invited guests

21:00 Close

Admission free – open to all

www.theORSociety.com/Blackett