horizon

DIGITAL ECONOMY RESEARCH

Impact Case Studies

Contents

Impact Case Studies from Horizon Digital Economy Research

Professor Derek McAuley

Welcome to this series of impact case studies we hope will demonstrate the breadth of research that has been carried out during the first phase of Horizon. We are also celebrating our success in gaining another five years of follow-on funding from the Research Councils UK so we can continue creating impact in conjunction with our partners.

Horizon is a multidisciplinary centre for translational Digital Economy research that balances the technical drivers in the capture and analysis of human data with an awareness and understanding of human and social values. Horizon follows a strongly user-centred approach undertaking research in the wild, based on principles of open innovation.

Horizon now encompasses more than 50 researchers spanning Computing, Engineering, Psychology, Social Sciences, Business and the Humanities. In addition we have engaged with a wider academic network of 25 UK and 10 International research institutions. We have also established a Centre for Doctoral Training that provides structured training for future leaders in the Digital Economy, and that will ultimately graduate over 150 PhDs.

Most importantly, we are lucky to have more than 200 organisations involved in our research in one way or another - including industry large and small, third and public sector organisations - and it is through these that we expose our research to real world problems.

The following case studies will give you a taste of our successes, and we welcome contact if you would like to become engaged.

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Artcodes: A visual recognition app for smartphones

Artcodes aims to revolutionise embedded computer codes. It designs visually beautiful images and encodes them, resulting in the same interactivity as that of a QR code, while offering a more engaging and playful experience. It uses an app which can be downloaded on to a smart device and can then be used to scan the Artcode — the app does not recognise the image but scans the topography of the image.

By making such decorative patterns interactive, all manner of everyday objects can become part of the "Internet of Things" simply by decorating their surfaces. Pointing a camera at a thing might then enable people to learn about what it is, how it was made, and how to use it; to access personal memories or review their history of use; or to trigger other contextually relevant services.

The team has worked with the London restaurant chain, Busaba Eathai, to provide ideas for an enhanced digital dining experience through allowing customers to scan decorative motifs and pattern designs on tableware, menus and placemats.

The intention is to allow the diners to access information on, for example, specials of the day, a view into the kitchen to see the food being prepared, and to learn about each dish, its inspiration and sourcing.

The team has also been exploring how Artcodes might be crafted into lace in order to promote public engagement with Nottingham's collection of machine-made lace. This involved manufacturing new lace samples based on historic pieces in the collection as packaged souvenirs and employing embedded Artcodes to link to digital media.

Working with two experienced fabric designers and the collection's access officer, the team experimented with fabric and refinement of the vision recognition software; designed and manufactured lace patterns; and developed a demonstrator mobile app. The outcome was that visitors were able to handle lace souvenirs produced through this process, scanning them with their mobile phone to reveal informative stories.

The team is working with ceramic designers and Johnson Tiles to explore the creation of beautiful tiles decorated with Artcodes. The intention is that users will be able to associate decorated locations in their homes with digital media and services such as documentation of DIY projects (before and after), knowledge about hidden infrastructures (such as cables behind the wall), and personal memories.

A further spin out project from the Artcodes research is the Carolan Guitar, named after the legendary Irish composer Turlough O'Carolan.

The team worked with a master craftsman to create the beautiful new interactive acoustic guitar that can digitally capture and chart its own life history. Scanning the different patterns on the Carolan

guitar takes you to different information such as the history of how it was made, details of who has played it, videos of their performances and also the instrument's user guide and full technical specification. As a result, this unusual and new technology enables the guitar to share a growing 'digital footprint' throughout its lifetime, but in a way that resonates with both the aesthetic of an acoustic guitar and the craft of traditional luthiery.

Professor Steve Benford is leading the project: "This is just the beginning of the journey. We're going to learn so much when our guitar finds its way into the world to gather stories and songs from players and audiences."

The research that has resulted in the Artcodes technology has great potential for providing businesses on-brand visual interaction for products, packaging and services. It also offers unique user interaction for museums, galleries and a range of other public spaces. Visitors to Tent London, part of the 2014 London Design Festival, utilised the Artcodes app to allow them to navigate the trade show. Artcodes were also embedded in a deployment of a number of ceramic clocks as part of a "Hidden Language, Hidden Trails" art installation in the town of Dorchester, using the concept of time to tell the story of the town's rich history.

Artcodes has been so well received that a design technology consultancy has now evolved out of the original research in Horizon in collaboration with academic partners Central St Martins and Brunel University. The Artcodes app is freely available through iTunes and Google Play, and there is a Wordpress plugin that allows people to associate Artcodes with blogposts, opening up this novel technology to a wide community of creative writers and designers.

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> *"This is just the beginning of the journey. We're going to learn so much when our guitar finds its way into the world to gather stories and songs from players and audiences."*

Wayward: Informing best practice in out-of-hours secondary care

The standard of out-of-hours care is a huge area of concern for the health service. Studies demonstrate drops in healthcare quality at night and on weekends, including significant increases in mortality. The demands of out-of-hours working lower quality of life for staff and impact the costs of care through absenteeism and over-reliance on locums. Despite well documented effects, out-of-hours care remains under-studied, due in part to practicalities of large scale manual studies in complex, geographically dispersed, and sensitive working environments.

Dr Dominic Shaw is a clinical academic and leads out-of-hours care at Nottingham City Hospital. He summarises the problem: "Providing care 24 hours a day 7 days a week is a hugely complicated, costly and specialist task. Understanding the relationship between workload and work place will help our understanding of this vital area."

The Horizon Wayward project investigates the collection and analysis of data concerning out-of-hours care in secondary care institutions. Dr Michael Brown, a researcher on the project, comments: "As it stands little is known about how doctors deliver out-of-hours care in hospitals and even less about whether they are doing it right. This is a problem Wayward is addressing head on though novel methods and technologies."

Wayward builds upon technology and procedures developed by the team in order to identify best practice for out-of-hours training, management and care delivery and make nationally relevant recommendations. They utilise the relationship between activity and location to record the type, timing and location of tasks being undertaken by medical doctors without the need for traditional direct observation methods.

In collaboration with three NHS Trusts (Nottingham University Hospitals, Aintree Hospital and Blackpool Victoria Hospital) and Liverpool School of Tropical Medicine the team has recently been awarded funding from the Health Foundation for the uptake and spread of the project team's ground breaking data collection technologies across NHS hospitals. "It will allow the expansion of our studies over multiple sites in order to demonstrate that the methods are scalable, cost effective and unobtrusive for staff and patients," Dr Shaw says. "It will enable evidence based improvements to safety, efficiency, and efficacy in service provision for this understudied and important aspect of secondary care."

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Broadcasting thrill for television, advertising and public engagement

Horizon Digital Economy Research has collaborated with the artist and engineer Brendan Walker, founder of the creative company Aerial, to explore how biosensing technologies can enhance thrilling experiences across the entertainment sector. Through Brendan's multifaceted Thrill Laboratory performances, they explored the use of wearable and networked biosensors that capture heart rate, galvanic skin response (used as a measure of emotional response), and facial muscle movements, alongside acceleration data and video, to enable new forms of entertainment.

Brendan says: "There have been two related technical thrusts to this work. The first has been to establish the underpinning technologies for capturing various forms of biodata from participants on rollercoasters and other thrilling experiences and transmitting it to spectators so that they can share in the experience. The second has involved also using this captured biodata to create human-in-the-loop interactive rides in which a robotic ride platform monitors and adapts to its riders' physiological responses."

This research has had far-reaching impact. As an example, the results have led television companies to experiment with incorporating biodata into TV programmes. Their motivations have been to provide close-up and unusual views of intense experiences such as riding rollercoasters, but also to help support a common narrative of the 'scientific' investigation of such experiences.

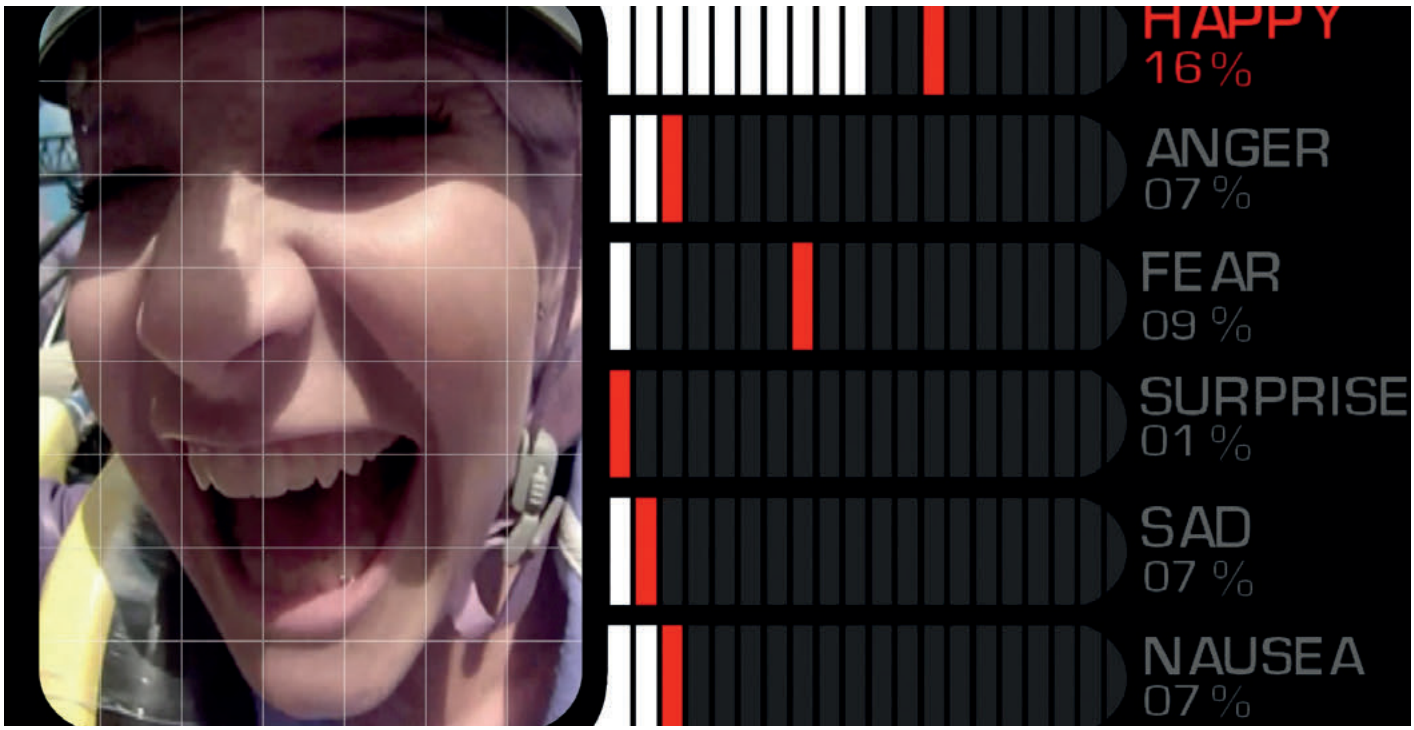
The lead item on the BBC's Blue Peter in May 2013 shows two presenters comparing their reactions to Alton Towers' new ride, 'Smiler'. Features were also aired on the BBC One Show, the BBC popular science programme Bang Goes The Theory, ITV Daybreak, Discovery Networks International and Discovery Canada. Radio coverage has included BBC World Service and You and Yours.

"Not only did these various productions build on our published research and reach many millions of people worldwide," Brendan says, "but also they employed our researchers as creative, technology and data analysis consultants, and directly used the technologies that we have developed to capture, analyse and visualise biodata."

The same research has been also been exploited by marketing companies to create innovative campaigns for thrilling products. Merlin Entertainment, the world's second largest provider of visitor attractions, used the technology and know-how to market two new attractions, a 'horror maze' themed around the film Saw VII at Thorpe Park, and a new interactive ride at The London Dungeon.

Brendan continues: "Summit Entertainment (part of the global film production and distribution company Lionsgate) engaged us to help produce a promotional trailer for their horror movie Sinister in which audience members' 'fear factors' were measured as they watched a pre-screening of the film.

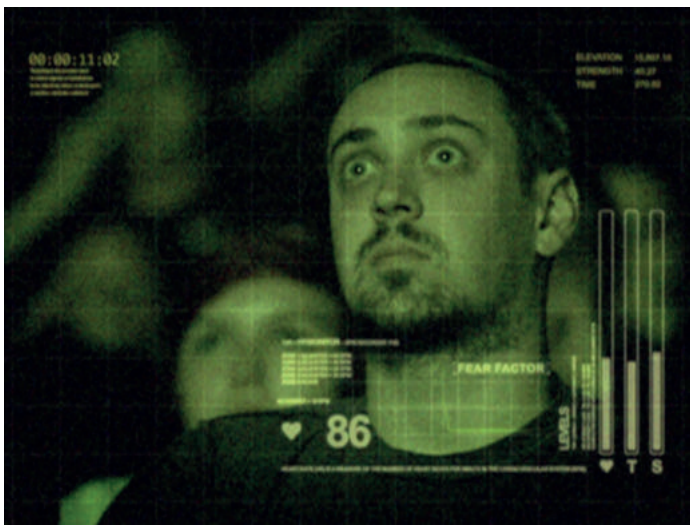
This led us to being engaged as consultants by the global advertising agency TBWA to support their "Built to Thrill" brand activation campaign for the NISSAN Juke car which involved us conducting a series of thrill experiments to measure peoples' physiological responses to various driving-related thrilling experiences."



The results were incorporated into four short films that appeared on the campaign website that reached 164,000 consumers.

Working with rides and other thrill experiences has also captured the public's imagination and proved attractive to science communicators. The team was commissioned by science communicators to engage thousands of people with a hands-on experience of the research at festivals and exhibitions. These included the Research Council's Pioneers exhibition in 2008, where they exhibited a bucking bronco ride; the 2011 Cheltenham Science Festival for which they created PerPing, a breath-controlled 'tennis' game; and the Mayhem Horror Film Festival in 2009, 2010, and 2011 where they conducted a series of 'fear experiments' on audience members who watched classic horror films. The Pioneers exhibit was subsequently nominated for the International Digital Arts award at Future Everything, the UK's leading annual festival of digital arts.

The various activities described above have generated extensive press coverage, impacting on further millions. This includes coverage in the New York Times (February 2008), Daily Mirror (October 2008), Observer Magazine (May 2009), the BBC's Focus science magazine (August 2009), Guardian Science Weekly (November 2010), the Independent (August 2011), New Scientist (May 2011), and the London Evening Standard (June 2012). The research even featured as the cover article of The Times' Eureka science supplement in January 2010 and as the cover article of the September 2013 edition of Communications of the ACM, which reaches 100,000 computing industry professionals worldwide.



"The use of biodata in entertainment to reveal the hidden emotions and physical performance of contestants, or provide biofeedback to augment their experience, is creating exciting and innovative opportunities for British producers. The requirements for capturing, analysing, and broadcasting hifidelty data, both recorded and real-time, is presenting unique technical challenges that are also relevant to other industries, which include the medical sector and engineering."

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> *"The use of biodata in entertainment to reveal the hidden emotions and physical performance of contestants, or provide biofeedback to augment their experience, is creating exciting and innovative opportunities for British producers."*

C-tech: Creating the energy for change

Shared buildings can present a challenge when it comes to monitoring energy use and encouraging people to change their behaviour.

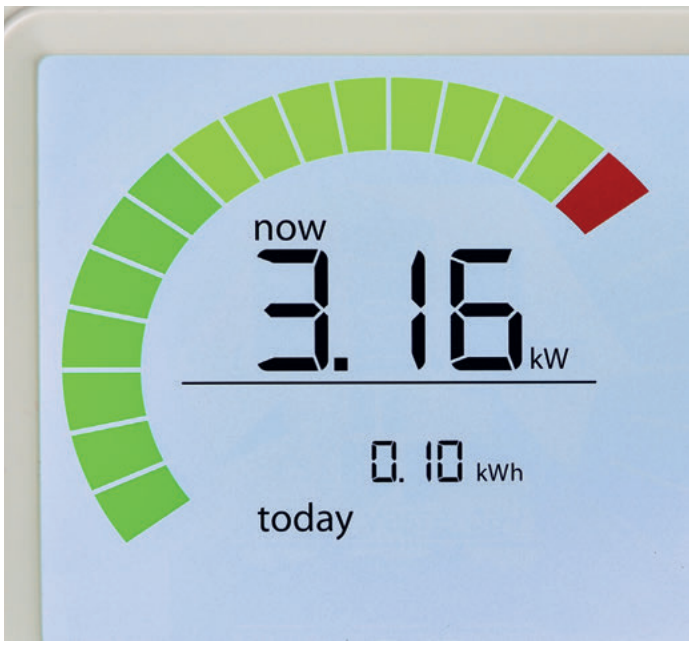
C-tech is a five-year research project that is investigating innovative ways of dividing up and representing energy use in shared buildings to motivate occupants to save energy.

The focus of the research team is on workplaces, where many different people interact and share utilities and equipment within the building. The research considers the opportunities that exist in engaging whole communities of people in reducing energy use. Little work has been done in this area to date.

Ian Gillard is the Facilities Manager at Wiltshire Council, which has been actively engaged with the research. "Our involvement in the C-tech project has been motivated by our goals to become leaner and work smarter as a local authority. Wiltshire Council manages over 450 buildings ranging from leisure centres to public toilets. Energy is one of the major overheads for any building that we run, amounting to over £4.5million per year. If we can reduce this cost we can have a significant impact on our budget, and as a result on the value we can deliver to the public."

The project team has carried out ethnography – embedding researchers in the council workplaces – and run workshops with council staff to identify new opportunities to reduce their carbon emissions, and to set new standards for energy management. "Since joining the project we have made valuable changes to the way we manage our buildings and the way we think about energy use," Mr Gillard says. "As a result of bringing together a variety of our staff to interrogate our building and utilities data, we have made savings - including 25 per cent of the gas usage at one of our main offices by adjusting hot water heating settings. These successes have added momentum to our own ongoing efforts to develop data-driven management processes, and initiatives that actively involve all staff in responsible resource consumption."

The research also explores saving energy in a workplace setting and how to motivate people who don't have to pay the bills. A recent study as part of the research explores how electricity feedback is delivered on an energy display and whether this can impact on people's behaviours. The research, led by Dr Alexa Spence, found that displaying electricity use in terms of carbon, as opposed to cost or kilowatt-hours, raises the awareness of the impact on climate change. This in turn appears to increase the likelihood that people will behave in a broadly sustainable manner rather than just focussing on simple energy reduction (known as behavioural spillover).



"Now we are designing energy feedback interventions that are grounded in our developed understanding of how people may be motivated and engaged with energy use," Dr Spence comments. "We are also crucially exploring how best to integrate these within current or new organisational policies so that these may be effective and continue to be effective in the long term."

One of the team's early developments is a game for engaging people with issues around energy in the workplace. Called Idlewars, the game involves "busting" your colleagues if they leave their computers on and idle while away from their desk, and resulted in some very competitive behaviour. Idlewars won the 2014 MACE EnviroGame award as the best game for spreading the saving energy message.

Other partners in the project are the University of Southampton and the Centre for Sustainable Energy.

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Towards data-driven environmental policy design

The national parks, nature reserves and wetlands of the semi-arid wheatbelt of Western Australia, with their rich diversity of flora and fauna, are the backdrop for this research to improve the management of natural resources in the 21st century.

The project combines the latest ideas in computer science at the University of Nottingham with the pioneering ambitions of forward-thinking Australian environmental planners at the Department for Parks and Wildlife (DPaW) of the Western Australian Government. The research has created new survey tools and intelligent data software to inform decision-making at government level in the field of sustainable development and environmental policy planning.

The research question is how to combine quantitative information such as species diversity, salinity, etc. with the actual (qualitative) values that stakeholders such as residents, farmers, and industry attach to a wide variety of biological assets in Western Australia - thus enabling tailored environmental management which delivers on human value expectations. This is a complicated problem to solve, as two different types of information need to be brought together, while allowing for the uncertainty inherent in each dataset.

To answer this research question, a series of novel techniques for the collection of uncertain information has been developed, including new survey tools for human data acquisition which enable the efficient capture of participant opinion and uncertainty around a given response.

The information is subsequently aggregated through newly developed algorithms which are designed to combine both quantitative and qualitative information while producing human-interpretable outputs, including sensitivity and cost-benefit analyses which account for data uncertainty and support comprehensive and informed decision making.

Dr Christian Wagner, computer scientist in Horizon and project lead, says: "Being able to aggregate these different information sources in a coherent way to enable informed decision making is vital both in order for the decisions to be appropriate to the specific context as well as to maintain due transparency in the decision process. We need to solve the problem of how to maximise the use of available conservation funds and human resources through combining innovative data collection and analysis techniques to accurately reflect the quantitative data available as well as the subjective views of stakeholders."

Currently, the resulting system has been deployed as a cloud-based service and is applied and evaluated in the context of the environmental management of several wetland conservation sites across Western Australia. These wetlands, managed by DPaW, are recognised worldwide for their ecological importance and are under immense pressure from climate change and surrounding land use. Thus, a comprehensive strategy transparently integrating the available information and priorities is urgently needed.

Dr Michael Smith, from the Western Australian Department of Parks and Wildlife added: "We hope that our work will allow nature conservation managers to better understand and account for the actual values that humans derive from our natural environment. This is important because good management should be driven by the values that are important to people, it gives local stakeholders ownership of the process and helps to create transparency for people to understand why and how conservation is occurring."

Beyond this project, the outcomes will help to inform complex decision-making more generally. Dr Wagner continues: "This project has the potential to inform policy making in environmental conservation all over the world. Further, decisions ranging from town-planning to the construction of new power plants and transport infrastructure generally require consultation with a wide variety of groups, including local and regional stakeholders as well as incorporating information from various sources including surveys, impact studies and sensor measurements." It is hoped the approach will ultimately be adopted by government and non-government organisations alike, and be applicable to a diverse range of management applications, including town planning and natural resource management.

In October 2014, the team behind this EPSRC funded project was awarded an EPSRC Impact Accelerator grant which builds on the research already undertaken, as well as specific funding from the Natural Environment Research Council (NERC) to look at comprehensive decision support in the context of infrastructure development and flood prevention in and around the Thames Estuary, UK. This work is conducted together with the Thames Estuary Partnership (TEP) and DPaW.

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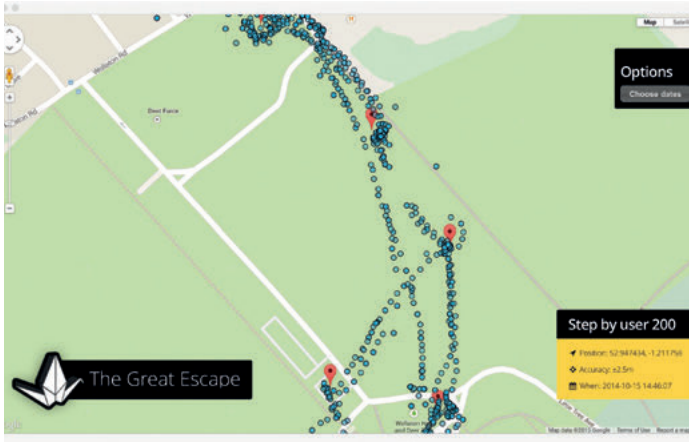
Wander Anywhere: Locative media experiences in the wild

Horizon's Wander Thoresby and Walk Calke projects exploit web, cloud and mobile technologies to bring entertaining and surprising experiences to visitors of city sites and country parks. Current research is aimed at the Cultural and Creative Industries, and involves relationships with the National Trust and Nottingham City Council.

The research directly contributes to the development of an active online platform: Wander Anywhere, which enables rapid prototyping of locative media. Authors create web content and associate it to geographic areas. Then, with the aid of a smart phone, mobile users can explore the outdoors to track down and reveal this content, experiencing it "on location".

The platform also reveals the GPS traces left by users. Our research has shown that these traces can provide valuable insight - revealing user behaviour and infrastructural issues - for authors to iterate and improve the design of the mobile experience.

The team has built a number of successful pilot experiences for culture and heritage, one being at Thoresby Hall in Nottinghamshire. The Thoresby Collection consists of 700 paintings, produced by Countess Manvers, of the Thoresby Park Estate and the locality and people who lived there. James Parkinson, the Thoresby Courtyard Manager, was very engaged in the Wander Thoresby Project: "We did have a permanent space where we could exhibit some of the paintings but it wasn't interpreted in the correct way and it certainly wasn't introducing visitors to Thoresby and the history of the courtyard, of the family and of the wonderful estate. We have far more stories than we could tell in the constraints of the space, so we were looking at ways visitors could interact with the history and the culture. The Wander Thoresby project was absolutely fabulous; it started new initiatives from us about seeing our heritage as the way



forward and as the forefront of the visitor attraction……everyone was engaged with it fully, different ages, different people."

Other sites for experiences included Buxton Museum and Museo Omero in Ancona, and the team is currently working with National Trust sites in the East Midlands.

The platform is also being used to deliver hands-on training to culture and heritage professionals. Previous classes delivered in London (via Tate Britain) and Nottingham have demonstrated that culture and heritage organisations are keen to adopt location-based technologies for public engagement, and further classes have been funded for 2015.

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> *"The Wander Thoresby project was absolutely fabulous; it started new initiatives from us about seeing our heritage as the way forward and as the forefront of the visitor attraction..."*


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ArtMaps: Exploring the relation between art and place

ArtMaps explores the relation between art and place, through the development of a crowdsourcing platform that allows people to 'put themselves in the picture' , and to contribute their knowledge about locations associated with artworks. The platform uses existing geographical data on works of art to map and visualise them in relation to locations in the real world. ArtMaps is a collaborative project involving Horizon Digital Economy Research, the Centre for Intermedia at the University of Exeter, and Tate (Tate Learning, Tate Digital and Tate Research).

Approximately one-third of the Tate Galleries collection, comprising almost 70,000 artworks, has been indexed with information about locations, typically the site represented in the work. For some artworks this information is quite specific (e.g. exact latitude and longitude of the landmark/site depicted in the work), but in many cases it is quite general, referring only to a city, region or major geographic feature. The ArtMaps project aims to improve the quality of the geographic data relating to these works, with members of the public contributing information, as well as to gain new insights into how people use technology to generate novel location-based interactions with their environment through art, and with art through their personal associations.

The ArtMaps platform has been successfully used to design and support several engagement events targeted at different audiences (e.g. families with children; migrants; elderly; on-line public). John Stack, formerly Head of Digital at Tate, highlights: "The ArtMaps project is shaping how we think about the role of the museum as a platform for audience engagement and the issues raised by the project are proving to be fundamental for our work in the years ahead.

"The ArtMaps project and its research questions has coincided with a wider transition at Tate from audience interaction being a marginal activity to one that is informing much of our thinking about the future of the organisation. The museum of the future is not just a place where objects related to cultural heritage are cared for and displayed. It is a platform where new ideas and meanings are generated, exchanged and preserved, and digital technologies will likely be key to enabling this."

The project findings show that ArtMaps facilitates access to people who do not habitually visit museums, extends the gallery experience outside the museum, allows for encounters with items not ordinarily on display, stimulates collaboration and group discussion, facilitates mobile learning and, through crowdsourcing, potentially produces valuable and original knowledge for the museum. "By opening new opportunities to engage the public in novel ways such as Web-based interactions and outdoor experiences, ArtMaps takes the museum out of its walls" added Laura Carletti, Horizon Research Fellow. "In fact ArtMaps promotes a new way of looking at art through its relationships with places, and, vice versa, facilitates the perception of places through their relationship with art."

ArtMaps is an open source platform and freely available to be repurposed.

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> *"By opening new opportunities to engage the public in novel ways such as Web-based interactions and outdoor experiences, ArtMaps takes the museum out of its walls"*

Neodemographics: Data-driven ways to characterize human behaviour

Horizon's Neodemographics project is working with both public and private sector institutions to reimagine the ways in which we describe day-to-day human behaviour. Instead of using outmoded demographics, such as age, gender and class, the research is harnessing real-world digital footprint data to cluster, characterize and predict behaviour.

The aim is to generate competitive advantage for UK business through cutting-edge understandings of consumers, and to explore whether Big Data analytics can be used to generate social good, while respecting individual privacy. Achieving these goals requires a unique set of factors:

- A combination of academic expertise in mathematical modelling, high performance computing, geospatial science and business research
- A network of multi-national companies willing to collaborate, share datasets and push forward the boundaries of Data Science
- Links with the Government, Citizen Organizations and local communities who will share in the impact of the research.

This fusion of research expertise with private and public sector stakeholders has resulted in a host of individual case studies, including:

Consumer and retail analytics:

In collaboration with UK companies (such as Boots, M&S and Experian) the project has developed a series of novel data-driven techniques that shed new light on consumer behaviour. One such approach, based on "dynamic topic modelling", scours data for the underlying purchasing trends cutting across the market. Using these trends as building blocks, and re-assembling them in different proportions, it is not only possible to characterize shoppers' distinct makeups in an actionable way, but to incorporate change over time. The team and their partners are exploring where these exciting new insights take them, from new product development to greater understanding of customer lifetime value.

Opening world markets via Big Data:

Traditionally, intelligence in emerging markets is very hard to come by – censuses, social infrastructures and open data often just don't exist in these regions. This hinders not only local companies, but seriously impacts on economic growth, deterring foreign investment from entering the market.

And yet, while these countries are often infrastructurally poor, they are data rich. The team has been funded by the EPSRC to work with a wide range of data providers in emerging economies (e.g. Dairy Farm, a multinational Asian retailer) to investigate just what market knowledge can be derived from digital footprint data. To this end, mass transactional event logs are being fused with open geospatial data and cutting edge mathematical techniques in order to generate new intelligence 'layers' - mobility models, transport networks, financial flow maps and new forms of data-driven geo-demographic segmentations - all aimed at supporting decision makers and business growth, and changing the way in which we think about collecting market intelligence.

Big Data for international development:

Lack of geo-demographic intelligence in the developing world can also seriously hamper the development efforts of both government organisations and NGOs, such as the World Bank. The team is working with these institutions, alongside the Department for International Development (DFID), to examine how Big Data can assist international development.

One example project, now underway in East Africa in partnership with TiGo, Tanzania's second largest telecommunication company, is applying predictability models to historical mobility data in order to inform disaster management. Case studies include everything from detecting failure of local water pumps in rural Tanzania, through to assessing the behavioural impact of Dar es Salaam's 2014 floods (which displaced over 10,000 people and destroyed houses, roads, bridges, public buildings and crops).

Data Science in the health sector:

The Neodemographics project team is also working extensively with the NHS in knowledge transfer, and the application of cutting edge techniques to the health sector. This has led to a range of analyst training projects, such as predictive modelling of NHS bed occupancy via machine learning. NHS researchers are now also being hosted within Horizon, enabling the direct transfer of more specialist knowledge.

Recently the project has been awarded further funding from the Newton Fund to model the transmission of dengue fever in Malaysia (occurrences of which rose in the UK by 60% in the 2014), ensuring that Horizon's analytics impact with the health sector continues to expand.

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Shaping policy at the House of Commons

Big data has been announced as one of the Government's eight great technologies with priorities for funding and research. In June 2013, the Government published their "information economy strategy" outlining the pivotal role big data will play in rebuilding and strengthening the economy. This was followed in October 2013 by "Seizing the data opportunity: a strategy for UK data capability".

Traditional data storage systems were not designed for real-time analysis but new technologies can now provide live information and data analysis can be accomplished in real-time. Social media data offers the possibility of studying social processes as they unfold at the level of populations as an alternative to traditional surveys or interviews. The data from social media is described as "qualitative data on a quantitative scale" and requires innovative analysis techniques.

The Science and Technology Committee agreed to hold an inquiry into social media data and real time analytics. As Horizon has been researching privacy-preserving ways to handle personal data, we responded to their call for written evidence to the inquiry with five pages of legal and ethical considerations, including: "The inclusiveness of social media means that it is very easy to ingest the personal data of vulnerable individuals... hence processing this data requires the highest degree of care and the most stringent safety procedures."

Behind the scenes at the Information Economy Council, Professor Derek McAuley was busy chairing a working group investigating ways to build consumer confidence in the personal data economy which has concluded with a recommendation for a voluntary code of conduct and a consumer focussed "kitemark" scheme.

This combination of activities led to Professor McAuley being invited to give verbal evidence at the House of Commons. He said: "I approached my first select committee with some trepidation – but the MPs wanted to learn and we were happy to oblige."

The select committee report on November 28th 2014 entitled "Responsible Use of Data" drew out twelve conclusions and recommendations, with eight of those concerned with the use of personal information and clearly identifying a "kitemark" scheme as a progressive way forward.

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