Why Location Matters in Data Analytics - AGI GeoCom 2016

AGI GeoCom 2016 boasted a new format, new speakers and a new venue. Stephen Booth reports.

We live in an age on constant change and churn so this year's AGI conference was no exception. A major departure from past formats of two or more days of presentations and keynotes, today's uber-busy world needed something sharper, quicker, more attention-grabbing. A one-day event at the home of geography, the Royal Geographical Society, attracted nearly two hundred to hear 12 invited speakers talk about location and data analytics. The audience seemed different; yes, the usual faces and greybeards were there but new faces too were in abundance. It looked as though it was going to work.

A brief but welcoming introduction from the RGS's director general, Dr Rita Gardner CBE set the scene. These are exciting times for geographers, she said. Graduates in the discipline are amongst the lowest without a job. On our topic for the day, Dr Gardner highlighted a growing world population: 2 billion more by 2050 and the likelihood of 150 million climate change refugees. We will need those new techniques of data analytics.

Does Size Matter?

To get us focused on the day ahead, which was blocked out in sessions of three or four speakers, up first was Timandra Harkness, author and broadcaster. Her book "Big Data: does size matter?" has been something of a best-seller, even if it is, as she conceded, No 1 in a very small category. Ms Harkness is a lively and engaging speaker with just the right examples to get our attention and thinking. She traced the beginnings of big data to two wolf shin bones dating from around 30,000 years ago when two hunters kept a tally of something with cuts across the bones. Why, nobody knows for sure but Harkness likes to think it was wolf kills. The winning total was 57 or for the binary minded, 111001.

Fifty-seven may well have been big data back in the Ice Age when' man's mathematical skills may not have extended to 57 but fast forward to the 21st century and CERN where, when the supercollider is fired up, 40Mb or more of data is captured in a second. Phew! We needed something a bit more on the human scale.

Harkness turned to some interesting analytics of the routes and pick-up points for New York taxis. Where were the most lucrative points for the drivers? A fascinating 3D graphic presented the points (appropriately) as skyscrapers of varying heights. Further data from the cabs tried to find where the best customers came from, based on their tips. But that rather falls over because often the tip is in cash and the data doesn't get recorded, other than by citizen snappers capturing poor-tipping celebs. Therefore, 'don't be fooled that all the data is in there' she cautioned.

Harkness turned to tracking mass cycle rides. The Dawn-to-Dusk ride around North Wales seems about as gruelling a ride as this writer could imagine in a 24-hour period. But it does produce some big data from the cyclists with suitable sensors. She told a beautiful tale of a cyclist in San Francisco, a city of rectangular blocks, who recorded his ride on a map so that it spelt out "I love you Emily". Needless to say, Emily was delighted and they lived happily ever after. . ?

Blockchain - The Future of Transactions?

So we were beginning to learn and understand what big data is. The next speaker had something far more complex for us to get our heads around. According to Dr Catherine Mulligan, Blockchain technology is the way we're going to manage transactions in the future. Think Bitcoins as an early example, described as "distributed ledger technology" relying on synchronised data in multiple locations to secure transactions. It is held up as a way of preventing fraud. Think land and property transactions. Georgia is already opting for the technology which provides "immutable" records of transactions; others including Sweden and Ghana may soon follow.

So what precisely is it? 'The best way to view Blockchain is as a platform', says Dr Mulligan., 'upon which applications can be built'. Its use can be way beyond financial services – 'it's a new way to manage data'. However, it raises some interesting issues around identity. There is currently research around using Blockchain to validate ownership of your identity, something which the Sustainable.

Development Goals set as the right of every person on the planet to own. How that will square with the big data it will generate and the big IT companies managing it, remains to be seen.

Another area for its application will surely be the Internet of Things, where provenance, anti-tampering and attestation of data all play a role. It is here that the role of GIS and location services will play a key role in securing the IoT and the services built upon them. Incidentally, Blockchain and Bitcoin is not only big data but big computing. Dr Mulligan told us that already Bitcoin transactions are using

more electricity than the whole of Ireland!

Green Corridors of Plenty

It was time to talk about mapping, something we all understand. Arancha Munoz-Criado is an architect and urban planner. She has also attracted the attention of Jack Dangermond and Esri to provide maps of green spaces to create a green infrastructure map for the whole of North America.

Her thesis is that we all need green space to enhance our quality of life but as towns and cities develop rapidly into surrounding countryside we need to preserve corridors of green space; better to allocate the green space ahead of construction. She describes it as 'a new conservation approach for the 21st century' and which she has applied in planning for Valencia in her native Spain. The city now has green corridors to the sea, green regeneration of old industrial sites and protection for wetlands and farming within urban areas.

Q&A

Brief questioning following the session centred around truth and how can we trust data to be clear and transparent? Dr Mulligan was asked where Blockchain was on the famous Gartner Curve; with people struggling to understand exactly what it was; were we in "the trough of despair?" A good name for a heavy metal band, thought Timandra Harkness.

Safety Standard for Drones

It would be an odd conference without drones wheedling their way on to the agenda. GeoCom16 was no exception and Ed Leon Klinger was there fresh from Ordnance Survey's Geovation Hub to tell us all about how big data, driven by risk analysis, will lead to safer drone flights. This is needed by insurers, who currently can charge more than the cost of the drone.

Drone use is predicted to be a US$127 billion industry by 2020 (one can't help thinking that if you take the military and playful consumers out of that you will be left with a much smaller sum), nevertheless, sales of drones alone are predicted to be $5bn by then.

The challenge is to reduce risk in real time. Klinger's start-up, Flock is aiming to develop a platform for drone operators driven by data from many sources – mapping, weather, traffic, etc – where users will log in to plan their flight based on real-time data (and presumably updated as the flight proceeds) using Software-as-a-Service technology. Flock's vision is to create a global de facto safety standard for drone operation.

His promises of Uber vertical take-off taxi drones 30 years hence will need a change to the laws of gravity and possible shrinkage of the (currently growing) human body. Terrestrial autonomous vehicles are more likely.

Smart Cities and Geology

The April 2016 issue of this magazine published an article on the development of a ground information model as part of BIM. Dr Catherine Royse of the British Geological Survey posed the question, is there a role for geological data in the Smart Cities Agenda. To which the answer must be a resounding, yes.

Cities both in the UK and the rest of the world continue to attract a huge influx of people, yet often have to cope with flooding and water contamination so it is essential that we adopt a more holistic view of the sub surface. In the capital, construction works regularly overrun, usually due to unforeseen ground conditions. While drilling into the underground can result in. . . well, drilling into the London Underground, as at least one event involving the Piccadilly Line records.

Dr Royse noted that London's underground railways do not extend very far south of the river. Having tunnelled under the Thames they often opt for over-ground routes; the reason is that north of the river tunnelling is in near perfect clay, whereas in the south wet gravels and sands hamper tunnellers.

The problem with geology is data, or rather its absence. 'Only 18% of ground data from recent infrastructure projects can be used', said Dr Royse. 'We need a standard for underground data'. She highlighted the ASK project in Glasgow where data was in a standard format, the key to usefulness. There are opportunities ahead for ground source heat pumps if we have the data through initiatives like GIRP – ground instability risk profiles. There is therefore a role for geology; the sub surface is vitally important otherwise there will be nasty surprises ahead.

Location Unlocks Value

Using data science to help charities was Andy Hamflett's presentation. He believes that location is vital to unlocking data use in this sector. His primary interest is in combating hunger. Backed by the Trussel Trust, which works to alleviate hunger and poverty in the UK, he's been getting local communities with food banks to track where visitors are coming from. An intense heat map of charity activities around Old Street Station in the City of London revealed alarming levels within what looked like less than a 1-mile radius.

This approach of using captured data can also work in the not-for-profit sector. He cited the Dallas Museum of Arts, where they decided to go for free admission provided you give your personal data (which they can use and trade). Attendance is reportedly up by 30%. The app charitymiles.org tracks personal movement via a smartphone; such data is valuable and could even be piggy-backed on to Pokémon Go players.

Hamilton also looked at tracking illegal fishing around the globe through the not-for-profit Geo4GooD initiative. Driven by GNSS data, a world map revealed an awful lot of it going on.

Q&A

Questions were around the value in interoperability and application of data. BGS's Dr Royse said that they gained from engaging with people who asked, 'how do we interpret it?'

The conference might have benefited from a session around digital licensing. A lawyer in the audience argued that just because data is free, it doesn't mean you can't licence it, especially for enterprise applications. There is also a new data protection bill on its way. Meanwhile, Graham Voles said there are serious problems in dealing with large corporations where start-ups are looking for legacy data.

The Snappy Seven

Following lunch and a chance to look around the exhibition of sponsors, it was time for four "Lightning Presentations" of seven minutes each, chaired by John Alderson of Informed Solutions. First was Patrick Bell, information systems leader at British Geological Survey, who spoke on 'taking the pulse of the UK's underground'. There is now real-time monitoring of environmental phenomena through boreholes. Funded by NERC, a £31m package is helping keep an eye on fracking around Fylde and the Vale of Pickering shale gas sites to check for water quality, seismicity, radon and soil gases. Data is available free online.

The next speaker really was a departure from what we're used at a geo event. Doug Specht is a researcher and lecturer in communication geography at the University of Westminster. His philosophical presentation was about the 'ugly untruths of data'. He took us back to a day in 1910 when the author and socialite Virginia Woolf wrote, after seeing an exhibition of impressionist painters, that "today human nature has changed".

What had attracted Woolf's keen eye and that of our speaker was Cezanne's numerous "non-finito" canvases. Hitherto, painters had tried to portray reality by painting near perfect representations of the world. The form behind those brilliant dabs of Cezanne's vivid colours on a white canvass could still be recognised as the Mont St Victoire, which he'd painted again and again in his search for some kind of reality. For Specht, the interesting aspect was what he'd left out. Like John Berger's "Ways of Seeing" in relation to a painting, an absence is a map. Plenty to ruminate on there.

Crispin Hoult has a PhD in Geomatics from the University of Newcastle upon Tyne. He posed the questions, Cartography, is the end nigh? A map is something that's been curated, according to Hoult. But today there are so many ways we can capture reality. However, it still requires continuous survey for the real world to be in the background.

James Milner is a software developer who works with start-ups at Ordnance Survey's Geovation Hub. The hub is an incubator for those with a geospatial or location-based idea for an app. The balance of technology is shifting according to Milner, so that by 2020 it will be 50:50 between mobile and online. 'We've never been in a better position to take advantage of technology, with new tools and data services available. But the user experience matters', he says. He urged us to look closely and consider how, for instance, Uber operates compared to traditional GIS.

Q&A

Questioning after this session was perhaps more searching than the speakers had expected. With the UK in the top five digital nations in the world, how could we as a community benefit, asked Dr Vanessa Lawrence? Answers were far from clear or concise.

Weatherman and his Supercomputer

The final session of the day heard two very different speakers. Dr Alberto Arribas is from the Met Office's Informatics Lab (http://www.informaticslab.co.uk/) and acknowledged that 'we operate outside the Met Office structure'. He described the government agency as 'a big technology company'. They have a super-computer from which the data never stops growing. Data volumes are so big that downloading to a desktop for analysis is fast becoming impractical. The answer is Jade, an environment accessed via a desktop to handle large amounts of data where analysts can look for a phenomenon in a subset of the data, or maybe downscale it.

They also have an immersive VR app where you can wander – literally - through 3D clouds, observing the weather as it changes in different layers; and all on a tablet. Like so many clever scientists left to play with technology, Dr Arribas predicted the next big disruptive technology: the Amazon Echo. If you haven't clocked it yet, Google it or pop into John Lewis. It's a smart bot that will stream voice information and music upon your verbal command, provided you subscribe to Amazon's Alexa service. Alas, most of the services available in the US are not available in the UK. I now understand disruptive technology, basically technology that will annoy me.

Beyond Web 2.0

The final speaker, Prof Jacqui Taylor, spoke about mapping the future towards the Internet of Things. She argues that as we move to a future where 80% of the world's population are connected, Big Data and the IoT will take us beyond web 2.0; it will require us to understand new ways of communicating with customers and clients. However, she doesn't believe in "Big Data" – 'it's just a term used by technologists; it has bred a herd of unicorns!'

Prof Taylor has had a variety of careers since she first qualified as an aerospace engineer. She has also been a wholesale energy specialist and a web entrepreneur. Currently, she runs Flying Binary Ltd (subtitle, changing the world with data), a company involved in data analytics and open data, which has advised government through the ministerial advisory group on open data.

Rounding up the day, which seemed to pass incredibly quickly, Rollo Home said 'the disruption drivers are forcing us to think differently. We have to work out our place in this brave new world'.

The day concluded with AGI awards made by chairman David Henderson to Simon Wheeler for exceptional service to the association and to Jamie Justham for career achievement. Geo-drinks followed.

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